Pembrokeshire Coast National Park Authority

Renewable Energy

Supplementary Planning Guidance to the Pembrokeshire Coast National Park Local Development Plan 2

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This item is also available in Welsh/ Mae'r eitem hon ar gael yn Gymraeg hefyd

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Glossary

AD – Anaerobic Digestion

AONB – Area of Outstanding Natural Beauty

BREEAM – Building Research Establishment Environmental Assessment Method

CAD – Centralised Anaerobic Digestion

CCHP – Combined cooling heat and power

CHP – Combined heat and power

CIL – Community Infrastructure Levy

CLG – Communities and Local Government

CSH – Code for Sustainable Homes

EIA – Environmental Impact Assessment

FIT – Feed In Tariff

GSHP – Ground Source Heat Pump

KWh – Kilowatt hours

LAPC – Local Air Pollution Control

LCA – Landscape Character Area

LDP – Local Development Plan

LPA – Local Planning Authority

LUC – Land Use Consultants

MIPPS – Ministerial Interim Planning Policy Statement

MW - Megawatt

MWh – Megawatt hours

NNR – National Nature Reserve

NPA – National Park Authority

NPS – National Policy Statement

NRW – Natural Resources Wales

PCNP – Pembrokeshire Coast National Park

PCNPA – Pembrokeshire Coast National Park Authority

PLANED - Pembrokeshire Local Action Network for Enterprise and Development

PPW – Planning Policy Wales

PV – Photovoltaics

ROC – Renewable Obligation Certificate

RHI – Renewables Heat Incentive

SAC – Special Area of Conservation

SDF – Sustainable Development Fund

SEA – Strategic Environmental Assessment

SHW – Solar Hot Water

SPA – Special Protection Area

SPG – Supplementary Planning Guidance

SSSI – Site of Special Scientific Interest

TAN – Technical Advice Note

WG – Welsh Government

Introduction

1.1 The purpose of the Supplementary Planning Guidance (SPG) is to provide guidance to support the positive implementation of the Pembrokeshire Coast National Park Local Development Plan 2, Policy 33.

1.2 An earlier version of this guidance was adopted under Local Development Plan 1.

The Role of Renewable Energy

1.3 Renewable energy refers to energy flows that occur naturally and continuously in the environment, such as energy from the wind or sun. These sources are not depleted by being used.

1.4 The term renewable energy is commonly used to describe both 'renewable' energy and 'low carbon' technologies. Whilst 'renewable energy' technologies (such as wind and solar energy) do not create carbon emissions during energy generation, 'low- carbon' energy technologies (such as air source heat pumps) have associated carbon emissions (in this case from the use of electricity to drive the motor), albeit much lower than that associated with conventional energy generation. It is recognised that heat pumps can produce zero carbon energy, for example, where electricity is supplied by a green energy provider.

1.5 For the purpose of this Supplementary Planning Guidance, the term 'renewable energy' will be used to refer to renewable and low-carbon energy technologies.

1.6 Renewable energy generation is a key part of the commitment to reducing reliance on fossil fuels, tackling the climate emergency and meeting the Welsh Government's targets to achieve decarbonisation.

1.7 In addition to powering and heating homes, buildings and businesses, renewable energy can bring social and economic benefits through job creation in the manufacturing, construction and maintenance industries. Renewable energy schemes can support rural diversification and educational opportunities, and community-owned renewable energy projects can provide incentives and ownership, as well as promoting self-sufficiency.

1.8 Careful consideration also needs to be given to likely adverse effects. Renewable energy schemes should minimise any environmental, social, resource and economic impacts through careful site selection, good design, construction and other measures that reflects local circumstances. These are 'material planning considerations' that will need to be addressed on a site-by-site basis. This is particularly important in National Parks, where renewable energy installations should not adversely affect their special qualities.

National Parks and special qualities

1.9 National Parks have been designated to conserve their natural beauty, wildlife and cultural heritage. It remains a central objective to maintain the integrity and quality of the landscape within National Parks. It follows that development proposals should not adversely affect the special qualities of the National Parks.

Valued and Resilient: The Welsh Government's Priorities for Areas of Outstanding Natural Beauty and National Parks July 2018

'4. Green energy and decarbonisation

Designated landscapes must ***contribute to a sustainable low carbon economy for Wales,*** for example, ***through enabling the generation of renewable energy at an appropriate scale, water management and carbon sequestration***.

In order to conserve and enhance the outstanding quality of these landscapes, AONBs and National Parks are afforded special protections within the land use planning system compared with the rest of the countryside. This is right. However, it is also right for the Authorities and Partnerships to be challenged to assist Welsh Ministers to discharge the duty under the Environment (Wales) Act to ensure that in 2050 net emissions are at least 80% lower than the baseline set in legislation.

Through careful planning and management these landscapes can play a key role in meeting the challenges of adaptation and mitigation of climate change, achieving energy security whilst creating resilient communities and supporting the environment. ***Communities should be supported to bring forward appropriate renewable energy schemes*** which have the potential to reduce dependence on carbon based energy and be a source of revenue for the community.

1.10 The special qualities are those characteristics and features of a National Park that individually or in combination contribute to making the National Park unique. The special qualities of Pembrokeshire Coast National Park are outlined in the Pembrokeshire Coast Landscape Character Supplementary Planning Guidance and in the Pembrokeshire Coast National Park Local Development Plan2 and are as follows:

The special qualities of Pembrokeshire Coast National Park

- Coastal splendour
- Diverse geology
- Diversity of landscape
- Distinctive settlement character
- Rich historic environment
- Cultural heritage
- Richness of habitats and biodiversity
- Islands
- Accessibility
- Space to breathe

- Remoteness, tranquillity and wildness
- The diversity of experiences and combination of individual qualities

1.11 The priorities for protecting these special qualities are outlined in Policy 8 of the Pembrokeshire Coast National Park Local Development Plan 2.

1.12 The National Park Authority has prepared Guidance on Sustainable Design and Development. This includes useful design guidance for renewable energy, to which developers and applicants should refer. This guidance is reflected in the technology-specific guidance that follows.

1.13 The National Park Authority has also prepared Guidance on the Cumulative Impact of Turbines which will assist.

National Planning Policy context

1.14 The key policy drivers for renewable and low carbon energy developments in Wales are as follows:

National policy

Renewable Energy (General)

1.15 **Nationally Significant Infrastructure Projects:** The Planning Act 2008 defines what a Nationally Significant Infrastructure project is. The 2008 Act process, as amended by the Localism Act 2011, involves an examination of major proposals relating to energy, transport, water waste and waste water. Under the 2008 Act an application is made for a Development Consent Order (DCO) to the Planning Inspectorate. The Authority's role in the Examination is that of a statutory consultee and it is under a duty to submit a 'Local Impact Report' to the Examining Authority. National Policy Statements (NPSs) are produced by the UK Government and decisions on Nationally Significant Infrastructure Projects are taken within the context of these statements.

1.16 **Developments of National Significance in Wales:** The statutory basis for the Development of National Significance ("DNS") process is provided in Part 5 of the Planning (Wales) Act 2015, which amends the Town and County Planning Act 1990 ("the Act"), and the Developments of National Significance (Procedure) (Wales) Order 2016 and subsequent Regulations. Future Wales – The National Plan 2040 states that proposals for large-scale energy development are classed as 'Developments of National Significance' and are determined by Welsh Ministers. As set out in legislation applications for Developments of National Significance must be determined in accordance with Future Wales, which is the national development plan for Wales. Large-scale energy developments include all on-shore wind generation of 10 or more megawatts and other energy generation sites with generating power between 10 and 350 megawatts.

1.17 Future Wales Policy 17 states that in Pre-Assessed Areas for Wind Energy the Welsh Government has already modelled the likely impact on the landscape and has found them to be ` development in an acceptable way.

There is a presumption in favour of large-scale energy development in these areas. Applications for large-scale wind and solar will not be permitted in National Parks and AONBs. Policy 18 states that proposals outside of the Pre-Assessed Areas for wind developments and everywhere for all other technologies will be permitted subject to the proposal having no unacceptable adverse impact on the surrounding landscape (particularly on the setting of National Parks and AONBs).

1.18 A full list of the types of developments covered by this can be found in The Developments of National Significance (Wales) Regulations 2016.

1.19 A Local Impact Report is also required for these types of proposals.

1.20 This guidance will be used to consider both planning applications to this planning authority for renewable forms of energy and for preparing Local Impact Reports.

1.21 **Planning Policy Wales (PPW) Edition 11 (2021)** sets out the land use planning polices of the Welsh Government. Chapter 4 of PPW Productive and Enterprising Places states as part of Welsh Government's aim to promote sustainability through the planning system, "The benefits of renewable and low carbon energy, as part of the overall commitment to tackle climate change and increase energy security, is of paramount importance." (PPW, para.5.77, 2021).

1.22 Planning Policy Wales section 5.9 Renewable and Low Carbon Energy states the planning system should be used to optimise renewable energy generation, optimise low carbon energy generation, maximise the use of waste heat or other heat sources such as former mine workings and promote heat networks where feasible and recognise that the benefits of renewable energy are part of the overall commitment to tackle climate change by reducing greenhouse gas emissions as well as increasing energy security. However, these objectives need to be viewed alongside the need to minimize impacts on local communities, the impact on the natural and historic environment and cumulative impacts, whilst ensuring the potential impact on economic viability is given full consideration and; encourage the optimisation of renewable and low carbon energy in new development to facilitate the move towards zero carbon buildings.

1.23 Planning Policy Wales 11 paragraph 5.9.8 states that Local Planning Authorities must develop an evidence base to inform the development of renewable and low carbon energy policies. Planning authorities should identify the accessible and deliverable renewable energy resource potential for their area whilst taking into account the cumulative impact of renewable energy development and associated infrastructure. Pembrokeshire Coast National Park Authority has undertaken such an assessment and it is this assessment that forms the background to this guidance.

1.24 **Policy 33 Renewable and Low Carbon Energy:** Policy 33 of the Local Development Plan sets out the policy framework for considering renewable and low energy proposals in the National Park.

1.25 **Permitted Development Rights:** Planning permission is not required for certain types of renewable energy developments. This is because these types of development are identified as being ‘permitted development’, under the Town and Country Planning (General Permitted Development) Order 1995 (the “GPDO”), as introduced by the Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2012. These changes include minor alterations to homes and the installation of a wide range of micro-generation equipment. It is important to consider the wider implications of any permitted development proposals. Although in some circumstances development may not require planning permission, it may still have the potential to adversely impact upon the natural environment. In such instances it is the responsibility of the applicant to ensure no harm results from the development. It is recommended that prior to changes being made applicants seek advice from the National Park Authority or Natural Resources Wales (NRW) in case other (legal) consents are required, e.g. an abstraction licence. Permitted development rights are sometimes removed by Local Planning Authorities. This can happen where an Article 4 Direction is put in place. It can also arise where a condition is put on a planning permission which removes permitted development rights.

Small Scale Solar Installations

What Are Small scale Solar installations?

1.26 Solar technologies are concerned with capturing energy from the sun. The two most common types of technology, and those considered here are solar hot water (SHW); and solar photovoltaics (PV). There are also emerging systems that heat the air of the building utilising roof mounted collector plates. This section covers small-scale building mounted SHW and solar PV installations. Some are subject to 'permitted development rights'. [1] Field-scale commercial solar installations (known as 'solar farms') are addressed in Section 3.

1.27 **Solar hot water:** Solar water heating is deployed primarily as a building-mounted or building-integrated technology serving the needs of the building with which it is associated. It involves collecting heat from the sun via highly heat-absorbent collectors. Two main types are common in the UK: flat plate collectors and evacuated tube collectors, the latter being more effective throughout the year but more expensive. In both types, radiation from the sun is collected by an absorber plate in the collector, and is transferred as heat to a liquid, which may be either water, or a special fluid employed to convey the energy to the hot water system using a heat exchanger. A typical solar hot water installation is shown in the image below.

1.28 **Solar Photovoltaics (PV):** Solar Photovoltaics (PV) produce electricity from the light of the sun. Solar PV can either be roof-mounted, building-integrated through the use of solar shingles, solar slates, solar glass laminates or stand alone[2] in modular form.

Solar hot water panel (evacuated tube system)

Credit: Centre for Sustainable Energy

[1] Where such rights apply, no specific application for planning permission is needed.

[2] which is not installed on a building.

Credit: Centre for Sustainable Energy

Retrofit solar PV panel

Credit: Centre for Sustainable Energy

Building-integrated solar PV tiles

Technological potential within Pembrokeshire Coast National Park

1.29 The National Park receives good levels of solar radiation, compared to the rest of the UK (Figure 2.1). Therefore, in theory:

- all areas of the National Park have good potential for solar energy generation; and small-scale solar installations can make a key contribution to meeting renewable energy targets in the National Park.

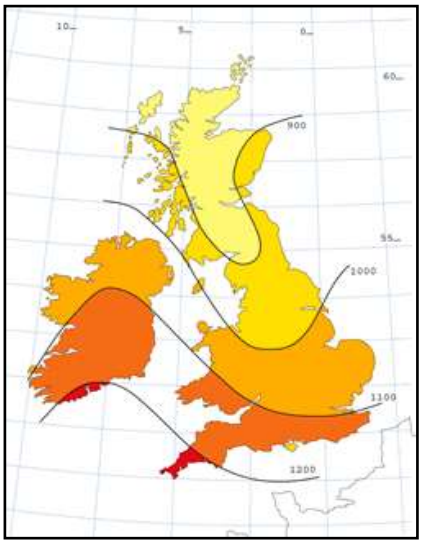

Figure 2.1: UK solar irradiation - Annual Total kWh/m² banding

Map showing average annual solar radiation on a 30° incline facing due south

Source: Solar Trade Association

Choosing a suitable site within the National Park

1.30 When determining where to install small scale solar hot water and solar PV systems, the key consideration is maximising exposure to sunlight. It is generally recommended that solar thermal systems and solar PV panels:

- are installed on a south facing roof, or on a flat surface, tilted in a southerly direction at an angle of 30-40 degrees from the horizontal, avoiding the shade cast by nearby tall structures such as buildings and trees – which will reduce its ability to collect energy;
- take account of views from neighbouring properties and other nearby buildings.

Key landscape sensitivities and general guidance for siting small-scale solar installations within the National Park

1.31 Both solar hot water and solar PV units can be used throughout the National Park, principally associated with buildings including agricultural buildings, offering a solution with low landscape impact so long as care is taken to minimise to an acceptable level the visibility of the units. Both technologies can be retrofitted on the roof of existing buildings using roof-mounted panels or integrated into the design of new buildings, such as through the use of PV roof shingles (see images following paragraph 1.28).

1.32 Historic buildings, listed buildings and those located in building Conservation Areas are likely to be particularly sensitive to small scale solar installations). Retrofitted roof-mounted solar units on buildings can sometimes have a 'modernising' effect on their character and appearance, particularly when they

are located on the principal elevation of a property. It is therefore beneficial for solar panels to:

- match other roof materials;
- lie be flush with the roof and be mounted at the same angle to minimise contrast;
- be mounted on a side or rear roof elevation where they are likely to be less visible in the case of retrofitted panels, or incorporated as a garden feature, especially in the case of older buildings;
- be located and at a suitable angle to maximize the capture of the sun's energy.

1.33 In this way solar technologies can help:

- maintain and enhance the rich heritage of historic buildings and settlements of the National Park reflecting their local character.
- ensure that new development, restoration and conversions reinforce and enhance the character of settlements and their setting.
- ensure that high quality modern design fits neatly and complements building traditions of the past.

Field-Scale Solar Photovoltaics (PV)

What Are Field-scale Solar Photovoltaics (PV)?

1.34 Solar technologies are concerned with capturing energy from the sun. This section covers field-scale solar PV installations. Small-scale solar PV and solar thermal installations are addressed in Section 2.

1.35 Field-scale solar PV has been popular with developers, however, following changes to the FiT scheme, field-scale solar PV is only eligible for limited funding.

