

**Brecon Beacons National Park Authority**

**Local Development Plan Policy SP9**

**Small Scale Renewable Energy Development**

**May 2015**

**Supplementary Planning Guidance**

## Contents

<b>1.0</b>	<b>Introduction .....</b>	<b>3</b>
<b>2.0</b>	<b>Policy Background .....</b>	<b>4</b>
2.2	European Policy.....	4
2.3	UK National Policy.....	4
2.4	Wales National Policy .....	4
2.5	Local Planning Policy .....	6
<b>3.0</b>	<b>Appropriate development in the National Park.....</b>	<b>6</b>
<b>4.0</b>	<b>Planning Considerations and Renewable Energy Technologies.....</b>	<b>7</b>
4.2	Solar Photovoltaic.....	7
4.3	Solar Thermal.....	8
4.4	Wind power.....	8
4.5	Hydroelectric schemes.....	9
4.6	Biomass.....	11
4.7	Heat Pumps .....	12
4.8	Anaerobic Digester .....	13

## 1.0 Introduction

- 1.1 In considering any scheme which involves the installation of renewable energy technologies the Brecon Beacons National Park Authority (BBNPA) will have particular regard to the Adopted Brecon Beacons National Park Authority Local Development Plan (LDP) and in particular Policy SP9 (Renewable Energy) which can be seen below. This Supplementary Planning Guidance (SPG) is produced to explain how this LDP Policy should be applied in practice.
- 1.2 The aim of SPG is to help applicants through some of the requirements and considerations of the planning process in respect to the generation of heat and/or electricity from Renewable Sources or Low/Zero Carbon Technologies.
- 1.3 This SPG relates to all applications that include a renewable energy technology regardless of the location of the project or whether it is a stand-alone project or part of an overall development. Potential developments and renewable energy situations include, but are not limited to;
- Housing developments
  - Industrial developments
  - Hydro-electric schemes
  - Barn conversions
- 1.4 Pre-application discussions can be particularly useful in helping applicants and agents identify the issues to be covered and information that will be required to support any application for planning permission, which in turn can help minimise delays in processing the application. The Authority provides a paid pre-application service, for details please see the website <http://www.beacons-mpa.gov.uk/planning/applications/guidance-note-01-april-2014-charging-for-pre-application-planning-advice/>
- 1.5 Where permits, consents or licences from Natural Resources Wales are required, applicants are encouraged to engage in pre-application discussions with NRW at the earliest opportunity.

## **2.0 Policy Background**

2.1 The generation of renewable energy has an increasingly important role to play in responding to climate change, fuel poverty and in promoting sustainable development. As such provisions for Renewable Energy have been made at all level of planning policy. The following section sets out the relevant policies applicants should be aware of in formulating their scheme for renewable energy.

### **2.2 European Policy**

2.2.1 The European Union has set targets for climate change and energy known as the '20-20-20' targets. These are to achieve, by 2020:

- A 20% reduction in EU greenhouse gas emissions from 1990 levels;
- An increase in the contribution of renewable sources to energy consumed in the EU to 20%; and
- A 20% improvement in the EU's energy efficiency.

### **2.3 UK National Policy**

2.3.1 The UK Government adopted the Kyoto Protocol in 1997. One of the targets of the Protocol is to reduce emissions of greenhouse gases during the period 2008 – 2012 by 12.5% from levels recorded in 1990. The Climate Change Act 2008 sets out a long-term target to reduce the UK's emissions to 80% below 1990 levels by 2050<sup>1</sup>.

2.3.2 The publication of the UK Renewable Energy Strategy in July 2009 strengthened the UK's commitment to meeting the legally binding EU targets for the UK to produce 15% of its energy from renewable sources by 2020.

