

# **Powys Local Development Plan (2011-2026)**

## **Supplementary Planning Guidance**

### **Renewable Energy**

~~**Consultation Draft – January 2019**~~

**April 2019**



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## 1.0 Introduction

1.0.1 This guidance supplements the Renewable Energy related policies of the Powys Local Development Plan (LDP) (2011-2026), which was adopted by Powys County Council on the 17<sup>th</sup> April 2018, and has been prepared to assist decision-making on planning applications within the Powys LDP area. This guidance does not apply to areas of the County of Powys located within the Brecon Beacons National Park Authority area (BBNP).

1.0.2 This Supplementary Planning Guidance (SPG) is intended to be read alongside the relevant policies of the LDP (see section 5), along with any other related adopted SPG. The guidance within the Landscape SPG, in particular, complements and adds to this guidance.

1.0.3 The planning system has an important role in supporting and encouraging renewable energy projects as a means to combat climate change by reducing the reliance on fossil fuels. In addition, renewable energy projects also offer potential for both economic regeneration and economic resilience. The local economic benefits derived through renewable energy should not be understated or undersold, with numerous studies (Jones et al., 2016; Jones 2018) showing the positive local economic benefits that can accrue for these technologies in Wales. In the Powys Local Planning Authority (LPA) area, as in much of Wales, wind energy developments have been the primary source of renewable energy and demand for more wind farms is expected to continue over the coming years. The drive towards a low carbon future cannot be secured by wind energy alone and it is recognised that a diverse mix of renewable energy sources is required. Through Planning Policy Wales (PPW), the Welsh Government has highlighted important criteria in the assessment of all energy infrastructure development and emphasises support for the delivery of a diverse range of renewable energy sources.

1.0.4 The LDP and consequently this SPG have been prepared with regard to the commitment of the Welsh Government to energy reduction, and developing the renewables agenda as a major component of its policy, recognising onshore wind will continue to offer the greatest potential to deliver a significant proportion of electricity generation to meet those policy aspirations. At a local level, this SPG supports the opportunities for all renewable and low carbon energy technologies across the County, including the potential for largely focuses on solar photovoltaic energy generation (solar PV) and less mature technologies such as storage and hydrogen generation which will develop over time. But However, it should be acknowledged that the future of all forms renewable energy generation relies on support within industry, politics, local communities and decision makers.

1.0.5 The importance of low-carbon technologies is recognised as a priority of the Council, as expressed through ***Towards 2040 - the Powys Well-being Plan*** which has the objective of developing a carbon positive strategy that maximises green energy production and ***Vision 2025: Corporate Improvement Plan*** in developing resilience, enhancing skills and enabling economic growth.

## 2.0 Purpose of the Guidance

2.0.1 The purpose of this guidance is to assist in the delivery of renewable energy projects by providing detailed guidance on how the Council will implement the relevant policies and proposals contained within the LDP. It is aimed at providing practical information for officers, developers, landowners and the public involved in proposals for renewable energy.

## 3.0 Status of the Guidance

3.0.1 This SPG has been produced to support the policies of the LDP which are used in the determination of planning applications. ~~This SPG will be taken into account as a material consideration in the planning decision making process.~~ The guidance within the SPG has had regard to relevant legislation, national planning policy and other available guidance and information.

3.0.2 This SPG has been prepared in accordance with the Council's approved Protocol for Preparation and Adoption of SPG (June 2018), which includes a Community Involvement Scheme. It has been subject to a six week public consultation stage undertaken 14 January to 24 February 2019 [insert dates]. A summary of the responses received to the public consultation along with an explanation as to how the responses have been addressed can be found within the Consultation Statement. This SPG was adopted by the Council on [insert date].

3.0.3 This SPG has been subject to an impact assessment [details to be inserted].

3.0.4 This SPG is a material consideration in the determination of planning applications.

## 4.0 Policy Context

### 4.1 UK National Policy

4.1.1 National policy relating to renewable and low carbon energy follows European Union commitments and directives, including the **EU Renewable Energy Directive (2009)(2)**, which included objectives to reduce CO2 emissions by 20% from 1990 levels, boost renewable fuel use by 20% and reduce predicted energy consumption by 20%, by 2020.

4.1.2 To meet these objectives, the UK has set a legally binding target of 15% of energy from renewable sources by 2020 [**UK Renewable Energy Strategy (2009)**]. Modelling, undertaken on behalf of the Department for Energy and Climate Change (DECC), suggests that by 2020 this could mean more than 30% of electricity, 12% of heat and 10% of transport energy being generated from renewable energy sources.

4.1.3 The **UK Climate Change Act (2008)** sets goals of a 34% reduction in greenhouse gas emissions by 2020 and a reduction of at least 80% in greenhouse house gas emissions by 2050. Five yearly carbon budgets have been introduced to help ensure that the targets are met and the **UK Low Carbon Transition Plan: National Strategy for Climate and Energy (2009)** outlines how the 34% target will be met. It also states that by 2020, 40% of electricity will be from low-carbon sources, nuclear, clean coal and renewable energy generation. The **UK Renewable Energy Road Map (2011)**, published jointly by the four UK administrations in July 2011, outlined a plan of action to accelerate renewable energy deployment while driving down costs.

4.1.4 The UK Government provides financial support for renewable energy generation through the **Renewables Obligation** and **Feed in Tariff** schemes. The **Contracts for Difference (CfD)** scheme is now the government's main mechanism for supporting low-carbon electricity generation. CfDs incentivise investment in renewable energy by providing developers of projects with high upfront costs and long lifetimes with direct protection from volatile wholesale prices, and they protect consumers from paying increased support costs when electricity prices are high. In Wales, the **The 'Renewables Obligation'** places an obligation on electricity suppliers to generate a certain portion of electricity from renewable sources and is regulated by the 'Office for Gas and Electricity Markets' (Ofgem). **The Renewables Obligation scheme closed to all new generating capacity on 31<sup>st</sup> March 2017. Eligible renewable technologies include wind energy; hydro-power; tidal and tidal stream energy; wave energy; photovoltaics; geothermal; all biomass material; landfill gas; sewage gas; and co-firing of biomass with fossil fuel.**

4.1.5 Six **National Policy Statements (NPSs)** for Energy Infrastructure were issued by the Department of Energy and Climate Change in 2011. Major energy project proposals (i.e. greater than 50MW) are dealt with at UK government level by the National Infrastructure Directorate (part of the Planning Inspectorate) and the NPSs set out national policy against which such proposals are to be assessed. Within Wales, Developments of National Significance (including energy generation proposals greater than 10MW but less than 50MW [N.B. 350MW from April 2019]) are determined by Welsh Ministers. The exception to this is on-shore windfarms of all capacities above 10MW which are determined by Welsh Ministers.