1.36 Proposals for field-scale solar PV developments consist of groups of solar PV panels installed in 'arrays' of 18-20 panels with each PV panel typically able to generate 220 watts of electrical power.

1.37 Four sizes of field-scale solar PV developments have been identified as having the potential to be located within National Park (classified to reflect its landscape sensitivities). These are:

Size	Area
Large	> 5 ha.
Medium	3 ha. – 4.9
Small	1 ha. – 2.9 ha.
Very small	<1 ha.

1.38 The main features of field-scale solar PV installations include:

- **Panels are dark in colour as a result of their non-reflective coating** to maximise absorption of light. Panels may however, appear paler in colour dependent on light conditions and type of panel. Panel surrounds and electric cable coverings may also reflect more light. They have been likened to polytunnels, silage bales wrapped in black plastic, or standing water (i.e. reservoirs or lakes) when viewed from a distance. Panels may also be seen from behind (back of the panels) or from the side (down the rows of frames) which strongly influences how they are perceived.
- **Panels are encased in an aluminium frame,** supported by aluminium or steel stands mounted and secured either on pre-moulded concrete block 'anchors', or foundations. Some developments contain panels that can be manually rotated and/or tilted several times a year to enable the arrays to track the sun. The technology does exist to allow for automatic tracking, although this is rarer.
- **Panels are held at a fixed angle** between 20-40 degrees from the horizontal, facing south to maximise absorption of energy from the sun
- **Arrays are sited in rows with intervening gaps** between them for access and to ensure that the individual panels are not in the shade of another panel. The actual arrangement of the arrays within the

landscape varies from scheme to scheme (i.e. regular layouts versus more varied and irregular, depending on the site situation). Generally though, the **layout of solar arrays is regular.**

- **The height of the racks of solar panels varies** depending on the panel manufacturer and installer, but they tend to be between 2-4m off the ground. The approved scheme at Rhos-y-Gilwen Solar Park, Pembrokeshire has panels that will stand 2.5 metres above ground level and will be supported on metal legs.

Credit: Land Use Consultants

Installed solar array near Berlin, Germany

Credit: Land Use Consultants

Close up view of free-standing solar array

- **Grazing by sheep or geese** is possible dependent on the height of the solar panels. This is a compatible form of land management, as it

ensures that growing vegetation does not affect the efficiency of the panels, and allows for traditional rural land management to continue.

- **Security fencing up to three metres in height** is generally proposed as part of field-scale solar PV developments for insurance purposes. This tends to be mesh fencing, often topped with razor wire.
- **Screen planting may be necessary** to ensure the solar panels and associated infrastructure are screened from view. This has to be at sufficient distance to avoid casting shade over the peripheral panels.

1.39 In addition to the main features listed above, other aspects of field-scale solar PV developments include:

- Temporary storage for plant, machinery and materials during construction.
- Inverters to convert the electricity from DC to AC – these may be housed within small new or existing buildings.
- Transformer / underground power cables to transfer the electricity to the National Grid.
- On-site power house or control room (usually a Portacabin with a concrete base). The size of the proposed control room for the approved Rhos-y-Gilwen solar farm was 10 x 8 metres.
- CCTV.

Technological potential within Pembrokeshire Coast National Park

1.40 Wales is an attractive location in the UK for this technology, due to its good levels of solar radiation, relative to the UK as a whole.

Choosing a suitable site within the National Park

1.41 In general, the favoured sites for field-scale solar PV installations are plateaux tops / flat land or gentle slopes with a southerly aspect to maximise efficiency. From a landscape impact and logistical point of view, steep slopes should be avoided.

1.42 The capacity of power lines running close to the site is also an important consideration. 11kV lines can support installation of a solar array with an output of 2 or 2.5 MW, while 33kV lines could support a solar array which generates up to 5MW or more. It is also important to check the proximity of the nearest electricity substation, to which the solar panels will be connected.

1.43 Another consideration for site selection is the proximity of the railway and road network, public rights of way and residential areas. The provision of any reflective material used on the panels should not interfere with the line of sight of train drivers and road users (for public safety reasons). In addition, the potential for glare or reflection of light from the panels that may impact upon signalling should be explored and eliminated. Similarly, the impact of the siting of solar panels, particularly in terms of their reflectivity, should be considered in relation to views from the sea and the impacts that may have on

sea users (e.g. for fishing, tourism and other commercial activities), views from public rights of way and from residential areas.

1.44 The cumulative effect of multiple schemes should be taken into account, particularly as they tend to cluster around grid connection points.

1.45 The need to protect the high quality coastal landscape of the Pembrokeshire Coast National Park, limits locations suitable for the installation of field-scale solar PV developments. In March 2011, an assessment of landscape sensitivity to field-scale solar PV was completed on behalf of Pembrokeshire Coast National Park Authority. This used the Landscape Character Assessment of Pembrokeshire Coast National Park as a base. This divides the landscape of the National Park into 28 unique Landscape Character Areas (LCAs) each with its own distinct landscape character. The sensitivity of each Landscape Character Area to different scales of solar PV installation is indicated in Figure 3.1 – 3.4 while Annex 1 provides a commentary on these sensitivities and guidance on where and how solar PV developments can be accommodated within the National Park.

1.46 To use this information, identify the location of interest and relevant LCA using Figure 3.1 – 3.4 and review the sensitivity description and guidance provided in Annex 1 where separate information is provided for each LCA.

Key landscape sensitivities and general guidance for siting field-scale solar installations within the National Park

1.47 Field-scale solar PV installations can occupy substantial areas of ground which may be visible (particularly where sites are able to be viewed from adjacent higher ground). Key landscape effects of field-scale solar PV developments are that they may:

- Be highly visible in open landscapes and on the upper slopes of hillsides, especially where covering significant areas.
- Lead to a perceived increase in human influence on the landscape.
- Result in a change in land use and in the appearance of a field or fields, affecting land cover patterns.
- Introduce a regular edge (to the panels) that can be particularly conspicuous in more irregular landscapes (especially where the panels do not follow contours).
- ‘Overtop’ hedgerows where panel heights rise to 3-4m, potentially reducing the visual prominence of field boundaries – this will be a particular issue where a number of adjacent small fields are developed.
- Change the character of enclosure with security fencing and screen planting (including hedges allowed to grow out) around solar PV developments.
- Damage landscape features during construction.
- Result in a significant change in the character of wild or natural landscapes which are valued for their high nature conservation value and qualities of remoteness.

- Introduce ancillary buildings that can be uncharacteristic in more wild and open landscapes.
- Result in glint and glare from the panels.

1.48 Annex 1 provides guidance on the location and siting of field-scale photovoltaic developments. A checklist of the main factors to be taken into account in the siting of field-scale photovoltaics is provided below:

- Locate any development back from the coastal edge so that it does not detract from the relative remoteness, drama and natural character of the coastline, maintaining its open and exposed character.
- Consider views along and to the coast, from local viewpoints, and from popular tourist and scenic routes (including The Pembrokeshire Coast Path and other rights of way). Avoid locating solar PV developments where they could be directly overlooked at close quarters from important or sensitive viewpoints.
- Maintain uninterrupted views from the coast to the internal landscape to preserve its remote and strong cultural and historic sense of place.
- Site solar PV development on flat landforms or on lower slopes/within folds in gently undulating lowland landscapes rather than on prominent upland landforms, highly visible slopes, or coastal headlands.
- Ensure PV developments do not span across different landscape types, such as across upland-lowland transitions.
- Site PV developments in landscapes where screening is already provided by woodland, hedgebanks or high hedges. Where new screen planting is required the National Park Authority should be consulted on the appropriate choice of species.
- Avoid siting PV developments across multiple fields in areas with a small scale irregular field pattern that is important to landscape character.
- Site PV development in areas that already contain signs of human activity and development rather than in landscapes with a high degree of perceived naturalness or remoteness.
- Consider how panels will be transported to site – some rural lanes are very narrow and have hedges either side. Small vehicles suitable for these narrow lanes should be used to ensure these features are not damaged.
- Suitable materials (such as cladding of buildings) and finish colours should be used that integrate any new buildings with their surroundings . Utilise existing farm buildings to house inverters wherever possible.
- Avoid adversely affecting areas of semi-natural habitat, and designated historic and archaeological sites directly or indirectly.
- Protect the character and setting of buildings within Conservation Areas.
- Ensure that any PV developments do not detract from prominent landmarks.

- Protect the special qualities of the Pembrokeshire Coast National Park (see Policy 8).
- Measures should be taken to minimise any visual and noise impacts on the amenity of neighbouring land uses.

Anaerobic Digestion

What is anaerobic digestion?

1.49 Anaerobic digestion (AD) is a method of waste treatment that can either produce a biogas with high methane content or, following a similar process, produces hydrogen, both from organic materials such as organic agricultural, household and industrial wastes and sewage sludge (feedstocks). The methane or hydrogen can be used to produce heat, electricity, or a combination of the two. Alternatively hydrogen can be used for storage of energy in hydrogen cells or as a medium for transporting energy for use elsewhere.

1.50 Anaerobic digesters utilising farm and food wastes bring considerable benefits. They convert methane, a significant greenhouse gas and a major by-product of animal slurries from livestock farming and anaerobic decomposition of food waste, into energy (electricity and heat). They make a significant contribution to reducing greenhouse gas emissions, both by reducing the quantities of methane released into the atmosphere, and by providing a low carbon energy source that substitutes for energy generated from fossil fuels.

1.51 An AD plant typically consists of a digester tank, buildings to house ancillary equipment, a biogas storage tank and a flare stack (3 – 10m in height). The digester tank is usually cylindrical or egg-shaped, its size being determined by the projected volume and nature of the waste. It can be part buried in the ground.

1.52 There are two scales of anaerobic digestion plant of relevance to Pembrokeshire Coast National Park:

- Small scale plants dealing with the waste from a single farm (generating in the region of 10kW) with the biogas potentially used to heat the farmhouse and other farm buildings in the winter when farm wastes are available.
- A medium-sized centralised facility (CAD) dealing with wastes from several farms supplemented by other feedstocks and potentially producing up to 2MW.

1.53 The potential sourcing of feedstock for anaerobic plants within the National Park includes:

- **Farm wastes:** the National Park is a major livestock producing area with a large number of small dairy farms producing significant quantities of farm slurries that are an ideal feedstock. In addition, the resultant digestate from AD is a good and stable fertiliser that does not have the environmental problems associated with farm slurries which may be easily washed into water courses.
- **Agricultural crops:** Where farm wastes are used in anaerobic digestion these are often supplemented during the summer by farm crops grown for that purpose.

- **Food processing wastes:** Food wastes produced within the National Park are a possible source.
- **Alternative plant materials:** Other sources of vegetation that have been considered as a feedstock for anaerobic digestion include waste vegetation arising from land management activities.

Technological potential within Pembrokeshire Coast National Park

1.54 The potential for anaerobic digestion will depend on the availability of suitable feedstocks within the area.

Choosing a suitable site within the National Park

1.55 Small-scale AD plants and those dealing with wastes from one or two farms offer significant potential for the generation of electricity and heat within the National Park. Provided digesters are integrated into the existing farm complex, or building groups, and natural screening is provided where appropriate, small digesters can be incorporated into the wider landscape and should not conflict with the National Park Management Plan objectives. Larger digesters, shared between a number of farms, or located to provide heat and energy to groups of houses, will need to be considered in terms of traffic movements and the potential impacts on landscape and the built environment.

1.56 Large commercial AD plants are unlikely to be acceptable within the National Park, because of the scale of the development and the lorry / tractor movements required to supply the feedstock through the year. As highlighted in the South West Wales Regional Waste Plan August 2008, Appendix J, National Parks are automatically excluded from areas of search for sub-regional waste management sites. In addition, Policy 27 Local Waste Management Facilities provides for facilities which predominantly serve the National Park rather than a wider area.

Key landscape sensitivities and general guidance for siting anaerobic digestion plants within the National Park

1.57 Areas of the National Park where AD development of any scale should be avoided are:

- Tranquil, rural areas where human influence is limited.
- The coastal edge.
- All areas of semi-natural habitat.
- Areas with a strong historic character.

1.58 A checklist of the main factors to take into account in the siting of g small or medium-scale anaerobic digestion plants is provided below:

- They should be integrated or adjacent to existing buildings or farmsteads.
- The digester tank should be part buried in the ground.

- Installations should not be sited in prominent locations or on exposed skylines – the flare stack can be prominent.
- Installations should not be prominent in key views, particularly those along the coastline.
- Existing landmarks (for example church towers and spires) should remain prominent and installations should not detract from views to these landmarks.
- Installations should not affect the historical value of designated industrial features, historic monuments and archaeological sites and remains, or the ecological value of semi-natural habitats.
- Installations should not adversely affect the character and appearance of any building Conservation Areas and listed buildings.
- Suitable materials (such as cladding of buildings) and finish colours should be used that integrate structures with their surroundings.
- Tree planting (using native species) that helps filter views of the AD plant should be considered from key public vantage points. This may include tree planting at a distance from the anaerobic digestion plant.
- Measures should be taken to minimise any visual, odour and noise impacts on the amenity of neighbouring land uses associated with the operation of the plant and delivery of feedstocks.

Biomass Plants

What are biomass Plants?

1.59 Biomass plants are concerned with producing heat from the burning of plant materials. The final output will either be heat or electricity. For electricity production the heat / steam is used to turn a turbine. There are currently three basic categories of biomass plant:

- **Plants designed primarily for the production of electricity**. These are generally the largest schemes, in the range 10 – 40 MW. Excess heat from the process is not utilised. These plants are major multi-million pound developments and are unlikely to be suitable within the National Park because of the scale of development and associated traffic movements. **They are therefore not considered further here.**
- **Combined Heat and Power (CHP) plants** where the primary purpose is the generation of electricity but the excess heat is utilised, for instance, as industrial process heat or in a district heating scheme. The typical size range for combined heat and power is 5 to 30 MW thermal total energy output but smaller 'packaged' schemes of a few hundred kilowatts have been built in the UK.
- **Plants designed for the production of heat.** These cover a wide range of applications from domestic wood burning stoves and biomass boilers to boilers of a scale suitable for district heating, commercial and community buildings and industrial process heat. Size can range from a few kilowatts to above 5 MW of thermal energy.

1.60 Small and medium-scale biomass heating systems (and combined heat and power systems) for commercial premises, tourism facilities/accommodation complexes, community facilities (schools, leisure centres, public buildings) and groups of dwellings are typified by the following:

- A boiler (and boiler house) and associated storage facilities. A small heat plant for a school might consist of a 4m x 4m boiler house with a fuel bunker of similar proportions, which may be part underground, with a lockable steel lid.
- A chimney – for a small plant like the one described above, this will be 3m to 10m high, depending on plant design and surrounding buildings.
- Sufficient space to manoeuvre a large lorry or tractor and trailer safely for fuel delivery.

1.61 Domestic systems, including wood-burning stoves and biomass boilers, comprise the following features / requirements:

- Woodburning stoves are the size of a typical room heater and may be fitted with a back boiler to provide water heating as well as room heat. These typically use sawn logs.

- Biomass boilers are connected to central heating and hot water systems are generally larger than 15 kW and utilise either wood pellets or woodchip, although some can use sawn logs.
- Fuel storage space, typically 7m^3 of wood pellets or 21 – 35m^3 of woodchip.
- Access to accommodate bulk deliveries of wood fuel by lorry or tanker.

1.62 The three main fuels that are used in biomass heating systems are logs (mainly used in domestic wood-burning stoves), woodchip and wood pellets.

Technological potential within Pembrokeshire Coast National Park

1.63 Within the National Park the main potential is for medium, small and domestic scale biomass heating systems, as well as small-scale combined heat and power plants serving a group of dwellings or other collection of buildings. In all cases, the scale of development should be in-keeping with the scale of the landscape or settlement within which it is to be located. **Larger scale plants are unlikely to be suitable.**

Choosing a suitable site within the National Park

1.64 Community and domestic scale biomass heating systems that use local wood fuel bring significant reductions in CO2 emissions. They will also provide a much needed stimulus to the existing local wood fuel supply chain and, in turn, will help diversify and strengthen the local land-based economy. They therefore bring significant benefits with household and community schemes generally easily accommodated into the built fabric of the National Park.