### **2.4 Wales National Policy**

2.4.1 The Welsh Government's Energy Policy Statement (2010) identifies the sustainable renewable energy potential for a wide range of renewable energy technologies across Wales. The policy statement has highlighted that Wales has a potential for some £50 billion of investments in large renewables and other low-carbon initiatives over the next 10-15 years. The Welsh Government will also be looking at heavily investing in domestic energy efficiency, community-scale renewables and alleviating fuel poverty in the coming years.

2.4.2 The Welsh Assembly Government (WAG) published a revised Planning Policy Wales (PPW) in 2014. Figure 12.1 of PPW repeats the energy potential for Wales stated within the Energy Policy Statement and highlights the energy potential by technology.

Technology	Target Capacity (GW)	Target date(s)
Onshore wind	2.0	2015/2017
Offshore wind	6.0	2015/2016
Biomass	1.8	2020
Tidal range	8.5	2022
Tidal stream/wave	4.0	2025
Local electricity generation	1.0	2020

2.4.3 Whilst the WAG considers the majority of renewable energy production will come from major developments, it is also considered that small and medium size developments will provide the opportunity to generate cleaner and cheaper energy in the home, community or workplace and, therefore make a valuable contribution to these targets.

2.4.4 PPW and Technical Advice Note 8 (TAN8) Renewable Energy states that LPAs should, “facilitate the development of all forms of renewable energy and energy efficiency and conservation measures which fit within a sustainable development framework”. LPAs should seek to make positive provision for such developments in order to meet society’s needs now and in the future. This may be done by:

- considering the contribution that their authority area can make towards developing and facilitating renewable energy and energy efficiency and conservation, and ensuring that development plan policies enable this contribution to be delivered;
- ensuring that development control decisions are consistent with national and international climate change obligations, including contribution to renewable energy targets, having regard to emerging national and international policy on the levels of renewable energy required and on appropriate technologies; and
- recognising the environmental, economic and social opportunities that the use of renewable energy resources can make to wider planning goals and objectives and the delivery of renewable energy targets.

2.4.5 Paragraph 8.4 of Annex D TAN8 Renewable Energy has the objective “to maintain the integrity and quality of the landscape within the National Parks/AONBs of Wales i.e. no change in landscape character from wind turbine development.”

## **2.5 Local Planning Policy**

- 2.5.1 The Brecon Beacons National Park Authority Local Development Plan was formally adopted on the 17<sup>th</sup> December 2013. The following strategic policy sets out the scale of such development which is appropriate within the National Park.

### **SP9 Renewable Energy**

**Proposals for renewable energy schemes will only be permitted where:-**

- a) they are of a scale and technology appropriate to their location; and**
- b) they do not have a significant adverse impact on the Natural Beauty, wildlife, cultural heritage and special qualities of the National Park.**

**Proposals for Renewable Energy Schemes defined as Major Development will be considered against the tests set out in Policy SP2.**

- 2.5.2 In our role as a Local Planning Authority and in accordance with PPW and TAN8 the Brecon Beacons National Park Authority wants to take an enabling approach to schemes which will make a positive contribution to limiting the ecological and carbon footprint of the National Park area.
- 2.5.3 Whilst schemes such as these will be looked upon favorably it is imperative that in enabling such development we do not fail in our statutory duty to protect and enhance the special qualities of the National Park, including the unique biodiversity of the area.
- 2.5.4 Although legislation defines micro generation as less than 45kW for heat and 50kW for electricity, the special qualities of the National Park and our statutory duty protect and enhance these qualities may require a lesser output due to the difficulties in ensuring that wind turbines, large free-standing photo-voltaic arrays and large turbine houses do not have an adverse impact on the landscape and visual amenity of the area.
- 2.5.5 The Authority has adopted an SPG on Landscape and Development and Landscape Character Assessment which may be of use when looking at what type of renewable energy technology may be appropriate for a particular area. Please see here <http://www.beacons-npa.gov.uk/planning/draft-strategy-and-policy/supplementary-planning-guidance/>