## 4.2 Wales Policy Context

4.2.1 Applying these UK wide principles, the ***Climate Change Strategy for Wales (2010)*** outlines the importance of renewable energy generation in meeting the energy demand in Wales and sets out a vision for the country up to 2050. The strategy intends to ensure that climate change is considered in all decision-making; that increased energy efficiency is delivered through making low carbon transport a reality; that the skills are developed to ensure that Wales can make the most of opportunities from a low carbon economy; that opportunities are taken to cut emissions and adapt to climate change where natural resources, land management pattern, and economic position allow; that the approach to Research & Development (R&D), technology, innovation and skills helps Wales gain maximum benefits from climate change related business and research; and that land use and spatial planning promote sustainable development and enable a move towards a low carbon economy which takes account of future climate impacts. The Strategy includes the targets of achieving 3% emission reduction per year and at least 40% emissions reduction by 2020 compared to 1990.

4.2.2 In March 2010, the Welsh Government published '***A Low Carbon Revolution – The Welsh Assembly Government Energy Policy Statement***' which set out the potential for 22.5GW of installed capacity from renewable sources by 2020/2025, 2GW of which would be from onshore wind. The policy statement set out how this installed capacity should be achieved with individual 'aspirations' for different renewable energy technologies in Wales.

4.2.3 ***Energy Wales: A Low Carbon Transition (2012)*** subsequently set out the Welsh Government's ambitions and intentions with regard to the move towards low carbon energy. The measures outlined included: improving the planning and consenting regime; putting in place a 21st Century energy infrastructure; coordinating and prioritising delivery through an energy programme; ensuring Wales benefits economically from energy developments; ensuring Wales' communities benefit from energy developments; focusing on energy projects of greatest potential benefit; unlocking the energy in our seas; and leading the way to smart living. This document was supported in 2014 by ***Energy Wales: A Low Carbon Transition Delivery Plan*** setting out progress so far, priorities for action and delivery targets for high level milestones.

4.2.4 The ***Environment (Wales) Act 2016*** sets a legally binding target of reducing greenhouse gas emissions by 80% from 1990/95 levels (dependent on which greenhouse gas is being measured) by 2050. The Act also requires a series of interim targets for 2020, 2030 and 2040 to be met, and carbon budgets for key sectors of the economy. The budgets will ensure that over successive 5 year periods progress is made towards the 2050 target.

4.2.5 In September 2017, in a statement in the Senedd, the Cabinet Secretary for Energy, Planning and Rural Affairs proposed that Wales should have a target of generating 70% of its electricity consumption generated by renewable energy by 2030. **The statement further highlighted the Welsh Government's ambition that 1GW of renewable and low carbon energy generation should be locally owned by that date, and that all renewable energy schemes from 2020 should have an element of local ownership.**

4.2.6 The most recent Welsh Government statistics published in ***Energy Generation Wales (2017)*** indicate 48% of gross electricity consumption was generated from renewable sources, further emphasising the progress towards a low carbon future. Despite the positive indicators, further progress towards the 22.5GW installed capacity target by 2020/2025 identified in "The

Low Carbon Revolution” (2010) and the new target of 70% of consumption by 2030 has to be supported by policy and guidance at the national, regional and local levels.

### 4.3 Welsh Planning Policy

4.3.1 Welsh planning policy supports and helps to implement Welsh Government legislation, principles and policies. Of particular relevance is **Planning Policy Wales (PPW)** supplemented by **Technical Advice Notes (TANs)**.

4.3.2 **Planning Policy Wales Edition 10 (2018)** identifies that the planning system plays a key role in delivering clean growth and the decarbonisation of energy, as well as being crucial in building resilience to the impacts of climate change. As such, planning policy at all levels should facilitate delivery of the ambitions of **Energy Wales: a Low Carbon Transition** and Welsh, UK and European targets.

4.3.3 It is stressed that development of all forms of renewable and low carbon energy should be facilitated by Local Planning Authorities (LPAs) which should seek to ensure that their area’s full potential for renewable and low carbon energy generation is maximised and renewable energy targets are achieved. Renewable energy projects should generally be supported by LPAs provided irreversible impacts are avoided on statutorily protected sites and buildings and nationally and internationally designated areas are not compromised.

4.3.4 Development Management decisions need to be consistent with national and international climate change obligations, including contributions to renewable energy targets and aspirations.

4.3.5 In relation to onshore wind energy specifically, PPW states that this constitutes a key part of meeting the Welsh Government’s vision for future renewable electricity production. Strategic Search Areas (SSAs) have been identified as the most appropriate locations for the development of a limited number of large-scale (over 25MW) wind energy developments which are required to contribute significantly to the Welsh Government’s onshore wind energy aspirations. Further information is given in TAN 8 (see para. 4.3.8).

4.3.6 **Technical Advice Note (TAN) 12: Design (2016)** provides advice on national planning design policy with regards to good building design and the importance of considering design at an early stage of a planning application. It provides detail on how energy efficiency and energy conservation can be incorporated into planning and the design of a building.

4.3.7 **Practice Guidance: Planning Implications of Renewable and Low Carbon Energy (Welsh Government 2011)** gives detailed advice on types of renewable and low carbon energy and the determination of planning applications.

4.3.8 **Technical Advice Note (TAN) 8: Planning for Renewable Energy (2005)** provides guidance for the land use planning considerations of renewable energy and also stresses the importance of improving energy efficiency and energy conservation as well as developing sources of renewable energy. The TAN covers all types of renewable energy and also gives advice on associated issues such as community benefits.

4.3.9 TAN 8 acknowledges that onshore wind power offers the greatest potential for achieving identified targets, and introduced the concept of SSAs for the location of large scale wind farms



(over 25MW) identifying seven SSAs throughout Wales. The boundaries are at a 'broad brush' scale, allowing local authorities to undertake local refinement to amend the SSA boundaries. Significant amendment should not be made without local evidence. The TAN provides guidance on how such amendment may be undertaken.