1.65 Provided they are well-integrated into the built environment, biomass plants have the potential to be installed throughout the National Park.

Key landscape sensitivities and general guidance for siting biomass plants within the National Park

1.66 Historic buildings, listed buildings and those located in Conservation Areas will require care in the siting of new structures and flues.

1.67 A checklist of the main factors to take into account in the siting of small-scale and community biomass facilities that require new building and/or the addition of a chimney is as follows:

- Integrate any new structures within existing building complexes.
- Avoid locating visible installations in prominent locations on the open coastal edge or on exposed skylines.
- Ensure existing landmarks (for example church towers and spires) remain prominent and that installations do not detract from views of existing landmarks.
- Ensure installations are not prominent in key views, particularly those along the coastline.

- Ensure installations do not affect the historical value of designated industrial features, historic monuments or archaeological sites and remains, or the ecological value of semi-natural habitats.
- Ensure installations do not adversely affect the character and appearance of building Conservation Areas or of listed buildings.
- Suitable materials (such as cladding of buildings) and finish colours should be used that integrate structures with their surroundings.
- Measures should be taken to minimise any visual, odour and noise impacts on the amenity of neighbouring land uses associated with the operation of the plant and delivery of feedstocks.

2 Micro-Hydro

What is Micro-hydro?

2.1 Hydro power is the use of water flowing from a higher to a lower level to drive a turbine connected to an electrical generator, with the energy generated proportional to the volume of water and vertical drop or head.

2.2 Small-scale hydro power plants in the UK generally refer to sites generating up to a few hundred kilowatts where electricity is fed directly to the National Grid. Plants at the smaller end of this scale (typically below 100kW) are often referred to as micro-hydro and may include schemes providing power to a single home.

2.3 The majority of suitable locations are likely to be for 'run of river' schemes, where a proportion of a river's flow is taken from behind a low weir and returned to the same watercourse downstream after passing through the turbine. Appropriate locations for 'storage' schemes, where the whole river is dammed and flow released through turbines when power is required, are unlikely to exist. The key elements of a 'run of river' micro-hydro scheme are:

- A source of water that will provide a reasonably constant supply. Sufficient depth of water is required at the point at which water is taken from the watercourse, and this is achieved by building a weir across the watercourse of sufficient height to fill the penstock or 'intake'.
- A pipeline, often known as a 'penstock', to connect the intake to the turbine. A short open 'headrace' channel may be required between the intake and the pipeline.
- A cover / small shed housing the turbine, generator and ancillary equipment – the 'turbine house'.
- A 'tailrace' returning the water to the watercourse.
- A link to the electricity network, or the user's premises.

Technological potential within Pembrokeshire Coast National Park

2.4 Hydro power is well developed in Wales where most sites with a potential greater than 1 MW have been exploited. Within the Pembrokeshire Coast National Park the realistic options will be micro-hydro 'run of river' with an installed capacity of less than 100kW and the restoration of traditional mills (both river mills and tidal mills).

River Basin Management Plans and Abstraction Licenses

2.5 Local Planning Authorities have a statutory duty to have regard to River Basin Management Plans in exercising their planning powers. For hydropower schemes, this means ensuring that the hydropower development will not compromise the ability to achieve:

- The environmental objectives of the River Basin Management Plan;
- Good ecological status / potential of the waterbody; and
- No deterioration of water quality status.

2.6 For all hydro power schemes, Natural Resources Wales will need to be contacted to issue an abstraction license. In addition, an Impoundment Licence and Flood Defence Consent may also be required from Natural Resources Wales.

Choosing a suitable site within the National Park

2.7 Micro-hydro schemes can be integrated into the landscape with appropriate siting and design, utilising landform and existing vegetation to help screen the new small turbine housing.

2.8 The sensitive restoration of old water mill sites or other structures (i.e. weirs, mill ponds, millraces or leats, sluice gates and tailrace outlets) will bring considerable conservation benefits over and above the generation of electricity.

Key landscape sensitivities and general guidance for siting micro hydro schemes within the National Park

2.9 The following checklist should be noted when siting micro hydro schemes within Pembrokeshire National Park.

- Hydro schemes sited in rivers lined with trees may be concealed more easily than those in open landscapes.
- In areas of more open landscape, high standards of design will help to minimise visual impacts, including the use of local materials for weirs and built structures along with vegetation screening.
- Burying pipelines and minimising hard surfacing and ‘formal’ planting can help to integrate more visible schemes into the rural landscape.
- Mills that are Listed Buildings and/or located within a Conservation Area require sensitive restoration that respects the structure of the original building.
- Measures should be taken to minimise any visual or noise impacts on the amenity of neighbouring land uses.

3 Ground and Air Source Heat Pumps

What are ground and air source heat pumps?

Ground source heat pumps

3.1 Ground source heat pump (GSHP) systems capture the energy stored in the ground surrounding (or even underneath) buildings or from water (rivers, canals, lakes or underground aquifers). Essentially, they use low grade thermal energy from the ground and a refrigeration cycle to deliver heat energy at higher temperatures, (typically 40-45^{o}C) or low temperatures, using a reverse cycle, for cooling (typically 6-12^{o}C).

3.2 GSHP systems collect or deliver heat using ground collectors (typically coils or loops of pipe laid in trenches in the ground or vertical boreholes), in which a heat exchange fluid circulates in a closed loop and transfers heat via a heat exchanger to or from the heat pump. The heat pump itself is a similar size to a large fridge and is situated inside the building. A typical GSHP comprises the following:

- A heat pump.
- An earth collector loop (which may be laid in a trench or in boreholes).
- An interior heating or cooling distribution system.
- Boreholes or trenches – boreholes drilled to a depth of between 15 - 150 metres benefit from higher ground temperatures than trenches.

3.3 Once installed, there are no externally visible features associated with ground source heat pumps.

Air source heat pumps

3.4 An air source heat pump (ASHP) uses the air as a heat source for heating a building. They can be described as an air-conditioning unit running in reverse. Air source heat pumps are typically mounted on an external wall (sometimes under a window). Increasingly, manufacturers are producing internally-mounted air source heat pumps which only need louvers and/or roof vents for air supply/exhaust emissions (as in a conventional boiler). Air source heat pumps tend to be much easier and cheaper to install than ground source heat pumps (as they lack any need for external heat collector loops). Once installed, the only externally visible structure may be the 'air conditioning unit' associated with the heat pump facility, although, as noted above, internally mounted pumps are now increasingly available which have no external visual impact. Air source heat pumps, depending on the manufacturer, may be no louder than a central heating boiler.

3.5 For both technologies, temperatures generated will generally be cooler than that associated with conventional heating systems. They are therefore better at supporting under floor heating (in the case of GHSP) or ducted warm air (in the case of ASHPs). However, new product ranges are emerging that can be retrofitted to conventional household heating systems.

Technological potential within Pembrokeshire Coast National Park

3.6 There are opportunities to use ground and air source heat pumps throughout the National Park.

Choosing a suitable site within the National Park

3.7 Because of their minimal landscape impacts, all areas of the National Park could be considered for the installation of ground and air source heat pumps.

Key landscape sensitivities and general guidance for siting ground and air source heat pumps within the National Park

3.8 The following checklist should be considered when siting ground or air source heat pumps within Pembrokeshire Coast National Park:

- The underground pipework associated with ground source heat pumps can easily be covered with soft or hard surfaces and so the system will not be visible from outside the building.
- During construction, the laying of pipes linked to ground source heat pumps should avoid disturbing ground which would be difficult to restore, such as unimproved grasslands, semi-natural habitats, tree roots and archaeological remains.
- Pembrokeshire Coast National Park Authority may require an archaeological survey before construction of ground source heat pumps and advice will need to be sought from the Dyfed Archaeological Trust.
- Air source heat pumps should be mounted on the least visible elevations, such as the rear or side elevation of the building if using an externally mounted unit. Internal units are appropriate anywhere within the National Park.
- Measures should be taken to minimise any visual and noise impacts on the amenity of neighbouring land uses.

District Heating

What is district heating?

3.9 District heating describes infrastructure which provides heat to multiple buildings from a central heat source through a network of pipes, to deliver space heating and hot water. Using this shared infrastructure, heat can usually be generated and delivered more efficiently than with multiple individual systems. There is significant potential for district heating in the UK, although relatively few systems are currently in place.

3.10 The technology typically comprises:

- An energy centre.
- A network of insulated pipes.
- A series of heat exchangers with heat meters in buildings being supplied with heat.

3.11 The pipe network can be installed at the same time as other services (water, drainage, etc.) to minimise costs in new developments. District heating systems can also be retrofitted into existing buildings, although this tends to be a more complicated process.

3.12 Renewable district heating schemes can make use of biomass boilers, anaerobic digestion and possibly ground source heat pumps. The central energy source can generate heat alone, or can be designed as a Combined Heat and Power (CHP) plant to generate both electricity and heat.

3.13 District heating can range from small-scale systems e.g. a biomass boiler supplying a group of ten dwellings, to large-scale schemes supplying town centres or communities, although larger systems are unlikely to be appropriate in the National Park.

3.14 District heating is flexible in terms of its energy source, and the heat can be derived from a wide range of fuel, plant and conversion process types, including traditional gas boilers, biomass boilers, gas or biomass combined heat and power systems and anaerobic digestion. As district heat networks are designed to last for many years; this flexibility also ensures that once installed, the system can adapt to technical advances.

Technological potential within Pembrokeshire Coast National Park

3.15 There is considerable scope for small-scale district heating systems associated with community facilities within the National Park such as swimming pools, leisure centres, sports halls, day and community centres, potentially combined with an adjacent new development. Other opportunities may include combining heating/cooling requirements for adjacent hotels, for example, in Tenby, Saundersfoot and St David's where there are a number of hotels in close proximity; or adjacent small business premises within the

larger settlements of the National Park. The facilities being heated need to be in close proximity to minimise the costs of distribution piping and to minimise thermal losses.

Choosing a suitable site within the National Park

3.16 The most appropriate opportunities will be small-scale district heating schemes associated with new development within the main settlements of the National Park, and small-scale schemes linked to an existing facility that has a large heat energy requirement.

Key landscape sensitivities and general guidance for siting district heating schemes within the National Park

3.17 Please refer to the information elsewhere in this SPG for the relevant technology /ies that are likely to make up a district heating scheme.

4 Wind Energy

What is wind energy?

4.1 Wind turbines are one of the best known and understood renewable technologies. Wind turbines use the wind's lift forces to rotate aerodynamic blades that turn a rotor creating a mechanical force that generates electricity. The amount of energy derived from a wind turbine depends on wind speed and the swept area of the blade (the greater the swept area, the more power the turbine will generate). Wind turbines are generally given planning permission for 25 years, although re-powering (providing a new generation of turbines) may take place after this period has elapsed.

4.2 Wind turbines can be deployed singly, in small clusters, (2 – 5 turbines) or in larger groups as wind farms (typically 5 or more turbines). In the Pembrokeshire Coast National Park, to conserve the National Park's special qualities, the only potential will be as single turbines or, in very specific cases, small clusters of 2 – 3 turbines.

4.3 In all cases wind turbines consist of:

- the tower
- a hub
- blades
- a nacelle (which contains the generator and gear boxes); and
- a transformer that can be housed either inside the nacelle or at the base of the tower.

4.4 The infrastructure requirements for large-scale turbines, in addition to the turbine itself, include:

- road access to the site (usually a bell mouth or equivalent off the main road but may include road widening of more minor roads to achieve access if turbines are large)
- on-site tracks (for construction and on-going maintenance)
- turbine foundations
- one or more anemometer masts
- electrical cabling and an electrical sub-station/control building plus connection to the grid.
- temporary crane hardstanding areas
- temporary construction compound

4.5 Wind energy developments are unique in relation to other tall structures in the landscape, in that they introduce a source of movement into the landscape. In most current designs the turbine blades turn around a horizontal axis (See image below) but in some designs, which have been deployed in and around the National Park, the blades turn around a vertical axis. Two-bladed turbines are also available.

Credit: Land Use Consultants

Two and three blade wind turbines rotating on the horizontal axis

Credit: Land Use Consultants

Vertical axis turbine

4.6 In the context of Pembrokeshire Coast National Park, four sizes of wind turbine have been identified (classified to reflect the landscape sensitivities of the National Park). These are:

Size	Height[1]	Energy output[2]
Large	65m – 125m	330kW - 3MW
Medium	25m – 65m	50kW – 330kW
Small	<25m	10 kW - 50 kW
Micro	Building or mast mounted	< 10kW

1 Height to blade tip

2 Efficiency and energy output is increasing all the time and therefore these values are likely to increase

Technological potential within Pembrokeshire Coast National Park

4.7 On the whole, Pembrokeshire Coast National Park has a good wind energy resource compared to many other parts of the UK. For more details, refer to the Renewable Energy Assessment for Pembrokeshire Coast National Park. Currently the BWEA3 suggests that a large wind turbine requires an average wind speed of more than 7m/s to be viable. Small turbines may be viable with average wind speeds as low as 5m/s.

Choosing a suitable site within the National Park

4.8 The potential for wind energy development within the National Park is constrained by the need to conserve the special qualities of the National Park. However, there is some potential for single or, in more limited locations, small clusters of 2 -3 small turbines where carefully sited.

4.9 An assessment of landscape sensitivity to different sizes of wind turbine was completed in 20084. This used the Landscape Character Assessment of Pembrokeshire Coast National Park as a base. This divides the landscape of the National Park into 28 unique Landscape Character Areas (LCAs) each with its own distinct landscape character. The sensitivity of each Landscape Character Area to each class of turbine height is indicated in Figures 9.1 - 9.3 while Annex 2 provides a commentary on these sensitivities and guidance on where and how wind turbine developments can be accommodated within the National Park. To use this information, identify the location of interest and relevant LCA using Figures 9.1 – 9.3 and review the sensitivity description and guidance provided in Annex 2 where separate information is provided for each LCA. This Supplementary Planning Guidance has been updated to take account of where wind turbines have resulted in discernible change in landscape character as a result of the LANDMAP update by Natural Resources Wales in March 2015.

Key landscape sensitivities and general guidance for siting wind energy schemes within the National Park

4.10 Figures 9.1 – 9.3, and Annex 2 summarise the key landscape sensitivities to wind energy installations within the National Park. A checklist of the main

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[3] British Wind Energy Association (BWEA) : Wind Power: A guide for farms and rural businesses (November 1994)

factors to take into account in the siting of wind energy developments is provided below:

- Locate any wind energy developments back from the coastal edge so that they do not detract from the relative remoteness, drama and natural character of the coastline.
- Locate any wind energy developments (other than those within the curtilage of a private dwelling or associated with a settlement) at least one field back from the coastal edge to maintain its open and exposed character.
- Locate any wind energy developments away from the most prominent rural skylines and consider the impact of associated access tracks and ancillary buildings.
- Consider views along the coast, from local viewpoints, popular tourist and scenic routes (including The Pembrokeshire Coast Path and rights of way network) when siting any wind energy developments in the landscape.
- Ensure wind farm sites do not span across different landscape types, such as across upland-lowland transitions.
- Utilise existing woodlands, rolling topography and overgrown hedges to integrate any infrastructure associated with any wind energy development into the landscape.
- Avoid affecting areas of semi-natural habitat, directly or indirectly.
- Protect designated historic and archaeological sites.
- Protect the character and setting of buildings within Conservation Areas.
- Ensure that any wind energy developments do not detract from prominent landmarks.
- Avoid siting turbines in the most tranquil areas.
- Consider how turbines will be transported to site – some rural lanes are very narrow and have hedges either side. Small vehicles suitable for these narrow lanes should be used to ensure these features are not damaged.
- Protect the Special Qualities of the Pembrokeshire Coast National Park as set out in the Pembrokeshire Coast National Park Local Development Plan 2.
- The National Park Authority should ensure that any wind turbine development located within the protected landscape does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[5].

