North York Moors National Park Authority

Renewable Energy Supplementary Planning Document

North York Moors National Park Authority
Local Development Framework
April 2010

This Supplementary Planning Document can be made available in Braille, large print, audio and can be translated. Please contact the Planning Policy team on 01439 770657, email policy@northyorkmoors-npa.gov.uk or call in at The Old Vicarage, Bondgate, Helmsley, YO62 5BP if you require copies in another format.

CONTENTS

SECTION 1 INTRODUCTION

1.1 Background

The Authority recognises the importance of reducing carbon emissions and supporting renewable energy developments which are appropriate to the North York Moors National Park and do not detract from delivering the statutory National Park purposes. As part of its commitment to this the Authority is co-ordinating a Community Renewable Energy Project which seeks to develop community based renewable schemes in the Park and is also supporting renewable energy schemes through its Sustainable Development Fund. This Supplementary Planning Document should help applicants to select and design proposals that can be appropriately accommodated in the Park.

1.2 Purpose

This Supplementary Planning Document aims to ensure that appropriate renewable energy developments can be supported within the National Park by:

- Providing information on and interpretation of renewable energy policy;
- Providing information on different renewable energy technologies and setting out the planning issues associated with renewable technologies in the North York Moors National Park;
- Establishing what type of renewable energy developments are likely to be appropriate in the Park whilst meeting statutory Park purposes;
- Setting out design advice to ensure that renewable energy developments are appropriate to the locality;
- Providing an overview of the issues likely to be associated with a planning application;
- Providing guidance on the types of renewable energy which may integrate well with different uses;
- Providing guidance on implementing the requirement for 10% of predicted CO_2 emissions to be displaced by renewable energy for developments of over 5 houses or other uses over 200sqm, including a template for performing the associated calculations;
- Setting out what should be submitted with your planning application; and
- Directing you to further sources of information.

The Supplementary Planning Document is intended to expand upon the relevant policies of the Core Strategy and Development Policies Development Plan Document. These are Core Policy D – Climate Change and Development Policy 3 – Design.

SECTION 1 INTRODUCTION

1.3 Development of the Document

During production of the first edition[1] of the Renewable Energy Supplementary Planning Document, organisations and individuals with a particular interest in renewable energy were initially consulted on a Discussion Paper which outlined the aims of the Supplementary Planning Document and the types of issues that could be covered. The Discussion Paper also included a number of questions seeking feedback from consultees on what information the document should contain. This Discussion Paper was discussed at Planning Committee in April 2007. The feedback from this consultation formed the basis of the draft Supplementary Planning Document. Public consultation, including an Exhibition, was carried out on the draft Supplementary Planning Document in March and April 2008. The comments received informed the final document which was adopted in June 2008.

Following adoption of the Core Strategy and Development Policies in November 2008 it was necessary to revise the Supplementary Planning Document, particularly to provide guidance on the requirement for 10% of predicted CO_2 emissions to be displaced by renewable energy in certain developments. A further Discussion Paper was produced at the outset of the revision of the Supplementary Planning Document. This focussed on those elements to be added, specifically in relation to the new requirement for incorporating renewable energy into developments over a certain size, but also asked whether there were any elements of the Supplementary Planning Document where amendment or clarification would be useful. A formal consultation was held in January and February 2010 which has informed the final document.

1.4 Status

The Renewable Energy Supplementary Planning Document forms part of the Local Development Framework and therefore has statutory weight and is **a material consideration** in the determination of planning applications. This Supplementary Planning Document replaces that which was adopted in June 2008.

In some instances, Village Design Statement Supplementary Planning Documents and Conservation Area Assessment and Management Plan Supplementary Planning Documents may contain more detailed, local guidance on renewable energy and these should be referred to alongside the Renewable Energy Supplementary Planning Document.

1.5 Objectives

This Supplementary Planning Document aims to contribute towards the reduction of greenhouse gas emissions by:

[1] Renewable Energy Supplementary Planning Document (North York Moors National Park Authority, June 2008)

SECTION 1 INTRODUCTION

- Ensuring that the use of energy within development is minimised;
- Encouraging renewable energy to be integrated within development wherever possible and guiding applicants through this process; and
- Supporting renewable energy developments that are consistent with pursuing National Park purposes.

SECTION 2 POLICY CONTEXT

Key policy points:

- The contribution of renewable energy towards the wider environmental, economic and social benefits is a material consideration but has to be balanced against National Park purposes.
- The value of all types of renewable energy generation is recognised.
- The generation of renewable energy as part of other new development is encouraged.

2.1 National Policy

National energy policy[2] sets out the actions that will be taken in order to meet the European target for 15% of energy to come from renewable sources by 2020[3]. The strategy identifies that the provision of renewable energy, as well as helping to reduce carbon emissions, will help to ensure secure and safe energy supplies and provide benefits to the economy.

With these aims in mind national planning policy strongly encourages the development of renewable energy through the planning system. Planning Policy Statement 1 'Delivering Sustainable Development', Planning Policy Statement 22 'Renewable Energy' and the supplement to Planning Policy Statement 1 'Planning Policy Statement – Planning and Climate Change' all strongly encourage the planning system to promote and support the development of renewable energy and to encourage designs which reduce the need for energy.

The guidance expects authorities to encourage the delivery of renewable energy developments whilst providing a high degree of protection for designated sites and areas. This not only relates to the protection of the North York Moors as a National Park but also to the protection of other internationally and nationally designated sites within the Park. Planning Policy Statement 22 states that in nationally designated areas:

'planning permission for renewable energy projects should only be granted where it can be demonstrated that the objectives of designation of the area will not be compromised by the development, and any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits'

Planning Policy Statement 22 goes on to say that *'Small-scale developments should be permitted within areas such as National Parks, Areas of Outstanding Natural*

[2] The UK Renewable Energy Strategy (July 2009)
[3] Directive 2009/28/EC

SECTION 2 POLICY CONTEXT

Beauty and Heritage Coasts provided that there is no significant environmental detriment to the area concerned.'

The Government is currently reviewing its planning policies on renewable energy and climate change and any changes to these will need to be taken into account by the Authority in future decisions upon renewable energy applications.

2.2 Regional Policy

Policy ENV5 'Energy' of the Regional Spatial Strategy[4] seeks to reduce greenhouse gas emissions and encourages renewable energy generation. In particular the policy requires new development to be energy efficient and encourages integrated renewable energy. The policy also sets targets for the development of renewable energy in the region. For North Yorkshire at least 209MW of renewable energy should be installed by 2010 and at least 428MW by 2021. These targets relate to grid-connected electricity and therefore the contribution from the National Park will be negligible as most schemes are likely to be small scale domestic schemes. Targets for individual local authority areas are also set to help to meet these sub-regional targets. It is however presumed that National Parks will contribute to these via appropriate developments, in accordance with Planning Policy Statement 22. Policy ENV5 also requires new developments of more than 10 dwellings or 1000m^2 of non-residential floorspace to secure at least 10% of their energy from decentralised and renewable or low-carbon sources, however the North York Moors National Park Authority has adopted lower thresholds.

The North York Moors National Park is identified as within the Remoter Rural Sub-Region. In terms of energy development in this area the Regional Spatial Strategy states that *'in terms of energy, landscape and biodiversity designations reduce the capacity for wind farms in the sub-area – however there may be scope for increases in biomass production and for further exploiting the sub-area's potential for hydropower.'*

2.3 Local Policy

North York Moors Core Strategy and Development Policies

Core Policy D of the Core Strategy and Development Policies Development Plan Document (2008) states:

> Activities in the National Park will address the causes of climate change and contribute to reducing greenhouse gas emissions, by:
>
> 1. Reducing the use of energy and the need to use energy.
> 2. Generating energy from renewable sources where these are of a location, scale and design appropriate to the locality and which contribute towards meeting domestic, community or business energy needs within the National Park.

[4] The Yorkshire and Humber Plan (Government Office for Yorkshire and the Humber, 2008)

SECTION 2 POLICY CONTEXT

3. Requiring residential developments of 5 or more houses and other uses of 200sqm or more to generate energy on-site from renewable sources to displace at least 10% of predicted CO_2 emissions.

Criterion 5 of Development Policy 3 – Design is also of relevance:

To maintain and enhance the distinctive character of the National Park, development will be permitted where:

1. The siting, orientation, layout and density preserves or enhances views into and out of the site, spaces about and between buildings and other features that contribute to the character and quality of the environment and will not result in the loss of an open space which contributes to the amenity, character and setting of a settlement.
2. The scale, height, massing, proportion, form, size, materials and design features of the proposal are compatible with surrounding buildings, and will not have an adverse effect upon the amenities of adjoining occupiers.
3. A high standard of design detailing is used whether traditional or contemporary, which reflects or complements that of the local vernacular.
4. Provision is made for adequate storage and waste management facilities.
5. Good quality sustainable design and construction techniques are incorporated in the development including measures to minimise energy use and where possible use energy from renewable sources.
6. A satisfactory landscaping scheme forms an integral part of the proposal.
7. The design takes account of the safety, security and access needs for all potential users of the development and provides car parking provision in line with the standards adopted by the Authority.

North Yorkshire Renewable Energy Study

A study was undertaken by Land Use Consultants in 2005 on behalf of all North Yorkshire local authorities, entitled 'Delivering Sustainable Energy in North Yorkshire – Recommended Planning Guidance'. In assessing the North York Moors National Park the following conclusions were drawn:

- Almost the entire area was identified as having a landscape of high sensitivity to wind energy development (sensitivity relates to the vulnerability of the landscape to changes)

SECTION 2 POLICY CONTEXT

- A similar pattern of sensitivity was identified in respect of commercial scale biomass (approximately a 1 MW plant)
- The study suggests that domestic scale wind turbines, smaller biomass plants and small scale hydro schemes (using existing structures) would therefore be more appropriate in the National Park.

North York Moors National Park Management Plan

The North York Moors National Park Management Plan[5] seeks to ensure that new development contributes towards energy objectives:

Planning and Sustainable Development Objective 3

To promote concepts, designs, orientation and aspects of development that minimise the use of energy and to encourage the use of sustainable resources in the construction of new development providing that the conservation of the landscape and built environment of the National Park is not adversely affected.

Planning and Sustainable Development Objective 4

To promote the use of renewable energy sources that provide energy for communities within the National Park providing that any development involved does not significantly detract from the conservation of the landscape and built environment of the National Park.

In taking the aims of the Management Plan forward the National Park Authority has established a Community Renewable Energy Project whereby communities are being facilitated to bring forward renewable energy projects. The Authority also operates a Sustainable Development Fund which has been used to finance renewable energy developments such as solar hot water and photovoltaic panels at Hinderwell Village Hall and at Lockton Youth Hostel. The Authority has also looked at its own impact upon climate change and has taken measures to reduce this such as using greener fuels in its vehicles.

[5] North York Moors National Park Management Plan (North York Moors National Park Authority, 1998)

SECTION 3 SUSTAINABLE USE OF ENERGY

In designing a new building or converting an old building, in addition to the use of renewable energy consideration should be given to how much energy could be saved. Reducing the amount of energy needed reduces the amount of renewable energy needed to meet that need, thus potentially decreasing the cost of the renewable energy installation as well as the visual impact.

Many of the energy efficiency considerations for new buildings are controlled by Building Regulations and your local District or Borough Council will be able to advise you on the requirements of these, however below are a few points for consideration when designing a building:

- Reduce the need for energy by making the most of the sun's heat and light - position the windows of the main living rooms to face towards south
- Install roof lights or sun pipes
- Ensure the roofs, walls and floors are well insulated
- Use double, triple or secondary glazing
- Reduce the need for cooling through the use of natural ventilation
- Use energy efficient lighting and appliances
- Use pale coloured interior decor to reduce the need for lighting
- Install heating controls
- If you are re-using an existing building, are there opportunities to make the building more energy efficient?

You may also wish to consider having an energy profile of your building undertaken in order to establish where savings may be possible.

Incorporating energy efficiency measures should be undertaken in a way which will not have an unacceptable impact upon the landscape or built environment, including Listed Buildings and Conservation Areas.

Reference should also be made to the Design Guide Supplementary Planning Document, the Code for Sustainable Homes, BREEAM standards (for non-residential development) and the supplement to Planning Policy Statement 1 'Planning Policy Statement – Planning and Climate Change'.

SECTION 4 RENEWABLE TECHNOLOGIES

The table in the **Appendix 1** of this document provides information on each of the renewable energy technologies including what they do and their key features.

Not all forms of renewable energy have been covered as technology is constantly evolving and many that exist are not yet widely available. The document covers the most common technologies which exist at present. The Companion Guide to Planning Policy Statement 22 and the organisations listed at the end of the document can provide more detailed technical information on the technologies. Not all of the technologies covered are strictly renewable however they are widely acknowledged as being sustainable forms of energy generation.