4.3.10 The Minister for Environment and Sustainable Development in a letter dated July 2011 ~~A Ministerial Letter in 2011~~ confirmed the ongoing commitment of the Welsh Government to limiting the development of large scale wind farms to the seven SSAs, and identifying indicative maximum capacities within each area. The ~~Minister for Environment and Sustainable Development in his~~ letter ~~dated July 2011~~ revised the maximum capacities for each SSA. ~~The TAN provides guidance on how such amendment may be undertaken.~~

4.3.11 Key points from TAN 8 to be considered by Local Planning Authorities in the determination of applications and by applicants in designing schemes include:

- Most areas outside SSAs should remain free of large wind power schemes. LPAs should consider the cumulative impact of small schemes in areas outside of the SSAs and establish suitable criteria for separation distances from each other and from the perimeter of existing wind power schemes or the SSAs (para. 2.13).
- Extending or re-powering existing wind farms outside SSAs should be encouraged (para. 2.14).
- Some community benefits can be justified as mitigation, while others may be offered not directly through the planning process (para 2.16).
- The TAN describes a number of other renewable energy processes and their planning considerations including: Anaerobic Digestion (biomass), Bio-fuels for Vehicles, Combined Heat and Power, Community (or District) Heating, Energy from Waste, Fuel Crops (biomass including Woodfuel), Hydro-Power, Methane, Solar Thermal and Solar Photo-Voltaic (PV).
- Appropriate planning conditions for decommissioning wind farms or turbines, their restoration and proposed after-use of the site should be used (para. 6.4).



## 5.0 Local Planning Policy relating to Renewable Energy

5.0.1 Adopted in April 2018, the Powys Local Development Plan (LDP) sets out the Council's policies and proposals for future development and use of land. Whilst the Plan should be read as a whole, there is a specific policy that applies to renewable energy proposals. Policy RE1: Renewable Energy is informed by national guidance and places an emphasis on the assessment of applications through the considerations set out in PPW. The need to have spatial representation of renewable energy proposals of "local authority-wide scale" greater than 5MW installed capacity is a key element of Welsh Government policy. In addition to PPW, Policy RE1 should be read alongside Strategic Policy SP7: Safeguarding Strategic Assets and all other LDP policies as well as those relating to development management generally, including but not limited to Policy DM4 ~~7~~: Landscape and Policy DM13: Design.

### **Policy RE1 – Renewable Energy**

**Proposals for renewable and low carbon energy development will be permitted subject to the following criteria:**

- 1. Within or close to the Strategic Search Areas (SSAs), proposals for wind energy greater than 25MW will be permitted subject to criteria 3 to 5; all other proposals for renewable and low carbon energy will only be permitted where they can demonstrate they would not prejudice the purpose of the SSA.**
- 2. Within the Local Search Areas (LSAs), proposals for solar PV between 5 – 50MW will be permitted subject to criteria 3 to 5; all other proposals for renewable and low carbon energy will only be permitted where they can demonstrate they would not prejudice the purpose of the LSA.**
- 3. Proposals for all types of renewable and low carbon energy development and associated infrastructure either on their own, cumulatively or in combination with existing, approved or proposed development, shall comply with all other relevant policies in the LDP.**
- 4. Satisfactory mitigation shall be in place to reduce the impact of the proposal and its associated infrastructure. Proposals shall make provision for the restoration and after-care of the land for its beneficial re-use.**
- 5. Where necessary, additional compensatory benefits will be sought by agreement with applicants in accordance with Policy DM1 - Planning Obligations.**

### **Strategic Policy SP7 – Safeguarding of Strategic Resources and Assets**

**To safeguard strategic resources and assets in the County, development proposals must not have an unacceptable adverse impact on the resource or asset and its operation.**

**The following have been identified as strategic resources and assets in Powys:**

- 1. Land designated at international, European and/or national level for environmental protection.**
- 2. Historic environment designations, including:**
  - i. Registered Historic Landscapes.**
  - ii. Registered Historic Parks and Gardens.**

- iii. Scheduled Ancient Monuments and other archaeological remains.**
- iv. Listed Buildings and their curtilages.**
- v. Conservation Areas.**
- AND the setting of designations i.-v.**

**3. Recreational Assets, including:**

- i. National Trails.**
- ii. Public Rights of Way Network.**
- iii. Recreational Trails.**
- iv. National Cycle Network.**

**4. The valued characteristics and qualities of the landscape throughout Powys.**

**5. Sennybridge (Ministry of Defence) Training Area.**

**6. Mineral Resource Areas.**

**7. Proposed Strategic Infrastructure Routes (if and when identified).**

### **Policy DM13 – Design and Resources**

**Development proposals must be able to demonstrate a good quality design and shall have regard to the qualities and amenity of the surrounding area, local infrastructure and resources.**

**Proposals will only be permitted where all of the following criteria, where relevant, are satisfied:**

- 1. Development has been designed to complement and/or enhance the character of the surrounding area in terms of siting, appearance, integration, scale, height, massing, and design detailing.**
- 2. The development contributes towards the preservation of local distinctiveness and sense of place.**
- 3. Any development within or affecting the setting and/or significant views into and out of a Conservation Area has been designed in accordance with any relevant adopted Conservation Area Character Appraisals and Conservation Area Management Plans, or any other relevant detailed assessment or guidance adopted by the Council.**
- 4. The development does not have an unacceptable adverse impact on existing and established tourism assets and attractions.**
- 5. The layout of development creates attractive, safe places, supporting community safety and crime prevention.**
- 6. It contains an appropriate mix of development that responds to local need, includes a flexibility in design to allow changes in use of subsequent buildings and spaces as requirements and circumstances change.**
- 7. It is inclusive to all, making full provision for people with disabilities.**
- 8. It incorporates adequate amenity land, together with appropriate landscaping and planting.**
- 9. The public rights of way network or other recreation assets listed in Policy SP7 (3) are enhanced and integrated within the layout of the development proposal; or appropriate mitigation measures are put in place where necessary.**
- 10. The development has been designed and located to minimise the impacts on the transport network - journey times, resilience and efficient operation - whilst ensuring that highway safety for all transport users is not detrimentally impacted upon.**

**Development proposals should meet all highway access requirements, (for all transport users), vehicular parking standards and demonstrate that the strategic and local highway network can absorb the traffic impacts of the development without adversely affecting the safe and efficient flow of traffic on the network or that traffic impacts can be managed to acceptable levels to reduce and mitigate any adverse impacts from the development.**

- 11. The amenities enjoyed by the occupants or users of nearby or proposed properties shall not be unacceptably affected by levels of noise, dust, air pollution, litter, odour, hours of operation, overlooking or any other planning matter.**

**12. Adequate utility services exist or will be provided readily and timely without unacceptable adverse effect on the surrounding environment and communities.**

**13. It demonstrates a sustainable and efficient use of resources by including measures to achieve:**

**i. Energy conservation and efficiency.**

**ii. The supply of electricity and heat from renewable sources.**

**iii. Water conservation and efficiency.**

**iv. Waste reduction.**

**v. The protection, where possible, of soils, especially important carbon sinks such as thick peat deposits.**

**14. Investigations have been undertaken into the technical feasibility and financial viability of community and/or district heating networks wherever the development proposal's Heat Demand Density exceeds 3MW/km<sup>2</sup>.**

## 6.0 Renewable Energy Projects

### 6.1. Background

6.1.1 The Council supports the development of renewable energy schemes within the county and seeks to ensure that they are located in the most suitable locations. The county is well located in terms of tapping into renewable sources of energy, and the number of applications for such schemes, in particular for wind and solar, have increased in recent years. The Council also recognises that the county offers opportunities for other technologies, particularly electricity generation from solar photo-voltaic, hydro-power and from biomass and anaerobic digestion plants.