[5] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

The National Park Authority has also prepared detailed supplementary guidance on the cumulative impacts of wind turbines.

4.10 Where proposed off-shore wind energy developments are intervisible with an area of sea or coast along with another terrestrial wind energy development and / or off-shore renewable energy development, the cumulative effects on regional or local seascape character area(s) should be identified depending on the scale of the development, taking into account the national seascape assessment[6] and the sensitivity of seascape to off-shore wind farm development. This is considered in a linked series of reports available from the NRW website[7]. Local seascape character assessments are detailed in the National Park Authority's Supplementary Planning Guidance on Seascape Character.

[6] National Seascape Assessment for Wales, NRW Evidence Report No 80, November 2015.

[7] Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance. Stages 1-3, NRW Evidence Report No 315, Natural Resources Wales, 2019.

On-shore Grid Connectors for Off-shore Wind and Tidal Energy Installations

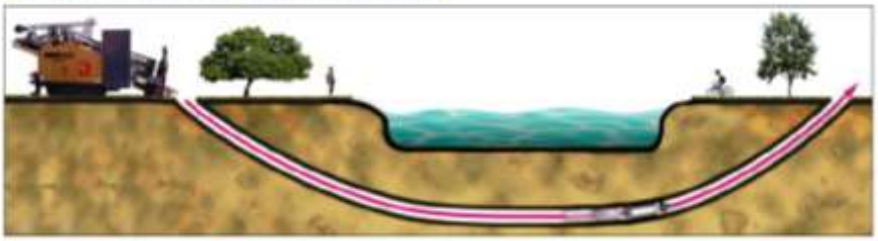
What is an on-shore grid connector?

4.11 On-shore grid connectors provide a distribution transformer to which the off-shore generator (the wind turbines or tidal energy installations) can be connected via a cable, which is usually routed underground, but could be overhead, or laid on the ground, e.g. over a cliff face.

4.12 The on-shore grid connection infrastructure consists of a grid connector (built structure), and cabling to link to the off-shore generator (the wind turbines or tidal energy installations). The cables will either take a route to the nearest road or a direct route to the nearest sub-station. In some cases, new sub-stations may be required. A single cable would typically be of the order 22-100mm in diameter, depending on the continuous current rating.

4.13 Cables are generally buried beneath the onshore material at a depth of around 1.5m deep. If the coastline includes cliffs, a hole is drilled from the cliff top down to the base of the cliff. The cables will be connected within an inspection chamber (approx. 2m concrete cube, buried underground) at the cliff base; the cables pass through the rock and into a second chamber, placed at the top of the cliff, buried but with an inspection hatch exposed. The cable runs are buried in trenches at around 1.5m depth – width depends on the size and number of cables (e.g. a large offshore windfarm will require a trench width of over 2m).

Simplified illustration of directional drilling to cross a surface feature



Typical cross-bonding arrangements involve either a buried pit with a manhole or an above ground pillar

Illustration of hole boring for long distance cabling (top) and of below and above ground cable connection chambers (bottom)[8]

Choosing a suitable location within the National Park

4.14 The location where the offshore cable comes on-shore is determined by:

- surface features on the sea bed close to the foreshore
- geology of the cliffs (ease of drilling, stability, fissures, etc.)
- impact on the existing grid infrastructure
- proximity of nearest distribution transformer
- cost and impact of cabling run to nearest transformer

General guidance for locating on-shore gird connectors within the National Park

4.15 On-shore grid connectors have the potential to impact on the local landscape in the following ways:

- Grid connections comprise small built structures which would have more significant landscape impacts in rural, tranquil areas.
- The process of placing cables underground is likely to cause localised landscape effects.
- Overhead cables introduce new industrial structures into landscape with potentially significant impacts on views.

[8] 'Sheringham Shoal Offshore Wind Farm Onshore Grid Connection: Environmental Statement, Non-technical summary' Scira Offshore Energy Limited, prepared by Royal Haskoning.

Annex 1: Landscape sensitivity and guidance for field scale solar PV development by LCA

This Annex provides a summary of landscape sensitivity to field scale solar PV development for each landscape character area (LCA) within the Pembrokeshire Coast National Park. LCAs 2, 17 and 23 are excluded as the assessment has focussed on predominantly rural LCAs.

The sensitivity of each Landscape Character Area to different scales of solar PV installation is indicated in **Figure 3.1 – 4.**

To use this information, identify the location of interest - see the attached **Map** showing the Landscape Character Area and relevant LCA using **Figure 3.1 – 3.4** and review the sensitivity description and guidance provided in **Annex 1** where separate information is provided for each LCA.

Landscape sensitivity levels and definitions

Sensitivity Level	***Definition***
High	Key characteristics of the landscape would be adversely affected by the renewable energy development. Such development would result in a significant change in character. Likely to be unsuitable for the renewable energy development.
Moderate-high	Many of the key characteristics of the landscape would be adversely affected by the renewable energy development. Such development would result in a noticeable change in character. There may be some limited opportunity to accommodate the renewable energy development without changing landscape character. Great care would be needed in locating infrastructure.
Moderate	Some of the key characteristics of the landscape are vulnerable and may be adversely affected by the renewable energy development. Although the landscape may have some ability to absorb some development, it is likely to cause some change in character. Care would be needed in locating infrastructure.
Low-moderate	Few key characteristics of the landscape would be adversely affected by the renewable energy development. The landscape is likely to be able to accommodate development without only minor change in character.

Low	Key characteristics of the landscape are robust and would not be adversely affected by the renewable energy development. The landscape is likely to be able accommodate development without a significant change in character.

The scales of PV development that have been considered are:

Size	**Area**
Large	> 5 ha.
Medium	3 ha. – 4.9
Small	1 ha. – 2.9 ha.
Very small	<1 ha.

LCA1: Saundersfoot Settled Coast

Landscape attribute	Sensitivity				
Overview	Although the strong sense of enclosure across much of the area and presence of human influence could indicate reduced sensitivity to solar PV development, the open, naturalistic coastline, the area's rich archaeological resource, views across the bay and presence of some irregular, small fields all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The undeveloped coastal areas. • Some areas of irregular small fields. • The enclosed intimate wooded valleys. • High historical value of industrial features and remains. • The historic value of the parkland / estate around Hean Castle and Coppet Hall. • The character and appearance of the Saundersfoot Conservation Area. • The ecological value of the semi-natural habitats				
Guidance	• The naturalistic coastal edge and intimate wooded valleys will be sensitive to all scales of solar PV development. • Areas of small irregular fields will be sensitive to all but the smallest scale of development. • Site PV development at least one field back from the undeveloped coastal edge so that it does not detract from the coast's exposed and natural character and open views along the coast. • Site PV development within folds in the rolling landscape, on flat ground and lower slopes rather than on prominent landforms, highly visible slopes, or coastal headlands. • Avoid siting PV development across multiple fields where this will mask the characteristic underlying small-scale field pattern. • Site PV development in areas with signs of human activity, avoiding areas free from disturbance or with a high degree of perceived naturalness. • Use the enclosure offered by woodland and high hedges to screen PV developments.				

	• Preserve the agricultural and woodland mosaic character, especially that of the estate landscape and parkland around Hean Castle and Coppet Hall. • Conserve the area's important archaeology, particularly that relating to its industrial heritage. Conserve the character and appearance of the Saundersfoot Conservation Area. • Conserve areas of semi-natural habitat. • Avoid solar PV development where it would be directly overlooked by important or sensitive viewpoints, especially from the Pembrokeshire Coast Path and rights of way.

LCA3: Caldey Island

Landscape attribute	Sensitivity				
Overview	Although the flat or gently sloping terrain across much of the area could indicate reduced sensitivity to solar PV development, the open exposed nature of much of the island, its predominantly pastoral landcover and minimal settlement all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The small scale character of the island's landscape. • Its lightly settled character. • Nationally important archaeological and historic remains, including the island's medieval priory and the potential of the inter-tidal zone. • The Conservation Area status of the eastern part of the island. • Important coastal habitats and species, including sea bird colonies on the cliffs.				
Guidance	• This area is assessed as having a high sensitivity to any size and scale of solar PV development and therefore no guidance has been included.				

LCA 4: Manorbier/Freshwater East

Landscape attribute	Sensitivity				
Overview	Although the rolling lowland nature of the inland areas and mix of landcover could indicate reduced sensitivity to solar PV the presence of small-medium scale medieval fields, predominantly pastoral land use, open nature nearer the coast, internationally important habitats and wealth of historic sites all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Small-medium scale medieval field pattern including small areas of preserved strip fields. • Presence of internationally important habitats and bird species (e.g. peregrine falcon, chough). • Wealth of historic and archaeological sites including stripfields which lie either side of the Ridgeway between Lamphey and to the south of St Florence and the preserved manorial landscape of Manorbier (a landscape of outstanding historic importance). • Its traditional enclosed farmland character with a strong historic sense of place. • The open nature of the coastal edge and views along the coast and beyond to Caldey Island. • Two Conservation Areas at Manorbier and Portclew.				
Guidance	• The presence of small-medium scale Medieval fields means that the landscape will be particularly sensitive to all but the very smallest scales of PV development. • The natural, varied, open and highly visible coastal edge will be sensitive to all scales of solar PV development. • Avoid all scales of PV development in the very small fields of medieval origin and of particular historic significance.				

	• More generally do not allow PV development to mask the field pattern with development across multiple fields. Avoid all areas of historic strip fields • Use folds in the landform to screen PV development from public vantage points including rights of way, favouring sites on flat landforms and lower slopes, while avoiding prominent landforms, highly visible slopes, or coastal headlands. • Use overgrown hedgerows and woodland to help screen PV developments, avoiding open unenclosed landscapes. • PV developments should avoid mosaics of bracken and scrub and areas with a strongly remote character. • Consider important views in the siting of PV developments, protecting views along the coastline from the Pembrokeshire Coastal Path and avoiding locations where PV developments would be directly overlooked at close quarters by important or sensitive viewpoints. • Avoid affecting areas of semi-natural habitats and sites of national and international importance for wildlife. • Protect the character and setting of the Conservation Areas at Manorbier and Portclew and more generally retain the setting to villages dominated by traditional built forms. • Protect historic and archaeological sites including the preserved manorial landscape of Manorbier (a landscape of outstanding historic importance) and the setting to key medieval buildings such as the Lamphey Bishop's Palace and moated house site at Hodgeston.

LCA 5: Stackpole

Landscape attribute	Sensitivity				
Overview	Although the enclosed nature of the landscape could indicate reduced sensitivity to solar PV development, the intimate scale of the river valleys, dense semi-natural woodland landcover, nationally important cultural and historic designed landscape and outstanding ecological importance of its diverse habitats all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The enclosed, intimate scale of this valley landscape clad in long-established estate woodlands. • The strong historic sense of place. • Diverse habitats of international importance. • The nationally important historical and archaeological value of the areas. • The flooded coastal valley system with sand dunes and scenic beaches at Barafundle Bay and Broad Haven.				
Guidance	• This area is assessed as having a high sensitivity to any size and scale of solar PV development and therefore no guidance has been included.				

LCA 6: Castlemartin / Merrion Ranges

Landscape attribute	Sensitivity				
Overview	Although the rolling nature of this LCA and the minimal areas of distinctive field pattern could indicate reduced sensitivity to solar PV development the expanse of coastal grassland, unenclosed nature of much of the area, presence of historic landscape features and important habitats all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its wild landscape character with large stretches of unenclosed coastal grasslands in the south with patches of heathland, with a sense of relative remoteness. • Its open and exposed character with long views along the coast. • Its largely undeveloped character – a tranquil wild landscape with little human disturbance. • The presence of nationally important historic and archaeological sites. • Habitats of international importance and areas of outstanding ecological value including coastal grassland, heathland and cliff habitats.				
Guidance	• All scales of PV development should avoid the extensive areas of unenclosed semi-natural grassland and patches of heathland in the south with their organic pattern and exposed character with the possible exception of very small-scale PV development associated with existing roadside huts. • Likewise the naturalistic and highly visible coastal edge will be sensitive to all scales of PV development, requiring that any such developments are sited well back from the coastal edge so that they do not detract from its relative remoteness, natural character and geological importance.				

	• In the north of the LCA do not mask the underlying field pattern by siting PV development across multiple fields in areas of small scale irregular fields where field patterns contribute strongly to character. • Use folds in the landform, hedgerows and woodland to screen PV development from public vantage points including rights of way, avoiding prominent landforms, highly visible slopes, or coastal headlands. • Ensure development does not interrupt long views along the coast from local viewpoints, popular tourist and scenic routes including the Pembrokeshire Coast Path and other rights of way or where it would be directly overlooked at close quarters by important or sensitive viewpoints. • Ensure that any PV development does not adversely affect areas of internationally important coastal ecology, including semi-natural habitats and breeding bird sites and feeding areas. • Protect prehistoric monuments, Iron Age hillforts, medieval and post-medieval buildings and sites, all of national significance.

LCA 7: Angle Penisula

Landscape attribute	Sensitivity				
Overview	Although the rolling lowland nature of the peninsula could indicate reduced sensitivity to solar PV development the distinctive small scale field pattern, strong historic values, important semi-natural habitats, dominance of pasture land and open exposed nature of parts of the area all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The small scale of the landscape with a strong sense of tranquility. • The relict mediaeval field system particularly evident in the area of Angle village and its surroundings - an outstanding survival of a planned Medieval village. • The outstanding historical and cultural value including the Milford Haven Waterway Registered Landscape of Outstanding Historical Interest in Wales encompassing the northern section of this LCA including Angle Bay. • The strong relationship between land and sea with the coastline and Milford Haven Waterway visible in many views. • Valued estuarine habitats and species, including overwintering wildfowl and waders.				
Guidance	• The open gently domed character of the southern part of this area, means that PV developments will need to be carefully sited to ensure they are not visible from a wide area. • The strong relationship between the coastline and Milford Haven Waterway means that the coastal edge will be sensitive to all scales of solar PV development, requiring that such developments are sited well back from the coastal edge to maintain uninterrupted views to St Ann's Head, and along the Milford Haven Waterway.				

	• Avoid all scales of PV development in the very small fields of Medieval origin and of historic significance, & keep development outside the Angle Conservation Area. • More generally do not allow PV development to mask the field pattern, with development across multiple fields. Avoid all areas of historic strip fields • Use folds in the landform, exiting hedgerows and woodland to screen PV development from public vantage points including rights of way, favouring sites on flat landforms and lower slopes, while avoiding prominent landforms and highly visible slopes. • Consider if there is any opportunity to combine new screen planting (to PV development) to also help screen views to industrial structures and despoiled land. • Avoid locating solar PV development where it would be directly overlooked at close quarters by important or sensitive viewpoints or where it would be highly visible from the Pembrokeshire Coast Path and other rights of way. • Avoid affecting areas of semi-natural habitats including internationally important habitats along the coastal edge. • Protect the historic features and sites that together make up the Milford Haven Waterway Registered Landscape of Outstanding Historical Interest in Wales encompasses the northern section of this LCA.

LCA 8: Freshwater West/ Brownslade Burrows

Landscape attribute	Sensitivity				
Overview	Although the rolling nature of this LCA and distinct lack of field pattern could indicate reduced sensitivity to solar PV development the presence of a rare dune system, nationally important wildlife habitats, undeveloped nature of the area and strong association with the coast all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Rare dune system and wetland. • Its remote and undeveloped character largely devoid of settlement and built features. • Diverse semi-natural habitats supporting a range of important plant and animal species. • Historic and archaeological sites, including Iron Age hillforts. Its unenclosed character and lack of cultivated land. Strong relationship between land and sea.				
Guidance	This area is assessed as having a high sensitivity to any size and scale of solar PV development and therefore no guidance has been included.				