The technical requirements of renewable energy developments are not planning considerations. The purpose of the table is to provide information on the types of technologies which might be suitable in which locations and in which circumstances.

The technologies covered in the note are:

- Wind turbines
- Solar Panels (Photovoltaic and Solar Water Heating)
- Biomass installations
- Hydro-electric installations
- Ground Source Heat Pumps
- Air Source Heat Pumps
- Water Source Heat Pumps
- Energy from Waste installations
- Combined Heat and Power installations

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

In line with National Policy, the Management Plan and the Core Strategy and Development Policies, the Authority supports renewable energy developments that do not compromise the National Park's statutory purposes. Whilst the Authority recognises the importance of reducing the causes of climate change and is actively seeking to reduce greenhouse gas emissions, large scale renewable energy developments can be particularly damaging to the landscape and environment of the National Park which is protected through the 1995 Environment Act. The basis for consideration of all applications will therefore be that the need for renewable energy must not override the statutory purposes.

This section sets out the potential planning issues associated with each technology, provides advice on what is likely to be acceptable and also sets out the information that should be submitted with a planning application. The account of potential issues identified is not exhaustive and depending upon the proposed development and location other issues could arise. Every proposal and location will be different and each application will be considered on its own merits. In particular, proposals affecting Conservation Areas or Listed Buildings may require careful consideration to ensure that these receive the necessary level of protection. Early discussion with Planning Officers will help to identify any potential issues and help you to reach an acceptable solution. Where an appropriate solution cannot be reached in relation to a particular proposal it may be necessary to look at alternative technologies.

Permitted Development

Some types of development benefit from Permitted Development rights, established by the Government, which means that planning permission is not required[6]. Amendments to Permitted Development rights for domestic renewable energy generation were introduced in 2008[7]. Technologies not covered in the amendment will be considered in terms of the other provisions of the General Permitted Development Order. Further amendments are likely to be brought out in the future, particularly in relation to wind energy. Where specific Permitted Development rights apply to a particular technology these are summarised in relation to that technology in this section. It is recommended however that you contact the Authority to confirm whether or not your proposal will require planning permission. Where planning permission is not needed other consents may be needed, such as Listed Building consent from the Authority or consents from other organisations, and statutory requirements such as in relation to the protection of wildlife and archaeology will still apply. Even if a proposal does not require planning permission, the guidance in this document can still be used to ensure that the scheme is well designed.

[6] The Town and Country Planning (General Permitted Development) Order 1995
[7] The Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2008

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.1 Wind Turbines

Planning Considerations

Technological issues, such as wind speed, and issues relating to aviation and distances from roads and railways should be resolved by the developer before the planning application stage. As wind speed is a critical factor, wind turbines ideally need to be sited in locations free from obstructions such as buildings, forests, large trees or other obstacles that affect wind speed or cause turbulence. However, this may result in the turbine being unduly prominent and therefore a balance should be achieved. The statutory National Park purposes must be at the centre of decision making and therefore where it is not possible to produce an acceptable scheme in a location where adequate wind speeds exist alternative means of renewable energy generation should be considered.

Visual

As wind turbine developments are likely to have a greater visual impact than other technologies, the North York Moors Landscape Character Assessment and the North Yorkshire Renewable Energy Study have been used to provide broad locational guidance for each area of the National Park. The table in **Appendix 2** highlights the suitability for wind turbines in each landscape type. To summarise:

- Wind turbines would be appropriate on the open moorland and the open coastal stretches only where they can be well assimilated with existing buildings or structures and do not detract from long open views;
- Turbines may be more appropriate in the lowland landscapes but should be located in association with settlements and farmsteads, provided the performance of The turbine is still sufficient;
- In wooded areas wind turbines may be appropriate where they could be set against a backdrop of trees, provided the performance of the turbine is still sufficient.

Turbines should be located away from open landscapes.

Reference should also be made to the North York Moors Landscape Character Assessment (White Young Green, 2003) and Delivering Sustainable Energy in North Yorkshire – Recommended Planning Guidance (Land Use Consultants, 2005).

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

Across the National Park, wind energy developments that would be appropriate in terms of statutory National Park purposes are likely to be domestic size individual turbines associated with an existing building or use. 'Domestic size' is not defined as what is appropriate will depend upon the specific site and location. An assessment will be made by weighing up the purpose and level of generation against the visual impact.

Key design considerations:

- Turbines should be close to and visually related to existing buildings, man-made structures or against a back-drop of trees to assimilate well with the surroundings, provided there is no impact upon bats. Care should be taken, however, to ensure that these are sited so as to not have an adverse impact upon any Listed Buildings or a Conservation Area or their setting. Alternatively, siting downslope can reduce visual impacts, especially of long distance views.
- The height to blade tip of the turbine should be appropriate to the height of any nearby buildings and structures, and no more than 50% higher than the closest buildings.
- To gain sufficient wind speeds there will need to be some degree of clearance and this will be taken into account.
- A lattice style mast may be less visible in the landscape and the use of this type of structure may be more appropriate than the more common solid pole. As lattice style masts are supported via cables, check that there will not be an issue with grazing animals.
- Turbines should be designed to minimise the visual impact through use of an appropriate colour. Colours such as semi-matt white, off white or grey can help to blend the turbine with the sky, and green or black could help to blend with the trees or hills. Where screening can provide a positive contribution to the locality this may also help to reduce the impact of the turbine mast.
- Development ancillary to the turbine (such as access tracks or machinery housing) should be constructed using materials appropriate to the locality and should be sited to have minimal visual impact, including through the use of screening.
- Consideration should be given to undergrounding any Grid connection.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

A wind turbine should be sited so that it relates well to the host building in terms of size and distance from the building(s), such as in this example.

There is less visual impact from a lattice mast compared to a solid pole.

The cumulative impact of turbines will also be a factor in decision making, with particular reference to existing wind energy developments in the area and other proposed wind energy developments in the area.

Ecology / ornithology

Many species of animals and birds seem unaffected by the presence of wind turbines and animals can graze up to the base of turbines. However, in or close to sites designated for ecological importance the impact of the proposal upon the integrity of the site should be properly considered and the advice of Natural England may be sought. Much of the upland area of the National Park is designated as a Special Area of Conservation and/or Special Protection Area under the Habitats Directive and many protected bird species live within the Park. Owing to the statutory protection these receive, permission will only be granted where the turbine will have no unacceptable impact upon these. It is also important to avoid locating turbines where migratory species such as wildfowl have traditional routes.

Bat roosts may be present in trees, houses or other structures and crevices, and bats use wooded areas and hedgerows as corridors along which to travel. The turbine should be sited away from such features or trees provided that the visual impact is not unacceptable. The National Park Authority's Planning Advice Note 2 'Planning and Biodiversity' provides more information on identifying the presence of bats.

Identify any locations where bats may be present.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

Noise

Turbines should be sited to ensure that noise at noise-sensitive developments and uses nearby (e.g. dwellings, bridleways) is kept to acceptable levels. The Environmental Health Department of the relevant District Council will be consulted in this respect and decisions will be made on the basis of their advice.

What information should be submitted with the planning application?

- Details of the design and colour of the turbine
- Size specifications of the turbine
- An assessment of the development's landscape impact and to assist this a photomontage could usefully demonstrate how the turbine will appear in the landscape
- Connection details to the building or grid
- Details of the construction process
- Power of the turbine (in KW) and anticipated efficiency
- Details of what the energy will be used for
- For turbines related to a specific building, site or community, details of existing energy efficiency measures

Further details on wind energy can be found in Appendix 1 of this document, the Companion Guide to Planning Policy Statement 22 and from the British Wind Energy Association.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.2 Solar Panels

This section considers both solar water heating and photovoltaics. Many solar installations will be classed as Permitted Development and will therefore not require planning permission, however the guidance below should help to inform the design and siting of the installation.

Planning Considerations

The main considerations are likely to be:

Visual

Because of their particularly modern, industrial look solar installations may be well suited to agricultural buildings, industrial buildings and contemporary buildings, however their use on domestic or traditional properties should not be ruled out provided satisfactory siting and design can be achieved. In some instances it will not be possible to locate solar installations on Listed Buildings or within Conservation Areas without harming their character and therefore alternative renewable technologies should be investigated.

Solar panels can be well suited to industrial or agricultural style buildings

Key design considerations:

- Where possible, use non-shiny materials that integrate well with the existing roof;
- Try to avoid installations which extend above the roofline. Use technologies that can be installed flush with the roof where possible;
- Locate the installations away from prominent or important views, such as on the rear of buildings or on outhouses.
- Site the installation to match the position of windows or other similar features on the existing building or surrounding buildings.

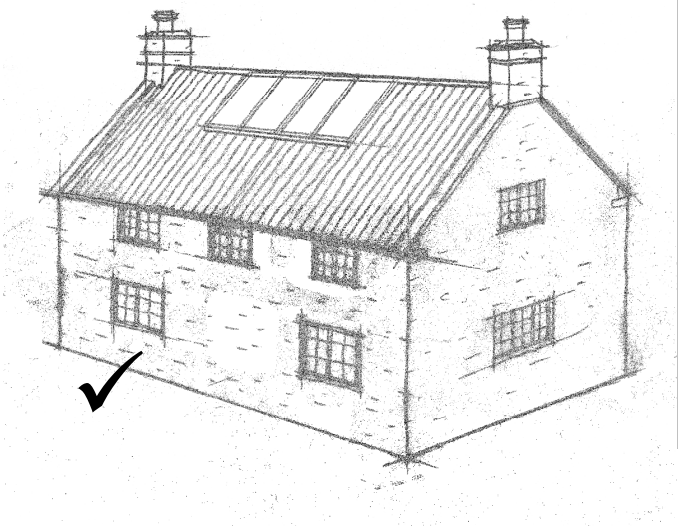
SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

Locating solar panels away from prominent views can help to reduce their impact. In this case one corner of the installation can just be seen.

Because of its flat, dark-coloured surface, solar is most likely to be acceptable on buildings with slate roofs, or in the case of new buildings in areas where slate roofs are characteristic of the area. Panels can be installed so that they are flush to the roof.

In addition to the better known panels, photovoltaic tiles are available. The tiles, which resemble slate, can be used to form part of or the whole of a roof.

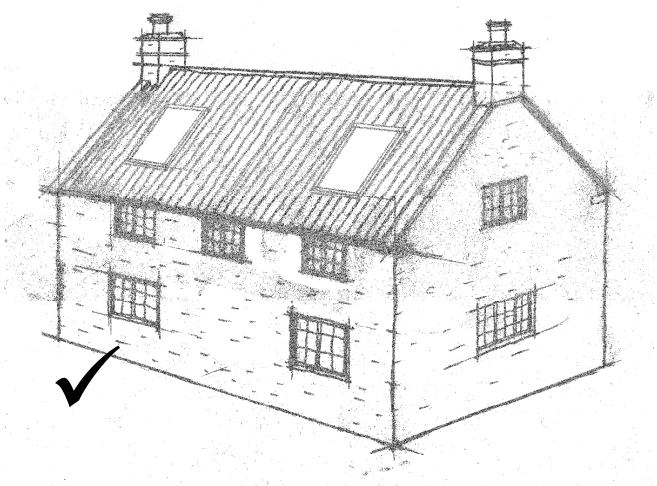
Solar installations are likely to have more of an impact when located on red clay pantile roofs, common across much of the National Park, although locating them to appear as roof lights or locating them away from prominent views can help to reduce the impact. At the time of writing there are no solar installations available which resemble pantiles however technological developments will be kept under review. Solar water heating panels can also be installed on the inside of conservatory roofs, where they will have very little visual impact.

