Conwy Local Development Plan
2007 – 2022

Supplementary Planning Guidance

LDP24 Renewable Energy

Adopted February 2017

www.conwy.gov.uk

CONWY
CYNGOR BWRDEISTREF SIROL
COUNTY BOROUGH COUNCIL

This document is available to view and download on the Council's web-site at: www.conwy.gov.uk/ldp **.** Copies are also available to view at main libraries and Council offices and can be obtained from the Strategic Planning Policy Service, Llandudno Library, Mostyn Street, Llandudno, Conwy LL30 2RP or by telephoning (01492) 575461. If you would like to talk to a planning officer working on the Local Development Plan about any aspect of this document please contact the Strategic Planning Policy Service on (01492) 575181 / 575445 / 575124 / 574232.

If you would like an extract or summary of this document on cassette, in large type, in Braille or any other format, please call the Strategic Planning Policy Service on (01492) 575461.

Statement of Consultation

This Supplementary Planning Guidance document was issued for a period of six weeks public consultation between 21 November 2016 and 6 January 2017

It was adopted by Cabinet on 28 March 2017

Copies of the representations received, together with the Council's response are available to view on-line at http://conwy.jdi-consult.net/ldp/

Contents

1. Background and Context 4
2. Objectives and Outputs 5
3. Planning Policy 5
4 Environmental Impact Assessment 8
5 Solar Energy- Land use planning considerations 14
6 Hydro and Tidal power 26
7 Offshore works 29
8 Onshore Infrastructure Work (including that to serve offshore development) 30
9 Biomass 32
10 Anaerobic Digestion 36
11 Energy from waste 37
12 Ground and Air source heat pumps 37
13 District Heating 40
14 Grid Connection 41
15 Decommissioning 42
16 Noise 42
17 Other Considerations 42
18 Biodiversity considerations 44
19 Embedded Energy 46
20 Sustainable materials 47
21 Hydrology and Geology Assessment 48
22 Heritage Evaluation 49
23 Site security, safety and lighting 51
24 Legal Agreements 51
25 Details of Community Benefit Schemes 52
26 Submission documents 52
27 Links to further Guidance 53
28 Glossary 56
29 Appendix A: Electricity Generating Capacity 57
30 Appendix B: Recommended Survey Times 58

1. Background and Context

1.1 The overarching objective of this SPG is to secure the implementation of Policy NTE/6 of the Conwy Local Development Plan 2007-2022 which outlines the primary objectives for assessing Renewable Energy (RE) development other than onshore wind turbine development under 50MW which is covered by LDP/17 Onshore Wind Turbine Development SPG. Good design principles for wind farms and other RE technologies are becoming established following more than a decade of RE development and incentives in Wales and with a number of medium-scale solar farms constructed. Design and landscape impact is a material consideration in the planning process and the Council believes that good siting and design of RE technology is important for all parties involved, helping to deliver development that is appropriate within a landscape whilst delivering targets for RE across Wales.

1.2 The Council supports the adoption of RE technologies to address the effects of climate change and supports Welsh Government's adopted policy in Technical Advice Note (TAN) 8. RE has an important role to play, taking advantage of the various natural resources Conwy has to offer. However, the Council's support for renewables has to be balanced with local and national commitments and aspirations to conserve and enhance the natural heritage, including the quality and diversity of Wales' and Conwy's landscapes, biodiversity and tourism appeal. The purpose of this guidance is to help direct RE to those landscapes and sites best able to accommodate them and to advise on how development can be sited appropriately and designed to best relate to their setting and minimise landscape and visual impacts.

1.3 The term 'renewable energy' is commonly used to describe both renewable and 'low carbon' technologies. Whilst RE technologies (such as wind and solar energy) do not create carbon emissions during energy generation, 'low- carbon' 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. For the purpose of this SPG, the term 'renewable energy' will be used to refer to renewable and low-carbon energy technologies. This SPG does not provide exhaustive text on RE and other TANs and guidance such as the Manual for Streets may also cover design issues relevant to specific topics or types of development.

1.4 In addition to powering and heating homes, buildings and businesses, RE can bring social and economic benefits through job creation in the manufacturing, construction and maintenance industries. RE 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. Careful consideration also needs to be given to likely adverse effects. RE schemes should minimise any negative environmental, social, resource and economic impacts through careful site selection, good design, construction and other

measures which reflect local circumstances. These are 'material planning considerations' which will need to be addressed on a site-by-site basis.

2. Objectives and Outputs

2.1 Welsh Government has confirmed that, following public consultation and subsequent Local Planning Authority (LPA) approval, SPG can be treated as a material planning consideration when LPAs, Planning Inspectors and the Welsh Government determine planning applications and appeals. This SPG has been prepared in accordance with guidance contained in Planning Policy Wales Edition 7 (2014); Local Development Plans Wales (December 2005); Technical Advice Note 8 – Renewable Energy (July 2005); and Welsh Government Practice Guidance – Planning Implications of Renewable and Low Carbon Energy Development. This SPG provides further advice and guidance on RE development proposals to supplement adopted Conwy LDP policy NTE/6.

3. Planning Policy

3.1 RE plays a significant role in the Welsh economy. Figures indicate that onshore wind alone could be worth more than £2bn to the Welsh economy, but this can only be realised if industry and government work side by side to develop its potential. Wales is legally bound to national and European targets on energy and climate change, for instance, 15% of total energy should come from renewable by 2020 as implemented by the Renewable Energy Directive (2009). Welsh Government has an ambition to make low carbon energy a reality in Wales. Welsh Government's energy policy and aspirations are set out in "A Low Carbon Revolution" which identifies Wales' sustainable RE potential to 2020/2025. The Welsh Government is committed to pursuing these aspirations and promoting all forms of RE with onshore wind currently considered the most viable technology. Welsh Government will achieve this situation by the following objectives:

- Maximise energy savings and energy efficiency in order to make producing the energy we need from low carbon sources more feasible and less costly;
- Energy needs must be met from low carbon sources and move to a resilient low carbon energy production via secure RE, on both a centralised and localised basis; and
- Ensure that this transition to low carbon maximises the economic renewal opportunities for practical jobs and skills. Annually, the Welsh Government aims to double renewable electricity production by 2025 in comparison to 2010. By 2050, at the latest, to be in a position where all local energy needs can be met by low carbon electricity production.

3.2 PPW 2014 (as amended) sets out the land use planning policies of Welsh Government and is supplemented by a series of Technical Advice Notes (TANs). It provides the strategic policy framework for the effective preparation of LPAs' development plans. PPW updated Chapter 12 'Infrastructure and Services' also provides guidance to Local Authorities about RE developments. One of the objectives of Chapter 12 is to promote the generation and use of energy from renewable and low carbon energy sources at all scales and promote energy efficiency, especially as a means to secure zero or low carbon developments.

3.3 TAN 12 requires LPAs in Wales to appraise the 'character' of the topography; landscape character, field patterns and land use patterns, distinctive views (in and out of the site), skylines and vistas, prevailing uses and plan forms, boundary treatments, etc. Furthermore, TAN 12 outlines that the appraisal of the landscape should focus on its quality in terms of geology and geomorphology, vegetation and habitats, visual and sensory quality and historic and cultural quality. Landscape considerations, natural heritage, ecological issues and other constraints need to be taken into account when developing a robust and coherent planning framework.

3.4 Good strategic planning can help to avoid RE diminishing landscape diversity within Wales by ensuring that RE schemes are sited within areas which are able to accommodate them. Landscape resources, such as 'LANDMAP', can help to inform and identify where development would be preferable in landscape terms. LANDMAP is one method of assessment which has the potential to provide a framework and information base from which good design and management can be developed. The planning framework in Wales advocates the use of LANDMAP as an information source. At the strategic level, landscape character analysis can help in identifying those landscape types best suited to large scale RE development. Conwy has also designated Special Landscape Areas based on LANDMAP data and methodology. Further guidance on design and landscape is available in LDP/09 Design SPG and LDP/18 Landscape, Access and Design SPG.