LCA 9: Marloes

Landscape attribute	Sensitivity				
Overview	Although the rolling nature of this landscape and presence of arable land could indicate reduced sensitivity to solar PV development the predominantly open nature of the landscape, presence of important historic features, internationally important habitats and naturalistic coastal edge all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The strong rural character. • Patchwork of small to medium scale regular shaped fields. • Heathland and shoreline habitats of international importance and wetland habitats at Marloes Mere. • The naturalistic character of the coastal edge. • Important historic features and cultural landscapes, including the prehistoric sites and monuments, medieval features and Monk Haven parkland and the features specifically associated with The Milford Haven Waterway Registered Landscape of Outstanding Historical Interest in Wales. • Coastal views, including to Skomer and Skokholm islands, as well as views back to this section of coast from Skomer and Skokholm.				
Guidance	• The presence of small to medium scale fields means that the landscape is likely to be particularly sensitive to 'medium' and 'large' scales of solar PV development. • The importance of the undeveloped coastal edge with cliffs to north and west and the estuarine shore of Milford Haven requires that all scales of PV development are sited at least one field back from the coastal edge to retain the strong cultural association between land and sea. • Maintain the heathy / scrubby character of the landscape especially along the southern coastal edge.				

	• Do not site PV development in areas free from disturbance and with a high degree of perceived naturalness (particularly on and around St Ann's Head). • Maintain the patchwork landscape pattern. • Site PV development on flat landforms or on lower slopes/within folds in the rolling lowland landscape favouring flat landforms and lower slopes, while avoiding prominent landforms, highly visible slopes, or coastal headlands. • Site PV developments in areas of existing enclosure provided by woodland, hedgebanks or high hedges rather than in open and unenclosed landscapes. • Avoid siting PV development across adjacent multiple fields where this will mask the field pattern. • Maintain uninterrupted views along the coast and from the Pembrokeshire Coast Path to and from the Islands, St Bride's Bay and over Milford Haven to the Angle Peninsula. • Protect historic and archaeological sites and their setting, including prehistoric sites and monuments, and Medieval features and the features associated with the Milford Haven Waterway Registered Landscape of Outstanding Historical Interest in Wales. • Avoid affecting internationally important heathland, shoreline habitats and Marloes Mere and associated wildlife.

LCA 10: Skomer and Skokholm

Landscape attribute	Sensitivity				
Overview	Although the flat nature of the islands may indicate reduced sensitivity to solar PV development, its predominantly semi-natural coastal grassland landcover, lack of enclosure, undisturbed qualities, important historic and cultural heritage, and very strong relationship with the sea all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Naturalistic landscape with semi-natural maritime grassland the dominant land cover. • Open and exposed character with panoramic sea views. • Absence of human disturbance. • Internationally important colonies of sea birds and natural habitats. • Internationally significant archaeological remains, including prehistoric agricultural and settlement features. • Constant relationship between the islands and the sea.				
Guidance	• This area is assessed as having a high sensitivity to any scale of solar PV development; therefore no guidance has been included.				

LCA 11: Herbrandston

Landscape attribute	Sensitivity				
Overview	Although the undulating lowland landscape, presence of overgrown hedgebanks and the presence of visually detracting industry may indicate reduced sensitivity to solar PV development, its predominantly pastoral land use, presence of valued historic features and important views across estuarine areas all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its predominantly pastoral character. • The naturalistic estuarine and coastal fringes and valued estuarine habitats. • The views from St Ishmael's across Sandy Haven Pill and views across Milford Haven Waterway. • Important historic features and cultural landscapes, including structures associated with the Milford Haven Waterway Registered Landscape of Outstanding Historic Interest in Wales.				
Guidance	• The varied pattern of medium scale fields means that the landscape will be particularly sensitive to 'large' scale solar PV developments. • Use folds in the landform, exiting hedgerows and woodland to screen PV development from public vantage points including rights of way, favouring sites on flat landforms and lower slopes, while avoiding prominent landforms and highly visible slopes. • Consider if there is any opportunity to combine new screen planting (to PV development) to also help filter views to the nearby oil refinery • Site developments at least one field back from the estuary edge to maintain its naturalistic character.				

	• Protect nationally significant historical sites and their setting, especially those associated with the Milford Haven Waterway Registered Landscape of Outstanding Historical Interest in Wales. • Ensure PV developments do not intrude on views along the estuary from local viewpoints, popular tourist and scenic routes (including the Pembrokeshire Coast Path and other rights of way) to Sandy Haven Pill, Great Castle and St Ann's Head (LCA 9) and across the Milford Haven Waterway towards the Angle Peninsula (LCA 7). • Avoid affecting areas of semi-natural habitat especially valued estuarine habitats.

LCA 12: St Bride's Bay

Landscape attribute	Sensitivity				
Overview	Although the rolling lowland nature of the landscape may indicate reduced sensitivity to solar PV development, its predominantly pastoral land use, open and exposed character, important views, presence of important historical features, internationally important habitats and it's strong visual relationship with the sea all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Open and exposed character of the coastal edge. • Semi-natural habitats, particularly on the coast and flood plain areas - heath, grassland (including marshy grassland and reed bed on floodplains), deciduous woodland, scrub • Varied pattern of small-medium scale fields of differing shapes. • Generally low hedgerows and hedgebanks and high visibility across the landscape • Extensive views along the coastline and across St Bride's Bay. • Archaeological features, particularly pre-historic sites, monuments and relic lime kilns. • The prominent Grade 1 listed thirteenth century Roch Castle. • Close visual relationship between land and sea.				
Guidance	• The presence of a varied pattern of small-medium scale irregular fields and internationally important habitats means that the landscape is likely to be particularly sensitive to 'medium' and 'large' scale solar PV developments. Areas of small fields will be sensitive to all but the very smallest scale of PV development. • The strong relationship between the coastline and the internal landscape means that the coastal edge is sensitive to all scales of PV development, requiring that developments are sited at least one field back from the coast to maintain uninterrupted views along the coastline and St Bride's Bay. • Avoid all scales of PV development in areas of very small fields.				

	• More generally do not allow PV development to mask the field pattern with development across multiple fields. • Use folds in the landform to screen PV development from public vantage points including rights of way, favouring sites on flat landforms and lower slopes, while avoiding prominent landforms, highly visible slopes, or coastal headlands. • Avoid development in the more remote and tranquil parts of this LCA. • Site development in areas with a sense of enclosure with existing screening by hedges • Protect important historical and archaeological sites and their setting including Roch Castle. • Avoid affecting areas of habitat including coastal heath, floodplain grassland, reedbeds. • Ensure PV development does not intrude on views to and along the coast and from local viewpoints (including the higher viewpoints of Ryndaston and Cuffern Mountains), popular tourist and scenic routes such as the Pembrokeshire Coast Path, and rights of way. Avoid locating PV development where it would be directly overlooked at close quarters by important or sensitive viewpoints.

LCA 13: Brandy Brook

Landscape attribute	Sensitivity				
Overview	Although the presence of hedgebanks and hedgerow trees contribute to a sense of enclosure and may indicate reduced sensitivity to solar PV development, the steep sided valleys, irregular field pattern of medium scale fields, predominantly pastoral landcover, areas of semi-natural landcover and sparse settlement all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The predominantly pastoral character and irregular field pattern. • The small scale, steep sided valley system. • The high sense of naturalness – including the presence of large areas of riparian, heathland and woodland habitats. • An intimate, sheltered, peaceful landscape • Important prehistoric remains and views to the prominent 13th century Roch Castle.				
Guidance	• The irregular pattern of medium scale fields and steep sided valleys means that the landscape will be particularly sensitive to 'large' and 'medium' scale PV developments. Areas of particularly small scale fields would also be sensitive to 'small' scale developments. • Site solar PV development on flat landforms or on lower slopes/within folds in gently rolling lowland rather than on prominent upland landforms or highly visible slopes. • Use existing woodland (and potentially small woodland extensions) and the existing pattern of hedges and hedgebanks to screen PV developments from public vantage points including the rights of way network.				

	• Avoid siting PV developments in the most secluded and peaceful parts of this LCA. • Avoid siting PV development across multiple fields in areas of small scale irregular fields where this will mask the field pattern. • Ensure that PV developments do not intrude on important views from public view points and rights of way especially to Roch Castle (and its setting), St David's headland and across St Bride's Bay. • Avoid affecting areas of existing woodland and the diverse habitats of the river valleys and the species they support. • Protect valued prehistoric and other historic features ad their remains.

LCA 14: Solva Valley

Landscape attribute	Sensitivity				
Overview	Although the high concentration of woodland and some high hedgerows contribute to a sense of enclosure and may indicate reduced sensitivity to solar PV development, the irregular pattern of small to medium scale fields, presence of large areas of pasture, dominance of woodland on valley sides, internationally important valley habitats and outstanding historic value all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The small scale of the valley and pattern of irregular small to medium sized fields, with the exception of large fields on the plateau top. • The semi-natural habitats including internationally important heathland habitats along the valley floor. • Extensive woodland cover on valley sides • Solva's historic sense of place and Conservation Area status (which covers much of this LCA). • Outstanding historic and archaeological features, particularly lime kilns by Solva harbour.				
Guidance	• The irregular pattern of small-medium scale fields, internationally important valley habitats, the Solva Conservation Area, and considerable tracts of semi-natural landcover mean that much of the landscape is sensitive to PV developments of all scales, especially to 'medium' and 'large' scale PV developments. • Site solar PV development on flat plateau landforms with larger fields. • Avoid all scales of PV development in any small fields of medieval origin and of particular historic significance. • More generally do not allow PV development to mask the field pattern with development across multiple fields.				

	• Avoid locating solar PV development where it would be directly overlooked at close quarters by important or sensitive viewpoints or where it would be evident in important views. • Avoid affecting areas of semi-natural habitats (including woodland) and the species they support, especially the internationally important valley habitats. • Ensure solar PV developments do not affect Solva's historic sense of place and special historic, cultural and architectural interest (as recognised by its Conservation Area status) and important historic and archaeological features, (e.g. the lime kilns and Iron Age hillfort at Solva).

LCA 15: Dowrog & Tretio Commons

Landscape attribute	Sensitivity				
Overview	Although the gently undulating nature of this landscape and the presence of some larger fields could indicate reduced sensitivity to solar PV development, its open exposed character, expanse of semi-natural landcover, internationally important habitats, valued historic features and undeveloped nature all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its open, exposed character. • The large areas of natural common land, including heathland and grassland habitats of international importance. • The area's strong historic and cultural sense of place, as reflected in the Conservation Area status of Caerfarchell and its inclusion in the wider St David's Headland & Ramsey Island Registered Landscape of Outstanding Historic Importance. • The presence of prehistoric and early Christian sites and monuments of national importance.				
Guidance	• The lack of enclosure and presence of expansive tracts of semi-natural landcover, and some smaller irregular fields means that the landscape is particularly sensitive to 'medium' and 'large' scale solar PV developments. • No development should occur on the open common land with its mosaic of wet and dry heathland, marshy grassland and purple moor grass of international importance or on land immediately visible from the common land. • Ensure that PV development does not affect the prehistoric significance of this landscape or the value of the St David's Headland & Ramsey Island Registered Historic Landscape of Outstanding Historical Interest in Wales that covers significant areas of this LCA.				

	• Ensure that PV development does not affect the character and setting of the Caerfarchell Conservation Area • Avoid all scales of PV development in small fields of medieval origin and of particular historic significance. • More generally do not allow PV development to mask the field pattern with development across multiple fields. • Site solar PV development within folds in this gently undulating landscape as a means of minimising the impact of development on the wider landscape in this open and exposed landscape with low hedgerows and limited woodland. • Ensure that PV development does not intrude on key views to and from Carn Llidi.

LCA 16: Carn Llidi

Landscape attribute	Sensitivity				
Overview	Although the absence large areas with distinctive field pattern could indicate reduced sensitivity to solar PV development, the steep slopes, expanse of unenclosed semi-natural landcover, pastoral land, lack of hedgerow trees, outstanding historic features, internationally important habitats and sparsely settled nature of this LCA all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its naturalistic moorland and heathland habitats and pervading sense of exposure with absence of tall vegetation. • Its predominantly unenclosed nature and pastoral land use. • Its nationally important archaeology, displaying thousands of years of use and settlement (recognised as part of the St. David's Headland and Ramsey Island Registered Landscape of Outstanding Historical Interest in Wales.). • Its internationally important heathland and maritime habitats. • Its strong sense of remoteness, with little human development.				
Guidance	This area is assessed as having a high sensitivity to any scale of solar PV development and therefore no guidance has been included.				

LCA 18: St David's Headland

Landscape attribute	Sensitivity				
Overview	Although the rolling nature of this landscape could indicate reduced sensitivity to solar PV development, the irregular pattern of small-medium scale fields, considerable amounts of pasture, its open and exposed nature, valued semi-natural habitats and outstanding historic and cultural heritage all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its open character particularly along the coast and on the headland. • Its predominantly pastoral land use with lack of woodland or other tall vegetation. • The presence of large tracts of semi-natural habitat including heathland, wetlands and rough grassland of international importance. • Pattern of irregular small-medium scale fields. • Extensive unspoilt views along the open coastline. • Outstanding historic and cultural value, including prehistoric features such as the Clegyr Boia Neolithic settlement and early Christian sites. • Strong associations with the cathedral city of St. Davids				
Guidance	• The pattern of irregular small-medium scale fields, lack of enclosure and large-swathes of internationally important semi-natural habitats means that the landscape is particularly sensitive to 'small', 'medium' and 'large' scale solar PV developments. • The natural and highly visible coastal edge is sensitive to all scales of PV development requiring that any PV developments are sited well back from the coast so that they do not detract from its remote and strong cultural sense of place.				

	• No development should occur on the open swathes of lowland heathlands, wetlands and semi-natural grasslands of international importance. • Ensure that PV development does not affect the historic and cultural features and associations of the St. David's Headland and Ramsey Island Registered Landscape of Outstanding Historical Interest in Wales with its extensive and well-preserved evidence of land use and intense ritual and religious activity from the prehistoric period onwards. Equally conserve the setting of Clegyr Boia, the only Pembrokeshire example of a Neolithic domestic settlement • Avoid all scales of PV development in areas of very small fields. • More generally do not allow PV development to mask the field pattern with development across multiple fields. • Use folds in the landform to screen PV development from public vantage points including rights of way, favouring sites on flat landforms and lower slopes, while avoiding prominent landforms, highly visible slopes, or coastal headlands. • Avoid development in the more remote and tranquil parts of this LCA. • Protect views along the coastline from the Pembrokeshire Coast Path, other rights of way and public vantage points to and from Ramsey Island and south across St Bride's Bay and the Marloes coastline and to the Carn Llidi hills and inland to St David's Cathedral. Avoid locations where PV developments would be directly overlooked at close quarters by important or sensitive viewpoints.

LCA 19: Ramsey Island

Landscape attribute	Sensitivity				
Overview	Although the flat nature of the islands may indicate reduced sensitivity to solar PV development, its large tracts of semi-natural landcover, lack of enclosure, undeveloped nature, rich diversity of habitats, valued historic and cultural heritage and very strong relationship with the sea all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its open, exposed character and absence of human settlement. • The predominance of naturalistic landcover and highly valued wildlife habitats, including heathland and maritime cliffs, along with the presence of sea bird colonies. • The presence of internationally important archaeological and historic remains, including the medieval chapel and prehistoric round barrows. • Its highly valued wildlife habitats, including heathland and maritime cliffs, along with the presence of sea bird colonies.				
Guidance	This area is assessed as having a high sensitivity to any size and scale of solar PV development, therefore no guidance has been included.				

LCA 20: Trefin

Landscape attribute	Sensitivity				
Overview	Although the undulating nature and scale of the landscape could indicate reduced sensitivity to solar PV development, the strong pattern of medium scale irregular fields, high percentage of pasture land, limited enclosure, presence of highly valued natural habitats, important historic features and sense of remoteness along the coast all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its open and exposed character with few woodlands particularly along the coast. • The extensive views along the coast and the essential relationship of this landscape with its coastline. • The area's strong relative sense of remoteness, particularly along the coastal edge. • Its highly valued habitats of international importance, particularly along the coastal cliffs and the areas of lowland heathland. • The strong, irregular field pattern defined by hedgebanks and walls. • The nationally important archaeological sites, including prehistoric and early Christian monuments and remains relating to its industrial past, such as lime kilns. • The character and appearance of the Conservation Areas at Porthgain and Trefin.				
Guidance	• The presence of a strong pattern of irregular medium scale fields, limited enclosure and valued semi-natural habitats means that the landscape is particularly sensitive to 'medium' and 'large' scale PV developments. Small fields would also be sensitive to all but the smallest 'small' scale PV developments.				