## **3.0 Appropriate development in the National Park**

- 3.1 The size and impact of developments should not conflict with the NPA's primary statutory purpose highlighted above. The following list, which is not exhaustive, shows which technologies are more likely to be compatible with Policy SP9:
- Solar photovoltaic
  - Solar thermal
  - Small scale wind

- Hydro
- Biomass
- Water, ground and air source heat pumps

## 4.0 Planning Considerations and Renewable Energy Technologies

4.1 The purpose of this Section is to provide an overview of what considerations applicants should make and the information that will be necessary when applying for planning permission for renewable energy developments. It is not the purpose of this Supplementary Planning Guidance to provide an in-depth description of the technologies. There are a number of other Planning Advice Notes published by the NPA relating to renewable energy developments available at <http://www.beacons-mpa.gov.uk/planning/applications/planning-advice-notes-1/>

### 4.2 Solar Photovoltaic

4.2.1 Solar photovoltaic systems (PV's) are generally located on or built into the roof of buildings or other structures but PVs can also be mounted standalone boards. These systems can also be static or have the capability to track the sun. The amount of electricity generated by these systems will be affected by the shade of trees or other buildings.

4.2.2 Planning applications for PVs should clearly explain and justify how the proposal meets with all relevant policies of the LDP. If mitigation is required to address any negative effects of such a proposal, this must be thoroughly assessed and recommendations made by a qualified professional who specialises in the relevant field.

4.2.3 Key considerations are likely to be:

- the effect that installing PVs is likely to have on the character and appearance of the building, townscape, archaeology and landscape. This could apply not only to the PVs themselves but also to the impact of the infrastructure used to link the PVs to a property or to the electricity network or the removal of trees and buildings;
- the effect on biodiversity and earth heritage, for example, if trees and/or buildings need to be removed or altered due to shading or works to put in the panels, for example what impact will the installation have on protected areas or species like bats already using the roof spaces. If the proposal is likely to affect a protected species, SAC or SSSI then more detailed information may be required.
- whether any excavations will be required, for example to site the PVs or to lay associated cables;
- the effect that reflections from the sun shining off the PVs could have on the character and appearance of the building, townscape and/or landscape; and
- whether there is the need to provide a Method Statement which to explain 'how, when and why' each stage of the development will take place, and provide a risk assessment if a specialist contractor is required. The statement should provide details of any specialist contractors' employment during the development. The

purposes of this statement are to ensure the proper management and instillation of the technology.

### **4.3 Solar Thermal**

4.3.1 Planning applications will be required to clearly explain and justify how the proposal meets with all relevant policies of the LDP. Any mitigation that is required to address any negative effects must be thoroughly assessed and recommendations made by a qualified professional who specialises in the relevant field.

4.3.2 Key considerations are likely to be:

- the effect that installing the equipment is likely to have on the character and appearance of the building, townscape, archaeology and landscape. This could apply not only to the equipment themselves but also to the impact of the infrastructure used to link the equipment to a property or to the electricity network and the removal of trees and buildings;
- the effect on biodiversity and earth heritage, for example, if trees and/or buildings need to be removed or altered due to shading or works to put in the equipment, for example what impact will the installation have on protected species like bats already using the roof spaces. If the proposal is likely to affect a protected species, SAC or SSSI then more detailed information may be required.
- whether any excavations will be required, for example to site the equipment;
- the effect which reflections from the sun shining off the equipment could have on the character and appearance of the building, townscape and/or landscape; and
- whether there is the need to provide a Method Statement which to explain 'how, when and why' each stage of the development will take place, and provide a risk assessment if a specialist contractor is required. The statement should provide details of any specialist contractors' employment during the development. The purpose of this statement is to ensure the proper management and instillation of the technology.

### **4.4 Wind power**

4.4.1 Wind turbines are available in many sizes and often work well in conjunction with solar based technologies. Examples of wind turbines include horizontal axis and vertical axis turbines.

4.4.2 The most obvious location for wind turbines are exposed areas subject to high levels of wind. Unfortunately, installing turbines in this type of location often causes adverse landscape impact in conflict with the NPA's primary statutory purpose.