3.5 The LDP provides the local planning policy context. The **Conwy Local Development Plan 2007-2022** is available on line here: http://www.conwy.gov.uk/ldp and Supplementary Planning Guidance documents are available here: http://www.conwy.gov.uk/ldp/spg.

3.6 Table 3.1 sets out the thresholds for scales of development:

Table 3.1

Scale of Development	Threshold (electricity and heat)
Strategic	Over 25MW for onshore wind and over 50 MW for all other technologies
Local Authority-wide	Between 5 MW and 25MW for onshore wind and between 5MW and 50MW for all other technologies
Sub Local Authority	Between 50kW and 5MW
Micro	Below 50kW

3.7 In terms of who takes the decision on RE schemes in Wales this is dependent on the size of the scheme. For electricity installations (e.g. wind, solar, biomass etc.) it is currently as follows:

Table 3.2

Installation Size	Current Consenting Body
Less than 10 MW onshore	Local Authority
More than 10 MW onshore	Welsh Government

3.8 Planning Policy Wales para. 12.10.1 outlines relevant national planning considerations which will be used to determine planning applications in addition to the Conwy LDP 2007-2021.

4 Environmental Impact Assessment

4.1 The term 'Environmental Impact Assessment' (EIA) describes a procedure that must be followed for certain types of projects. It ensures the likely effects of the development on the environment are fully understood and taken into account before it is allowed to go ahead. The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2016 sets out the thresholds.

EIA Screening and Scoping

4.2 An applicant can ask for a screening opinion in order to establish whether an Environmental Impact Assessment (EIA) is required. If an EIA is required then a planning application would need to be accompanied by an Environmental Statement.

A screening opinion is normally only required when:

- the development falls within a 'sensitive' area as defined by the **Town and Country Planning (Environmental Impact Assessment (Wales) Regulations 2016 [2016 No.58 (W.28)]** (external link). In Conwy a 'sensitive' area would be a World Heritage Site, Scheduled Monument, SSSI, SACs or SPAs.

4.3 Applicants should make a formal request to the authority's Planning Service's Development Management Section for a screening opinion. The screening and scoping decision and reasons will be made available by the LPA. All requests for a screening opinion should be accompanied by contact details, a description of the proposal along with the location of the development, a 1:2500 location map, a 1:500 site map and power output, as well as a description of the development's potential effect on the environment. As such further details may be requested. For survey times see **LDP05: Biodiversity in Planning SPG** available at: www.conwy.gov.uk/ldp/spg. Screening out of the need for EIA does not absolve the developer from the need to provide environmental information in support of the application, or at the request from the LPA.

Habitats Regulations Appraisal

4.4 A Habitat Regulations Appraisal (HRA) is required where a plan or project could affect a Natura site. The process of HRA is quite separate from EIA and is required by the Habitats Regulations.

4.5 Thus, in addition to screening for EIA, planning authorities must also determine whether a HRA might be required. The key question is whether a proposal could have a likely significant effect on a European (Natura) site (a Special Protection Area (SPA) or a Special

Area of Conservation (SAC). In line with Welsh Planning Policy, proposed European sites (pSPAs and cSACs) should be treated as if they were designated when considering the potential effects of proposals.

4.6 **If it is determined that a proposal could have a likely significant effect on a European site (please refer to Section 5 below), Natural Resources Wales (NRW) should be consulted by the planning authority to confirm this and determine the level of information required to conduct an appropriate assessment.** Guidance on HRA is available on the NWR website: http://naturalresourceswales.gov.uk

Scoping Opinions

4.7 If it is established that an Environmental Impact Assessment is required, the LPA, if instructed by the applicant, will provide a scoping opinion to establish what details should be included in the Environmental Statement.

An Environmental Impact Assessment identifies the environmental impacts of projects and potential measures to avoid excessive levels of harm.

Where an Environmental Impact Assessment is required, a developer must prepare and submit an Environmental Statement with the application.

- Elephant Hawkmoth

- Nightjar monitoring in Clocaenog

- Boardwalk at RSPB Conwy

- Swift nestboxes

Table 4.1 EIA thresholds for Schedule 2 Developments

Type of development	Applicable thresholds and criteria	Indicative thresholds and criteria
Industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1)	The area of the development exceeds 0.5 hectare.	EIA will normally be required for power stations which require approval from the Planning Inspectorate (PINS) with decisions made by the Secretary of State (SoS) (onshore generating stations (OGS) >50MW)Secretary of State, i.e. those with a thermal output of more than 50 MW.
Installations for hydroelectric energy production	The installation is designed to produce more than 5MW.	In addition to the physical scale of the development, particular regard should be had to potential wider impacts on ecology and hydrology. EIA is more likely to be required for new developments which have more than 5 MW generating capacity.
Installations for the harnessing of wind power for energy production (wind farms)	(i) The development involves the installation of more than two turbines; or (ii) The hub height of any turbine or height of any other structure exceeds 15 metres.	The likelihood of significant impacts will generally depend on the scale of development, and its visual impact, as well as potential noise impacts. EIA is more likely to be required for commercial developments of five or more turbines, or more than 5 MW of new generating capacity.

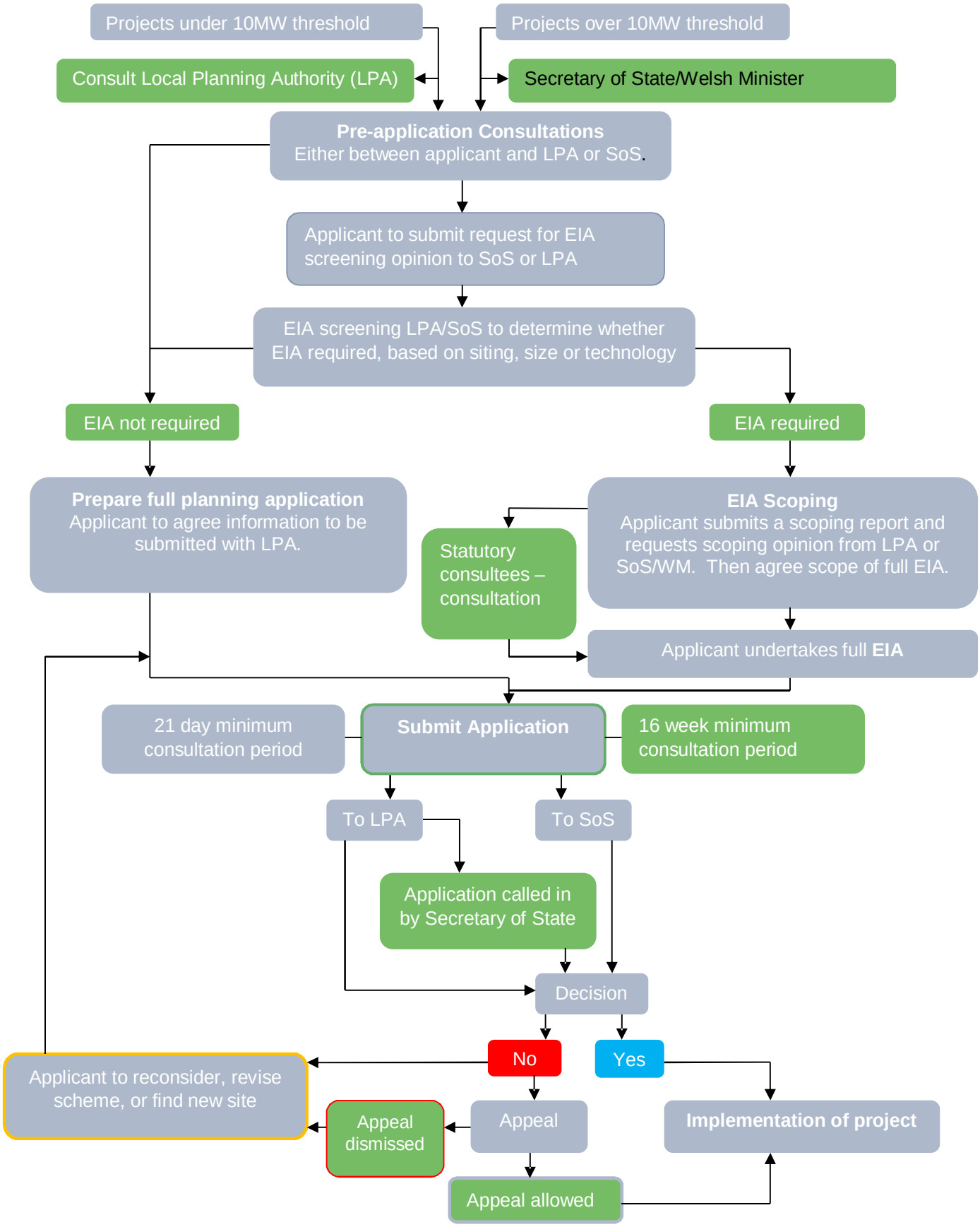
4.8 Some renewable energy development proposals require an Environmental Impact Assessment (EIA) under Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations (2016). EIA may be required for any RE development falling under Schedule 2 of the Regulations or sensitive area. As such, an Environmental Impact Assessment (EIA) is not mandatory in every case but the LPA will provide a 'screening opinion' on request, indicating whether an EIA is required, based on whether the development is likely to give rise to significant environmental effects.
Significant effects are more likely for developments which:

- Are of more than local importance;
- Are in particularly vulnerable or sensitive locations;
- Have unusually complex and potentially hazardous environmental effects.

4.9 In judging the likelihood of significant effects, the LPA will also have regard to the thresholds and criteria set out in the Regulations. Figure 4.1 outlines the circumstances in which an EIA may be required for different types of RE development. Where the 'applicable thresholds and criteria' (Table 4.1) are not met, EIA will not normally be required, although it may still be necessary for development in an 'environmentally sensitive area' or when directed by the Secretary of State. Where the 'indicative thresholds and criteria' in column 3 are exceeded, EIA is more likely to be required.

Above: Hiraethog uplands of Conwy within the SLA looking west towards Snowdonia.

Figure 4.1


Projects under 10MW threshold
Projects over 10MW threshold
Consult Local Planning Authority (LPA)
Secretary of State/Welsh Minister
Pre-application Consultations
Either between applicant and LPA or SoS.
Applicant to submit request for EIA screening opinion to SoS or LPA
EIA screening LPA/SoS to determine whether EIA required, based on siting, size or technology
EIA not required
EIA required
Prepare full planning application
Applicant to agree information to be submitted with LPA.
Statutory consultees – consultation
EIA Scoping
Applicant submits a scoping report and requests scoping opinion from LPA or SoS/WM. Then agree scope of full EIA.
Applicant undertakes full EIA
21 day minimum consultation period
Submit Application
16 week minimum consultation period
To LPA
To SoS
Application called in by Secretary of State
Decision
No
Yes
Applicant to reconsider, revise scheme, or find new site
Appeal dismissed
Appeal
Implementation of project
Appeal allowed

5 Solar Energy- Land use planning considerations

5.1 Technologies for harnessing the sun's power fall into two main categories, solar thermal and photovoltaic;

- Solar thermal is a way of heating water from the sun. There are two common systems; the flat plate and the vacuum tube.
- Photovoltaic (PV) systems convert sunlight into electricity. The sun collectors collect the sun's rays within cells which create an electric field causing electricity to flow (DC). This is then wired to a converter to convert the electricity generated into an alternating current (AC) to the buildings main electricity distribution board. An inverter is required to convert DC to AC for exportation to the national grid. The PV cells usually come in the form of a panel that fits on top of a roof. Free standing solar panels arranged in 'solar arrays' on agricultural land or cleared brownfield land sites would constitute a solar farm.

These photovoltaic and solar thermal technologies can often be integrated into the roof of a building or as standalone structures.

5.2 Solar thermal and PV systems come in many sizes. This SPG applies the size designations used in Planning Policy Wales, Chapter 12, see table 4.1 above. Micro generation solar technologies on a domestic property are generally limited to 4kW peak capacity. This is due to single phase connection limits and electrical regulations. This equates to about 16 solar PV panels on the roof of a house. In many cases you will be able to install solar thermal and/or PV without the need for planning permission.

5.3 For a roof mounted photovoltaic scheme (industrial buildings, sheds etc.) generating energy between 50kW and 50MW planning permission will always be required. Placing solar panels in a field used for agriculture is a material change of use and requires planning permission regardless of size. As a general guidance, each MW of energy generated by photovoltaic installations requires 2.5 to 3.0 hectares of land.

5.4 A photovoltaic solar array should be designed so the field can be restored to agricultural use upon cessation of use of the photovoltaic cells (approximately 25-30 years). Evidence will be sought on the reversibility of the development in the context of the aim to conserve high quality agricultural land as a resource for the future. Also, information is required regarding the management of the land to keep the site from becoming overgrown.

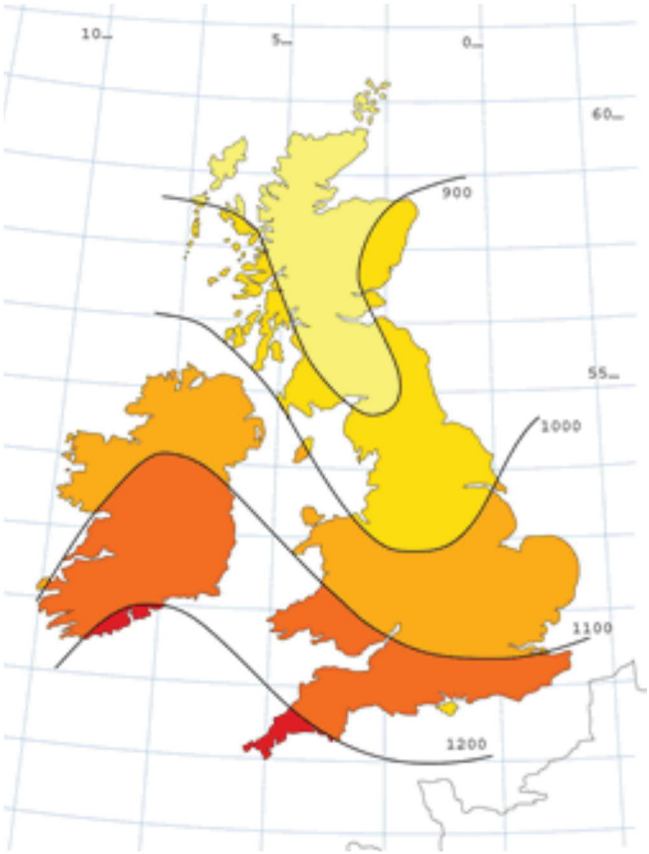
5.5 The British Research Establishment (BRE) have produced guidance on large scale photovoltaic arrays. Whilst this is based on English legislation much of the advice can be applied to Wales. Please note that it is important to make sure you check any relevant Welsh legislation to ensure there no a difference.

5.6 Proposals should be subject to a sequential test (of suitable and available land) to meet the requirements of Planning Policy Wales paragraph 4.10.1.

5.7 **Solar hot water (SHW):** 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.

5.8 **Solar Photovoltaics (PV):** Solar Photovoltaics 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 in modular form.

Tai Moelion, Ty Croes solar farm on Anglesey



Above: UK solar irradiation - Annual Total kWh/m2 banding.
Map showing average annual solar radiation on a 30° incline facing due south
©Solar Trade Association

5.9 Small Scale Solar Installations

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'.

5.10 Key Planning Considerations

Small-scale domestic and commercial solar PV and solar hot water installations are classified as 'permitted development' under the Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2012 and the Town and Country Planning (General Permitted Development) (Amendment) (Wales) (No.2) Order 2012 under certain circumstances.

5.11 Stricter controls are likely to apply if the property is a listed building (i.e. buildings which are identified for their historic or architectural interest), or within a Conservation Area. In order to alter a listed building, 'listed building consent' must be applied for from the Council, in accordance with the Planning (Listed Buildings and Conservation Areas) Act, 1990.

5.12 Choosing a suitable site within Conwy

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;
- avoid sensitive landscapes, habitats and those of value;
- avoid high-yielding agricultural land particularly that graded 1, 2, and 3a BMV.