	• The natural and highly visible coastal edge and wooded inlets would be sensitive to all scales of solar PV development requiring that any PV developments are sited well back from the coastal edge so that they do not detract from its remote and strong cultural sense of place. • Avoid all scales of PV development in areas of very small fields. • More generally do not allow PV development to mask the field pattern with development across multiple fields • Use folds in the landform and small woodland clumps and scrub to screen PV development from public vantage points including rights of way, favouring flat landforms and lower slopes, while avoiding prominent landforms, highly visible slopes, or coastal headlands. • Avoid development in the more remote and tranquil parts of this LCA. • No development should occur on the open swathes of lowland heathlands and coastal cliffs of international importance. • Ensure that PV development does not affect the wealth of historical and archaeological features present, dating from prehistoric times to the recent industrial past, with the northernmost area of this LCA Pen Caer: Garn Fawr and Strumble Head Registered Landscape of Special Historic Interest in Wales. • Ensure that PV development does not affect the character and setting of the Trefin and Porthgain Conservation Areas, the latter recognising the large-scale industrial heritage of the area. • Protect views along the coastline from the Pembrokeshire Coast Path, other rights of way and public vantage points. Avoid locations where PV developments would be directly overlooked at close quarters by important/sensitive viewpoints.

LCA 21: Pen Caer/Strumble Head

Landscape attribute	Sensitivity				
Overview	Although the large scale of the landscape could indicate reduced sensitivity to solar PV development the strong pattern of irregular medium-scale fields, large areas of pasture and extensive semi-natural landcover, its open and lightly settled nature and outstanding historic features all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The open character of the landscape with extensive areas of wild open moorland. • Extensive views along the coast. • The presence of significant areas of naturalistic habitats, both inland and along the coastal edge. • The strong, irregular field pattern. • The presence of nationally important archaeological sites, including prehistoric sites and early Christian monuments. • Valued maritime (important for breeding sea birds).				
Guidance	This area is assessed as having a high sensitivity to any size and scale of solar PV development and therefore no guidance has been included.				

LCA 22: Mynydd Carningli

Landscape attribute	Sensitivity				
Overview	Although the large scale of the landscape could indicate reduced sensitivity to solar PV development the presence of small-scale irregular fields, extensive area of open, unenclosed moorland, predominance of pasture, highly valued range of historical features and internationally important semi-natural habitats all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its open character with sparse vegetation cover and dominance of grazing as a land use. • The strong feeling of remoteness and tranquility with little human disturbance and lack of intrusive development. • Extensive views across the surrounding landscapes • Close proximity of the sea. • The wild and natural character with extensive areas of dry heathland, along with wet heath, marshy grassland, are internationally important semi-natural habitats. • The presence of nationally important archaeological features forming part of the Newport and Carningli Registered Landscape of Special Historical Interest in Wales.				
Guidance	This area is assessed as having a high sensitivity to any scale of solar PV development and therefore no guidance has been included.				

LCA 24: Dinas Head

Landscape attribute	Sensitivity				
Overview	Although the presence of hedgebanks and pockets of woodland providing some enclosure and occasional large scale fields could indicate reduced sensitivity to solar PV development the predominance of pastoral land, irregular field pattern of predominantly small-medium scale fields and important historic features all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Open and naturalistic coastal character, including rocky coastlines and unenclosed heathland. • The predominantly pastoral character of the landscape. • The well managed hedgebanks that are important in creating landscape pattern. • Areas of scrub, fen, marshy grassland, and lowland mixed deciduous woodland. • The wealth of outstanding archaeology including important prehistoric remains, forming part of the Newport and Carningli Registered Landscape of Special Historic Interest.				
Guidance	• The highly visible coast will be sensitive to all scales of development requiring that any PV developments are sited well back from the coastal edge. • Use existing woodland and higher hedgebanks to help screen PV development from public vantage points including rights of way. • Avoid all scales of PV development in areas of very small and small fields to maintain the pattern of prominent hedgebanks. • More generally do not allow PV development to mask the field pattern with development across multiple fields. • Avoid development in the more remote and tranquil parts of this LCA.				

	• No development should occur on areas of semi-natural habitat including areas of open coastal heath, scrub, fen and marshy grassland, nor should it occur in the steeply incised stream valleys. • Ensure PV development does not affect the area's prehistoric remains within the Newport and Carningli Registered Landscape of Special Historic Interest, particularly Cerrig y Gof Neolithic tomb. • Consider the effect of PV developments in views from higher areas to the coast and Dinas Head and views to the Preseli Mountains and Mynydd Carningli. • Ensure that development does not intrude on views from local viewpoints, popular tourist and scenic routes (including the Pembrokeshire Coast Path and other rights of way). Avoid locating solar PV development where it would be directly overlooked at close quarters by important or sensitive viewpoints.

LCA 25: Cemaes Head

Landscape attribute	Sensitivity				
Overview	Although the large scale of the landscape could indicate reduced sensitivity to solar PV development the presence of irregular, predominantly small-medium scale fields, dominance of permanent pasture, its open and lightly settled nature, nationally important archaeological and historic sites all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The predominantly pastoral character of the agricultural land. • The open and exposed character, particularly along the coast and on higher pockets of land. • The irregular field pattern with valued traditional hedgebanks. • The presence of naturalistic cliff-top habitats. • The extensive views to and along the coast and sea from open ridge tops. • The presence of nationally valued prehistoric remains including the burial mounds and tumuli on Crugiau Cemmaes.				
Guidance	• The presence of a well defined pattern of irregular, predominantly small-medium scale fields means that the landscape is likely to be particularly sensitive to 'medium' and 'large' scale PV developments. Areas of small fields would also be particularly sensitive to 'small' scale developments. • The highly visible coast will be sensitive to all scales of development requiring that any PV developments are sited well back from the open coastal edge to maintain the strong relationship between land and sea. • Site solar PV development on flat landforms or on lower slopes/within folds in gently rolling lowland rather than on prominent upland landforms or highly visible slopes.				

	• Use existing woodland and higher hedgebanks to help screen PV development from public vantage points including rights of way. • Avoid all scales of PV development in areas of very small and small fields to maintain the pattern of prominent hedgebanks. • More generally do not allow PV development to mask the field pattern with PV development across multiple fields. • Avoid development in the more remote and tranquil parts of this LCA. • No development should occur on areas of semi-natural habitat including areas of open coastal heath. • Ensure PV development does not affect the area's wealth of nationally important archaeological and historical sites including part of the Lower Teifi Valley Registered Landscape of Special Historic Interest and the burial mounds and tumuli on Crugiau Cemmaes. • Consider the effect of PV developments in long views to the coast and south to the Preseli Hills. • Ensure that development does not intrude on views from local viewpoints, popular tourist and scenic routes (including the Pembrokeshire Coast Path and other rights of way). Avoid locating solar PV development where it would be directly overlooked at close quarters by important/ sensitive viewpoints.

LCA 26: Cwm Gwaun / Afon Nyfer

Landscape attribute	Sensitivity				
Overview	Although the strong sense of enclosure could indicate reduced sensitivity to solar PV development the patchwork of small-scale, irregular fields, pastoral land use, large amounts of woodland and valued historic features all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The predominantly pastoral agricultural land use. • The presence of significant areas of naturalistic habitats, including large areas of semi-natural woodland. • The small scale and intimate character of the valley landscapes. • The landscape's sparse settlement pattern and lack of recent development. • The presence of valued woodland and meadow habitats, particularly in the Cwm Gwaun valley. • The landscape's nationally significant archaeology, including Iron Age hillforts and Neolithic tombs around Nevern.				
Guidance	Because of the very high sensitivity of this area no guidance has been included.				

LCA 27: Mynydd Preseli

Landscape attribute	Sensitivity				
Overview	Although the large scale of the landscape could indicate reduced sensitivity to solar PV development the presence of very small irregular fields, extensive open moorland, improved pasture, slopes and higher summits providing panoramic views, the sparse nature of settlement, valued habitats and its outstanding historical and cultural value all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• The open, exposed character of the moorland, with a strong sense of remoteness. • Dominance of very small irregular fields surrounding the extensive open moorland. • The pastoral character of the fringing agricultural land. • The presence of valued upland habitats including acidic grassland and heathland grading into much wetter vegetation including boggy flushes, marshy grassland and wet heath. • The presence of nationally valued prehistoric remains. • The extensive views to the coast and the surrounding landscapes. • The high visual prominence of the LCA – present in views from across northern Pembrokeshire.				
Guidance	Because of the very high sensitivity of this area no guidance has been included.				

LCA 28: Daugleddau

Landscape attribute	Sensitivity				
Overview	Although the strong sense of enclosure and scale of the landscape could indicate reduced sensitivity to solar PV development the irregular pattern of small-medium scale fields, pastoral land, valued semi-natural habitats and outstanding historical features all increase levels of sensitivity to solar PV development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large scale solar PV					
Medium scale solar PV					
Small scale solar PV					
Very small scale solar PV					
Key sensitivities	• Its predominantly pastoral character, with irregularly shaped often small fields set within an historic agricultural landscape. • Sparsely settled with a strong rural quality creating a strong sense of tranquillity. • Providing the frame to an enclosed water body. • The landscape's valued semi-natural oak woodlands and estuarine habitats. • The presence of historic features including Bronze Age barrows, Iron Age hillforts, parkland and industrial archaeology with virtually the whole LCA falling within the Milford Haven Waterway Registered Landscape of Outstanding Historical Interest in Wales. • Important views across and along the river from shoreline settlements.				
Guidance	• The presence of an irregular pattern of small-medium scale fields and valued semi-natural habitats means that the landscape is likely to be particularly sensitive to 'small', 'medium' and 'large' scale solar PV developments. The very small fields would be sensitive to all scales of solar PV development. • Site PV development in enclosed landscapes where the development would be screened by woodland, treebelts and hedgerows.				

	• Site PV development on flat landforms or within folds in landform rather than on highly visible slopes. • Avoid all scales of PV development in areas of very small fields. • More generally do not allow PV development to mask the field pattern with PV development across multiple fields. • Ensure that the development would not necessitate tree felling of affect areas of valued semi-natural habitat. • Site developments at least one field back from the estuary edge. • Avoid development in the more remote and tranquil parts of this LCA. • Ensure PV development does not affect the area's wealth of nationally important archaeological and historical sites including prehistoric sites, parkland and industrial archaeology including that associated with small-scale mining. • Ensure that PV development does not intrude on key views along and across the river or on views from other key public viewpoints including those from public rights of way.

Annex 2: Landscape sensitivity and guidance for wind energy development by LCA

This Annex provides a summary of landscape sensitivity to wind energy development for each Landscape Character Area (LCA) within the Pembrokeshire Coast National Park. LCAs 2, 17 and 23 are excluded as the assessment has focussed on predominantly rural LCAs.

Landscape sensitivity levels and definitions

Sensitivity Level	***Definition***
High	Key characteristics of the landscape would be adversely affected by the renewable energy development. Such development would result in a significant change in character. Likely to be unsuitable for the renewable energy development.
Moderate-high	Many of the key characteristics of the landscape would be adversely affected by the renewable energy development. Such development would result in a noticeable change in character. There may be some limited opportunity to accommodate the renewable energy development without changing landscape character. Great care would be needed in locating infrastructure.
Moderate	Some of the key characteristics of the landscape are vulnerable and may be adversely affected by the renewable energy development. Although the landscape may have some ability to absorb some development, it is likely to cause some change in character. Care would be needed in locating infrastructure.
Low-moderate	Few key characteristics of the landscape would be adversely affected by the renewable energy development. The landscape is likely to be able to accommodate development without only minor change in character.
Low	Key characteristics of the landscape are robust and would not be adversely affected by the renewable energy development. The landscape is likely to be able accommodate development without a significant change in character.

The sizes of wind turbine that have been considered are:

Size	**Height to blade tip**
Large	65m – 125m
Medium	25m – 65m
Small	<25m

Where the assessments have made reference to 'small clusters' of wind turbines, these comprise groups of 2-3 turbines.

LCA1: Saundersfoot Settled Coast

Landscape attribute	Sensitivity				
Overview	The area is already densely settled, and this indicates that this is landscape already affected by human impact and could therefore, in theory, accommodate additional built elements. However, the prominent undeveloped skylines, relative sense of tranquillity away from urban areas, the area's rich archaeology, and open views along the coast mean that this landscape has an overall moderate-high sensitivity to the development of wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that could be sensitive to any scale of wind turbine development are: • The open views along the coast, particularly south towards Tenby. • The relative sense of tranquility away from the urban areas. • The prominent undeveloped skylines, especially as viewed from the coast. • High historical value of industrial features and remains. • The ecological value of the semi-natural habitats. • The historic value of the parkland / estate around Hean Castle and Coppet Hall. • The character and appearance of the Saundersfoot Conservation Area.				
Guidance	• Locate any wind energy developments away from the most prominent rural skylines and consider the impact of tracks and ancillary buildings. There may be some opportunity for single or small clusters of small scale wind turbines within or on the edges of existing urban areas. • Utilise existing woodlands and the rolling topography to integrate any infrastructure associated with any turbine development into the landscape. • Ensure that development does not adversely affect the character and appearance of Saundersfoot's Conservation Area.				

	• Avoid the close juxtaposition of different small turbine designs and heights, aiming instead for a consistent height and design in any given area. • Consider the open views along the coast when siting any wind turbines. • Ensure the church spire, seen above Monkstone Point, remains the prominent landmark in the view southwards from Amroth towards Tenby and turbines do not compete or conflict with this landmark. • New development within Saundersfoot may provide opportunities for integrating renewable energy structures such as wind turbines. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[9].

[9] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA3: Caldey Island

Landscape attribute	Sensitivity				
Overview	This landscape's open aspect would provide great potential to harness wind energy. However, the high visibility of the island from the mainland, its strong sense of tranquillity, nationally significant archaeological and historic features, along with its high value for biodiversity (including sea bird colonies and cliff top habitats) mean it has an overall high sensitivity to wind turbine developments of any size or scale.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that make it unsuitable for wind technology development are: • Its high visual prominence from the mainland (including the island's lighthouse) and its flat terrain. • The small scale character of the island's landscape. • Its tranquil and lightly settled character. • Nationally important archaeological and historic remains, including the island's medieval priory and the potential of the inter-tidal zone. • The Conservation Area status of the eastern part of the island. • Important coastal habitats and species, including sea bird colonies on the cliffs.				
Guidance	This area is assessed as having a high sensitivity to any size and scale of wind turbine development, therefore no guidance has been included.				

LCA4: Manorbier / Freshwater East

Landscape attribute	Sensitivity				
Overview	Although this LCA contains some development impacting on its otherwise open feel, the presence of an enclosed small-medium scale traditional agricultural landscape, internationally important habitats, and a strong historic sense of place means that it would have an overall moderate-high sensitivity to the development of wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that make it sensitive to wind turbine development are: • Its traditional enclosed farmland character with a strong historic sense of place. • The open skyline with views across the coast and beyond to Caldey Island. • Presence of internationally important habitats and bird species (e.g. peregrine falcon, chough). • Wealth of historic and archaeological sites including the preserved manorial landscape of Manorbier (a landscape of outstanding historic importance) • Two Conservation Areas at Manorbier and Portclew.				
Guidance	• This LCA is unsuitable for large scale turbines. • Single or small clusters of small scale turbines are likely to be most appropriate in this relatively small scale, rolling traditional farmed landscape. There may be opportunity for the single or small clusters of medium-scale turbines where sensitively sited, particularly inland. • Link any development to existing points of focus in the landscape, such as building clusters or industrial sites. • Consider the visual impact of tracks and ancillary buildings. There may be some opportunity for small scale wind turbines (below 25 metres) within or on the edges of existing or new urban development. • Utilise existing woodlands, the rolling topography and overgrown hedges to integrate any infrastructure associated with any turbine development into the landscape.				