6.1.2 The Council is responsible for determining planning applications for renewable energy schemes of less than 10MW, excluding those smaller householder schemes that are classed as “permitted development” which do not require planning permission (typical examples are given in **Appendix 3**). Permitted Development rights are subject to change over time, the latest guidance is outlined on the Welsh Government website:

<https://beta.gov.wales/planning-permission-permitted-development-rights-householders>

6.1.3 Whilst permitted large-scale (>25MW) onshore wind energy within the TAN 8 Strategic Search Areas (SSA) is likely to make a substantial contribution to renewable energy targets in the Powys planning area, Welsh Planning Policy advises that development plans should support a diverse range of renewable energy projects and ensure that an area’s potential to accommodate them is realised.

*5.9.1 Planning authorities should facilitate all forms of renewable and low carbon energy development. In doing so, planning authorities should seek to ensure their area’s full potential for renewable and low carbon energy generation is maximised and renewable energy targets are achieved.*

*5.9.4 Planning authorities should ensure development plan policies are supportive of renewable and low carbon energy development in all parts of Wales, direct developments to the right locations and set out clearly the local criteria against which proposals will be evaluated.*

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6.1.4 The Council prepared a Renewable Energy Assessment (May 2017) informed by the Welsh Government’s **Practice Guidance: Planning for Renewable and Low Carbon energy – A Toolkit for Planners (2015)** to be in accord with National Policy. Other than wind power and solar PV farms, hydro-power schemes, biomass / CHP and anaerobic digesters are three examples of potentially viable renewable technologies that could be capable of delivering renewable energy at a commercial scale and would be generally supported by the Council.

6.1.5 Developers should always seek to involve the Council at the outset of any development proposals.

## **6.2. Pre-Application Advice**

6.2.1 Applicants are encouraged to contact the Council prior to submitting an application in order to ascertain what information would be required to be submitted as part of the application. The Council offers pre-application advice before a formal application is submitted in order to guide applicants through the process, provide an indication of issues and the likelihood of obtaining planning permission. A fee may be applicable for this service, as set out on the Council's website.

6.2.2 Pre-application discussions can also help the applicant and the planning authority identify areas of concern about the proposed development so that consideration is given to amending the proposal before the application is submitted, and so minimise delays later when processing the application. The advice and guidance provided at the pre-application stage is given in good faith, however, it does not guarantee or supply a definitive undertaking as to whether the proposal is likely to be acceptable.

## **6.3 Pre-Application Consultation**

6.3.1 New legislation came into effect on the 16th March 2016 with the Planning (Wales) Act 2015 that requires applicants of “major developments” to submit a pre-application consultation report as part of the application. “Major developments” are defined in the Development Management Procedure (Wales) Order 2012 and for the purposes of Renewable Energy schemes includes “development carried out on a site having an area of one hectare or more”. Section 17 of the Planning (Wales) Act 2015 sets out the requirements for pre-application consultation.

## 7.0 Application of LDP Policy RE1: Renewable Energy

### 7.1 Policy Criteria

7.1.1 Policy RE1: Renewable Energy covers the development of all types of renewable and low carbon energy. Policy criterion 1 is concerned with wind farms and the approach to be taken within the Strategic Search Areas (SSAs). Policy criterion 2 is concerned with the approach to be taken within the identified Local Search Areas (LSAs) for solar PV development, while criteria 3, 4 and 5 are applicable to all renewable / low carbon technologies.

### 7.2 Strategic Search Areas (SSAs) for Wind Farm Development

7.2.1 **Technical Advice Note (TAN) 8: Planning for Renewable Energy (2005)** identified seven SSAs (areas identified as being suitable for the location of large scale onshore wind developments) within Wales, two of which are wholly within Powys [SSA B (Carno North) and SSA C (Newtown South)] whilst a third [SSA D (Nant-y-moch)] is predominantly within Ceredigion.

7.2.2 While TAN 8 introduced notional targets for power generation in megawatts (MW) for each SSA, these were amended by a Welsh Government Ministerial Letter issued in July 2011 which clarified the policy approach that should be taken to SSAs and indicated that the SSA capacities that had previously been identified were the maximum appropriate figures for each SSA.

7.2.3 For the SSAs within, or partly within, Powys, the identified maximum capacity figures ~~were~~ **are** 430MW for SSA B, 98MW for SSA C and 212MW for SSA D. The Welsh Government compiles information on the proposed, approved or operational outputs from the SSAs which is regularly updated and is available on the WG Website:

Technical Advice Note (TAN) 8 Database - Review of Wind Farm Development:

<https://gov.wales/topics/planning/planningstats/tan-8-wind-farm-database/?lang=en>

7.2.4 Criterion 1 sets out the Council's policy requirement that large windfarms (defined as those that would generate more than 25MW) ~~should be located~~ **will be permitted subject to criteria 3 to 5 of Policy RE1** within or close to the SSA boundaries. It is acknowledged in policy terms (as set out in TAN 8) that significant change in landscape character as a result of wind farm developments can be accepted within or close to their boundaries.

7.2.5 Within the SSAs the intention is to maximise installed wind turbine capacity taking into account relevant site constraints. Development proposals that might constrain this capacity (including smaller wind farms and other types of renewable energy schemes) would be resisted. However, medium scale (5-25MW) wind farms could potentially be acceptable within the SSAs provided they do not **prejudice large windfarm developments and so** constrain the SSAs' overall generating capacity.

7.2.6 Elsewhere, outside the SSA boundaries, criteria 3, 4 and 5 set out the requirements that will apply to wind proposals for turbines of all sizes and installed capacities, indicating that proposals will have to demonstrate no unacceptable impacts on visual amenity or landscape



character through cumulative or in combination effects, and must comply with all other relevant policies in national policy and in the LDP. Further information on small-scale wind development is given in Section 7.7).

**7.2.7 The Council acknowledges there have been significant technological advances for onshore wind since the publication of TAN8 including increases in turbine size. Developers should assess not only the visual impact of the size of their development, but also wider socio-economic impacts on other strategic assets including but not limited to those included in LDP Policy SP7.**

### 7.3 Local Search Areas (LSA) for Solar PV Farm Development

7.3.1 Policy RE1 criterion 2 sets out the spatial framework against which applications for stand-alone “Local Authority-wide” scale solar PV farm development in excess of 5MW installed capacity can be assessed. Informed by the Powys Renewable Energy Assessment 2017, it identifies 20 broad areas of search to provide clear guidance for medium- to large-scale solar PV farm development in Powys (Table 1). The LSAs are strategic in nature and whilst they are generally the least-constrained parts of Powys in terms of the assumptions applied in the REA, they are not without site specific constraints and having identified these, it will be for developers to take forward the refinement of these areas to establish their long term potential.