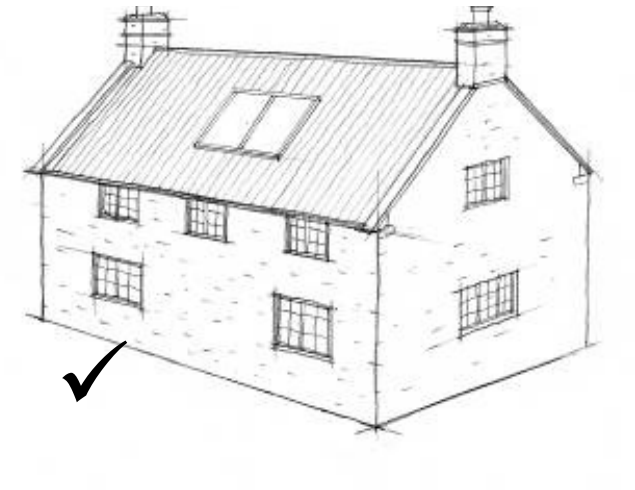


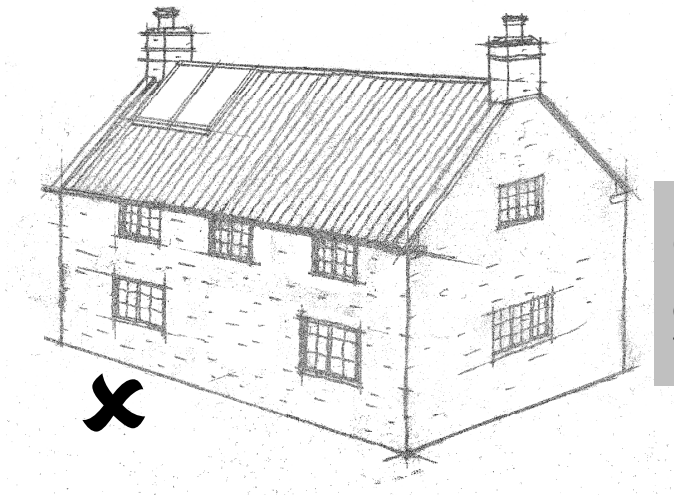
Panels should be sited to conform with the design of the existing building and the locality. Where panels are to be sited on a building of symmetrical appearance the panels should be sited as such, possibly in line vertically with the main windows of the building.

A row of panels across the ridge line could be an acceptable solution for buildings with slate roofs or for industrial or farm buildings.

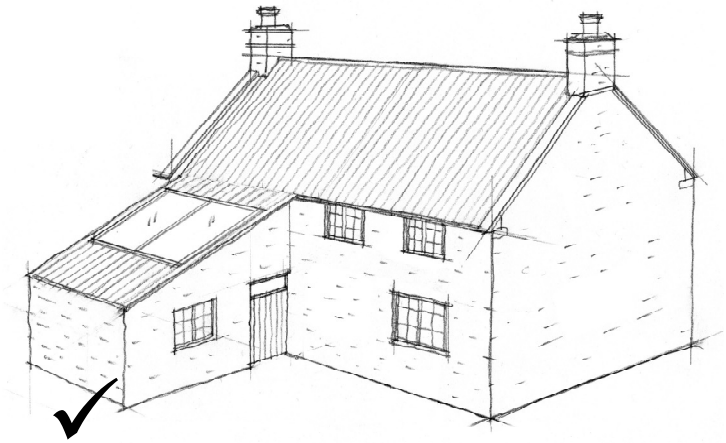
SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

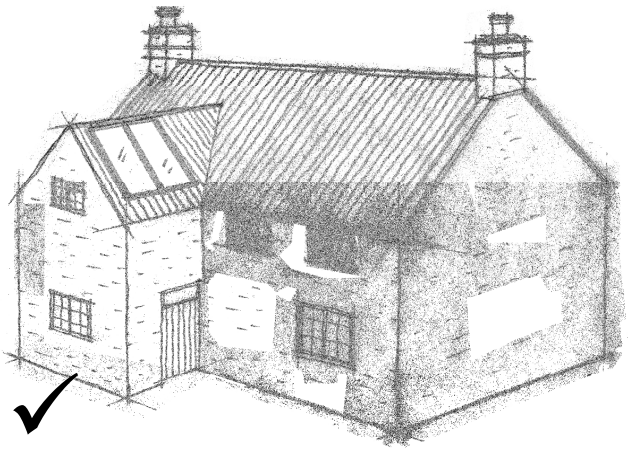






Panels which do not take account of the existing features of the building can look out of place and detract from the appearance of the building.





Consideration should be given to siting panels on outbuildings or extensions which are not as prominent. Siting on a roof lower than the hot water tank can also be beneficial for the operation of the system.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

Ground mounted panels could be located downslope to reduce their impact.

On industrial and agricultural buildings it may be more appropriate to site the panels in a block, for example across the ridge line or across one part of the roof.

Where an acceptable solution for roof mounted panels cannot be achieved, the use of ground mounted panels could be explored. These should be sited to reduce the visual impact, possibly within the rear garden or other location away from the main frontage of the property or other important views.

Operational

The further south facing panels are the better, and they should be within 40 degrees of south. Shading of the panels should be avoided and trees, other buildings, chimneys and other potential obstacles should be taken into account in siting the panels. Panels should not be laid completely horizontal.

What information should be submitted with the planning application?

- Details of the design of the installation
- Photographs of the existing built environment
- Details of the roof mounting arrangement, if applicable
- Indicative drawings of the installation in place
- A photomontage of the proposed installation could be useful, particularly if the scheme is in a Conservation Area or on a Listed Building
- Details of the power from the installation
- Connection details to the building or grid if relevant
- A brief description of the visual amenity issues and the building materials
- Details of the power from the installation and anticipated efficiency
- Details of what the energy will be used for
- Details of existing energy efficiency measures in the building

Further details on solar energy can be found in Appendix 1 of this document, the Companion Guide to Planning Policy Statement 22, from the Solar Trade Association and from the British Photovoltaic Association.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.3 Biomass

The majority of biomass installations in the National Park are likely to be domestic and are unlikely to require planning permission. Therefore the guidance below is aimed predominantly at the larger scale plants which would require planning permission.

Planning Considerations

The main considerations are likely to be:

Visual

Generating energy from biomass or processing fuel for biomass requires a building and therefore visual impact is an issue. The guidance below relates to processing and storage facilities as well as energy generation.

In visual terms, larger scale biomass development, whether through conversion or new-build, is likely to be most appropriate in association with an existing farm or industrial use. Ideally use should be made of existing buildings. However, new build may be appropriate where farm or industrial uses are typical in the locality such as around the fringes of the Park rather than in the exposed moorland areas, and new buildings should be associated with existing farm or industrial buildings. The impacts of new buildings can be minimised through careful siting, or through appropriate screening, and therefore locating the development where this can be screened by existing trees, buildings or landform may help to create an acceptable solution.

Farming landscapes may be suitable for biomass development

Key design considerations:

- Use an existing building where possible;
- Where new building is involved, use materials that are traditional to the area and minimise the impact through screening by trees, existing buildings or landform;
- Locate as much equipment as possible within the building it is to serve or other existing buildings to reduce the need for new buildings;
- Locate the fuel storage in existing buildings, or below ground where there are no archaeological or other environmental constraints;

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

- Consideration should be given as to how deliveries of fuel or timber will be made and/or how products will be taken from the site;
- Use the smallest size flue possible (subject to meeting Building Regulations requirements) and locate this to minimise visual impact;
- Colour the flue to blend with the background (for example, dark green against a backdrop of trees) or use trees or woodland to screen the flue;
- Consider undergrounding any new grid connection.

The remit of planning covers only the plant and infrastructure and not the growing of crops. However, the growing of the crops can have a significant impact upon landscape and biodiversity and certain projects may require an Environmental Impact Assessment. Further, landscape impact may be a consideration of some funding sources for growing biofuels.

Transportation

The distance required to transport fuel and the processed product adds costs to the operation of the development as well as leading to environmental and amenity implications associated with lorry movements. The impacts of traffic movements are likely to be of particular concern bearing in mind the rural nature of the road network in the National Park. In this respect sources of fuel should be identified by the applicant and these should be as near to the storage, processing or generating site as possible. Advice in the Planning Policy Statement 22 Companion Guide is that the ideal maximum transport distance for fuel should be about 25 miles. There will also need to be sufficient space on site for lorries to unload and to turn.

Pollution

Advice from the Environment Agency should be followed in relation to emissions to the air, ground and water courses. Larger schemes will need to meet the relevant Integrated Pollution Prevention and Control (IPPC) requirements[8].

Economy

Benefits to the local economy, for example through providing a demand for local fuels, is a material consideration in determining the planning application.

What information should be submitted with the planning application?

- Maps, diagrams and drawings showing the location and design of the plant, and the general location of fuel sources

[8] Pollution Prevention and Control Regulations (2000)

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

- Details of the technology to be employed
- In the case of large schemes, a Zone of Visual Impact map of the chimney, and photomontages of the plant from selected viewpoints
- Details of vehicular access and movements, and principal transport routes for fuel supply
- Landscaping provisions
- Details of noise and other emissions
- Site management measures during construction
- Details of connection to the Grid
- Details of preliminary discussions with the Environment Agency in respect of the likelihood of meeting the IPPC requirements
- A method statement detailing how the plant will be constructed and operated (this may include all or some of the above)
- Details of the power from the installation and anticipated efficiency
- Details of what the energy will be used for
- For schemes related to a specific building, site or community, details of existing energy efficiency measures

Further details on biomass energy can be found in Appendix 1 of this document and the Companion Guide to Planning Policy Statement 22.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.4 Hydro Power

Planning Considerations

The main considerations are likely to be:

Visual

Hydro schemes will be located on rivers or at reservoirs which by their very nature are often popular amenity locations in the National Park, either within built up areas or in the open countryside. The schemes can have an impact upon the local or wider landscape character and visual amenity and are therefore more likely to be suitable in locations where industrial installations are commonplace, such as on farms. However, domestic schemes where the river runs behind the built frontage are also likely to be suitable. In settlements where the river is a main feature, hydro schemes which require new buildings should be located away from the main focal points.

Key design considerations:

- Consider locating hydro schemes in wooded areas or close to trees where these exist to help to conceal them;
- Use existing buildings where they exist for housing machinery, particularly any old buildings that were previously used for this purpose, or consider undergrounding the equipment;
- Where possible locate the plant away from the river/reservoir if it could be better screened;
- Use materials traditional to the area to construct any new buildings;
- Bury the pipeline and restore the ground;
- Consider undergrounding any new grid connection.

Former mills could provide ideal opportunities for hydro generation

Pipelines can be located underground – in this example windows have been left so that the working turbine can be seen. . Painting the machinery housing green helps to conceal it.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

The visual appearance of reduced water in waterfalls may also be an issue and consideration should be given to ensuring reduced operation in the summer days where visual impact may be most recognisable.

Water systems

It is important to contact the Environment Agency at the outset to ensure that the required permits can be obtained and that any standards will be met as necessary. Hydro schemes do not pollute or consume water and usually return the supply to the channel from which it was abstracted. Water that has passed through a turbine is often improved by aeration and is free of debris. Specific site management measures may be required to ensure that construction processes do not pollute the river. Flooding of the hydro site is a possibility and should be considered.

Archaeology

As hydro schemes involve a degree of excavation there is the potential to impact upon archaeological remains and in some circumstances it may therefore be inappropriate to disturb the ground.

Ecology

Watercourses and wetlands are important wildlife habitats and depleting their water supply, especially in summer, can cause damage. Impacts upon ecology could potentially be overcome through seasonal operation and conditions may be attached to planning permission to ensure this. There are designs which ensure that fish can get through and the use of these should be investigated in locations where fish are present, or alternatively fish passes can be incorporated. Locating schemes in wooded areas can damage valuable woodland habitats, especially close to rivers, so sites must be carefully chosen.

Recreation

There is the potential to obstruct recreational activities through the construction of a weir. Temporary diversions or closing of footpaths may be necessary during the construction phase and the agreed procedure for doing this should be followed.

What information should be submitted with the planning application?

- Maps, diagrams and drawings showing the location and design of intake, pipeline, turbine house, tailrace (channel which returns the water to the river) and security fencing and lighting for urban schemes
- Photomontage of intake (weir and associated infrastructure)
- Grid connection works, including transformer and transmission lines
- Provision for fish passes (where required)
- Details of vehicular access and vehicular movement

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

- Landscaping provisions
- Site management measures during the construction phase
- A method statement detailing how the development will be constructed and operated (this may include all or some of the above)
- Details of the power from the installation (in KW) and anticipated efficiency
- Details of what the energy will be used for
- For schemes related to a specific building, site or community, details of existing energy efficiency measures

Further details on hydropower can be found in Appendix 1 of this document, the Companion Guide to Planning Policy Statement 22 and from the British Hydropower Association.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.5 Ground Source Heat Pumps

Ground Source Heat Pumps in the curtilage of a dwelling house do not require planning permission (but may still require Listed Building consent). However, the following should help to inform the design of any scheme.

Planning Considerations

The main considerations are likely to be:

Visual

The pipes themselves are underground and therefore there are unlikely to be any potential visual issues. They could therefore be particularly suitable for Listed Buildings or within Conservation Areas where other technologies would have an unacceptable impact. However the ground should be restored to the satisfaction of the Authority following the construction of the system. Vertical pipes could be more suitable than horizontal as they take up less area and will result in the disturbance of less ground.

Installing ground source heat pumps can cause significant earth disturbance which should be restored.

Where possible the pump should be located within an existing building, particularly in the case of Conservation Areas. The pump may need to be housed outside if space does not exist inside and this will need to be sympathetic to the building and the locality in terms of design and materials.