4.4.3 Turbines are required to be located as close as possible to, and to be clearly associated with buildings. However, such siting can cause other problems for neighbours through, for example, noise and light flicker. Turbines which are seen as prominent or overly large within the landscape are potentially harmful to the character of the landscape and spoil its appearance are unlikely to be approved.

4.4.4 The height, design and colour of the wind turbine tower/column/structure will need

to be carefully considered so to mitigate for its impact on the visual quality of the area where it will be located. Planning applications will be required to clearly explain and justify how the proposal meets with all relevant policies of the LDP. Wind turbines tend to be the most visually prominent of the technologies associated with using renewable energy and they can have a detrimental impact on nearby residents. Applicants and agents will be expected to provide factual information from a qualified professional who specialises in the relevant field to explain why this type of technology has been chosen over others. A landscape visual impact assessment is likely to be required by Applicants for such development are referred to the Authorities Landscape and Development SPG.

#### 4.4.5 Key considerations are likely to be:

- the effect and cumulative effect that installing a turbine and/or any associated buildings might have on the character and appearance of the building, archaeology, townscape and/or landscape. These considerations also apply to the effects of the infrastructure to link the turbine and any associated buildings to a property or electricity network. The cumulative effect of turbines will also be taken into account;
- the effect and cumulative effect on biodiversity and earth heritage, for example, if trees and/or buildings need to be removed or altered due to shading or works to install the equipment, for example what impact will the installation have on protected species like bats and birds. If the proposal is likely to affect a protected species, SAC or SSSI then more detailed information may be required. Turbines should not be sited in close proximity to bat roosts, hedgerows, or linear features likely to be used as flight-lines, or close to woodland edges likely to be important for bat foraging;
- whether any excavations will be required before submitting a planning application;
- whether there is the need to provide a Method Statement which to explain ‘how, when and why’ each stage of the development will take place, and provide a risk assessment if a specialist contractor is required. The statement should provide details of any specialist contractors’ employment during the development. The purpose of this statement is to ensure the proper management and instillation of the technology; and
- the effect on neighbors or the surrounding area caused by noise, light flicker and any issues of massing and scale caused by the turbine and/or associated buildings and/or associated infrastructure.

#### 4.5 **Hydroelectric schemes**

##### 4.5.1 This technology uses the power of water to generate electricity. Essential elements for a hydro scheme are:

- a suitable water catchment area;
- an hydraulic head;

- a method of transporting water from the intake to a turbine, such as penstock or leat;
- a turbine, generator, valve equipment and associated buildings;
- a tailrace or outflow (this returns the water to its natural course); and
- a link to local user(s) or the local electricity distribution network.

#### 4.5.2 There are two main types of hydro technology: Low Head and High Head.

1. Low Head schemes are appropriate for valley bottom locations or where the land is slightly sloping. Low Head schemes sometimes need to store water above an intake but normally the water feeds directly into a generator. Rather than storing water, the natural flow of a river can also be used.
2. High Head schemes are appropriate for valley sides, where the land slopes steeply. In some cases a reservoir is created above an intake and some of the water is diverted into a pipe (penstock). The water then flows down the penstock to the generator and the electricity is then transferred to the local user(s) or the local electricity distribution network. The water is then returned to its natural course.

#### 4.5.3 The benefit of hydro power technologies is that, generally, they have a low visual Impact. However, the effect on archaeology, flora and fauna needs to be considered. Turbine houses that are small scale and visually unobtrusive in their siting, and which are built with local materials (for example, stone walls and slate roofs), are more likely to blend in as part of the agricultural landscape, particularly where existing agricultural stone walls, outbuildings, or enclosures are already on the site. Modern steel enclosed structures and substantial engineering to provide channelling, ancillary transmission cabling or access roads are unlikely to be permitted within countryside settings.