7.3.2 Other renewable energy schemes, such as wind farms or individual turbines should not constrain solar PV farm development, although there may be opportunities for co-location.

7.3.3 Elsewhere, outside the LSA boundaries, criteria 3, 4 and 5 set out the requirements that will apply to solar PV farm proposals of all sizes and installed capacities. The framework recognises that smaller scale solar PV farm developments may be possible throughout other parts of Powys, however constraints and potential cumulative impacts may limit the extent of these development opportunities.

**Table 1: The Solar PV Farm Local Search Areas identified in the Powys LDP**

<b>Table RE1 - Local Search Areas (Solar) LSA Number</b>	<b>LSA Name</b>	<b>LSA Size (sq. km)</b>	<b>Potential Capacity (MW)</b>	<b>Landscape Sensitivity</b>
SA	Bachrydrada	2.3	10	Medium-High
SB	Abertridwr	3.7	10	Medium
SC	Ffridd Llwydiarth	1	10	Medium-Low
SD	Domgay	0.6	25	Medium
SE	Buttington	1.1	10	Medium-Low
SF	Heldre Hill	0.9	25	Low
SG	Staylittle	14.4	25	Medium
SH	Trefen	0.9	25	Medium
SI	Glynhafren	2.3	10	Medium-High
SJ	Bryn Blaen	3.2	10	Medium
SK	Bryn Titli	8.4	25	Medium-Low
SL	Waun Ddubarthog	20.5	50	Low
SM	Drysgol	4.3	25	Low
SN	Bwlch y Sarnau	3.4	10	Medium-Low

SO	Llandegley Rhos	8	10	Medium
SP	Gilwern Hill	4.5	10	Medium
SQ	Nant Fawr	2.3	10	Medium
SR	Llandefalle Hill	4.9	25	Medium-Low
SS	Camlo Hill	9.9	25	Medium-Low
ST	Ddyle	10.9	10	Medium-High

Further details on each of the solar LSAs is provided in **Appendix 1**.

## 7.4. Small- and medium-scale and standalone installations

7.4.1 Powys, as the largest County in Wales by area and with a wide range of land use types and topography, has potential to support renewable energy technologies as stand-alone or small-scale installations with installed capacities of less than 5MW (small-scale) and medium-scale (5-10MW), the technologies most likely to be viable being:

- Anaerobic Digestion Units.
- Hydro-power.
- Small-scale wind developments.
- Combined Heat and Power.

Such technologies have the potential to provide renewable energy for local use and, where appropriate, minimise the transport of feedstock of long distances.

7.4.2 To maximise the opportunities for electricity generation and grid connection, developers should consider the potential to co-locate with other types and scales of renewable energy developments, subject to SSAs and LSAs not being prejudiced (LDP Policy RE1).

## 7.5 Anaerobic Digestion Units

7.5.1 Anaerobic Digestion (AD) is the degradation of organic material by a range of micro-organisms in the absence of oxygen (i.e. anaerobic conditions). The process occurs throughout nature, however, it can be mechanised, industrialised and optimised for the purposes of treating readily biodegradable wastes such as food waste and agricultural wastes. Other waste streams, including certain household and industrial wastes and sewage sludge may also provide suitable feedstocks. The digestion of biodegradable material under anaerobic conditions will produce two very useful products:

- A mixture of solids and liquid that contains almost all of the nutrients that were contained within the feedstock – but in a form which is more bioavailable to plants. This product is known as “digestate”.
- A mixture of gases – methane (usually 45-65%) and carbon dioxide (usually 35-55%), with low concentrations of other gases (e.g. Hydrogen) associated with biodegradation. This is known as “biogas”.

7.5.2 The anaerobic digestion of agricultural wastes such as cattle slurry and chicken manure / litter, and the subsequent production and appropriate utilisation of biogas and digestate could provide a number of strategic benefits, both to the rural environment and to wider society. These include:

- The capture of a significant proportion of the greenhouse gases (such as methane) that would have been emitted to the atmosphere by uncontrolled decomposition of the wastes;
- Provide a product that can displace mineral fertiliser thus avoiding financial and environmental costs – and conserving scarce phosphate resources;
- Build soil structure and lock-in carbon whilst also improving the water-holding capacity;
- Provide the opportunity to export nutrients (particularly phosphates) where they are not required on the land concerned – thus avoiding eutrophication of local water courses/bodies and reduction of non-point source pollution associated with agricultural practices;
- Provide a gaseous product that can be used in a number of ways (e.g. as a fuel or energy source to generate electricity and heat) to generate income and/or offset costs, also providing a low-carbon energy source that substitutes for energy generated from fossil fuels;
- Provide opportunities for a number of symbiotic commercial activities that could make use of the available nutrients and/or electrical or thermal energy;
- Reduce odours to the locality (assuming best practice spreading techniques are used);
- Destroy some pathogens and weed seeds.

7.5.3 Whilst the anaerobic digestion of cattle slurry is relatively straightforward from a technical perspective, it is acknowledged that the digestion of chicken litter does provide some challenges due to the high nitrogen content of the material. However, providing sufficient carbon in the digestion process to balance this high nitrogen content, e.g. by co-digesting with another carbon rich feedstock, is an effective strategy for digesting chicken manure, and there are also other engineering and bio-chemical solutions to allow the digestion of high nitrogen feedstocks.

7.5.4 Biomass provides a potential source of carbon-rich material to support the digestion of high-nitrogen wastes. However, the growing of crops on agricultural land simply to provide sufficient feedstock is not encouraged by the Council and AD development proposals should seek to maximise the use of available waste streams in accordance with national and LDP waste policies W1 and W2, whilst mitigating potential impacts on the landscape, the environment and residential amenity.

7.5.5 Dairy and poultry units are generally restricted to clustered in particular areas of the county and it is within these areas that AD is most likely to be appropriate. An AD plant will usually consist of a store/loading facility, digester (a closed, heated and insulated tank with some means of agitating the contents), a digestate store (similar to a slurry store), a gas store (which might be integrated into the digester or be separate) and a building or container containing the energy utilisation equipment. There will also need to be a flare (typically a stack 3 -10m high) in order to prevent the discharge of biogas in the event of a mechanical or process breakdown. It is possible to partially bury the digester and digestate store underground but this is likely to be discouraged despite the possible benefits from a visual perspective. It is seen as being far preferable that all containers and pipes are visible in order to make leak detection and repair much faster and easier.