Underfloor heating is often used in conjunction with heat pumps, however in the case of Listed Buildings this may not be appropriate and other heat emitters may need to be considered.

Water systems

In open water cooling systems, where water is extracted from the ground, this could affect the local water table and the advice of the Environment Agency should be followed.

Archaeology and Ecology

In some circumstances it may be inappropriate to disturb the ground due to archaeological concerns or, more occasionally, the presence of valuable habitat.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

What information should be submitted with the planning application?

- Details of the technology to be used
- Details of the location of the pipes
- Details of the ground restoration works
- Details of the power from the installation and anticipated efficiency
- Details of what the energy will be used for
- Details of existing energy efficiency measures

Further details on Ground Source Heat Pumps can be found in Appendix 1 of this document, the Companion Guide to Planning Policy Statement 22 and from the Ground Source Heat Pump Association.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.6 Air Source Heat Pumps

Planning Considerations

The main considerations are likely to be:

Visual

A heat exchanger will need to be installed on the outside of the building. These are typically industrial in appearance and should therefore be sited on an inconspicuous part of the building. For this reason, Air Source Heat Pumps may not be appropriate on Listed Buildings. Screening may also help to reduce visual impact provided this does not interfere with the operation of the equipment.

The heat exchanger could have a significant impact upon the appearance of a building and will therefore need to be carefully sited.

Noise

Consideration will also be given to the impacts upon surrounding neighbours of the noise arising from Air Source Heat Pumps. Air Source Heat Pumps should be sited to reduce noise impact as much as possible.

What information should be submitted with the planning application?

- Details of the technology to be used
- Details of the location of the pump and vent
- Details of the power from the installation and anticipated efficiency
- Details of what the energy will be used for
- Details of existing energy efficiency measures

Further details on Air Source Heat Pumps can be found in Appendix 1 of this document and from the Heat Pump Association.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.7 Water Source Heat Pumps

Water Source Heat Pumps in the curtilage of a dwelling house will not require planning permission (but may require Listed Building Consent). However, the following guidance should help to inform the design of any scheme.

Planning Considerations

The main considerations are likely to be:

Visual

The pump (bottom left of picture) can be housed in an appropriately designed structure.

The pipes which lead to the water source are underground and therefore there are unlikely to be any potential visual issues and they could therefore be more suitable for Listed Buildings or within Conservation Areas than other technologies. However the ground should be restored to the satisfaction of the Authority following the construction of the system.

Where possible the pump should be located within an existing building, particularly in the case of Listed Buildings or in Conservation Areas. The pump may need to be housed outside if space does not exist inside and this will need to be sympathetic to the building and the locality in terms of design and materials.

Environmental / Ecological Impacts on Water Source

As a heat exchanger is submerged at the source to absorb the heat from the water this could lead to ecological or environmental impacts. Where water is extracted from the ground, this could affect the local water table. Permits may be required from the Environment Agency and they should be contacted at the outset.

Archaeology and Ecology

In some circumstances it may be inappropriate to disturb the ground due to archaeological concerns or, more occasionally, the presence of valuable habitat.

What information should be submitted with the planning application?

- Details of the technology to be used
- Details of the location of the pump and vent

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

- Details of the power from the installation and anticipated efficiency
- Details of what the energy will be used for
- Details of existing energy efficiency measures

Further details on Water Source Heat Pumps can be found in Appendix 1 of this document and from the Heat Pump Association.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.8 Energy from Waste

Energy from waste plants would need to be considered under Core Policy F 'Sustainable Waste Management' as well as Core Policy D 'Climate Change'. These policies provide support in principle to small scale waste disposal facilities but regard larger facilities as major development which will only be permitted in exceptional circumstances.

Planning Considerations

The main considerations are likely to be:

Visual impact

Energy from waste plants could be accommodated within existing farm or industrial buildings. However, new build could be appropriate where farm or industrial uses are typical in the locality such as around the fringes of the Park rather than in the moorland areas. The impacts of new buildings can be minimised through screening or siting, and therefore locating the development where this can be screened by existing trees, buildings or landform may help to create an acceptable solution.

Key design considerations:

- Use an existing building where possible;
- Where new building is involved, use materials that are traditional to the area and minimise the impact through screening by trees, existing buildings or landform;
- Locate as much equipment as possible within the building it is to serve or other existing buildings to reduce the need for new buildings;
- Where it is needed, use the smallest size flue possible and locate this to minimise visual impact. Colour the flue to blend with the background (for example, dark green against a backdrop of trees);
- Consider undergrounding any new grid connection.

Traffic movements

For facilities on farms there is unlikely to be any significant changes to normal traffic movements associated with that farm. However, larger plants may generate traffic movements as waste products are brought in especially. Bearing in mind the rural nature of many of the roads in the National Park significant increases in traffic levels may be inappropriate. Plants should be located as close as possible to the source of waste.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

Odour

Measures to control this should be put in place. However in instances where the works are to take place at an existing facility, for example at farms where slurry is stored in pits, the proposed use may decrease the existing level of odour.

Pollution

Advice from the Environment Agency should be followed in relation to emissions to the air, ground and water courses. Larger schemes will need to meet the relevant Integrated Pollution Prevention and Control (IPPC) requirements[9].

What information should be submitted with the planning application?

- Site plan and elevation drawings to help determine visual impact
- Photomontage of digester (where relevant), plant building(s) and chimney stack with clear indication of building material
- Information on grid connection works, including transformer and transmission lines
- Details of vehicular access and vehicular movement
- Landscaping provisions
- Site management measures during the construction phase
- Model of emissions dispersion
- Details of preliminary discussions with the Environment Agency in respect of the likelihood of meeting the IPPC requirements.
- A method statement detailing how the development will be constructed and operated (this may include all or some of the above).
- Details of the power from the installation and anticipated efficiency
- Details of what the energy will be used for
- For schemes related to a specific building, site or community, details of existing energy efficiency measures

Further details on energy from waste can be found in Appendix 1 of this document and the Companion Guide to Planning Policy Statement 22.

[9] Pollution Prevention and Control Regulations (2000)

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

5.9 Combined Heat and Power

The majority of combined heat and power installations in the National Park are likely to be micro CHP units for domestic use and are unlikely to require planning permission. Therefore the guidance below is aimed at the larger scale plants which would require planning permission. The guidance in the sections on Biomass and Energy from Waste should also be consulted for Combined Heat and Power schemes involving these technologies.

Planning Considerations

The main considerations are likely to be:

Visual impact

In terms of visual impact, larger scale Combined Heat and Power plants could be accommodated within existing farm or industrial buildings. However, new build could be appropriate where farm or industrial uses are typical in the locality such as around the fringes of the Park rather than in the moorland areas. The impacts of new buildings can be minimised through screening or siting, and therefore locating the development where this can be screened by existing trees, buildings or landform may help to create an acceptable solution.

Key design considerations:

- Use an existing building where possible;
- Where new building is involved, use materials that are traditional to the area and minimise the impact through screening by trees, existing buildings or landform;
- Locate as much equipment as possible within the building it is to serve or other existing buildings to reduce the need for new buildings;
- Use the smallest size flue possible and locate this to minimise visual impact;
- Colour the flue to blend with the background (for example, dark green against a backdrop of trees);
- Consider undergrounding any new grid connection.

SECTION 5 APPROPRIATE RENEWABLE ENERGY DEVELOPMENT IN THE NORTH YORK MOORS NATIONAL PARK

Traffic movements

Larger plants may generate traffic movements as fuel is brought in. Bearing in mind the rural nature of many of the roads in the National Park significant increases in traffic levels may be inappropriate. Plants should be located as close as possible to the fuel sources.

Pollution

Larger combined heat and power plants are likely to require a permit under the Pollution Prevention and Control Regulations[10]. Emissions into the air, soil and water courses will need to be maintained at acceptable levels and meet the relevant requirements.

What information should be submitted with the planning application?

- Site plan and elevation drawings to help determine visual impact
- Photomontage of proposed buildings where relevant
- Information on grid connection works, including transformer and transmission lines
- Details of vehicular access and vehicular movement
- Landscaping provisions
- Site management measures during the construction phase
- A method statement detailing how the development will be constructed and operated (this may include all or some of the above)
- Details of the power to be provided from the installation and anticipated efficiency
- Details of how the energy will be used
- If relating to a specific building or community, details of existing and proposed energy efficiency measures

Further details on energy from waste can be found in Appendix 1 of this document and from the Combined Heat and Power Association.

[10] Pollution Prevention and Control (England and Wales) Regulations 2000

SECTION 6 INTEGRATING RENEWABLE ENERGY INTO OTHER DEVELOPMENTS

The term for renewable energy installed as part of another development is 'integrated'. Core Policy D of the Core Strategy and Development Policies requires 10% of predicted CO_2 emissions to be displaced by renewable energy for developments of over 5 houses or other uses over 200sqm. However, when applying for planning permission for smaller developments applicants are encouraged to consider whether a renewable energy installation could be appropriately accommodated within the development. This should be undertaken in the context of the guidance provided in Section 4 of this document.

Renewable energy can be integrated as part of new build or renovation projects.

The potential for integrating renewables as part of another development is set out in the tables below. This is based upon patterns of energy use for different types of development. This is not exhaustive or conclusive but provides a rough guide as to which technologies may be suitable.

Type of development	Likely Suitable Technologies
Residential	Solar water heating Small biomass boiler (wood pellets or logs) Heat pumps Micro-wind Photovoltaics
Industrial / Agricultural	Energy from Waste (e.g. bio-digestion of slurry) Solar water heating (if hot water is required) Photovoltaics Wind Hydro Biomass (wood chips or pellets) Heat pumps
Commercial / Office	Photovoltaics Solar water heating (if hot water is required) Wind Biomass (wood chips or pellets) Heat pumps
Schools	Photovoltaics Solar Hot Water (dependent on need) Wind Biomass (wood chips or pellets) Heat Pumps
Hotels	Solar water heating Photovoltaics Heat Pumps Biomass (wood chips or pellets)

SECTION 6 INTEGRATING RENEWABLE ENERGY INTO OTHER DEVELOPMENTS

Type of development	Likely Suitable Technologies
Community buildings	Photovoltaics (if in regular day time use) Heat pumps Wind Biomass (wood chips, pellets or logs)
Community projects (i.e. to serve a number of buildings)	Biomass (wood chips) Hydro Large heat pumps (possibly with bore holes) A combination of technologies

The table below considers the circumstances whereby each technology is likely to be suitable.

Technology	Potential for Integration
Wind	Small-scale wind power is particularly suitable for remote off-grid locations where conventional methods of supply are expensive or impractical. Requires suitable space and wind speeds.
Solar - Photovoltaics	Photovoltaics are particularly useful where a grid connection is expensive or problematic. A suitable roof, wall or area of ground of sufficient size is needed and this should enable the panels to face within 40 degrees of south.
Solar Water Heating	A suitable roof, wall or area of ground of sufficient size is needed and this should enable the panels to face within 40 degrees of south.
Biomass	Biomass heating is ideally suited for any situation where there is a high demand for heat and larger schemes can also generate electricity. Biomass schemes will require a nearby source of fuel.
Hydropower	Hydropower will require a source of water that will provide a reasonably constant supply. A specific speed and depth is needed depending upon the level of generation.
Ground Source Heat Pumps	Ground Source Heat Pumps would be particularly suited to Listed Buildings, within Conservation Areas and elsewhere where the visual impacts of other technologies would be unacceptable, provided that there are no archaeological implications.

SECTION 6 INTEGRATING RENEWABLE ENERGY INTO OTHER DEVELOPMENTS

Technology	Potential for Integration
Air Source Heat Pumps	An Air Source Heat Pump requires a heat exchanger which are typically industrial looking and need to be located on the outside of the building. Therefore these are only likely to be appropriate where they can be placed away from prominent positions, particularly in Conservation Areas and other important views, and are unlikely to be appropriate on Listed Buildings.
Water Source Heat Pumps	Water source heat pumps can be used to provide heating for buildings near to rivers, streams, lakes or other water courses. As most of the equipment can be stored within the building they are particularly suitable in Conservation Areas, Listed Buildings and elsewhere where other technologies cannot be incorporated without having an unacceptable impact upon the National Park.
Energy from Waste	Energy from waste developments are likely to be appropriate in association with an existing farm or industrial use where there is a constant on-site supply of suitable waste. It could have particularly beneficial knock-on effects, for example preventing pollution from slurry.
Combined Heat and Power	Combined Heat and Power is likely to be suitable for industrial processes that use a lot of heat and operate long hours, community heating schemes and buildings that use a lot of energy such as hotels. Micro CHP is suitable for domestic use.