5.13 Key landscape sensitivities and general guidance for siting small-scale solar installations within Conwy

Both solar hot water and solar PV units can be used throughout Conwy but they will principally be 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.

5.14 Historic buildings, listed buildings and those located in 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 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.

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.

5.15 **Field-Scale Solar Photovoltaics (PV)**

Solar technologies are concerned with capturing energy from the sun. This section covers field-scale solar PV installations.

5.16 Field-scale solar PV is an emerging RE technology which has been popular with developers, particularly as a result of the Government's Feed in Tariff (FiT) which has provided an attractive financial incentive for their development (for schemes of less than 5MW in capacity). However, following changes to the FiT scheme, field-scale solar PV is only eligible for limited funding, and the Department of Energy and Climate Change should be consulted for the latest tariff.

5.17 There are few existing field-scale solar PV developments in the UK, although several have recently been granted planning permission, including Tai Moelion in Anglesey and two granted planning permission in Conwy. 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.

5.18 Scales of solar development:

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

5.19 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. 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 in Anglesey has panels that will stand 2.5 metres above ground level and will be supported on metal legs. In order to qualify for the Feed in Tariff, the maximum height of any part of the solar farm must not be more than 4 metres.

5.20 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 Porta-cabin type structure with a concrete base).
- Security: CCTV, fencing.

New access tracks are not a requirement because temporary matting can be used to bring the solar panels to site (i.e. if a site is not accessible by existing roads or tracks).

Tai Moelion, Ty Croes solar farm on Anglesey.

5.21 **Key Planning Considerations**

Where a solar installation is larger than 9m^2, the development falls outside the scope of 'permitted development', under the Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2009, and is likely to require planning permission from the LPA.

5.22 **Choosing a suitable site within Conwy**

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.

5.23 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.

5.24 Another consideration for site selection is the proximity of the railway or road network. The provision of any reflective material used on the panels should not interfere with the line of sight of drivers (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 impact that may have on sea users (e.g. for fishing, tourism and other commercial activities).

5.25 The cumulative effect of multiple schemes should be taken into account, particularly as they could result in clustering around grid connection points.

5.26 The need to protect the high quality areas of Conwy's landscape and impacts on sensitive areas and Snowdonia National Park limits locations suitable for the installation of field-scale solar PV developments.

5.27 An assessment of landscape sensitivity to field-scale solar PV will be completed during 2016 on behalf of Conwy CBC. This will use the Landscape Character Areas as used in the LDP/11 "Landscape Sensitivity and Capacity Assessment for Onshore Wind Turbine Development" as a basis. This divides the landscape of Conwy 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 will be shown and commentary on these sensitivities and guidance on where and how solar PV developments can be accommodated within the areas will be provided.

5.28 **Key landscape sensitivities and general guidance for siting field-scale solar installations within Conwy.**
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 3-4metres, 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.

5.29 The need for renewable or low carbon energy does not automatically override environmental protections.

- cumulative impacts require particular attention, especially the increasing impact that RE can have on landscape and local amenity as the number of solar arrays in an area increases
- local topography is an important factor in assessing whether large scale solar farms could have a damaging effect on landscape and recognise that the impact can be as great in predominately flat landscapes as in hilly or mountainous areas
- great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting
- proposals in close proximity to Snowdonia National Park and Special Landscape Areas where there could be an adverse impact on the protected area will need careful consideration.
- protecting local amenity is an important consideration which should be given proper weight in planning decisions

5.30 **What are the particular planning considerations that relate to active solar technology (photovoltaic and solar water heating)?**
Active solar technology, (photovotaic and solar water heating) on or related to a particular building is often permitted development (which does not require a planning application) provided the installation is not of an unusual design, or does not involve a listed building, and is not in a designated area.

5.31 Where a planning application is required, factors to bear in mind include:

- the importance of siting systems in situations where they can collect the most energy from the sun

- need for sufficient area of solar modules to produce the required energy output from the system
- the effect on a protected area such as SPA, SAC, SSSI
- the colour and appearance of the modules, particularly if not a standard design

5.32 **What are the particular planning considerations that relate to large scale ground-mounted solar photovoltaic farms?**

The deployment of large-scale solar farms can have a negative impact on the rural environment, particularly in very undulating landscapes. However, the visual impact of a well-planned and well-screened solar farm can be properly addressed within the landscape if planned sensitively.

5.33 Particular factors a LPA will need to consider include:

- encouraging the effective use of previously developed land, and if a proposal does involve greenfield land, that it allows for continued agricultural use and/or encourages biodiversity improvements around arrays.
- that solar farms are normally temporary structures and planning conditions can be used to ensure that the installations are removed when no longer in use and the land is restored to its previous use.
- the effect on landscape of glint and glare, neighbouring uses, and aircraft safety
- the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun
- the need for, and impact of, security measures such as lights and fencing
- great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. As the significance of a heritage asset derives not only from its physical presence, but also from its setting, careful consideration should be given to the impact of large scale solar farms on such assets. Depending on their scale, design and prominence, a large scale solar farm within the setting of a heritage asset may cause substantial harm to the significance of the asset
- the potential to mitigate landscape and visual impacts through, for example, screening with native hedges
- the energy generating potential, which can vary for a number of reasons including, latitude and aspect

5.34 The approach to assessing cumulative landscape and visual impact of large scale solar farms is likely to be the same as assessing the impact of wind turbines. However, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be much less.

5.35 **Grazing by sheep** 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.

5.36 **Glint and glare**

Glint is produced as a direct reflection of the sun on the surface of the solar PV pane and/or the frame. Glare is a continuous source of brightness. This is not a direct reflection of the sun, but rather a reflection of the bright sky around the sun. Glare is less intense than glint.

5.37 Glint and glare can be a significant issue and should not be underestimated, particularly to the south east of a solar PV development. The potential impacts upon homes, businesses and public highways in particular, should be thoroughly assessed at the pre-planning stage.

5.38 Details of the external finish of the frames and panels including any anti-glare covering will be expected with the details of any planning application.

6 Hydro and Tidal power

6.1 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.

6.2 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.

6.3 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.

6.4 **What are the particular planning considerations that relate to hydropower?**

Planning applications for hydropower should normally be accompanied by a Flood Risk Assessment. Early engagement with the LPA and Natural Resources Wales will help to identify the potential planning issues, which are likely to be highly specific to the location. Advice on environmental protection for new hydropower schemes has been published by Natural Resources Wales.

6.5 For the purpose of this guidance micro hydro means installations of less than 50kw. Installations at this scale are unlikely to give cause for concern, unless:

- Depleted flows result in a visual or biodiversity concern
- the proposal is on, or could affect a freshwater Special Area of Conservation;
- the proposal is on or could affect a river which contains important fishing interests (developers /installers should contact the local fisheries board to establish the importance of a particular watercourse);
- the proposal could affect a European Protected Species (e.g. Otter);
- there are other hydro developments within the same catchment, which could have a cumulative impact.

6.6 Any micro hydro installation is likely to require a licence from NRW and developers should consult NRW as early as possible. All micro hydro installations require planning consent.

6.7 **Technological potential within Conwy**

Hydro power is well developed in Wales where most sites with a potential greater than 1 MW have been exploited. Within Conwy 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).

6.8 **Key Planning Considerations**

Small-scale hydro power plants will require planning permission from the LPA under the Town and Country Planning Act 1990. If the proposals will affect a listed building, additional regulations will apply and the Council's Building Conservation Officer should be consulted.

6.9 Hydro power plants with a generation capacity above 0.5MW fall under Schedule 2.3(h) of the Town and Country Planning Act (Environmental Impact Assessment) (England and Wales) Regulations (1999) (known as the 'EIA Regulations'). At this size an Environmental Impact Assessment (EIA) is not mandatory but the LPA will provide a 'screening opinion' on request, indicating whether an EIA is required, based on whether the development is likely to give rise to significant environmental effects.

6.10 **River Basin Management Plans and Abstraction Licenses**

LPAs 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.

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

6.12 **Choosing a suitable site within Conwy**

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.

6.13 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.