#### 4.5.4 Planning applications will be required to clearly explain and justify how the proposal meets with all relevant policies of the LDP. Any mitigation required to address any negative effects of the development must be thoroughly assessed and recommendations made by a qualified professional who specialises in the relevant field.

#### 4.5.5 Key considerations are likely to be:

- the effect and cumulative effect that installing hydro power technologies will have on the character and appearance of the building, archaeology, townscape and/or landscape in locating reservoirs, penstock, plant and associated buildings and the impact of installing any infrastructure required to link the sections of the plant to a property or electricity network;
- whether any excavations will be required and impacts and mitigation considered before submitting a planning application;
- whether there is the need to provide a Method Statement which to explain 'how, when and why' each stage of the development will take place, and provide a risk assessment if a specialist contractor is required. The statement should provide details of any specialist contractors' employment during the development. The

purpose of this statement is to ensure the proper management and instillation of the technology;

- the effect on archaeology, biodiversity (including trees) and earth heritage both in and adjacent to the water course. If the proposal is likely to affect a protected species, SAC or SSSI then more detailed information may be required.; and
- the effect and cumulative effect on neighbours and the surrounding area through the noise created by the generator(s).

4.5.6 We also recommend that you make early contact with Natural Resources Wales (NRW) to discuss and permissions, permits or licences you may need to obtain from them before your development can be brought on line. <http://naturalresourceswales.gov.uk/apply-and-buy/water-licences-discharges/water-abstraction-and-impoundment-licensing/hydropower/before-you-apply/?lang=en>

#### **4.6 Biomass**

4.6.1 This is a technology that uses the stored carbon to create energy or a make a resource which can, in turn, be used to create energy. Biomass fuels can be derived from:

- wet agricultural waste (anaerobic digestion of slurry);
- poultry litter (using the litter as a fuel);
- crops grown especially for energy production (using a crop like wood chip as a fuel); and
- public waste (both municipal and industrial)

4.6.2 There are a number of methods in which biomass fuels can be used. The size of the systems can also vary from domestic to industrial size. If you are considering installing a biomass scheme we strongly recommended that you make contact with the NPA as early as possible to discuss the proposed development. We also recommend that you make early contact with the Local Authority Building Regulations and Environmental Health Departments and with Natural Resources Wales as there may be issues arising from possible pollution in the form of spills and/or unpleasant odour.

4.6.3 In the National Park, applications for biomass schemes will be required to demonstrate that the product(s) to power the plant come from local sources and not from regional sources.

4.6.4 Planning applications will have to clearly explain and justify how the proposal meets all the relevant policies of the LDP, for example the Farm Diversification Policies. If mitigation is required to address negative effects of the development this must be thoroughly assessed and recommendations made by a qualified professional who specialises in the relevant field.

4.6.5 Key considerations are likely to be:

- the effect and cumulative effect on the character and appearance of the building, archaeology, townscape and/or landscape resulting from the required plant, any

ancillary development, or the provision of additional space on site for fuel storage and delivery and impacts of installing any infrastructure to link the plant to property, gas or electricity networks;

- the effect and cumulative effect on the character and appearance of the building, archaeology, townscape and/or landscape arising from harvesting the biomass;
- the effect and cumulative effect on character and appearance of the building,
- archaeology, townscape and/or landscape resulting from the infrastructure which is needed to link the sections of the plant and the electricity network for Combined Heat and Power schemes;
- whether any excavations will be required before submitting a planning application;
- whether there is the need to provide a Method Statement which to explain 'how, when and why' each stage of the development will take place, and provide a risk assessment if a specialist contractor is required. The statement should provide details of any specialist contractors' employment during the development. The purpose of this statement is to ensure the proper management and instillation of the technology;
- the suitability of the highway infrastructure to carry any lorries transporting biomass to and from the site;
- that an Emergency Plan is likely to be required and, for example, if additional buildings or bunding are required details must be included in the planning application;
- the effect on neighbours and the surrounding areas caused by pollution or noise created by plant; and
- the effect and cumulative effect on biodiversity and earth heritage. If the proposal is likely to affect a protected species, SAC or SSSI then more detailed information may be required. You should show how you intend to deal with pollutants emitted on a day-to-day basis and, should any plant or equipment and transport carriers lose their contents or fail, worst case scenario needs to be provided for (this information will be part of an Emergency Plan). You should show that you have considered the impacts of such failures both on-site and off-site.