SECTION 7 MEETING THE 10% REQUIREMENT

7.1 Policy Requirement

Core Policy D of the Core Strategy and Development Policies requires residential developments of 5 or more houses and other uses of 200sqm or more to generate energy on-site from renewable sources to displace at least 10% of predicted CO_2 emissions.

This section provides guidance on calculating this requirement and selecting an appropriate renewable technology. This process should be undertaken from the initial design stages to ensure that renewable energy requirements are considered as part of the layout and siting.

To clarify, the term 'houses' in the policy relates to all residential uses, including flats. The policy also applies to conversions. In circumstances where some parts of the development have no or negligible energy use but the majority of the development will use energy, the size of the whole development should be used to determine whether this policy applies.

It is acknowledged that some agricultural buildings will have very low energy requirements and in these instances the Authority will consider waiving the requirement. The definition of a non-residential agricultural building with low energy demand, as defined by Communities and Local Government[11], is

'Non-residential agricultural buildings with low energy demand include buildings, or parts of buildings, designed to be used separately, that are heated for a few days each year to enable plants to germinate but are otherwise unheated.'

7.2 How to calculate 10%

In order to work out how much renewable energy you will need to displace 10% of the CO_2 emissions, you will first need to work out how much energy the building(s) will use. It is important to ensure that the demand for energy in the building is reduced as much as possible as this will reduce the amount of renewable energy that will need to be provided to meet the 10%. Part 1 of the Authority's Design Guide Supplementary Planning Document contains guidance on reducing energy use.

Energy requirements relate to space heating, hot water and fuel / electricity use, but will need to be considered in terms of CO_2 emissions to enable energy requirements to be looked at as a whole.

To comply with Building Regulations, all new buildings must now have an assessment of their predicted energy use. Energy use must be calculated using Standard Assessment Procedure (SAP) for domestic buildings and using Simplified Building Energy Model (SBEM) for non-domestic buildings. This assessment will provide data on the predicted CO_2 emissions from the building. For the purposes of complying with Core Policy D the SAP and SBEM assessment should show CO_2 emissions *without* any renewable energy installations proposed but *with* any energy efficiency measures in place.

[11] Improving the energy efficiency of our buildings - A guide to energy performance certificates for the construction, sale and let of non-residential dwellings (Communities and Local Government, 2008)

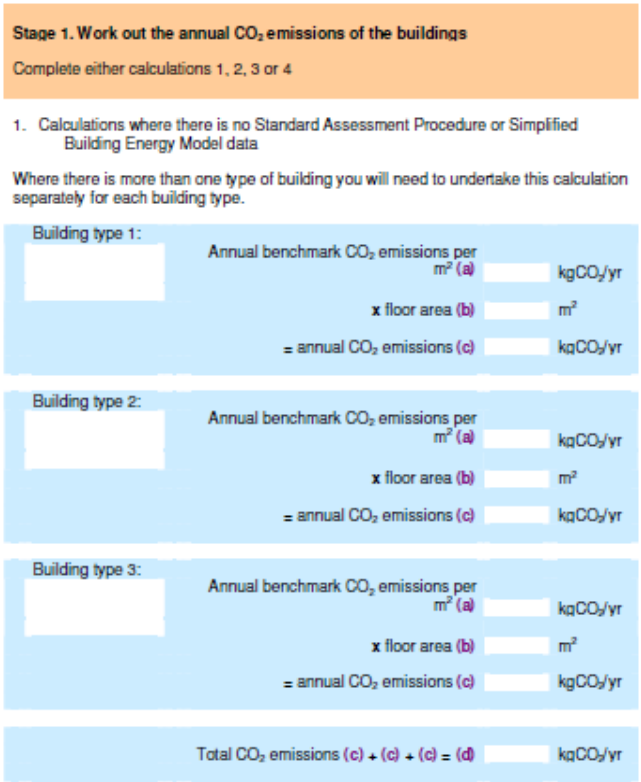
SECTION 7 MEETING THE 10% REQUIREMENT

In some instances, for example when the final end user is not known, it will not be possible to apply SAP or SBEM calculations. Where this is the case energy benchmarks for different building types can be used. These are set out in **Appendix 3** for a range of uses that might be developed in the National Park. *'Integrating Renewable Energy into New Developments: Toolkit for Planners, Developers and Consultants'* (London Energy Partnership, 2004) contains details for a wider range of buildings. No benchmarks exist in relation to agricultural buildings, largely because the activities which take place are likely to be so variable, for example in relation to numbers of livestock. To calculate the requirement for agricultural buildings it will therefore be necessary to undertake a SBEM assessment.

SAP or SBEM data should be used wherever possible as this will provide the most accurate prediction of energy use, and will allow for any specific energy efficiency measures which have been included as part of the design. It is in the interests of the applicant to use SAP or SBEM data as benchmark data may equate to higher predicted CO_2 emissions as it becomes out of date compared to up to date Building Regulations. For the purposes of complying with Core Policy D the SAP or SBEM assessment should show CO_2 emissions *without* any renewable energy installations proposed but *with* any energy efficiency measures in place.

Alternatively, you can work out the predicted CO_2 emissions for housing at the Government's Act On CO_2 website - http://carboncalculator.direct.gov.uk/index.html. This requires you to input information on the size of house, type of energy use and the appliances. For new housing this will be based largely on assumptions and these should be realistic. You will need to do the assessment for each individual house and then add the totals to find the total predicted CO_2 emissions. Details or printouts of the information entered into the website should be submitted with your application.

Appendix 4 shows the calculations needed to work out 10% of the predicted CO_2 emissions. To accompany this document, a spreadsheet is available on CD which will assist with carrying out the calculations. Two worked examples are also included in **Appendix 4** to show how the calculations should work.



Stage 1. Work out the annual CO_2 emissions of the buildings

Complete either calculations 1, 2, 3 or 4

1. Calculations where there is no Standard Assessment Procedure or Simplified Building Energy Model data

Where there is more than one type of building you will need to undertake this calculation separately for each building type.

Building type 1:

Annual benchmark CO_2 emissions per m^2 (a) ____ $kgCO_2/yr$

x floor area (b) ____ m^2

= annual CO_2 emissions (c) ____ $kgCO_2/yr$

Building type 2:

Annual benchmark CO_2 emissions per m^2 (a) ____ $kgCO_2/yr$

x floor area (b) ____ m^2

= annual CO_2 emissions (c) ____ $kgCO_2/yr$

Building type 3:

Annual benchmark CO_2 emissions per m^2 (a) ____ $kgCO_2/yr$

x floor area (b) ____ m^2

= annual CO_2 emissions (c) ____ $kgCO_2/yr$

Total CO_2 emissions (c) + (c) + (c) = (d) ____ $kgCO_2/yr$

Extract from the spreadsheet

SECTION 7 MEETING THE 10% REQUIREMENT

7.3 Selecting a renewable technology

It is recommended that the use of a suitably qualified professional with knowledge of Renewable Energy assists with this stage. Details of currently available technologies are set out in Sections 4 and 5 of this document. An indication as to the CO_2 savings that could be made from different technologies is set out below. This will help you in the first instance to select a technology, although as technology is constantly developing and as there are a wide range of products available this is only a guide. The final calculations to be submitted to the Authority should be based upon the actual installation selected. Details should also be provided on the make, supplier or other sources of information for the figures given on the renewable energy installation.

Appendix 4 shows how to work out whether the technology will provide sufficient CO_2 savings to meet the 10% requirement. Alternatively you can size a renewable energy system to meet the 10% requirement. As a starting point Section 4 will give you an idea as to which sorts of technology might be suitable.

Any requirement to use power to operate the energy generating installation, such as in the case of ground source heat pumps, should be taken into account in the calculations.

In addition to the level of CO_2 savings, other factors such as operational considerations and visual impact should also be considered when selecting a renewable energy technology. Section 4 contains further information on these considerations.

It is worth considering whether it would be sensible to use renewable energy to displace more than 10% of CO_2 emissions. For example, if you are considering installing a biomass boiler it would be logical to operate this at capacity instead of just using it to supply the 10%.

CO_2 savings from renewable energy

Housing development

The table below provides an indication of the CO_2 savings that could be gained from the installation of different renewable energy technologies when applied to houses. The purpose of this table is to act as a rough guide to help you to select the type of renewable energy that might be best for your scheme, and to look at various options. The energy contribution of technologies will vary depending upon the manufacturer and evolutions in technology, and therefore it will be necessary to research actual products available.

The information contained in the table is intended as a guide only. Detailed designs, costings and specifications should be sought from a qualified professional prior to submitting the planning application.

SECTION 7 MEETING THE 10% REQUIREMENT

Renewable Energy Technology	Renewable Energy Contribution (kWh/yr)	CO_2 saving ($kgCO_2/yr$)
Solar Water Heaters ($4m^2$)	1,200	230
Photovoltaics (2kWp / around $15m^2$)	1,600	680
Wind turbine (2.5kW)	4,300	1,800
Ground Source Heat Pump	4,500	580
Biomass boiler	6,800	1,300

This table is adapted from 'Meeting the Ten Percent Target for Renewable Energy in Housing – A Guide for Developers and Planners' (Energy Saving Trust, 2006)

Non-residential development

Due to the variable nature of non-residential buildings no published figures are available which would indicate the contribution that different technologies might make. It will therefore be necessary to investigate particular technologies available on the market, using the guidance in the Renewable Energy Supplementary Planning Document and the 10% figure you will have calculated as a guide.

7.4 Submitting your application

The following should be submitted alongside your planning application:

- A completed copy of the checklist in **Appendix 4** or a print out of the completed spreadsheet contained on the accompanying CD;
- If figures are based upon SAP or SBEM data, copies of these assessments;
- If the estimated CO_2 emissions are calculated through actonco2.co.uk details of the figures used;
- Details of the renewable energy installation(s) should be set out in the Design and Access Statement (which must accompany every planning application in the National Park) in terms of the design implications, including a statement of why the technology has been chosen and any other technologies which were considered but subsequently ruled out.

The Authority will ensure by way of a condition attached to planning permission that the installation is put in place and operating, and remains so in perpetuity.

7.5 Useful Information

'Meeting the 10 per cent Target for Renewable Energy in Housing – A Guide for Developers and Planners' (Energy Saving Trust, 2006)

Building Research Establishment (for information on Standard Assessment Procedure and Simplified Building Energy Model) - www.bre.co.uk

'Energy and Carbon Conversions' (Energy Saving Trust leaflet)

SECTION 8 APPLYING FOR PLANNING PERMISSION

8.1 Permitted Development

Some renewable energy developments may not require planning permission depending upon their size and siting and whether they are only to be installed for a short period (e.g. demonstration projects). You should contact the Authority in the early stages of your project for advice on whether planning permission is needed. Even if a proposal does not require planning permission, the guidance in this document can still be used to ensure that the scheme is well designed. Specific Permitted Development rights for domestic renewable energy developments are set out in the 2008 amendment to the General Permitted Development Order[12], and further rights for additional domestic technologies and also for non-domestic microgeneration are currently being considered by Government.

8.2 Pre-application Discussion

Applicants are advised to contact the Authority and arrange a pre-application discussion with the relevant Planning Officer prior to submitting a planning application. This will help to ensure that any issues are resolved at the outset and that the planning application process will run smoothly.

8.3 Consultation

Many renewable energy projects are often contentious and can attract a wide level of objection, particularly in the case of projects that are larger than domestic scale.

The Statement of Community Involvement states that for certain planning applications the applicant will be encouraged to undertake pre-application consultation with the local community. The Statement of Community Involvement specifies certain sizes of proposed developments where consultation with the local community should be undertaken prior to submitting a planning application. In the case of renewable energy developments, which are likely to be particularly contentious, it is recommended that consultation be undertaken on any proposed scheme that is larger than domestic scale or for use wider than on-site. This will assist the application process by ensuring that potential objections can be overcome, or at least made known, prior to the application stage.

The purpose of the consultation should be to inform the community about the reasons for renewable energy and the purpose of the proposed scheme, allow them to take part in informing the proposals, and ensure that they are informed of the outputs and progress of the scheme. Discussions should be held with the Authority to determine an appropriate method for consultation.

The Statement of Community Involvement is available on the Authority's website www.moors.uk.net.

[12] The Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2008

SECTION 8 APPLYING FOR PLANNING PERMISSION

8.4 Information to Accompany a Planning Application

Details of specific information that should be submitted alongside renewable energy applications are set out in section 4 of this document in relation to each technology, and in Section 6 in relation to meeting the 10% requirement.

Some applications must be accompanied by a Design and Access Statement and the Authority has produced an Advice Note on preparing these. Where this Statement is required, the information needed should be included within this. However, in some circumstances it may be more appropriate to submit a separate report in relation to the requirements of Section 6.