6.14 **Key landscape sensitivities and general guidance for siting micro hydro schemes within Conwy**

The following checklist should be noted when siting micro hydro schemes within the plan area:

- 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.

7 Offshore works

7.1 On 1 April 2012, under the Localism Act 2011, the Planning Inspectorate became the agency responsible for operating the planning process for nationally significant infrastructure projects (NSIPs).

7.2 NSIPs are usually large scale developments such as new harbours, power generating stations (including wind farms), and electricity transmission lines, which require a type of consent known as 'development consent' under procedures governed by the Planning Act 2008 (and amended by the Localism Act 2011). The 2008 Act sets out thresholds above which certain types of infrastructure development are considered to be nationally significant and require development consent.

7.3 The Planning Inspectorate offers a service for applicants at the pre-application stage of the nationally significant infrastructure planning process. The service is free and is designed to help applicants in planning and carrying out their pre-application duties. Further information is available here: http://infrastructure.planninginspectorate.gov.uk/

Swansea Bay Tidal Lagoon, which potentially will be the world's first man-made tidal lagoon, the first in a series that the client intends to deliver throughout the UK. The project will harness the 8.5m tidal range of Swansea Bay (average Spring tides) to generate renewable electricity for 14 hours per day, for 120 years, with a net annual output in excess of 500GWh (equivalent to about 90% of Swansea Bay's annual domestic electricity use, or 11% of Wales'). A similar project is proposed off Conwy's coast from 2018 onwards subject to funding.

©LDA Design.

This would support the ambitions of the Conwy Economic Growth Strategy, improve skills base, recreational offer and flood alleviation in the area provided that other environmental protection policies in the LDP are met.

8 Onshore Infrastructure Work (including that to serve offshore development)

8.1 The onshore works for on and offshore renewable energy development will require considerable pre-application scoping and sequential assessment exercises and pre-application discussions are advised.

8.2 Environmental Statements should include impacts and mitigation measures relating to:

- Soils and contaminated lands
- Hydrology
- Ecology
- Landscape and views
- Archaeology and cultural heritage
- Noise
- Transport
- Tourism
- Electric and magnetic fields
- Assessment of both overhead and underground cabling routes

8.3 Planning applications should also include a Planning Statement, Design and Access Statement and where necessary a Flood Consequence Assessment and Crown Estate consent letter.

The main planning considerations are:

- Ecological impact and improvement
- Transport impacts
- Coastal protection
- Tourism

- Landscape/Visual Impact
- Noise
- Electro-magnetic Fields
- Land Use
- Hydrology
- Archaeology
- Decommissioning impacts

9 Biomass

9.1 What are Biomass Plants?

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:

1. **Plants designed primarily for the production of electricity**. These are generally the largest schemes, in the range 10-40MW. Excess heat from the process is not utilised. These plants are major multi-million pound developments and are large scale with considerable associated traffic movements. As such they are unlikely to be seen within the Plan Area but sited on more of a regional strategic basis. However the county is likely to see an increase in production, sourcing and transportation of raw material. **This scale is therefore not considered further here.**

2. **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.

3. **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.

110kw unit serving a farm cluster near Llanrwst

biomass hopper

AD Plant

9.2 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.

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

- Wood-burning 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 7m3 of wood pellets or 21 – 35m3 of woodchip.
- Access to accommodate bulk deliveries of wood fuel by lorry or tanker.

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

9.4 **Technological potential within Conwy**

Within the Plan Area 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.

9.5 **Key Planning Considerations**

Commercial (small and medium-scale) biomass installations

Heat-only biomass plants and combined heat and power electricity plants with an electrical output of 50MW or less will require planning permission from the LPA under the Town and Country Planning Act 1990. Biomass installations with an electrical output of greater than 50MW would need to apply for consent to the Major Infrastructure Unit within the Planning Inspectorate from 2012, as defined under the Planning Act 2008.

9.6 **Environmental Impact Assessment**

Biomass plants may fall under Schedule 2 of the In Wales, this became law through the **Town and Country Planning (Environmental Impact Assessment (Wales) Regulations 2016 [2016 No.58 (W.28)]**. if either of the following thresholds apply:

- industrial installations for the production of electricity, steam and hot water, where the development exceeds 0.5 hectares; and
- industrial installations for carrying gas, steam and hot water, where the area of works exceeds 1 hectare.

At this size, an Environmental Impact Assessment (EIA) is not mandatory but the LPA will provide a 'screening opinion' on request, indicating whether an EIA is required, based on whether the development is likely to give rise to significant environmental effects.

It is also possible that where a development will process waste, it could also fall under Schedule 2.11(c) of the Regulations.

9.7 **Domestic and commercial biomass installations**

The installation of domestic biomass boilers which do not require alterations to the outside of the building does not require planning permission. The installation, alteration or replacement of a flue, forming part of a biomass heating system, in a dwelling is classed as permitted development under the Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2012 subject to criterion. Permitted development rights for biomass installations also exist for commercial buildings under the Town and Country Planning (General Permitted Development) (Amendment) (Wales) (No.2) Order 2012, subject to criterion.

9.8 If the proposals will affect a listed building, additional regulations will apply and the Building Conservation Officer should be consulted.

9.9 Through Planning Policy Wales, the Welsh Government actively promotes the installation of combined heat and power schemes as "imperative to reduce carbon emissions".

9.10 **Choosing a suitable site within Conwy**

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

9.11 **Key landscape sensitivities and general guidance for siting biomass plants within Conwy**

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

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 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 local residents associated with the operation of the plant and delivery of feedstocks.

10 Anaerobic Digestion

10.1 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.

10.2 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.

10.3 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.

10.4 There are two scales of anaerobic digestion plant of relevance to Conwy:

- 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.

10.5 The potential sourcing of feedstock for anaerobic plants within Conwy includes:

- **Farm wastes:** Conwy is a major livestock producing area with a number of small dairy farms and overwintering sheds for beef 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 Conwy are currently utilised outside of the county.
- **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.

11 Energy from waste

11.1 Energy from waste falls into two broad categories, systems that use biological processes to extract energy from waste and those that use thermal processes. Biological processes include landfill gas; sewage gas; biogas from agricultural waste; digestible domestic or industrial waste. Developments associated with landfill sites or sewage works would tend to be located onsite.

11.2 Small scale digesters could be located on individual farms to serve their needs. However larger scale energy from waste developments including those that use thermal processes will be industrial in nature and due to their nature, careful siting of any such developments would be required.

11.3 Biomass energy generation, microgeneration, and energy from waste developments have the potential to impact on local air quality. Renewable energy developments which involve thermal or biological processes should not have an unacceptable impact on air quality.

12 Ground and Air source heat pumps

12.1 What are Ground and Air Source Heat Pumps?

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).

12.2 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.
- 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.

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

12.3 **Air source heat pumps**

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.

12.4 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.

12.5 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 GSHP) or ducted warm air (in the case of ASHPs). However, new product ranges are emerging that can be retrofitted to conventional household heating systems.

12.6 **Technological potential within Conwy**

There are opportunities to use ground and air source heat pumps throughout the Plan Area.

12.7 **Key Planning Considerations**

The installation, alteration or replacement of a ground source or water source heat pump within the curtilage of a dwelling is classed as permitted development under The Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2012. Ground source or water source heat pumps on commercial buildings can also be classed as permitted development, under certain circumstances under The Town and Country Planning (General Permitted Development) (Amendment) (Wales) (No.2) Order 2012.

12.8 Air source heat pumps within the curtilage of a dwelling house are also classified as permitted development under The Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2012 under certain circumstances. In the case of listed buildings and Conservation Areas, advice should be sought from the Conservation Officer, as separate regulations may apply.

12.9 **Choosing a suitable site within Conwy**

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

12.10 **Key landscape sensitivities and general guidance for siting ground and air source heat pumps within Conwy**

The following checklist should be considered when siting ground or air source heat pumps within Conwy:

- 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.
- The Council may require an archaeological survey before construction of ground source heat pumps and advice will need to be sought from the Gwynedd Archaeological Trust or the Clwyd-Powys 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 Conwy.

13 District Heating

13.1 What is district heating?

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.