	• Avoid the close juxtaposition of different small turbine designs and heights, aiming instead for a consistent height and design in any given area. • Site turbines away from the coastal edge so that they do not intrude into coastal views, particularly to Caldey Island and the coastal cliffs to the east. Consider views to the Preselis when siting any turbine development. • Protect the internationally important ecology by locating turbines away from sites of interest. • Protect historic and archaeological sites including the preserved manorial landscape of Manorbier (a landscape of outstanding historic importance). • Protect the character and setting of the Conservation Areas at Manorbier and Portclew. • Ensure that any turbine developments do not detract from the prominent landmarks at Manorbier; its castle, church and dovecote. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[10].

[10] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA5: Stackpole

Landscape attribute	Sensitivity				
Overview	This LCA's nationally important cultural and historic designed landscape, its enclosed and confined character, the outstanding ecological importance of its diverse habitats, its lack of built forms and the presence of important buried archaeology, make it highly sensitive to wind turbine developments. It is therefore assessed as having an overall high sensitivity to this form of renewable energy development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that make it sensitive to wind turbine development are: • The strong historic sense of place. • The tranquil nature of the area. • Enclosed, intimate valley landscape • Diverse habitats of international importance. • The nationally important historic and archaeological features. • Scenic beaches with strong cultural presence. • The presence of breeding sea bird colonies on the cliffs.				
Guidance	• This LCA is unsuitable for large and medium scale turbines. • Single small scale turbines are likely to be most appropriate in this enclosed and intimate landscape. • Link any development to existing points of focus in the landscape, such as building clusters. • Utilise existing woodlands and the steep valley sides to integrate any infrastructure associated with any turbine development into the landscape. • Protect the strong historic character of the Stackpole Estate and ensure the location of any turbines does not detract from this. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Site turbines away from the coastal edge and outside of views to and from the beaches at Broad Haven and Barafundle Bay.				

	• Protect the internationally important ecology, including breeding bird sites. • Protect historic and archaeological sites including the character and setting of the designed Stackpole Estate and the wealth of archaeological features associated with Stackpole Warren. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[11].

[11] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA6: Castlemartin / Merrion Ranges

Landscape attribute	Sensitivity				
Overview	The large scale of the landscape, the presence of military structures on the skyline, and the intrusive sound of gunfire in an otherwise tranquil landscape could indicate that this landscape might be able to accommodate additional man-made structures such as wind turbines. However, its open and wild landscape character, sense of relative remoteness, unsettled nature, long views along the coast, strong archaeological interest and the presence of important habitats supporting a range of wildlife species all pose constraints to the development of turbines and their associated infrastructure.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that could be sensitive to wind turbine development of any scale are: • Its wild landscape character, with a sense of relative remoteness. • Its open and exposed character with long views across the coast. • Its largely undeveloped character. • The ridgetop skyline of prominent lines of church towers and spires. • The presence of nationally important historic and archaeological sites. • Valued coastal habitats and species, including coastal grassland and heathland.				
Guidance	• The majority of this LCA is unsuitable for large or medium scale turbines. There may, however, be limited opportunity for a single or a small cluster of medium or large (under 100m to blade tip) scale turbines on land close to existing oil refinery chimneys (on the north-western edge of the LCA) to provide a new point of focus as long as they are sited sensitively following the guidance below. • Elsewhere, this landscape is most suitable for single or small clusters of small scale turbines.				

	• Site turbines well away from the coastal edge to conserve the open views along the coast and the naturalistic character of the coastal edge. • Small scale turbines that are visually associated with existing built development (e.g. adjacent to buildings) and rationed within the landscape rather than concentrated in one particular area, will be most suited to this landscape. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Ensure turbines do not compete with the church towers and spires as landmarks on the skyline. • Protect the internationally important coastal ecology, including semi-natural habitats and breeding bird sites and feeding areas. • Protect historic and archaeological sites from infrastructure associated with turbines. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[12].

[12] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA 7: Angle Peninsula

Landscape attribute	Sensitivity				
Overview	The small scale field patterns, open undeveloped skylines, important coastal views, strong historic sense of place and the presence of important archaeological features and wildlife habitats all pose constraints to the development of turbines and their associated infrastructure.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that could be sensitive to wind turbine development of any scale are: • Its exposed and undeveloped skyline, with sensitive coastal views, including to St Ann's Head. • The small scale of the landscape with a strong sense of tranquillity. • The outstanding historical and cultural value including presence of nationally important historic and archaeological sites, including the Milford Haven Waterway and Angle Conservation Area. • Valued estuarine habitats and species, including overwintering wildfowl and waders.				
Guidance	• The majority of this LCA is unsuitable for large or medium scale turbines. There may, however, be limited opportunity for a single or a small cluster of medium or large (under 100m to blade tip) scale turbines on land close to existing oil refinery chimneys (on the eastern edge of the LCA) to provide a new point of focus as long as they are sited sensitively following the guidance below. • There may be limited opportunity for single small scale turbines , as long as they are sited sensitively following the guidance below. • Small scale turbines that are visually associated with existing developed areas and built features and rationed within the landscape rather than concentrated in one particular area, will be most suited to this landscape. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area.				

	• Site turbines away from the undeveloped coastal edge to protect coastal views, including to St Ann's Head. • Site well away from the planned Medieval village of Angle. • Ensure traditional agricultural field patterns with hedges and hedgebanks are not affected. • Protect valued habitats and species, including Angle Bay for its overwintering bird species. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[13]. • Identify and take account of possible cross-boundary cumulative impacts associated with turbines outside the National Park.

[13] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA8: Freshwater West / Brownslade Burrows

Landscape attribute	Sensitivity				
Overview	This LCA's remote and undeveloped character, and the presence of a rare dune system and nationally important wildlife habitats, indicates that this LCA has a high sensitivity to any scale of wind turbine.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The landscape attributes that will be sensitive to turbine development of any scale are: • Its remote and undeveloped character. • Rare dune system. • Diverse semi-natural habitats supporting a range of important plant and animal species. • Historic and archaeological sites, including Iron Age hillforts.				
Guidance	This area is assessed as having a high sensitivity to any size and scale of wind turbine development, therefore no guidance has been included.				

LCA 9: Marloes

Landscape attribute	Sensitivity				
Overview	Although this LCA already contains some existing small-scale turbines, the sparse settlement, predominantly rural character, inter-visibility with off-shore islands, undeveloped skylines and strong cultural heritage and valued wildlife habitats mean that this landscape has an overall moderate-high sensitivity to the development of wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	Landscape attributes that are sensitive to turbine development are: • Its strong sense of rural tranquillity and undeveloped skylines. • Coastal views, including to and from Skomer and Stockholm islands. • Strong sense of tranquillity and relative remoteness, particularly at St Ann's Head. • Lighthouses that form landmarks on an otherwise open skyline. • Heathland and shoreline habitats of international importance supporting species such as peregrine falcon and grey seal. • Important historic features and cultural landscapes, including prehistoric sites and the Milford Haven Waterway.				
Guidance	• This LCA is unsuitable for large scale turbines. • There may be opportunity for single small scale turbines close to existing built elements (such as farm buildings). There may also be limited opportunities for single medium-scale turbines so long as they are sensitively sited. The guidance below must be adhered to. • Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Ensure turbines do not compete with, or detract from, lighthouses as landmarks on the skyline.				

	• Ensure ancillary development is well integrated into the landscape. • Protect historic and archaeological sites and their setting, including prehistoric sites and monuments, and medieval features. • Avoid affecting any heathland and shoreline habitats and protect valued habitats and species. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[14].

[14] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA 10: Skomer and Skokholm

Landscape attribute	Sensitivity				
Overview	The islands' open aspect would provide great potential to harness wind energy. However, their high visibility from the mainland, open skylines, defining wilderness qualities, internationally significant archaeological and historic features, internationally important natural heritage and lack of human disturbance mean they have a high sensitivity to wind turbine developments of any size or scale.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that are sensitive to wind turbines are: • Open and exposed character with panoramic sea views. • Strong wilderness qualities. • High visibility in views from most of the local mainland. • Absence of human disturbance. • Internationally important colonies of sea birds and natural habitats. • Internationally significant archaeological remains, including prehistoric agricultural and settlement features. • Constant relationship between the islands and the sea.				
Guidance	This area is assessed as having a high sensitivity to any size and scale of wind turbine development, therefore no guidance has been included.				

LCA 11: Herbrandston

Landscape attribute	Sensitivity				
Overview	The dominating presence of industry on land in and immediately adjacent to this LCA indicates that it could accommodate additional man-made structures on the skyline. However, the landscape's peaceful, rural qualities, its lightly settled character, its outstanding historic and cultural heritage and valued estuarine habitats all increase sensitivity to the development of turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The landscape attributes that are sensitive to turbine development are: • Its peaceful, agricultural character. • Valued estuarine habitats along Sandy Haven Pill and Milford Haven. • Important historic features and cultural landscapes, including structures associated with the Milford Haven Waterway Registered Landscape of Outstanding Historic Interest in Wales. • Views from St Ishmael's across Sandy Haven Pill and views across the Milford Haven Waterway.				
Guidance	• This LCA is unsuitable for large scale turbines. • There may, however, be limited opportunity for a single or a small cluster of medium or large (under 100m to blade tip) scale turbines on land close to existing oil refinery chimneys (on the eastern edge of the LCA) to provide a new point of focus as long as they are sited sensitively following the guidance below. There may be opportunities for single or small clusters of small-scale turbines sited within or adjacent to existing or new building clusters in the LCA. • Small scale turbines that are visually associated with existing or new building clusters and rationed within the landscape rather than concentrated in one particular area, will be most suited to this landscape. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Site turbines away from important estuarine habitats.				

	• Ensure development does not adversely affect the setting of the nationally significant historical sites. Particularly consider how any development appears in views from and to Sandy Haven Pill, Great Castle and St Ann's Head (LCA 9) and across the Milford Haven Waterway towards the Angle Peninsular (LCA 7). • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[15]. • Identify and take account of possible cross-boundary cumulative impacts associated with turbines outside the National Park.

[15] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA12: St Bride's Bay

Landscape attribute	Sensitivity				
Overview	Although this is a large scale landscape, the open skylines, the remote and undeveloped coastal edge, and presence of historical and archaeological features all pose constraints to development of wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that could be sensitive to wind turbine development of any scale are: • The strong relationship between land and coast and the constant sight and sound of the sea. • The views across St. Brides Bay and along the undeveloped coastline. • The sense of remoteness/ tranquillity associated with the higher ground and the cobble beach at Newgale Sands. • Landscapes of high ecological value.				
Guidance	• This LCA is unsuitable for large or medium scale turbines. • There may be some limited opportunity for single or small clusters of small scale single turbines in areas of the rolling farmed landscape. • Small scale turbines that are visually associated with existing buildings or farms and rationed within the landscape rather than concentrated in one particular area, will be most suited to this landscape. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Avoid siting turbines on the undeveloped coastline within views across St. Brides Bay. • Avoid siting turbines in the most tranquil areas i.e. on the higher ground and the cobble beach of Newgale Sands. • Consider views to and from the Marloes coast, St David's headland and the off-shore islands. • Protect habitats of high ecological value. • Protect historical and archaeological features and the relationship with their surrounding landscape, including prehistoric sites and monuments.				

	• The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[16]. • Identify and take account of possible cross-boundary cumulative impacts associated with turbines outside the National Park.

[16] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA13: Brandy Brook

Landscape attribute	Sensitivity				
Overview	The presence of the main A487 cutting across the west of this LCA introduces a human form which could indicate the landscape could accommodate further man-made structures. In addition, the woodland and vegetation cover may indicate some structures could be hidden from view. However, its small scale, strong sense of peace and tranquility, strong visual relationship with Roch Castle, valued river habitats and species and archaeological remains all pose constraints to the development of wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The main landscape attributes that would be sensitive to wind turbine developments are: • Its small scale, intimate character. • The relative sense of tranquility and peacefulness. • Strong visual relationship with Roch Castle as a prominent skyline feature. • Views to sea from hilltops. • Valued riparian habitats supporting species such as the otter. • Important prehistoric remains.				
Guidance	• Large or medium scale turbines would not be appropriate in this landscape due to its small scale and tranquil character. • Small scale turbines that are visually associated with existing groups of buildings and rationed within the landscape rather than concentrated in one particular area, will be most suited to this landscape. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • • Ensure that Roch Castle remains the dominant skyline feature, making sure that the siting of turbines does not conflict with this local landmark. • Use the area's woodlands to provide screening against any turbines or related infrastructure.				

	• Maintain coastal views to and from St David's Headland and St Bride's Bay. • Protect the area's valued semi-natural habitats and archaeological remains when considering the location of turbines and infrastructure. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[17]. • Identify and take account of possible cross-boundary cumulative impacts associated with turbines outside the National Park.

[17] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA 14: Solva Valley

Landscape attribute	Sensitivity				
Overview	The area's industrial past, presence of built features/ buildings and high woodland cover indicate that this LCA could accommodate well sited man-made structures. However, its small scale, tranquil character, Solva's strong historic sense of place, the presence of an outstanding historic and archaeological heritage, and the presence of valued habitats and species all increase sensitivity to the development of wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	Landscape attributes that are particularly sensitive to wind turbine development are: • The small scale, intimate character of the valley landscape and its relative sense of tranquillity. • Solva's historic sense of place and special historic, cultural and architectural interest (as recognised by its Conservation Area status). • The strong link between the harbour at Solva and the coast. • Outstanding historic and archaeological features, particularly lime kilns by Solva harbour. • Internationally important heathland habitats along the valley floor supporting priority species such as the peregrine falcon and chough.				
Guidance	• Large or medium scale turbines would not be appropriate in this landscape due to its small scale. • There may be limited opportunity for single small scale turbines as long as they are sensitively sited and take account of the guidance below. • Only site small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape. • Avoid the proliferation of separate small turbine schemes along the same ridgelines • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area.				

	• Use the area's woodlands to provide screening for related infrastructure. • Protect the area's valued heathland habitats and species they support. • Do not allow the location of turbines and associated infrastructure to affect the character and setting of the Conservation Areas within the village and valley. • Ensure turbines do not affect Solva's historic sense of place and special historic, cultural and architectural interest (as recognised by its Conservation Area status). • Protect the importance of historic and archaeological features, for example the lime kilns at Solva. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[18].

[18] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA 15: Dowrog & Tretio Commons

Landscape attribute	Sensitivity				
Overview	This landscape's large scale, presence of man-made features (airfield and main road) and lack of prominent skylines within the LCA indicate that this landscape may be able to accommodate well sited built features, such as wind turbines. However, its relative sense of tranquillity, inter-visibility with the Carn Llidi mountains and St David's, outstanding historic and cultural significance, and presence of highly valued semi-natural habitats all increase sensitivity to this form of renewable energy development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The main landscape attributes that would be sensitive to wind turbine developments are: • Its open, undeveloped skylines and inter-visibility with the Carn Llidi mountains. • The strong rural and relative sense of tranquillity, particularly away from the main road through the LCA. • The large areas of unenclosed common land with internationally valued heathland habitats. • Outstanding historic and cultural interest, particularly the prehistoric sites and early Christian monuments, linking to the wider St David's Headland & Ramsey Island Registered Historic Landscape, and the Caerfarchell Conservation Area.				
Guidance	• Large and medium scale turbines would not be appropriate in this open landscape due to its inter- visibility with surrounding areas. • There may be limited opportunity for single small scale turbines as long as they are sensitively sited and take account the guidance below. • Only site single small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape. Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area.				

	• Consider views from Carn Llidi and St David's headland when siting small turbines • Protect areas of greatest tranquillity (there may be some opportunity to site small turbines close to the main road). • Ensure turbines and infrastructure do not affect the area's valued heathland habitats and commons. • Ensure that turbine development does not affect the character and setting of the Caerfarchell Conservation Area. • Ensure that turbine development does not affect the prehistoric significance of this landscape or the value of the St David's Headland & Ramsey Island Registered Historic Landscape. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[19].