8.5 Environmental Impact Assessment

The National Park is defined as a 'sensitive area' under the Environmental Impact Assessment regulations[13] and therefore the usual thresholds for the requirement for Environmental Impact Assessment do not apply. The Authority will decide on a case by case basis whether an Environmental Impact Assessment is required, however it is likely that most domestic scale developments will not require this.

8.6 Habitats Regulations Assessment

As indicated in paragraph 6.21 under Core Policy D, there may be instances where renewable energy developments might impact upon sites protected under the Habitats Directive. Where there are potential impacts the Authority will require a Habitats Regulations Assessment to be submitted with the planning application.

8.7 Community Projects

The social benefits to the community of community renewable energy projects will be a consideration of any planning application.

8.8 Non-domestic applications

For proposals which are not associated with providing energy for one particular site (such as in the case of community projects), applicants will be expected to demonstrate:

- The process involved in selecting the site;
- The reasons for selecting the site; and
- Alternative sites and/or technologies that have been discounted and the reasoning for this.

The process of selecting a site should take into account the planning considerations set out in section 5 of this document.

[13] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999

SECTION 8 APPLYING FOR PLANNING PERMISSION

8.9 Listed Buildings

Proposals on or within the curtilage of Listed Buildings will require Listed Building consent. This is independent of whether the proposal requires planning permission, and some proposals may need to obtain both consents.

8.10 Consideration of Applications over 50MW

Proposals for renewable energy development above 50MW will be considered by the Infrastructure Planning Commission.

SECTION 9 USEFUL INFORMATION

General information on renewable technologies

Renewable Energy Association
17 Waterloo Place
London
SW1Y 4AR
020 7747 1830
www.r-e-a.net

The National Energy Foundation
Davy Avenue
Knowlhill
Milton Keynes
MK5 8NG
01908 665555
www.nef.org.uk

Community Renewable Energy Officer
North York Moors National Park Authority
The Old Vicarage
Bondgate
Helmsley
YO62 5BP
01439 770657

Technology Associations

British Wind Energy Association
Renewable Energy House
1 Aztec Row
Berners Road
London
N1 0PW
020 7689 1960
info@bwea.com
www.bwea.com

British Hydropower Association
Unit 12 Riverside Park
Station Rd
Wimborne
Dorset
BH21 1QU
01202 880333
www.british-hydro.org

Combined Heat and Power Association
Grosvenor Gardens House
35/37 Grosvenor Gardens
London
SW1W 0BS
020 7828 4077
info@chpa.co.uk
www.chpa.co.uk

Solar Energy Association
www.uk-energy-saving.com/solar_energy_association.html

Ground Source Heat Pump Association
The National Energy Centre
Davy Avenue
Knowlhill
Milton Keynes
MK5 8NG
01908 665555
info@gshp.org.uk
www.gshp.org.uk

Heat Pump Association
2 Waltham Court
Milley Lane
Hare Hatch
Reading
Berkshire
RG10 9TH
0118 9403416
info@feta.co.uk
www.heatpumps.org.uk

SECTION 9 USEFUL INFORMATION

Advice on energy saving

Ryedale Energy Conservation Group
(Covers whole of North Yorkshire)
20 George Hudson Street
York
YO1 6WR
01904 554406
www.4sustainable-energy.co.uk

Energy Saving Trust North East Advice Centre
18b Manor Way
Belasis Hall Technology Park
Billingham
TS23 4HN
01642 373020
www.energysavingtrust.org.uk/Energy-Saving-Trust-advice-centre-North-East

Energy Saving Trust
21 Dartmouth St
London
SW1H 9BP
0800 512012
0207 222 0101
www.energysavingtrust.org.uk

Act on CO_2
http://actonco2.direct.gov.uk/actonco2/home.html

Planning Policy

Communities and Local Government
Eland House
Bressenden Place
London
SW1E 5DU
020 7944 4400
www.communities.gov.uk

North York Moors National Park Authority
The Old Vicarage
Bondgate
Helmsley
YO62 5BP
01439 770657
policy@northyorkmoors-npa.gov.uk
www.moors.uk.net

Local Government Yorkshire and Humber
18 King Street
Wakefield
WF1 2SQ
01924 331555
www.lgyh.gov.uk

Renewable energy toolkit for Yorkshire and Humber - www.renewable-energy-toolkit.org.uk

SECTION 9 USEFUL INFORMATION

Building Regulations

North Yorkshire Building Control Partnership
Suite 2
Coxwold House
Easingwold Business Park
Easingwold
York
YO61 3FB
01347 822703
enquiries@nybcp.org

Redcar and Cleveland Borough Council
Belmont House
Rectory Lane
Guisborough
TS14 7FD
01642 774774
www.redcar-cleveland.gov.uk

APPENDIX 1 SUMMARY OF TECHNICAL INFORMATION

For more details on each technology see the Companion Guide to Planning Policy Statement 22 (available from www.communities.gov.uk)

What does it do?	What are the key features?
Wind	
Wind energy is harnessed via the power of the wind being used to turn blades which in turn drive a generator to produce electricity. Wind turbines are currently available with outputs ranging from a few hundred watts to 3-4MW. A minimum wind speed will be required.	• Blades (connected to a hub and nacelle). There are usually three blades but smaller machines can often have more. • Tower. The tower is usually of a tubular steel construction but for smaller turbines can be a lattice construction. Alternatively small turbines can be mounted directly onto buildings. • For larger schemes – access roads, site tracks, crane hardstandings, anemometer mast(s) (built to the height of the tower to monitor wind speed and direction), construction compound, electrical sub-station and control building. • Domestic wind installations will not require this level of infrastructure, perhaps only a small generator. Small turbines often have a tail to monitor wind direction. • Alternatively, turbines can feature upright blades mounted upon a vertical axis, although these are not as efficient.
Solar Power - Photovoltaics	
Photovoltaic (PV) systems convert energy from the sun into electricity through semi-conductor cells. A typical array could generate around half an average dwelling's annual requirement.	• Only the panels will usually be visible. • The panels are normally blue/grey in colour and they can be designed to look similar to slate.

What does it do?	What are the key features?
PV systems can generate electricity from daylight, not just sunlight, and therefore can operate in cloudy conditions.	• A typical array of panels on a dwelling would be 9 to 18m^2.
Solar Power – Water Heating	
This operates in a similar way to PV but uses the sun's heat to heat water rather than to generate electricity. They can also be used to provide space heating although this is rare. A typical system should provide around 50-60% of an average dwelling's annual hot water requirements.	• Only the panels will usually be visible. • There are two types of collectors used for solar water heating applications; flat plate collector and evacuated tube collector. The latter is more common in the UK as it is more effective at heating water in the winter and is more efficient thus requiring less space. • Both types of panel look similar to roof lights and are usually grey or black in colour and 1-2m^2 in area. For a typical domestic building 4-5m^2 of flat plate collector or 3m^2 of evacuated tube collector would be required.
Biomass	
This process involves converting the energy of biomass fuel to a useful form of energy, electricity, heat or a combination of both. There are three main methods used to convert dry biomass fuels to energy: Direct combustion – heats water or raises steam to turn a turbine to produce electricity. Gasification – solid fuel undergoes incomplete combustion to produce a combustible gas that can be burned in a boiler or used to power a turbine.	• Generating plant. A large plant may be two storeys in height, a smaller plant generating energy for use on site or in the locality may require a 4m x 3m boilerhouse with a similar sized fuel storage building. • Chimney. For a large plant this may be 25 metres or more or for a smaller plant may be around 3 to 10 metres high. • Yards and buildings for delivery and storage of fuel are needed. Storage on site is usually only for the short term. Longer term storage for fuel prior to being 'chipped' is usually located close to where the crop is grown.

What does it do?	What are the key features?
Pyrolysis – heating in the absence of oxygen to produce a combustible gas or liquid which is used in a similar to gasification. There are five main sources of biomass fuel - material from forestry harvesting, material from timber processing, agricultural residues (e.g. chicken litter, straw), energy crops, and waste streams (e.g. garden refuse). A large biomass scheme may use fuel from one or more sources in order to ensure security of supply. Most methods require the fuel to be 'chipped' which usually takes place where the crop is grown.	
Hydro	
Water flowing from a higher to a lower level is used to drive a turbine, which produces mechanical energy. This energy is usually turned into electrical energy by a generator, or more rarely to drive another mechanical device as was the case in many traditional mills. The majority of schemes use the 'run of river' method whereby water is passed through a turbine and returned to the river. Alternatively 'pumped storage' schemes can store the water to be used to generate energy at times of high demand or intermittency from other technologies. Because of the costs pumped storage schemes are only usually feasible for schemes of over 1MW. This scale of hydropower can be used to produce anything from a few kilowatts to 5 megawatts.	• A hydraulic 'head' (the vertical distance between the river (or reservoir) above the weir to the reservoir). • A water intake above a weir or behind a dam. The intake typically comprises a concrete or rubble masonry weir, up to 2 metres high, across the watercourse. • A pipeline or channel to transport the water to the turbine. This is typically a pipe of steel, plastic or composite material, the diameter of which could be between 10cm and 100cm, depending on the characteristics of the site, and the capacity of the scheme. Pipes are often buried. • A turbine, generator and associated buildings. Typically a single storey building of between 3 metres by 4 metres for a small domestic scheme, to 10 metres by 10 metres for a large grid connected scheme.

What does it do?	What are the key features?
	• An outflow where the water returns to the main water course. • A spillway ensures that the downstream watercourse is never totally deprived of flow, and a screen or 'trashrack' prevents floating debris or fish from entering the pipeline.
Ground Source Heat Pumps	
Ground Source Heat Pumps are used to extract heat from the ground to provide space and water heating, using the heat of the ground to heat liquid in pipes. They can be used for space or water heating. The pipes can be buried horizontally or vertically. A similar process can be used for cooling and a single system can be used for both heating and cooling.	• Pipes which are buried horizontally underground (e.g. a metre underground) or vertically in a borehole (often exceeding 100m in depth). • A pump and associated equipment (using a space of approximately $2m^3$).
Air Source Heat Pumps	
Air Source Heat Pumps are used to extract heat from the air to provide space and water heating using the heat extracted from the air as the heat source for the building's heating system. They can be used for cooling as well as heating.	• A heat exchanger, incorporating a box usually around 1 or $2m^2$ on the outside of the building.
Water Source Heat Pumps	
Water Source Heat Pumps work in a similar way to Ground Source Heat Pumps although through extracting heat from water sources such as rivers, ponds or ground water. They can be used for space or water heating. They can be used for cooling as well as heating.	• A pump and associated equipment (using a space of approximately $2m^3$). • Pipes below the ground surface leading to water courses.
Energy from Waste	

What does it do?	What are the key features?
There are two main types of Energy from Waste (EfW) technology – biological and thermal. Biological processes use the gases from waste to power a generator. The waste used can be organic such as farm slurry, sewage sludge or garden waste or landfill can be used. Thermal processes use either direct combustion, pyrolysis or gasification to release energy. This process can use Municipal Solid Waste, business waste, sewage sludge and wood processing waste.	The equipment required for biological EfW plant is: • a digester tank (not needed for landfill gas): Medium to large tanks can be between 8 and 15 metres high whilst a small scheme would be much smaller. The tanks can sometimes be partially buried; • buildings to house ancillary equipment; • a biogas storage tank; • a flare stack; • associated pipework; and • if Municipal solid waste is to be used facilities will be required to separate organic from non-organic waste The key features of a thermal EfW plant are: • a building (which can be between 6 and 45 metres high); • a stack (which can be between 10 and 80 metres high); • a waste storage area; and • associated pipework Plants can vary in size from a small scheme associated with one farm, a medium sized scheme serving a number of farms or a large industrial plant.
Combined Heat and Power	
Combined Heat and Power is the generation of usable heat and power in a single process. This can use both fossil and renewable fuels. Combined Heat and Power is therefore not always a renewable form of energy generation but is recognised as a sustainable form of generation. The fuel is combusted to drive a turbine to generate electricity which can be used on or off site, whilst the heat generated can be used for industrial processes or for space or water heating.	For domestic use, a unit similar to a conventional boiler. For larger scale generation this depends upon the fuel being used but generally: • a building; • a stack; and • a fuel store.

What does it do?	What are the key features?
MicroCHP can be installed in homes and buildings, whilst larger scale plants can serve community, commercial or industrial uses.	

Currently available technologies

The technologies listed below are those that are available at present. Some may be more suited to incorporation within a development than others and their suitability will depend upon the development and location.