13.2 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.

13.3 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.

13.4 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.

13.5 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 Conwy.

13.6 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.

13.7 **Technological potential within Conwy**

There is considerable scope for small-scale district heating systems associated with community facilities within the Plan Area 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 Llandudno where there are a number of hotels in close proximity; or adjacent small business premises within the larger settlements in the rural area. The facilities being heated need to be in close proximity to minimise the costs of distribution piping. There is also considerable opportunity for smaller schemes which serve rural villages, smaller clusters and any off-gas areas.

13.8 **Key Planning Considerations**

District heating schemes that solely generate heat and those designed as a combined heat and power plant to generate both electricity and heat with an electrical output of 10MW or less will require planning permission from the LPA under the Town and Country Planning Act 1990.

13.9 District heating schemes with a capacity of more than 10MW are unlikely to be suitable within Conwy. Applications of this size would need to apply for consent to the Major Infrastructure Unit within the Planning Inspectorate.

14 Grid Connection

14.1 In many cases the ability and capacity of a proposed RE development to connect to the electricity distribution grid will not be a planning consideration. However, given the importance of exporting electricity to the grid in many cases, it is recommended that developers conduct initial discussions with the Distribution Network Operator (DNO) at an early stage in the development of the project. These discussions should seek to identify routes for grid connection infrastructure which avoid areas of high landscape, ecological or archaeological sensitivity. Preference will be for sub-surface connections where possible.

14.2 This will not be an issue in circumstances where it is not proposed to connect the technology to the electricity distribution grid. Examples of this include using the electricity generated directly by the business or household, or using storage solutions, such as batteries.

15 Decommissioning

15.1 LPAs should consider using planning conditions to ensure that redundant development (e.g. turbines, biomass plant, solar arrays) are removed when no longer in use and the land/site is restored to an appropriate use, usually land restoration to its former quality. Planning permission for RE may be subject to conditions which require the future decommissioning in a set period of time (usually 25 years) and the return of the ground to its previous appearance. If the RE fails during the consent period and stops generating electricity for a period of more than 12 months it will be expected to be removed unless there are genuine mitigating circumstances and the ground reinstated to avoid the potential visual harm of a derelict structure in the landscape. This does not preclude an extension of time application should the RE still be viably functioning after 25 years.

16 Noise

16.1 Ground mounted solar PV developments can emit noise during their operational phase, particularly in association with transformers and inverter equipment.

16.2 Applicants should consider the following guidance in relation to noise emissions:

- Any noise emitting equipment should be located away from dwellings to minimise harm to residential amenity.
- Where there is a risk of dwellings being adversely affected by noise, machinery should be housed to reduce noise levels.
- The Rating Level (LArTr) of the noise emanating from the proposed development should be at least 5 dB below the measured background noise level at any time at the curtilage of any noise sensitive premises.
- The rating level (LArTr) and the background noise level (LA90) should be determined in accordance with the guidance and methodology set out in BS4142: 1997.

17 Other Considerations

17.1 **Are buffer zones/separation distances appropriate between renewable energy development and other land uses?**

Local planning authorities should not rule out otherwise acceptable renewable energy developments through inflexible rules on buffer zones or separation distances. Other than when dealing with setback distances for safety, distance of itself does not necessarily determine whether the impact of a proposal is unacceptable. Distance plays a part, but so does the local context including factors such

as topography, the local environment and near-by land uses. This is why it is important to think about in what circumstances proposals are likely to be acceptable and plan on this basis.

17.2 **What technical considerations relating to RE technologies affect their siting?**

Examples of the considerations for particular RE technologies that can affect their siting include proximity of grid connection infrastructure and site size, and:

- for biomass, appropriate transport links
- for hydro-electric power, sources of water,
- Any air safeguarding, electromagnetic interference and access for large vehicles

17.3 Discussions with industry experts can help to identify the siting requirements and likely impacts of technologies. The National Policy Statements on the Department of Energy and Climate Change's website give generic and technology specific advice relevant to siting particular technologies. Natural Resources Wales has published advice showing which areas may be suitable for open loop ground source heat pumps, as well as advice on the technologies it regulates.

17.4 Renewable energy developments should be acceptable for their proposed location. In addition to the factors that should be considered regarding the acceptability of a location for any form of renewable energy development, there are particular considerations for the following technologies: hydropower (see section 6), active solar technology (photovoltaics and solar water heating) (see section 5), and solar farms (see section 5). Also, local planning authorities may wish to consider how planning conditions or planning obligations can mitigate the impacts identified.

18 Biodiversity considerations

18.1 The key aim is to ensure that RE development proposals are supported with information so that they can demonstrate that they will not have an unacceptable impact on: protected species, carbon balance, soils and peatlands, the water environment; the marine environment, flood risk, and air quality.

18.2 For **freshwater sites**, if the development proposal is likely to have a hydrological connection with a protected area then it is important that any application contains a construction method statement detailing how the works will avoid impacts on the water quality, quantity or associated water dependant habitats.

18.3 **Bats**

All species of bats are European protected species. The Bat Conservation Trust's Bat Surveys: Good Practice Guidelines (2nd edition) 2012 provides useful guidance and we recommend that developers follow this approach. However, the level of effort should still be tailored to the sensitivity of the site. If there is a good case to do less than the recommended survey effort (for example where the habitat is less likely to support bats), we suggest that you seek our advice over any deviation from the good practice guidelines. Any such request for advice on survey effort should be made well in advance of the planned submission of any application to ensure that sufficient time remains available to carry out any surveys that may be deemed necessary.

18.4 **Peat**

Peat lands are vitally important for people but unfortunately the majority have been damaged or destroyed through extraction but in Conwy more damage has been done through land drainage. Peat lands support important wildlife habitats, hold vast carbon stores, collect and supply much of our drinking water, provide archives of archaeological and environmental information and offer breathing spaces and a sense of place for many people. Peat lands are a huge asset for society and urgent steps are needed to ensure the peat land resource, with its biodiversity, is properly managed and secured for the future. This is an even more urgent task in the face of a changing climate, which could accelerate the deterioration of damaged peat lands.

18.5 Development should avoid peat land areas and watercourses which feed into them. Where impacts are identified measures to protect and maintain existing peat lands and ensure restoration of damaged areas should be demonstrated. The protection of peat lands objectives are linked across climate change, biodiversity, water, heritage, development and access legislation.

Further information is available in **LDP05: Biodiversity in Planning SPG** available at: www.conwy.gov.uk/ldp/spg

18.6 In order to assess the potential impact on key habitats and species, which are protected by law, **NRW should be consulted on any proposal to install any RE proposal within a Special Protection Area, Special Area of Conservation, Ramsar site or Site of Special Scientific Interest**.

18.7 Within 200m of a Special Protected Area (SPA) the installer should consider whether there could be a detrimental impact on the species for which the SPA has been designated, recognising that many birds will travel outside of the site for feeding or breeding and that they may be at risk of collision or disturbance. This could include, for example, a RE installed close to the boundary; a RE installed near to a known nest site or a RE installed on a known flight corridor (for example between roosting and feeding sites).



19 Embedded Energy

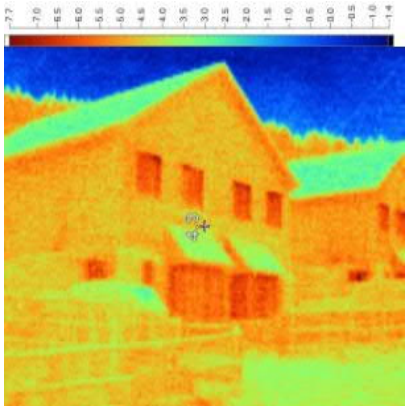
19.1 The process of assessing embodied energy involves measuring or estimating the total energy consumed in the lifecycle of the product. This may include: gas, oil, electricity etc, but can also include features that are not easy to quantify such as water use and ecological impact. The measurement process involves assessing the relevant production means, which may include but is not limited to:

- Extraction
- Manufacturing (including energy to manufacturing capital: equipment
- Heating and lighting in factories/plant etc.)
- Transportation
- Construction
- Maintenance
- Disposal

Samples of sustainable walling option as displayed by The Natural Building Centre

http://thenaturalbuildingcentre.co.uk/

19.2 Some assessment methods exclude maintenance and disposal. The full measure of energy processes involved in the various stages of a products life is often referred to as 'Cradle to Grave'. However, the embodied energy of products is often specified in terms of 'Cradle to Gate', that is the energy consumed until the product leaves the factory gate. An alternative measure is 'Cradle to Site', which is the energy consumed until the product reaches the construction site.