#### **4.7 Heat Pumps**

4.7.1 Heat Pumps collect heat from the water, air or ground and transfer it to buildings. Water source and ground source pumps can be located inside buildings. The pipes needed to transport the heat are sited underground. Air Source Pumps are usually located outside the host building.

4.7.2 Due to wider variations in air temperature, water or Ground Source Heat Pumps tend to function slightly more efficiently than Air Source.

4.7.3 Planning applications will be required to clearly explain and justify how the proposal meets with all relevant policies of the LDP. Any mitigation needed to address negative effects resulting from the installation must be thoroughly assessed by a qualified professional who specialises in the relevant field.

4.7.4 Key considerations are likely to be:

- the effect and cumulative effect that installing the system(s) could have on the character and appearance of the building, archaeology, townscape and/or the landscape and by locating any associated buildings. This could also apply to the infrastructure needed to link the sections of the plant to a property or electricity network;
- whether any excavations will be required before submitting a planning application;
- whether there is the need to provide a Method Statement which to explain ‘how, when and why’ each stage of the development will take place, and provide a risk assessment if a specialist contractor is required. The statement should provide details of any specialist contractors’ employment during the development. The purpose of this statement is to ensure the proper management and instillation of the technology;
- the effect and cumulative effect noise will have on neighbours and the surrounding area (generally this is only a consideration for Air Source Pumps); and
- the effect and cumulative effect on archaeology, flora and fauna on or adjacent to areas requiring excavations, siting of plant, associated buildings and link to property. If the proposal is likely to affect a protected species, SAC or SSSI then more detailed information may be required.

#### **4.8 Anaerobic Digester**

- 4.8.1 Anaerobic digesters make use of the natural process of anaerobic digestion of organic materials (animal wastes and/or vegetable matter) in a closed vessel to produce biogas (a mixture of carbon dioxide and methane) and digestate (a nitrogen-rich fertiliser). The biogas can be used directly in engines generate electricity, burned to produce heat, or can be cleaned and used in the same way as natural gas or as a vehicle fuel. The remaining digestate can be used as a fertiliser or soil conditioner provided it meets certain standards (BSI PAS 110 covers all anaerobic digestion (AD) systems that accept source-segregated biowastes).
- 4.8.2 The technology can be used at a variety of scales, from small digestors on individual farm holdings to larger plant sourcing organic wastes from a wide area.
- 4.8.3 The size of the systems can also vary from domestic to industrial size. If you are considering installing an anaerobic digester we strongly recommended that you make contact with the NPA as early as possible to discuss the proposed development. We also recommend that you make early contact with the Local Authority Building Regulations and Environmental Health Departments and with Natural Resources Wales as there may be issues arising from possible pollution in the form of spills and/or unpleasant odour.
- 4.8.3 In the National Park, applications for anaerobic digester schemes will be required to demonstrate that the product(s) to power the plant come from local sources and not from regional sources.
- 4.8.4 Planning applications will have to clearly explain and justify how the proposal meets all the relevant policies of the LDP. Specifically policy 63 of the LDP *Energy from Waste*. This policy sets out that such schemes will only be permitted where they are of an appropriate scale and location commensurate with the NP designation and

where they:-

- a) form part of a farm diversification scheme; or
- b) waste processing will service the needs of One Planet Developments where the processor is designed as a discrete unit operating without requirement to import waste material from activity derived from outside the development; or
- c) the proposed scheme is part of existing waste management site; or
- d) is located on an existing B2 sites/existing employment site, where the need cannot be met in any other way outside the National Park and the scheme is intended to treat locally derived waste materials.