- Bio-mass
    - Logs
    - Chips
    - Pellets
    - Miscanthus
    - Short Rotation Coppice (SRC)
    - Rape Seed Cake
- Bio-digestion
    - Surry
    - Compostable Household waste
- Wind Energy
    - Vertical and horizontal axis turbines
- Solar Thermal (Hot Water)
    - Flat plate collectors and Evacuated Tubes
- Solar PV (Electricity)
    - PV Panels
    - Concentrated Solar Thermal making steam for a turbine
- Geothermal (Deep Borehole)
- Ground Source Heat Pump
    - Ground Loops or Bore Holes
- Air Source Heat Pumps
- Water Source Heat Pumps
- Liquid Bio-fuels
    - Bio-diesel
    - Bio-Ethanol

Recycled Cooking Oil

Virgin Vegetable Oil

- Tidal Power

  Barrage

  Reef

  In Stream

- Wave Power

  Both anchored and fixed solutions

- Hydro Power

  Run of River (Low Head)

  Piped (High Head)

- Micro Combined Heat and Power

  Run on bio-fuels

APPENDIX 2 SUITABILITY OF WIND TURBINE DEVELOPMENT IN LANDSCAPE CHARACTER AREAS

See map for locations of landscape types[14]

Landscape Type	Key Landscape Characteristics	Issues for wind turbine development
Moorland 	• Located in the upland areas of the Park. • Elevated open expansive remote upland. • Extensive tracts of heather moorland. • Panoramic long distance views. • Moors drop off steeply into well defined dales. • Occasional sandstone outcrops mark the moorland edges. • Few roads, settlements, enclosures or woodland on moors contributes to sense of isolation and solitude. • Settlement is almost entirely absent in upland areas. • Occasional isolated farms in the moorland valleys. • Walled fields and sheepfolds associated with buildings.	Wind turbines would be inappropriate on the open exposed moorland but could be located in association with buildings or farmsteads in the valley sides provided views of the skyline are not affected.

[14] As identified in the North York Moors Landscape Character Assessment (White Young Green, 2003). Photographs courtesy of White Young Green.

Landscape Type	Key Landscape Characteristics	Issues for wind turbine development
Narrow Moorland Dale 	• Located within the central moorland and western parts of the Park. • Dales deeply incised into the open moorland. • Steep upper valley sides with smoothly sloping lower valley sides. • Trees follow the lines of watercourses. Down valley sides. • The dales are settled by small scattered traditional farmsteads and a network of dry stone walls enclosing small pastures. • Settlements located in clusters in valley floors or along spring lines along mid-valley sides. • Occasional modern outbuildings • Villages and hamlets characterise some parts of the dales and are visible from long distances on the moorland plateau.	Wind turbines could be located in association with farmsteads or settlements, particularly in the lower valley sides. They should be sited away from prominent views towards the upper valley sides.

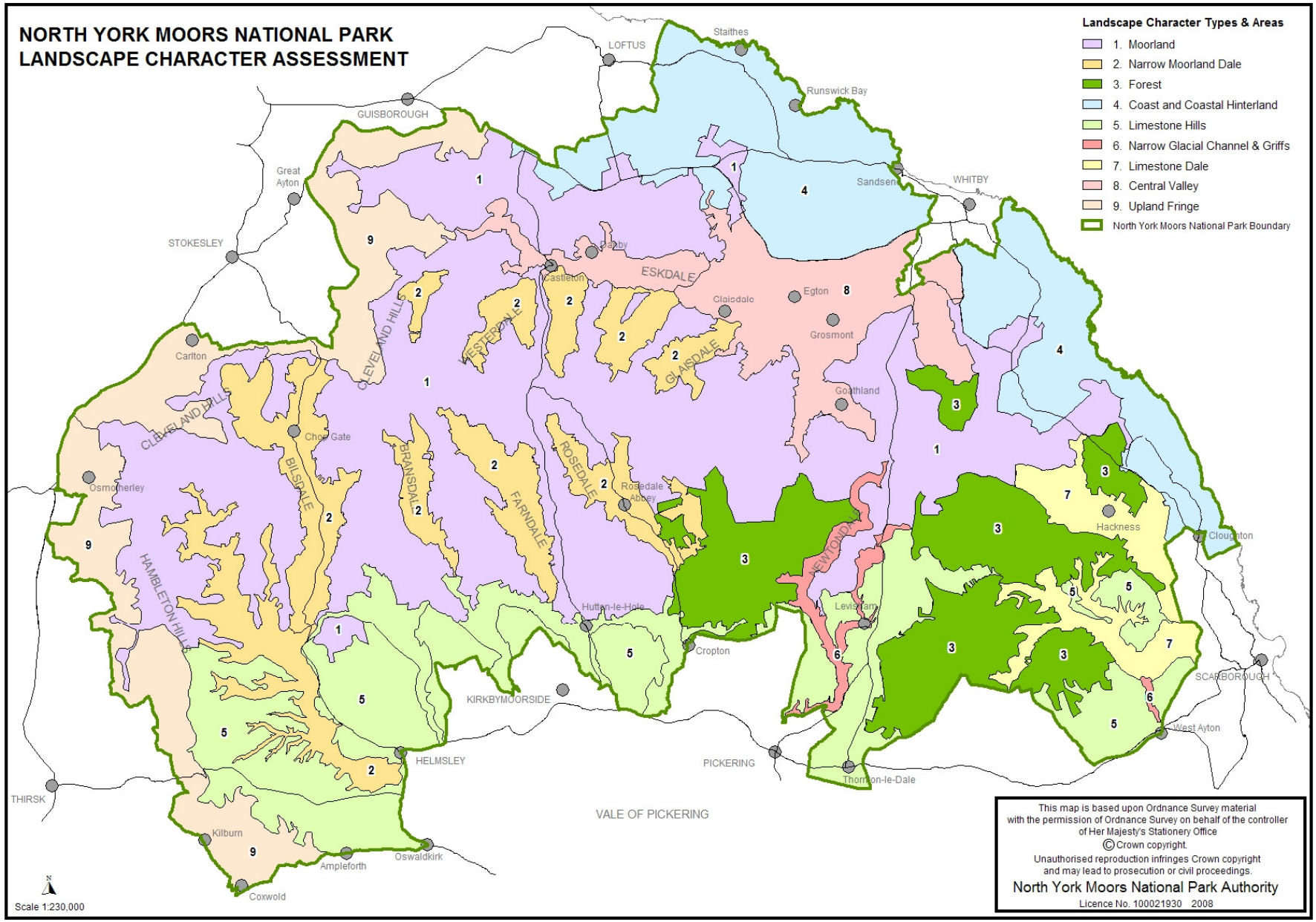
Landscape Type	Key Landscape Characteristics	Issues for wind turbine development
Forest 	• Located in the south eastern area of the Park. • Sited on the gradually rising areas of former moorland and the moorland fringe areas. • Largely coniferous with some deciduous on the fringes. • Settlement is almost completely absent from the area with exception of occasional isolated properties. • Small hamlet of Low Dalby in the Dalby Forest is exceptional.	As forests will screen long distance views turbines could be located within clearings against a back-drop of trees or associated with buildings. Turbines may also be suitable around the edges of the forest where they can blend in to a backdrop of trees. Care should be taken to ensure that the turbine can operate effectively in the proximity of trees or buildings.

Landscape Type	Key Landscape Characteristics	Issues for wind turbine development
Coast and Hinterland 	• Undulating or rolling coast and coastal hinterland • Drained by a series of steeply incised and winding minor becks that flow mainly towards the coast • Broad bays are interspersed with a rugged indented line of high crumbling or slumping cliffs of considerable botanical interest with habitats ranging from dry heath and bracken to scrub, woodland and wet flushes • The cliffs are home to variety of nesting seabirds and are renowned for their geological and fossiliferous exposures • Elevated areas allow panoramic long distance views • Characteristic coastal settlements and fishing villages are crowded into tight cliff foot locations or confined into narrow valleys where they meet the sea. • Modern expansion on the adjacent flatter cliff top areas is generally unsympathetic • Inland, settlements are largely traditional. Farmsteads are nucleated • Busy main roads in elevated open locations have a significant effect	Wind turbines could be located in association with farmsteads or settlements, but should be sited away from open views along the coastline. Wind turbines may be more easily assimilated into the more modern developments on the cliff top areas.

Landscape Type	Key Landscape Characteristics	Issues for wind turbine development
Limestone Hills 	• Located along the southern fringes of the Park. • Rising at a shallow angle to prominent escarpments with flats tops dissected by densely wooded dales. • Steep slopes are wooded. • Settlements, large farm buildings with numerous outbuildings and modern sheds.	Wind turbines should be located in association with settlements and buildings, particularly in association with modern buildings. Turbines should be located away from long views across the flat tops.
Narrow Glacial Channel and Griffs 	• A small area of land stretching northwards from Pickering. • Narrow, steep sided, well wooded valleys. • Small becks follow a tree lined course. • Occasional small settlements, farms and houses.	Wind turbines could be located against a back-drop of trees or in association with settlements, farms or houses, and away from prominent views towards the upper valley sides and cliffs. Care should be taken to ensure that the turbine can operate effectively in the vicinity of trees and buildings.

Landscape Type	Key Landscape Characteristics	Issues for wind turbine development
Limestone Dale 	• In the south eastern part of the Park. • Steep sided, winding relatively broad u-shaped wooded valleys. • Upper reaches of the valleys are broad and open. • Small hamlets and scattered farms.	Wind turbines could be particularly appropriate here as the wooded areas limit views. Turbines should be associated with settlements or buildings. Woodland can be used to screen long distance views and turbines could be located within clearings against a back-drop of trees or associated with buildings. Care should be taken to ensure that the turbine can operate effectively in the vicinity of trees and buildings.
Central Valley 	• Comprises the area of the Esk Valley. • Narrow, deep valley between the heather moorland which widens in the middle reaches to an open flat valley floor. • The upper valley is relatively densely settled. • The lower valley consists mainly of farmland and woodland and a number of settlements.	Wind turbines could be located against a back-drop of trees or associated with settlements or buildings, but care should be taken to ensure they are not prominent in views towards the upper valleys sides. Care should be taken to ensure that the turbine can operate effectively in the vicinity of trees and buildings.

Landscape Type	Key Landscape Characteristics	Issues for wind turbine development
Upland Fringe 	• Located along the western edge of the Park. • Steep escarpment, generally flat top with Dales cut through in places. • Settlements and medium to large farms at the scarp foot. • Mostly simple form street villages • Pastoral landscape, variations in topography and woodland help settlements to 'nestle' into the landscape.	Wind turbines could be located against a back-drop of trees or associated with settlements or buildings, but on the top of the escarpment care should be taken to ensure that continuous skylines are not interrupted. Care should be taken to ensure that the turbine can operate effectively in the vicinity of trees and buildings.


NORTH YORK MOORS NATIONAL PARK
LANDSCAPE CHARACTER ASSESSMENT
Landscape Character Types & Areas
1. Moorland
2. Narrow Moorland Dale
3. Forest
4. Coast and Coastal Hinterland
5. Limestone Hills
6. Narrow Glacial Channel & Griffs
7. Limestone Dale
8. Central Valley
9. Upland Fringe
North York Moors National Park Boundary
Staithes
LOFTUS
Runswick Bay
GUISBOROUGH
Great Ayton
Sandsend
WHITBY
STOKESLEY
Castleton
ESKDALE
Egton
Glaisdale
Grosmont
Carlton
CLEVELAND HILLS
WESTERDALE
GLAISDALE
Goathland
Chop Gate
BILSDALE
BRANSDALE
ROSEDALE
Rosedale Abbey
FARNDALE
NEWTONDALE
Osmotherley
HAMBLETON HILLS
Hutton-le-Hole
Levisham
Hackness
Cloughton
Cropton
SCARBOROUGH
KIRKBYMOORSIDE
West Ayton
HELMSLEY
PICKERING
Thornton-le-Dale
THIRSK
VALE OF PICKERING
Kilburn
Ampleforth
Oswaldkirk
Coxwold
Scale 1:230,000
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APPENDIX 3 ENERGY BENCHMARKS

The table below sets out the benchmark CO_2 emissions for different types of building.

The energy requirements for housing are based upon data on energy requirements for different house types contained in Meeting the Ten Percent Target for Renewable Energy in Housing – A Guide for Developers and Planners[15] (page 17). This provides information on the energy use and the corresponding CO_2 emissions.

The energy requirements for all other uses are taken from the gas and electricity benchmarks for different uses contained in Integrating Renewable Energy into New Developments: Toolkit for Planners, Developers and Consultants[16] (pages 107 - 109). Standard conversion factors[17] (0.422 for electricity, 0.194 for gas and 0.265 for oil) have been used to convert energy requirements to CO2 emissions.