19.3 Calculation of embodied energy is very complex, and is just one of the environmental indicators that designers must consider when specifying materials and components for a building. Other considerations might include the deleterious nature of some materials, difficulty of disposal, ecological impact, waste generation, recycled component and recyclability, renewable resources, locally sourced materials, ease of deconstruction and separation, durability, efficiency in use, standardisation and so on.

20 Sustainable materials

20.1 A **sustainable material** is one that:

- Does not deplete non-renewable (natural) resources (peat horticultural products).
- Whose use has no adverse impact on the environment

20.2 In practice both these objectives are impossible to achieve, but they do show us the direction we should aim. We can preserve natural resources in many ways including:

- Avoiding using scarce (non-renewable) materials.
- Creating less waste
- Using less, by not over-specifying performance requirements, by designing minimum weight structures
- Using reclaimed, rather than new materials
- Using renewable materials (crops, timber, stone) especially locally sourced.

20.3 We can reduce the impact on the environment of using construction materials by:

- Using materials with low(er) embodied energy
- Reducing transport of materials and associated fuel, emissions and road congestion
- Preventing waste going to landfill
- Designing and constructing for ease of reuse and recycling at end of life (design for deconstruction).

21 Hydrology and Geology Assessment

21.1 Applicants should consider how the excavation and construction works can be carried out without substantially altering the hydrological and geological regime of the site.

21.2 In addition, a number of properties within rural areas of the county are reliant on private water supplies. Depending on the geology of the site and the proximity to sources of supply, construction activities relating to development has the potential to cause adverse impacts on the quantity, quality and colouration or water supplies.

21.3 Areas of peat soils are one of the defining characteristics of a range of BAP priority peat land habitats in Wales. Peat soils should be subject to particular attention in the undertaking of SEA assessments of plans which have the potential to affect these soils. Developments which result in the direct loss of peat or which have the potential to interfere with natural hydrological processes in peat are unlikely to be acceptable, and impact assessment studies at project level should include detailed assessments of peat depth, peat type, and hydrology, including the distribution and functionality of macroporous features such as peat pipes.

21.4 The LPA may request a hydrological and / or a geological report to be submitted and a scheme of works to be drawn up to ensure hydro/geological assets are safeguarded during the construction, operation and decommissioning of the plant.

21.5 Applicants are advised to contact the Council's Environmental Health officers during the pre-application stages.

21.6 Some areas are safeguarded from development on the basis that they contain aggregate resources which need to be protected over a long term period. Please contact the North Wales Minerals and Waste Planning Service during the pre-application stages.

22 Heritage Evaluation

22.1 Conwy has an especially important historic environment, a key part of its distinctive cultural heritage. The county has a high density of designated historic assets including Scheduled Monuments, Listed Buildings, Conservation Areas, Registered Parks and Gardens,

Historic Landscapes, and a World Heritage Site. In addition, Conwy has a rich heritage of undesignated sites. The Council's Conservation Officer can give an indication of where additional protection is required and local Archaeological Trusts will be consulted on all applications.

22.2 The general considerations are whether ground equipment has an impact on the setting of Listed Buildings and Scheduled Monuments as well as impact on the historic landscape of Conwy. Below-ground equipment could impact on archaeological deposits through ground disturbance.

22.3 Paragraph 3.15 of TAN 8 states that other than in circumstances where visual impact is critically damaging to a listed building, ancient monument or a conservation area, proposals for appropriately designed solar thermal and solar PV systems should be supported.

22.4 There are many important areas of historic and heritage interest within the county both above and below the ground. Where RE development is proposed in close proximity to an area of heritage interest, or where development may have an impact on the setting of a historic feature, it may be necessary to commission a heritage evaluation to assess the implications of the proposal on features of historic interest either through direct loss of a feature or visual impact on the setting of features of historic interest.

22.5 Applicants are advised to contact the Council's Conservation Section during the pre-application stages. Applicants are also advised to contact the regional archaeological trust (Gwynedd Archaeological Trust Planning Service in the west of the County Borough; Clwyd Powys Archaeological Trust in the east).

22.6 The impacts likely to give concern associated with biomass installations would be the visual impact of the flue or the visual impact of any external storage hopper required for fuel. However, both are likely to be of a scale which can be accommodated within most buildings, with the flue, for example, being similar to the flue required for a log burning stove or fire and the storage hopper similar in size to a domestic oil tank.

22.7 **Only in highly visible locations within SLAs and Green Wedges where the installation would <u>significantly</u> alter the landscape character or openness of the area would it be likely to raise concerns about biomass installations.**

22.8 With regard to biomass, the role of the planning system is to consider the power plant and associated impacts and not the production of the fuel source. The location of biomass plants is likely to be determined by a number of factors related to the economic costs of transporting supply materials from source, the availability of feedstock through the year, the location of the end user and the scale of the plant. Biomass plants are industrial in nature but require being located close to sources of feedstock and being accessible to the end users of the energy or heat and/or a grid connection. These factors will be taken into account when considering siting development effecting a heritage asset. Biomass proposals should include details of site drainage, a description of the combustion appliance and maximum rates of emissions of PM 10 and PM 2.5 when operating at capacity.

Further guidance is provided in "Renewable Energy and your Historic Building, (WG/CADW, 2010)".

23 Site security, safety and lighting

23.1 Whilst there is an acknowledged need to ensure solar PV facilities are adequately secured, consideration should be given to the impacts of such security measures on the landscape, habitat connectivity and visual amenity. Lighting and other pollution sources should comply with national guidance.

24 Legal Agreements

24.1 The need for developer contributions required as a result of the proposed development e.g. road network enhancements or habitat management plans, may need to be secured through the use of legal agreements. Where legal agreements are necessary, it would be preferable for heads of terms to be discussed and prepared at an early stage in the planning process.

24.2 A legal agreement may also be required to ensure a suitable mechanism is in place, e.g. a bond, to ensure that sufficient resources would be available for dismantling the plant and site remediation. This is necessary to prevent large redundant plant from remaining in the landscape once the end of their operating life has been reached, and acts as a safeguard in case of any financial constraints which may prevent the owner / operator of the plant from carrying out decommissioning works in future.

25 Details of Community Benefit Schemes

25.1 Applicants for RE developments with a total generating capacity of 500kW or above should consider the provision of a community benefit scheme to compensate the communities likely to be most heavily impacted by the development.

25.2 For schemes over 5MW, industry best practice guidance exists for applicants on the appropriate level of community benefits, published by Renewable UK in its *Community Benefits Protocol*, which can be found on the following website: http://www.bwea.com/pdf/publications/CommunityBenefits.pdf

25.3 It is important to note that the absence or presence of any contribution to local communities is not material to the determination of planning applications. Developers are therefore encouraged to engage directly with communities rather than the LPA on this issue, however where a community benefits payment is volunteered, a legal agreement may be used to secure community benefit payments.

26 Submission documents

26.1 *Also see Appendix A for Development Guidance.*

Description of the development

All development relating to the RE development must be within the red edge shown on the site and location plan and in all cases, the supporting information should provide details of the following:

- Unit size, individual and total including ground coverage.
- Rated generation capacity (kW or MW) and indicative annual electricity output (kWh or MWh).
- Colour of unit.
- Site access arrangements and any new, temporary or permanent access points and tracks.
- All ancillary equipment (e.g. equipment cabins, meter boxes, transformers, substations etc.).
- Cable trenches and / or new overhead lines.
- Meteorological masts.
- Any gates, fencing or landscaping proposed.
- Any other engineering works, buildings or structures relating to the development (e.g. construction compounds, crane pads, lay-down areas etc.).