7.5.6 The biogas generated can be used in a boiler to generate heat, in an engine to generate electricity and heat or, if enough gas is available to render the processing viable, can be upgraded to biomethane for injection into the gas grid or as a vehicle fuel. The upgrading process involves removing all gases other than methane and, whilst costs have been reducing,

is still generally only viable at a larger scale. It may be that the gas output from multiple AD units could be combined at a centralised upgrading and injection plant.

7.5.7 If the number of AD plants in Powys is to grow it is highly likely that this will be as result of the recognition of the wider agronomic and pollution abatement benefits of the process, rather than purely as a generator of renewable energy. As a result, AD development proposals are likely to fall into one of two scales of development:

1. The digestion of animal wastes can be undertaken in single-farm units, the size of which will clearly reflect the number of animals/birds on the farm and the extent to which they are kept in buildings. A large zero-grazed dairy herd, with an input of some chicken litter would likely to see electricity generated in the hundreds of kilowatts but an average dairy herd that is grazed traditionally may only utilise the biogas for maybe a 15kW generator or for on-site heating in the winter months when farm wastes are available.
2. The alternative to on-farm plant digesting its own material, is one that imports material from other farms or sources to a centralised anaerobic digestion (CAD) facility. This is clearly likely to have implications for the surrounding road network, and insert transport costs into the economic and sustainability equations - but can also benefit from “economies of scale”. The location of such plants would need to be carefully selected, particularly if it were proposed to import material from more than a few surrounding livestock units/farms. It is possible that other organic wastes (food-waste for example) could form the feedstock for AD in Powys but the number of such plants is likely to be very restricted due the limited quantities of such material. Food-waste collected by the Council currently goes out of the county to be digested at a plant that receives material from several local authorities.

7.5.8 As the biogas produced from the anaerobic digestion of manure and slurry is classified as a waste, the storage of biodegradable waste for anaerobic digestion use requires an environmental permit or an agreed exemption under the Environmental Permitting Regulations 2010. Natural Resources Wales should be consulted to determine whether a permit is required. Small-scale anaerobic digesters, which produce less than 0.4MW of power output, are exempt from any form of environmental permit under permitted exemptions (T24 and T25) (see **Appendix 2**).

**7.5.9 Some small AD installations on farms may have permitted development rights. To be permitted development the power output of the installation is limited (see Section 8.1) and the size of the plant less than 465m<sup>2</sup>. All feedstock must be sourced from within the farm and no additional material can be imported. Developers should be aware that ancillary structures may require planning permission and it is recommended that developers of agricultural AD plants discuss their proposal with the Council as local planning authority.**

7.5.109 In addition to the size and power output limitations for agricultural permitted development, applicants for agricultural anaerobic digester units should be aware that up to a maximum of 1,250 cubic metres of manure and vegetation waste can be stored in an AD plant to produce a digestate, and that waste must be kept in the digester for at least 28 days.

7.5.1140 For all AD proposals, measures should be taken by developers to minimise any visual, odour and noise impacts on local residents associated with the operation of the plant and delivery of feedstocks, which can include sorting, screening, cutting, shredding, pulverising and chipping the waste to aid the AD process and its subsequent storage. Furthermore, AD plants

which import waste material as a feedstock should comply with LDP policies W1 and W2 with respect to the location and management of waste proposals.

7.5.12<sup>44</sup> The stabilised digestate from AD plants on agricultural premises can be spread on agricultural land under the U10 exemption as an alternative to using inorganic fertiliser (see Appendix 2), but best practice should be followed to prevent runoff and pollution of watercourses.

## 7.6 Hydro-power

7.6.1 Hydro-power technology to generate electricity is mature and can provide a predictable source of energy. 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.

7.6.2 Across Wales, many of the sites capable of supporting generation of more than 1MW have already been exploited, but the Council recognises that opportunities exist for “micro-hydro” ‘run of river’ with an installed capacity of less than 100kW and the restoration of traditional river mills.

7.6.3 The relatively high upfront cost and lack of cost reduction potential as each scheme requires bespoke engineering solutions relevant to its site is likely to limit future growth without subsidy support. Whilst there is potential for hydro-power development, sites are only likely to be developed where conditions are optimal, for example where there is the potential to supply the electricity to a local user or users (e.g. direct supply or community-led schemes), or where a long term approach to capital payback is adopted.

7.6.4 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.

7.6.5 Small-scale hydro-power plants require planning permission under the Town and Country Planning Act 1990. If the proposals affect a listed building, such as a former mill, additional regulations will apply and pre-application advice should be sought.

7.6.6 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 2017 (1999) (known as the ‘EIA Regulations’) (Table 3). At this size an Environmental Impact Assessment (EIA) is not mandatory but the Council 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. Further information can be obtained in **Welsh Government Circular 11/99**.

7.6.7 The Council has a duty under the Water Framework Directive to have regard to River Basin Management Plans for enhancing water quality in exercising its planning powers. For hydro-power schemes, this means ensuring that the hydro-power 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.

7.6.8 For all hydro-power schemes, Natural Resources Wales (NRW) will need to be contacted through its own pre-application advice service to ensure the scheme meets the relevant permitting regime and so be issued an abstraction license. In addition, Ordinary Watercourse Consent, an Impoundment Licence and/or Flood Risk Activity Permit may also be required.

7.6.9 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.

7.6.10 Burying penstock pipelines and minimising hard surfacing and ‘formal’ planting can help to integrate more visible schemes into the rural landscape.

## 7.7 Wind Turbine Development

7.7.1 Single turbines and turbine groups of 10MW or less installed capacity, which are not classified as permitted development, will need to apply for planning permission to the Council.

7.7.2 The installation of a stand-alone wind turbine within the curtilage of a dwelling house is classified as permitted development under The Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2012 under certain circumstances (see Appendix 3 & 4).

7.7.3 In the case of listed buildings and Conservation Areas, advice should be sought from the Council through the pre-application advice process, as separate regulations may apply.

7.7.4 Welsh Government Circular 11/99 is a useful initial reference in determining whether a wind energy development is likely to require an Environmental Impact Assessment (EIA), and covers other associated planning issues. Individual wind turbines with a hub height exceeding 15 metres and windfarms of more than two turbines are listed under Schedule 2.3(i) of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017 1999.

7.7.5 ~~For turbines and developments of this size, an~~ An Environmental Impact Assessment (EIA) is not mandatory ~~but it is mandatory for~~ the Council ~~to undertake~~ 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. The developer may also request a screening opinion before submitting an application.