Building Type	Using Gas and Electricity - CO_2 Emissions per m^2 ($kgCO_2/m^2/yr$)	Using Oil and Electricity - CO_2 Emissions per m^2 ($kgCO_2/m^2/yr$)[18]
Top floor flat	35.0	45.3
Mid- terraced house	30.9	39.7
End-terraced house	32.5	41.9
Semi-detached house	32.1	41.2
Detached house	32.5	41.6
Care homes / sheltered housing	90.1	117.1
Post Offices	46.2	56.1
Post Offices (all electric)	34.4	33.8
Banks and Building Societies	43.5	48.1
Banks and Building Societies (all electric)	43.0	42.2
Small hotel	80.5	97.4
Business / holiday hotel	84.3	102.7
Luxury hotel	96.3	117.5
General manufacturing	71.2	87.1
Light manufacturing	52.1	64.5
Primary school	34.9	44.7
Restaurant with bar	490.7	565.8
Book stores (all electric)	90.3	88.6
Butchers (all electric)	204.3	200.5
Clothes shops	113.1	116.0

[15] 'Meeting the Ten Percent Target for Renewable Energy in Housing – A Guide for Developers and Planners' (Energy Saving Trust, 2006)
[16] 'Integrating Renewable Energy into New Developments: Toolkit for Planners, Developers and Consultants' (London Energy Partnership, 2004)
[17] The Government's Standard Assessment Procedure for Energy Rating of Dwellings – 2005 Edition, Revision 1 (BRE on behalf of DEFRA, 2008) (see page 142, Table 12)
[18] There are no benchmark figures available referring directly to use of oil and therefore the CO_2 conversion factor for oil has been applied to the kWh of gas use figures in the London Renewables Toolkit, as the kWh used would be the same for either gas or oil. The benchmarks for housing have been taken from the Energy Saving Trust guidance which calculates cooking within gas use and therefore for oil this has had to be calculated as electricity.

Building Type	Using Gas and Electricity - CO_2 Emissions per m^2 ($kgCO_2/m^2/yr$)	Using Oil and Electricity - CO_2 Emissions per m^2 ($kgCO_2/m^2/yr$)[19]
Clothes shops (all electric)	116.1	113.9
Shoe shops (all electric)	84.7	83.1
Sports facility (without pool)	73.5	88.6
Sports facility (with pool)	133.6	158.7
Swimming pool	219.8	275.0
Offices (air conditioned - standard)	73.7	79.7
Offices (naturally ventilated open-plan)	38.4	43.7
Offices (naturally ventilated – cellular)	29.4	34.9
Storage and distribution warehouses	38.4	48.0
Distribution warehouses	42.6	49.7
Distribution warehouses (all electric)	23.7	23.2
Supermarkets	431.9	439.1
Supermarkets (all electric)	444.6	436.3

Instead of using the benchmarks above, a conversion factor of 2.52[20] can be used to convert litres of oil to kg/CO_2, provided that the annual amount of oil to be consumed by the development is known and evidence is available to show this.

[19] There are no benchmark figures available referring directly to use of oil and therefore the CO_2 conversion factor for oil has been applied to the kWh of gas use figures in the London Renewables Toolkit, as the kWh used would be the same for either gas or oil. The benchmarks for housing have been taken from the Energy Saving Trust guidance which calculates cooking within gas use and therefore for oil this has had to be calculated as electricity.

[20] National Energy Forum (see www.nef.org.uk)

APPENDIX 4 CALCULATING THE 10% REQUIREMENT

See Section 7 for detailed guidance on how to undertake the calculations.

Stage 1. Work out the annual CO_2 emissions of the buildings

Complete either calculations 1, 2, 3 or 4

1. Calculations where there is no Standard Assessment Procedure or Simplified Building Energy Model data

Where there is more than one type of building you will need to undertake this calculation separately for each building type.

Building type 1:	Annual benchmark CO_2 emissions per m^2 **(a)**		$kgCO_2/yr$
	x floor area **(b)**		m^2
	= annual CO_2 emissions **(c)**		$kgCO_2/yr$
Building type 2:	Annual benchmark CO_2 emissions per m^2 **(a)**		$kgCO_2/yr$
	x floor area **(b)**		m^2
	= annual CO_2 emissions **(c)**		$kgCO_2/yr$
Building type 3:	Annual benchmark CO_2 emissions per m^2 **(a)**		$kgCO_2/yr$
	x floor area **(b)**		m^2
	= annual CO_2 emissions **(c)**		$kgCO_2/yr$
	Total CO_2 emissions **(c) + (c) + (c) = (d)**		$kgCO_2/yr$

OR

2. Annual CO_2 emissions from SAP assessment

CO_2 emissions **(d)**		$kgCO_2/yr$

OR

3. Annual CO_2 emissions from SBEM assessment

CO_2 emissions **(d)**		$kgCO_2/yr$

OR

4. Annual CO_2 emissions from Act on CO_2 website

CO_2 emissions **(d)**		$kgCO_2/yr$

Stage 2. Work out 10% of the annual CO_2 emissions

10% of CO_2 emissions **((d)/100) x 10 = (e)**		$kgCO_2/yr$

Stage 3. Select the renewable technology (or technologies) you wish to incorporate and work out the annual CO_2 savings

Electricity generating technologies

	Electricity generating renewable energy **(f)**		kWh/yr
	x 0.422[21] **(g)**		$kgCO_2/yr$

Heat generating technologies

	Heat generating renewable energy **(h)**		kWh/yr
	x 0.194 or **x** 0.265[22] **(i)**		$kgCO_2/yr$

[21] Standard conversion factor for kWh electricity to $kgCO_2$
[22] Standard conversion factors - use x 0.194 if displacing gas or x 0.265 if displacing oil

Total CO_2 savings **(g) + (i) = (j)** _____ $kgCO_2/yr$

Stage 4. Check that your chosen technology will provide enough CO_2 savings

(j) should be equal to or greater than **(e)** to ensure that at least 10% of predicted CO_2 emissions are offset through renewable energy.

% of CO_2 emissions which will be offset by renewable energy **(j) / (d)** _____ %

If this figure is less than 10%, look at increasing the size / capacity of the installation, try other technologies or look at using a mix of technologies.

Worked Example 1

The example provided is a development of five houses (2 semi-detached with a floor area of 80m^2 each and 3 terraced with a floor area of 70m^2 each) within a village. The wind resource at the site is 3m/s. There is the potential to establish a wood fuel supply chain in the area if sufficient demand can be created but at the moment fuel would need to be brought in.

Stage 1. Work out the annual CO_2 emissions of the buildings

Complete either calculations 1, 2, 3 or 4

2. Calculations where there is no Standard Assessment Procedure or Simplified Building Energy Model data

Where there is more than one type of building you will need to undertake this calculation separately for each building type.

Building type 1: 2 semi detached			
	Annual benchmark CO_2 emissions per m^2 **(a)**	32.3	kgCO_2/yr
	x floor area **(b)**	160	m^2
	= annual CO_2 emissions **(c)**	5,186	kgCO_2/yr

Building type 2: 2 end terraced			
	Annual benchmark CO_2 emissions per m^2 **(a)**	32.7	kgCO_2/yr
	x floor area **(b)**	140	m^2
	= annual CO_2 emissions **(c)**	4,578	kgCO_2/yr

Building type 3: 1 mid terraced			
	Annual benchmark CO_2 emissions per m^2 **(a)**	31.1	kgCO_2/yr
	x floor area **(b)**	70	m^2
	= annual CO_2 emissions **(c)**	2,177	kgCO_2/yr

Total CO_2 emissions **(c) + (c) + (c) = (d)**	11,941	kgCO_2/yr

OR

2. Annual CO_2 emissions from SAP assessment

CO_2 emissions **(d)**		$kgCO_2/yr$

OR

3. Annual CO_2 emissions from SBEM assessment

CO_2 emissions **(d)**		$kgCO_2/yr$

OR

4. Annual CO_2 emissions from Act on CO_2 website

CO_2 emissions **(d)**		$kgCO_2/yr$

Stage 2. Work out 10% of the annual CO_2 emissions

10% of CO_2 emissions **((d)/100) x 10 = (e)**	1,194.1	$kgCO_2/yr$

Stage 3. Select the renewable technology (or technologies) you wish to incorporate and work out the annual CO_2 savings

Electricity generating technologies

Photovoltaics (800kWh each)	Electricity generating renewable energy **(f)**	4,000	kWh/yr
	x 0.422[23] **(g)**	1,688	$kgCO_2/yr$

[23] Standard conversion factor for kWh electricity to $kgCO_2$

Heat generating technologies

Ground Source Heat Pumps	Heat generating renewable energy **(h)**	22,500	kWh/yr
	x 0.194 or **x** 0.265[24] **(i)**	4,365	kgCO_2/yr

Total CO_2 savings **(g)** **+** **(i)** **=** **(j)**	6,053	kgCO_2/yr

Stage 4. Check that your chosen technology will provide enough CO_2 savings

(j) should be equal to or greater than **(e)** to ensure that at least 10% of predicted CO_2 emissions are offset through renewable energy.

% of CO_2 emissions which will be offset by renewable energy **(j)** / **(d)**	51	%

If this figure is less than 10%, look at increasing the size / capacity of the installation, try other technologies or look at using a mix of technologies.

In this example the renewable energy generated would reduce CO_2 emissions from the site by 51% which easily meets the 10% requirement and demonstrates that higher percentages can be achieved.

[24] Standard conversion factors - use x 0.194 if displacing gas or x 0.265 if displacing oil

Worked Example 2

The example provided is a small hotel. The proposal involves the conversion of a large house on the edge of a small village. The wind resource is an average of 2.5m/s and there is a local supply of biomass from a nearby small privately owned wood. As standard data does not exist for the types of renewable energy which would be needed to provide for such a development (i.e. there is no equivalent to the table in Appendix C for non-domestic buildings) it is necessary to look at the options available on the market.

Stage 1. Work out the annual CO_2 emissions of the buildings

Complete either calculations 1, 2, 3 or 4

3. Calculations where there is no Standard Assessment Procedure or Simplified Building Energy Model data

Where there is more than one type of building you will need to undertake this calculation separately for each building type.

Building type 1:			
Hotel	Annual benchmark CO_2 emissions per m^2 **(a)**	80	$kgCO_2/yr$
	x floor area **(b)**	350	m^2
	= annual CO_2 emissions **(c)**	28,000	$kgCO_2/yr$

Building type 2:			
	Annual benchmark CO_2 emissions per m^2 **(a)**		$kgCO_2/yr$
	x floor area **(b)**		m^2
	= annual CO_2 emissions **(c)**		$kgCO_2/yr$

Building type 3:			
	Annual benchmark CO_2 emissions per m^2 **(a)**		$kgCO_2/yr$
	x floor area **(b)**		m^2
	= annual CO_2 emissions **(c)**		$kgCO_2/yr$

Total CO_2 emissions **(c) + (c) + (c) = (d)**	28,000	$kgCO_2/yr$

OR

2. Annual CO_2 emissions from SAP assessment

CO_2 emissions **(d)**		$kgCO_2/yr$

OR

3. Annual CO_2 emissions from SBEM assessment

CO_2 emissions **(d)**		$kgCO_2/yr$

OR

4. Annual CO_2 emissions from Act on CO_2 website

CO_2 emissions **(d)**		$kgCO_2/yr$

Stage 2. Work out 10% of the annual CO_2 emissions

10% of CO_2 emissions **((d)/100) x 10 = (e)**	2,800	$kgCO_2/yr$

Stage 3. Select the renewable technology (or technologies) you wish to incorporate and work out the annual CO_2 savings

Electricity generating technologies

No technologies have been selected for electricity generation

Electricity generating renewable energy **(f)**		kWh/yr
x 0.422[25] **(g)**		$kgCO_2/yr$

[25] Standard conversion factor for kWh electricity to $kgCO_2$

Heat generating technologies

20m² solar water heaters	Heat generating renewable energy **(h)**	6,000	kWh/yr
	x 0.194 or **x** 0.265 **(i)**	1,164	$kgCO_2/yr$

Total CO_2 savings **(g)** + **(i)** = **(j)**	1,164	$kgCO_2/yr$

Stage 4. Check that your chosen technology will provide enough CO_2 savings

(j) should be equal to or greater than **(e)** to ensure that at least 10% of predicted CO_2 emissions are offset through renewable energy.

% of CO_2 emissions which will be offset by renewable energy **(j)** / **(d)**	4.2	%

If this figure is less than 10%, look at increasing the size / capacity of the installation, try other technologies or look at using a mix of technologies.

The solar water heaters selected here to supplement the gas heating would only reduce the predicted CO_2 emissions by 4.2%. The applicant would therefore need to look into the possibility of increasing the number of solar water heaters or look at alternative technologies to supplement the savings made by the solar water heaters.