4.8.5 if mitigation is required to address negative effects of the development this must be thoroughly assessed and recommendations made by a qualified professional who specialises in the relevant field.

4.8.6 Key considerations are likely to be:

- the effect and cumulative effect on the character and appearance of the building, archaeology, townscape and/or landscape resulting from the required plant, any ancillary development, or the provision of additional space on site for fuel storage and delivery and impacts of installing any infrastructure to link the plant to property, gas or electricity networks;
- the effect and cumulative effect on the character and appearance of the building, archaeology, townscape and/or landscape arising from harvesting the biomass;
- the effect and cumulative effect on character and appearance of the building, archaeology, townscape and/or landscape resulting from the infrastructure which is needed to link the sections of the plant and the electricity network for Combined Heat and Power schemes;
- whether any excavations will be required before submitting a planning application
- whether there is the need to provide a Method Statement which to explain 'how, when and why' each stage of the development will take place, and provide a risk assessment if a specialist contractor is required. The statement should provide details of any specialist contractors' employment during the development. The purpose of this statement is to ensure the proper management and instillation of the technology;
- the suitability of the highway infrastructure to carry any lorries transporting biomass to and from the site;
- that an Emergency Plan is likely to be required and, for example, if additional buildings or bunding are required details must be included in the planning application;
- the effect on neighbours and the surrounding areas caused by pollution or noise created by plant; and
- the effect and cumulative effect on biodiversity and earth heritage. If the proposal is likely to affect a protected species, SAC or SSSI then more detailed information may be required. You should show how you intend to deal with pollutants emitted on a

day-to-day basis and, should any plant or equipment and transport carriers lose their contents or fail, worst case scenario needs to be provided for (this information will be part of an Emergency Plan). You should show that you have considered the impacts of such failures both on-site and off-site.

## Glossary

**Bio-fuels** Fuels that derive from biomass.

**Biomass** Biomass fuels are those derived from living, or recently living organisms, usually plant based materials. Biomass produces heat energy through burning (eg woodchip boilers) or through conversion to a biofuel such as biodiesel.

**Climate Change** The recognised phenomenon whereby the climate of the Earth is changing due to rising average temperatures.

**Distribution network** the system of wires, switches and transformers that serve homes and businesses. It operates at 132kV, 33kV and 11kV. The wires are usually carried on wooden poles.

**Fossil Fuels** fuels that arise from organic matter but over geological timescales.

**Greenhouse Gases** the gases that are responsible for trapping the solar radiation – the greenhouse effect. The most significant impact comes from carbon dioxide and methane.

**Hydro** Hydroelectric power is electricity derived from the energy of falling or running water. Within the National Park we will mostly be considering applications for river based micro-hydro schemes. These generated enough electricity to power single dwellings

**Kw** Measure of electricity. One Kilowatt equals 1,000 watts.

**Renewable Energy** the term used to cover those energy flows that occur naturally and repeatedly in the environment. It includes all energy derived from the sun (solar, wind, tidal, wave, hydro and biomass) and geothermal sources

**Solar photovoltaic** Cells that convert sunlight directly into electricity. These are commonly referred to as solar panels and in domestic circumstances are usually roof mounted.

**Solar thermal** Generates heat energy from the sun, usually used to heat water (solar hot water) or other fluids. These are commonly referred to as solar hot water panels, and as with PV in domestic settings are usually roof mounted.

**Small Scale Wind** Converts kinetic energy from the wind into electrical power, commonly referred to as wind turbines. Within the National Park it is generally considered that this technology would not generate more than 50kW.

**Water, ground and air source heat pumps** central heating system that transfers heat to and from the source energy ie a ground source heat pump harvests heat absorbed at the Earth's surface from solar energy for use as central heating and/or hot water

**Watt** International measure of energy defined as joule per second.