## 7.8 Combined Heat and Power

7.8.1 Combined Heat and Power (CHP) is where the energy installation utilises heat produced as a by-product of electricity generation. The electricity is either sold locally or onto the wholesale electricity market whilst the heat is used to supply heating to a building or range of buildings via a network of insulated pipes.

7.8.2 The heat from CHP units can also be used to meet cooling demands via the use of absorption chillers. This can involve either a centralised chiller, distributing “coolth” via a chilled water network, or decentralised absorption chillers in individual buildings. This approach is sometimes referred to as “tri-generation” or CCHP (Combined Cooling Heat and Power).

7.8.3 CHP installations can be flexible in terms of their energy source including gas engines and traditional gas-fired boilers, but to be identified as renewable or low carbon energy installations, most typical CHP installations are:

- Anaerobic digestion plants (described above).
- Biomass.
- Energy from Waste facilities.

7.8.4 Stand-alone biomass installations are most usually utilised for electricity generation (normally situated away from residential development) with the heating component restricted to non-domestic buildings. Such installations require there to be sufficient room for fuel storage and access for large delivery vehicles and development proposals should take these requirements, together with the wider feedstock transportation impacts through a transport assessment, into account.

7.8.5 The useable energy that the potential quantity of biomass could produce will be dependent on whether the fuel is burnt in facilities that only generates electricity (where the heat is simply dumped), or in a Combined Heat and Power plant (where the heat is usefully employed), or a boiler providing space heating and/or hot water. The Welsh Government’s Energy Policy Statement (2010) confirms a target of 1GW installed capacity of electricity generation from biomass by 2020. The potential for biomass growing opportunities to support such installations has been indicated in the Powys Renewable Energy Assessment (2017).

7.8.6 In the Powys Renewable Energy Assessment (2017), consideration has been given to the spatial constraints associated with restrictions to harvesting energy crops and wood fuel, most importantly the availability of suitable agricultural land so as not to conflict with the growing of food crops, or damage to ancient woodlands. Development proposals should consider the sources of feedstock as long distance transport may impact the low-carbon credentials of the development. Furthermore, for larger stand-alone CHP installations, the additional buildings for storage and processing the biomass must be considered as part of any development proposal, together with any environmental permits required for the processing of the fuel and disposal of residues.

7.8.7 **Towards Zero Waste** highlights that Energy from Waste facilities in Wales should operate at a high level of efficiency and therefore cannot generate electricity without making use



of some of the waste heat. The Welsh Government has indicated that a minimum efficiency of 60% is technically achievable (***Collections, Infrastructure and Markets Sector Plan 2012***). Therefore, it is anticipated that any new installation that burns waste and so produces Combined Heat and Power will have to identify how and where the heat will be usefully employed. More details are available from the Welsh Government at: [https://gov.wales/topics/environmentcountryside/epq/waste\\_recycling/disposal/energy-from-waste/?lang=en](https://gov.wales/topics/environmentcountryside/epq/waste_recycling/disposal/energy-from-waste/?lang=en)

7.8.8 As an indication of the efficacy of CHP plants which burn waste, the Powys Renewable Energy Assessment (2017) indicated that 10,320 tonnes of waste are required for each 1MW of electricity generated in a CHP plant, and that CHP facility will also produce about 2MW of thermal output.

7.8.9 As with anaerobic digesters, CHP plants which use waste as a feedstock will require the appropriate environmental permits or exemptions from Natural Resources Wales to ensure that environmental damage from the development does not occur.

## 7.9 Batteries and Other Storage Facilities

7.9.1 Advances in technology means the potential exists for standalone batteries and other energy storage facilities to be developed within renewable and low carbon energy schemes as ancillary infrastructure.

7.9.2 Batteries may be used for storage or as a means to even out power fluctuations from developments which generate electricity, and so contribute to management of the electricity grid. Such battery facilities tend to be large (typically a “battery” may approximate to the size of a shipping container).

7.9.3 Other developing technologies include using electricity generated from renewable and low carbon sources to produce, for example, hydrogen for fuel or compressed air, which can be stored in tanks or similar structures. Such technologies also provide opportunities for renewable energy schemes to be off-grid as the stored energy can be transported by other means.

7.9.4 Any development proposals for renewable energy storage facilities should be sensitively sited and accord with LDP policies including Policy SP7 (see also the Landscape SPG), and measures should be taken to minimise any visual and noise impacts on local residents associated with the operation of the plant and movements of vehicles if applicable.

## 7.10. District Heat

7.10.1 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.

7.10.2 The Powys Renewable Energy Assessment (2017) recognised that whilst there was potential for DHN development on development sites, heat densities were considered to be insufficient for settlement-wide scale DHNs to be developed to support renewable heat opportunities.

7.10.3 To promote consideration of heat opportunities LDP Policy DM13: Design, Criterion 14, expects developers to investigate the technical feasibility and viability for district heating either within their own development or in combination with other developments in the community and satisfy the Council that such studies have been undertaken.

7.10.4 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.

7.10.5 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 or neighbourhoods, although this tends to be a more complicated process.

7.10.6 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 engines, biomass or anaerobic digestion combined heat and power systems – or a combination of several options, e.g. an AD CHP plant providing base-load with a biomass boiler providing additional winter peak demand input. 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. CHP alone is less efficient when there is substantial diurnal and/or seasonal fluctuations in demand for heat.

7.10.7 District heating systems can be highly efficient and cost-effective at the smaller scale e.g. a single biomass boiler supplying:

- a group of ten dwellings in a new development, or
- a terrace of houses by retrospectively installing a heat main through the loftspace.

As district heat networks are designed to last for many years; once installed the system can adapt to technical advances, and the Council recognises that in the future such schemes could play an important role in reducing reliance on fossil fuels.

## 8.0 Permitted Development Rights

### 8.1 Non-Domestic Buildings

8.1.1. Permitted development rights exist for non-domestic premises for certain types of micro-generation opportunities on, or within, the curtilage of the property, subject to certain conditions. Permitted development rights also extend to buildings on agricultural or forestry land to house microgeneration equipment (see *The Town and Country Planning (General Permitted Development) (Amendment) (Wales) (No.2) Order 2012 Appendix 3*). The Welsh Assembly Government/CADW has published best practice guidance on installing micro-generation systems in historic buildings. Developers considering the installation of renewable / low carbon technologies such as hydropower turbine houses and boiler houses etc. on or associated with non-domestic buildings are advised to contact the Council's Planning Department for further advice.