27 Links to further Guidance

National

Planning Policy Wales http://wales.gov.uk/topics/planning/policy/ppw/?lang=en

Energy Wales: A Low Carbon Transition – Welsh Government March 2012
http://wales.gov.uk/docs/desh/publications/120314energywalesen.pdf

Welsh Government (2011) Planning Implications of Renewable and Low Carbon Energy.
http://gov.wales/topics/planning/policy/guidanceandleaflets/planningimplications/?lang=en

Technical Advice Notes (TAN's)
Welsh Government (2010) Technical Advise Notes 6: Sustainable Rural Communities
Welsh Government (2008) Technical Advise Notes 8: Renewable Energy
Welsh Government (2014) Technical Advise Notes 12: Design
http://gov.wales/topics/planning/policy/tans/?lang=en

Welsh Government (2012): Generating your own Renewable Energy: A Planning Guide
http://gov.wales/topics/planning/policy/guidanceandleaflets/generaterenewable/?lang=en

Permitted Development:

Copies of the Order can be obtained from the following link:
http://www.legislation.gov.uk/wsi/2012/1346/contents/made

Copies of the MCS Planning Standard are available from the following link:
http://www.microgenerationcertification.org/installersmanufacturers/installerscertification

General

Energy Saving Trust
http://www.energysavingtrust.org.uk/wales/Generate-your-own-energy/Aboutmicrogeneration

Greener Homes on the Planning Portal
http://www.planningportal.gov.uk/planning/greenerhomes/generation/

http://www.decc.gov.uk/en/content/cms/meeting_energy/microgen/strategy/strategy.aspx

http://www.decc.gov.uk/en/content/cms/meeting_energy/microgen/microgen.aspx

Local

Conwy Local Development Plan 2007-2022: www.conwy.gov.uk/ldp

LDP/05 Biodiversity in Planning
LDP/06 Welsh Language and Culture
LDP/11 Landscape Sensitivity and Capacity Study
LDP/18 Landscape, Access and Design
LDP/22 Community Facilities

} as adopted, viewable at: www.conwy.gov.uk/ldp/spg

Landscape and Visual Impact Guidance

"LANDMAP and Special Landscape Areas", Countryside Council for Wales (2008)
http://naturalresources.wales/our-evidence-and-reports/maps/?lang=en

"Designing Windfarms in Wales", Design Commission for Wales (2012)
http://dcfw.org/publications/view/wind_farm_design/

"Guidelines on Environmental Impacts of Wind Farms and Small Scale HydroElectricity Schemes", Scottish Natural Heritage, 2001
http://www.snh.gov.uk/publications-data-and-research/publications/search-thecatalogue/publication-detail/?id=108

Noise

BS 4412:1997 "Method for rating industrial noise affecting mixed residential and industrial areas", British Standard (1997)
http://shop.bsigroup.com/en/ProductDetail/?pid=000000000001154363

Ecology

Council Directive 79/409/EEC on the Conservation of wild birds (Birds Directive)
http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm

The Conservation of Habitats & Species Regulations 2010
http://www.legislation.gov.uk/uksi/2010/490/contents/made

Wildlife and Countryside Act 1981 (as amended)
http://www.legislation.gov.uk/ukpga/1981/69

The Natural Environment and Rural Communities (NERC) Act 2006
http://www.legislation.gov.uk/ukpga/2006/16/contents

UK Biodiversity Action Plan (UKBAP)
http://jncc.defra.gov.uk/page-5155

IEEM Guidelines on Ecological Impact Assessment in the UK Institute of Ecology and Environmental Management (2006)
http://www.ieem.net/data/files/Resource_Library/Technical_Guidance_Series/EcIA_Guidelines/TGSEcIA-EcIA_Guidelines-Terestrial_Freshwater_Coastal.pdf

Handbook for Phase 1 Habitat Survey: A Technical for Environmental Audit Joint Nature Conservation Committee (2010)
http://jncc.defra.gov.uk/page-2468

Bat Surveys: Good Practice Guidelines, 2nd Edition, Bat Conservation Trust (2012)
http://www.bats.org.uk/publications.php?keyword=bat+surveys&month=&year=&category=&search=search

Survey Methods for use in Assessing the Impacts of Onshore Windfarms on Bird Communities

Hydrology and Geology
UKSF Guidelines on Forestry and Water (Forestry Commission 2011)
www.forestry.gov.uk/pdf/FCGL007.pdf/$FILE/FCGL007.pdf
Woodlands for Wales – Water & Soils (Welsh Government 2010)
http://forestry.gov.uk/pdf/Water-&-Soils-WAG-(E).pdf/$FILE/Water-&-Soils-WAG-(E).pdf

Aviation and Communications
Defence Infrastructure Organisation Safeguarding
www.gov.uk/MOD-safeguarding

Civil and Military Aviation and Defence interests'
www.decc.gov.uk/assets/decc/11/meeting-energy-demand/consentsplanning/nps2011/1938-overarching-nps-for-energy-en1.pdf

British Research Establishment (BRE)
Large Scale Solar: https://www.bre.co.uk/nsc/page.jsp?id=3523
BRE National Solar Centre Biodiversity Guidance for Solar Developments
http://www.bre.co.uk/filelibrary/nsc/Documents%20Library/NSC%20Publications/

28 Glossary

Ancillary infrastructure The built element and structures of a RE development which serve the development, such as access tracks, borrow pits, the control building and substation.

Capacity Study Research which attempts to identify the acceptable limits to development in a given area.

Cumulative Impact Additional changes caused by a proposed development in conjunction with other similar developments.

Design and Access Statement A document which aims to create a development with a cohesive design that relates to the surrounding landscape and allows access to all users.

EIA Environmental Impact Assessment, the process by which the key environmental and socio-economic impacts of a development are assessed to reduce likely negative effects during the screening.

LIA Landscape Impact Assessment, part of the LVIA process which explores the potential effects on the landscape of a proposed development (see below).

LVIA Landscape and Visual Impact Assessment – a standard process for examining the landscape and visual effects.

Megawatt (MW) 1,000 kilowatts (kw)

NRW Natural Resources Wales www.naturalresources.wales

WG Welsh Government http://gov.wales

29 Appendix A: Electricity Generating Capacity

Planning applications for RE development should be accompanied by the following information.

Installed capacity (kW) [1]	Capacity factor [2]	Estimated annual production (kWh p.a.) [3]	Number of residential properties electricity equivalent [4]

Notes:

[1] Installed capacity is the full-load, continuous rating of the RE unit(s) under specific conditions as designated by the manufacturer. In other words, this is the power generated when the RE unit(s) is working at full capacity.

[2] Capacity factor is the calculated factor which compares the RE unit(s) actual production over a given period of time with the amount of power the plant would have produced if it had run at full capacity for the same amount of time. The capacity factor should take account of the specific equipment and the specific location. It is expressed as a percentage.

[3] Estimated annual production of electricity based upon the installed capacity and the capacity factor.

[4] Number of residential properties that would be powered by the estimated annual production based upon the UK average household consumption of 4,629 KWh/year (DECC 2007). The number of UK and Welsh household equivalent should be provided in this box.

30 Appendix B: Recommended Survey Times

As per Appendix 5 in LDP5/Biodiversity SPG.

- Above: Short-eared Owl on a brownfield Industrial site
- Below: Red-billed Chough

Habitat/Species	Optimal Survey Time
Grassland	May – August
Woodland/hedgerows	April – June
Ponds/water courses	May – June
Birds, their nests and eggs (breeding)	March – August
Birds Wintering	October - March
Water vole	March – October
Otter	Search for signs at any time but note flooding along watercourses may remove spraints
Dormouse	Hazel nut searches September – November Nest searches May – September
Bats	Depends on nature of roost e.g. summer roosts and feeding areas April – September but may occupy separate hibernation roosts October – March
Badger	Sett surveys October – April Bait marking February – April and September – October
Grass snake, adder, slow worm, common lizard	April – June and September
Fish	Varies for species, life stages and environmental conditions
Invertebrates	All year for different larval and adult life stages.
Fungi	July - December