[19] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA16: Carn Llidi

Landscape attribute	Sensitivity				
Overview	The distinctive open rocky skylines, strong feeling of remoteness with little human disturbance, and the wealth of outstanding archaeology and internationally important habitats all pose serious constraints to this type of renewable energy development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	Landscape attributes that make it unsuitable for wind turbines are: • Its distinctive open, rocky skylines and inter-visibility with lower land including St Davids and the Dowrog and Tretio Commons • Its strong sense of tranquillity and remoteness, with little human development. • Its nationally important archaeology, displaying thousands of years of use and settlement (recognised as part of the St. David's Headland and Ramsey Island Registered Landscape of Outstanding Historical Interest in Wales). • Its internationally important heathland and maritime habitats.				
Guidance	This area is assessed as having a high sensitivity to any size and scale of wind turbine development, therefore no guidance has been included.				

LCA18: St David's Headland

Landscape attribute	Sensitivity				
Overview	This landscape's rural remote character, open and undeveloped skylines, extensive coastal views, wealth of outstanding archaeology and internationally important habitats all pose serious constraints to this type of renewable energy development. However, inland cultivated areas are a little less sensitive.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The main landscape attributes that would be sensitive to wind turbine developments are: • Its peaceful, rural character with few built intrusions, particularly along the coast and on the headland. • Its open, undeveloped skylines, with St David's Cathedral a prominent local landmark. • The extensive unspoilt coastal views, including those to and from Ramsey Island. • Its outstanding historic and cultural value, including prehistoric features such as the Clegyr Boia Neolithic settlement and early Christian sites. • The presence of internationally important heathland, grassland and wetland habitats.				
Guidance	• Large and medium scale turbines would not be appropriate in this open landscape. • There may be limited opportunity for single small scale turbines as long as they are sensitively sited and take account the guidance below. • Only site single small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape, well away from the coastal edge. • Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Maintain the open views along the coast and to Ramsey Island, Carn Llidi, St Bride's Bay and south to the Marloes				

	Coast – consider views from these landscapes when siting turbines. • Ensure St David's Cathedral remains prominent on the skyline, and that the siting of turbines does not conflict with this important local landmark. • Ensure small turbines and any associated infrastructure do not affect the area's valued heathland and wetland habitats. • Ensure small turbines and any associated infrastructure do not affect the area's archaeology, including the Clegyr Boia Neolithic settlement. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[20].

[20] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA19: Ramsey Island

Landscape attribute	Sensitivity				
Overview	This landscape's open aspect and exposed character would provide great potential to harness wind energy. However, its pervading sense of wildness, spectacular natural heritage, high visibility of the island from the mainland, lack of human disturbance and internationally significant archaeological and historic features, along with its high value for nature conservation all pose severe constraints to the development of wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The key landscape attributes that make it unsuitable for wind turbines are: • Its pervading sense of wildness, spectacular natural heritage and lack of human disturbance/settlement. • Its high visual prominence from the mainland, and open, undeveloped skylines. • The presence of internationally important archaeological and historic remains, including the Medieval chapel and prehistoric round barrows. • Its highly valued wildlife habitats, including heathland and maritime cliffs, along with the presence of sea bird colonies.				
Guidance	This LCA is assessed as being unsuitable for any size of scale of wind turbine development; therefore no guidance has been included.				

LCA20: Trefin

Landscape attribute	Sensitivity				
Overview	This landscape's large scale, open aspect, settled character, and past industrial activity may indicate that features such as wind turbines may be accommodated within the LCA if sensitively sited. However, its open undeveloped skylines, extensive coastal views, relative sense of remoteness on the coastal edge, highly valued coastal and heathland habitats, and presence of nationally important archaeological and historic sites all increase sensitivity to wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	Landscape attributes that are particularly sensitive to wind turbines are: • Its large scale, open aspect and undeveloped skylines. • The extensive views along the coast. • The area's strong relative sense of remoteness, particularly on the coastal edge. • The wealth of nationally important archaeological sites, particularly related to the area's industrial heritage such as lime kilns and the famous Blue Lagoon quarry. • The character of the Conservation Areas at Trefin and Porthgain. • Its highly valued habitats, particularly along the coastal cliffs and the areas of lowland heathland.				
Guidance	• Large and medium scale turbines would not be appropriate in this landscape. • There may be limited opportunity for single or small clusters of small scale turbines as long as they are sensitively sited and take account the guidance below. • Only site small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape. • Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area.				

	• Maintain open views along the coastline by siting turbines and related infrastructure away from the coastal edge. Protect views to this coastline from the inland LCAs (15 and 16) by sensitively siting turbines. • Ensure turbines and related infrastructure do not affect the area's valued heathland and cliff-top habitats. . • Ensure turbines do not adversely affect the character or setting of the Conservation Areas at Trefin and Porthgain. • Ensure turbines do not adversely affect the area's valued historic and archaeological features, including lime kilns and other features linked to its industrial heritage. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[21].

[21] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA21: Pen Caer / Strumble Head

Landscape attribute	Sensitivity				
Overview	This landscape's open aspect would make it well suited for harnessing wind energy. However, its open, undeveloped skylines, extensive coastal views, strong sense of tranquillity and remoteness, valued habitats and species, and the presence of nationally important archaeological and historic sites all pose constraints to the development of turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	Landscape attributes that are particularly sensitive to the development of wind turbines are: • The undeveloped and characterful skylines of jagged coastal cliffs and rocky hill summits. • The landmarks of Strumble Head lighthouse and Iron Age hillfort at Garn Fawr . • The extensive views along the coast and intervisibility with the Preseli Hills. • The strong sense of tranquillity and remoteness, with sparse settlement and lack of intrusive development. • The presence of nationally important archaeological sites, including the prominent hill forts at Garn Fawr and Garn Fechen and early Christian sites. • Its valued habitats, particularly along the coastal cliffs and the open hill summits.				
Guidance	• Large and medium scale turbines would not be appropriate in this landscape. • There may be limited opportunity for single small scale turbines as long as they are sensitively sited and take account the guidance below. • Only site small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape, preferably adjacent to existing farm buildings, and well away from the coastal edge. • Avoid the proliferation of separate small turbine schemes along the same ridgelines.				

	• Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Ensure turbines do not affect the undeveloped and characterful skylines of jagged coastal cliffs and rocky hill summits. • Consider views to and from the Preseli Mountains in the east when siting any turbines. • Ensure turbines do not conflict with views to important land mark features, namely the hillforts on Garn Fawr and Garn Fechen, and the lighthouse on Strumble Head. • Do not site turbines of any size on Strumble Head, or along the landscape's distinctive coastline. • Ensure turbines and related infrastructure do not affect the area's valued heathland and cliff-top habitats or the area's valued historic and archaeological features, particularly its prehistoric and early Christian sites and monuments. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[22].

[22] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA22: Mynydd Carningli

Landscape attribute	Sensitivity				
Overview	This landscape's distinctive rocky and undeveloped skylines, strong sense of tranquillity and remoteness, internationally valued habitats, and nationally important archaeological and historic sites indicate that this LCA has a high sensitivity to any scale of wind turbine development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	Landscape attributes that are particularly sensitive to the development of wind turbines are: • Its undeveloped skylines with distinctive rock formations and Iron Age hillfort, which are dominant features when viewed from the surrounding landscape. • The intervisibility of the area with the coast and the Preseli Hills. • Its strong sense of tranquility and remoteness and relative inaccessibility. • Its sparse settlement and lack of intrusive development. • The presence of nationally important archaeological sites, including the prominent hill forts at Garn Fawr and Garn Fechen and early Christian sites. • Its valued habitats (including open moorland and heathland), particularly along the coastal cliffs and the open hill summits.				
Guidance	This area is assessed as having a high sensitivity to any size and scale of wind turbine development, therefore no guidance has been included.				

LCA24: Dinas Head

Landscape attribute	Sensitivity				
Overview	Although this landscape has a large scale landform and settled character, its relative sense of tranquility, open undeveloped skyline, coastal views and valued prehistoric archaeology all present sensitivities to this form of renewable energy development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	Landscape attributes that are particularly sensitive to wind turbines are: • The prominent headland of Dinas Head and the rocky coastline, visible in many views from within the LCA. • The relative sense of tranquillity away from the A487 road. • The scattered, traditional settlement pattern. • The distinctive views to, and inter-visibility with Mynydd Carningli and the Preseli Hills. • Nationally valued prehistoric remains including Cerrig y Gof chambered tomb, as part of the Newport and Carningli Registered Landscape of Special Historic Interest.				
Guidance	• Large and medium scale turbines would not be appropriate in this landscape. • There may be limited opportunity for single small scale turbines as long as they are sensitively sited and take account the guidance below. • Only site single small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape, including adjacent to existing farm buildings, and well away from the coastal edge. • Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Ensure turbines do not affect the characteristic undeveloped skylines of rocky coastal cliffs and the distinctive feature of Dinas Head. Do not site any turbines on Dinas Head.				

	• Consider views to and from the Preseli Hills and Mynydd Carningli when siting any turbines. • Ensure turbines and related infrastructure does not affect the area's prehistoric remains within the Newport and Carningli Registered Landscape of Special Historic Interest, particularly Cerrig y Gof Neolithic tomb. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[23]. • Identify and take account of possible cross-boundary cumulative impacts associated with turbines outside the National Park.

[23] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA25: Cemaes Head

Landscape attribute	Sensitivity				
Overview	Although this landscape has a large scale landform, its relative sense of tranquillity, open undeveloped skylines, coastal views and valued prehistoric archaeology all present sensitivities to this form of renewable energy development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The landscape attributes that would be particularly sensitive to the development of wind turbines are: • The landscape's sparse settlement pattern, lack of visible development and strong sense of tranquillity. • Its open, undeveloped skylines including distinctive burial mounds and tumuli on the high outcrop of Crugiau Cemmaes. • The open and exposed coastal edge and important coastal views. • Inter-visibility with the adjacent Mynydd Carningli and Mynydd Preseli. • The presence of nationally valued prehistoric remains including burial mounds and tumuli on the high outcrop of Crugiau Cemmaes.				
Guidance	• Large and medium scale turbines would not be appropriate in this landscape. • There may be limited opportunity for single or small clusters of small scale turbines as long as they are sensitively sited and take account the guidance below. • Only site small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape, e.g. adjacent to existing farm buildings, and well away from the coastal edge. • Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Take advantage of the screening effects of the area's woodlands and hedgerows when locating wind turbine infrastructure.				

	• Ensure turbines do not affect the undeveloped skylines of the high coastal cliffs or skylines as seen along the coast. • Consider views to and from Mynydd Preseli and Mynydd Carningli when siting any turbines. • Ensure turbines and related infrastructure do not affect the area's prehistoric remains including burial mounds and tumuli on the high outcrop of Crugiau Cemmaes. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[24].

[24] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA26: Cwm Gwaun / Afon Nyfer

Landscape attribute	Sensitivity				
Overview	The small and intimate scale of the valleys, high levels of tranquillity, sparse settlement, and the presence of valued semi-natural habitats and historic sites all pose constraints to this form of renewable energy development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	Landscape attributes that are particularly sensitive to the development of wind turbines are: • The small scale and intimate character of the valley landscapes. • The landscape's sparse settlement pattern, lack of recent development and sense of tranquillity. • Its wooded, undeveloped skylines and views to the adjacent uplands of Mynydd Carningli and Mynydd Preseli. • Valued woodland and meadow habitats, particularly in the Cwm Gwaun valley. • The landscape's nationally significant archaeology, including Iron Age hillforts and Neolithic tombs around Nevern.				
Guidance	• Large or medium scale turbines would not be appropriate in this landscape. • There may be limited opportunity for single small scale turbines as long as they are sensitively sited and take account the guidance below. Only site small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape, preferably adjacent to existing buildings. • Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Take advantage of the screening effect of the area's woodlands and overgrown hedges when locating any infrastructure associated with small scale turbines.				

	• Ensure turbines do not affect the undeveloped skylines of the valleys, or views to the adjacent Mynydd Preseli and Mynydd Carningli. • Ensure turbines and related infrastructure do not affect the area's historic and archaeological features, particularly Iron Age hillforts on the valley ridges and Neolithic tombs around Nevern. • Ensure turbines and related infrastructure do not affect the area's internationally designated sites for nature conservation interest and do not result in any woodland loss. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[25].

[25] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA27: Mynydd Preseli

Landscape attribute	Sensitivity				
Overview	This landscape's conspicuous landform, undeveloped skylines, absence of settlement and built development, and nationally valued prehistoric remains all pose significant constraints to the development of wind turbines.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The landscape attributes that would be particularly sensitive to the development of wind turbines are: • Its open moorland character with an overriding sense of tranquility and remoteness. • The lack of development and woodland cover. • The strong visual prominence of the hills in the wider landscape of northern Pembrokeshire. • The extensive views to the coast and across the surrounding landscapes. • Its nationally valued archaeological resource, particularly the breadth and range of prehistoric remains.				
Guidance	• This landscape would be highly sensitive to the development of all sizes and scales of turbine. There may be very limited potential for single or small clusters of small scale turbines, providing the guidance below is followed. • Only site small scale turbines in areas where they can relate visually to existing buildings or built structures in the landscape, preferably adjacent to existing farm buildings. • Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Take advantage of the screening effects of the area's plantations when locating wind turbine infrastructure. • Ensure turbines do not affect the undeveloped skylines and views across the surrounding landscape towards the coast. • Do not site turbines in prominent positions which could be visible from surrounding areas.				

	• Ensure turbines and related infrastructure does not affect the area's prehistoric remains within the Preseli Registered Landscape of Outstanding Historic Interest in Wales. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[26]. • Identify and take account of possible cross-boundary cumulative impacts associated with turbines outside the National Park.

[26] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.

LCA28: Daugleddau

Landscape attribute	Sensitivity				
Overview	Although there are signs of former industry (small scale mining industry and limestone quarrying), this landscape's sheltered and intimate rural character, undeveloped skylines, great sense of tranquility, characterful views across the river, and semi-natural habitats present sensitivities to this form of renewable energy development.				
	Low	**Low-Moderate**	**Moderate**	**Moderate-High**	**High**
Large turbines					
Medium turbines					
Small turbines					
Key sensitivities	The landscape attributes that would be particularly sensitive to the development of wind turbines are: • The landscape's lightly settled character and high levels of tranquility. • Its intimate and enclosed landscape character with strong historic sense of place. • Its undeveloped, wooded skylines. • The presence of historic features including Bronze Age barrows, Iron Age hillforts and parkland. • The presence of valued semi-natural habitats.				
Guidance	• Large and medium scale turbines would not be appropriate in this landscape. • There may be limited opportunity for single or small clusters of small scale turbines as long as they are sensitively sited and take account the guidance below. • Only site small scale turbines in areas where they can visually relate to existing buildings or built structures in the landscape, preferably adjacent to existing farm buildings, and away from the estuary edges. • Avoid the proliferation of separate small turbine schemes along the same ridgelines. • Avoid the close juxtaposition of different turbine designs and heights, aiming instead for a consistent height and design in any given area. • Take advantage of the screening effect of the area's woodlands when locating wind turbine infrastructure.				

	• Ensure turbines do not adversely affect the characterful views from shoreline settlements across and along the river. • Ensure turbines and related infrastructure does not affect the area's prehistoric remains – including the including Bronze Age barrows and Iron Age hillforts. • Ensure turbines and related infrastructure does not affect the area's valued semi-natural habitats. • The National Park Authority should ensure that any wind turbine development located within this LCA does not sacrifice the essential integrity, coherence and character of the landscape or the special qualities of the National Park[27].

[27] 'Integrity' refers to how the landscape reads as a whole, whilst 'coherence' relates to how the individual components of the landscape connect together. 'Character' relates to the combination of essential landscape elements which make one landscape distinctive from another.