8.1.2 For the purposes of current permitted development rights, non-domestic microgeneration is defined in Table 2.

**Table 2: Non-domestic Microgeneration with Permitted Development Rights**

Type	Capacity
Technologies that generate <b>electricity</b>	50 kilowatts (kW)
Technologies that generate <b>heat</b>	45 kilowatts (kW)

8.1.3 Providing the installation is not within the curtilage of a listed building or a conservation area, or is in a property subject to an Article Four direction which removes permitted development rights, the following technologies can be installed, altered or replaced:

- 1. For building-mounted solar photovoltaic (PV) and solar thermal panels:**
  - The panels are not more than 200mm from the plane of an existing pitched roof or the surface of an existing wall.
  - The panels do not protrude more than one metre above the surface of a flat roof.
  - Panels on a roof are not within one metre of the external edge of the roof.
  - Panels on a wall are not within one metre of a junction of that wall with another wall or with the roof of the building.
- 2. For stand-alone (free standing) PV and solar thermal panels**
  - They are set at least five metres within the boundary of the curtilage.
  - Do not exceed four metres in height.
  - There is only one stand-alone solar array (one frame for the collection of panels).
  - The total surface area of the panels does not exceed nine square metres and the array (including any housing) does not exceed three metres in any dimension.
- 3. For ground source heat pumps**
  - There is only have one ground source heat pump within the curtilage.
  - The total area covered by the excavation does not exceed 0.5 hectares.

#### 4. For water source heat pumps

- The total area covered by the water source heat pump (including any pipes) does not exceed 0.5 hectares.

#### 5. For flues for biomass heating or for combined heat and power (CHP) systems

- The capacity of the system that the flue would serve does not exceed 45 kilowatts thermal.
- The flue does not project more than 1m above the highest part of the roof or the height of an existing flue which is being replaced (whichever is highest).
- There is only one flue, forming part of either a biomass heating system or a combined heat and power system, on the same building.

In most categories, and in particular for solar electricity (photovoltaic) and solar water (solar thermal panels), permitted development is conditional on minimising the effect on the amenity of the area and on the external appearance of the building, and the equipment must be removed if no longer needed for microgeneration.

8.1.4 It is important to note that when considering the installation of micro-generation and low carbon technologies on non-domestic buildings, the Council as local planning authority should be consulted under the relevant regulations. These regulations are set out in The Town and Country Planning (General Permitted Development) (Amendment) (Wales) (No.2) Order 2012. For more information on the regulations visit: [www.wales.gov.uk/planning](http://www.wales.gov.uk/planning).

8.1.5 The Permitted Development Rights also extend to new plant and machinery within extensions to existing buildings which may include enclosed renewable energy installations, such as biomass or battery storage facilities.

## 8.2 Building Integrated and Domestic

8.2.1 Many domestic renewable / low carbon technologies are classed as 'permitted development' and can be installed without needing planning permission, although there are specific limits relating to size and position, and listed buildings or properties within conservation areas are more strictly controlled. Listed Building Consent will be required for any proposal that affects the character or setting of a listed building, including structures within its curtilage. The Welsh Assembly Government/CADW has published best practice guidance on installing micro-generation systems in historic buildings. Householders considering the installation of renewable / low carbon technologies are advised to contact the Council's Planning Department for further advice.

8.2.2 Information about domestic permitted development rights in Wales is outlined in **Appendix 3** and further details can be obtained from the Planning Portal: [https://www.planningportal.co.uk/wales/en/info/2/do\\_you\\_need\\_permission](https://www.planningportal.co.uk/wales/en/info/2/do_you_need_permission)

## 9.0 Criteria for Determining Renewable Energy Schemes

### 9.1 Overview

9.1.1 In assessing proposals for all renewable energy developments, the Council will consider the development plan policy and all other material considerations including Planning Policy Wales and the relevant Technical Advice Notes (TANs).

9.1.2 Proposals for renewable energy developments should always take account of spatial frameworks where these are relevant, including the location of the TAN 8 Strategic Search Areas (SSA) for large-scale wind developments and Local Search Areas (LSA) for solar PV developments identified in the LDP. For all renewable energy proposals including associated transmission / storage infrastructure, considerations will vary relative to the scale of the proposal and area characteristics but the information requested by the Council are likely to include:

- net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities;
- the scale of contribution to renewable energy generation targets;
- effect on greenhouse gas emissions;
- cumulative impacts – developers should be clear about likely cumulative impacts arising from all of the considerations below, recognising that in some areas the cumulative impact of existing and consented energy development may limit the capacity for further development;
- impacts on communities and individual dwellings, including zones of theoretical visibility (ZTV), visual impact and residential amenity;
- the potential for pollution, noise, dust, odours, vibration, reflected light and shadow flicker;
- landscape and visual impacts, including effects on nationally protected landscapes, upland areas and commons;
- effects on the natural heritage, biodiversity and geodiversity, including birds and local ecology;
- impacts on carbon-rich soils;
- impacts on defence interests, including safeguarded military training facilities, low flying zones and military aircraft flight approach routes;
- impacts on aviation requirements, including safeguarding airports and aerodromes, air traffic control radar<sup>1</sup> and controlled airspace (see Appendix 4 for NATS Frequently Asked Questions about wind turbines);
- impacts on tourism, recreation and public access, including Public Rights of Way, and particularly the impact on bridlepaths<sup>2</sup>, long distance walking and cycling routes and scenic routes identified in the LDP;
- impacts upon best and most versatile (BMV) agricultural land;
- impacts on the historic environment, including scheduled ancient monuments, listed buildings and their settings, Registered Historic Landscapes, Registered Parks and Gardens and Conservation Areas;

<sup>1</sup> The National Air Traffic Service (NATS) provides safeguarding self-assessment data and guidance for wind turbine developers.

<sup>2</sup> The British Horse Society provide specific guidance for developers of wind turbine installations.

- impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised;
- impacts on road traffic and highway safety including toppling distances, glint and glare;
- impacts on adjacent trunk roads;
- effects on hydrology and hydrogeology, the water environment and flood risk;
- the need for conditions relating to the decommissioning of developments, including ancillary infrastructure, and site restoration;
- opportunities for energy storage; and
- the need for a robust planning obligation to ensure that operators achieve site restoration and any additional compensatory benefits.

9.1.3. For schemes which do not fall within Permitted Development rights and which have an installed capacity of 10MW or less, early discussion with the Council's Planning department is encouraged and will help to highlight key issues informed through a Landscape Sensitivity and Capacity Assessment (LSCA). Development specific considerations will have to be addressed through a Landscape and Visual Impact Assessment (LVIA), the Environmental Impact Assessment (EIA) if required and the application design statement.

9.1.4 The matters listed above in Paragraph 9.1.2 will **all** need to be taken into consideration in relation to all types of renewable / low carbon energy developments. Particular attention will need to be given to potential impacts on the landscape, townscape or seascape, including that of lighting, ancillary equipment and grid connection, the natural environment and nature conservation, wildlife interests, areas of historical and cultural importance, design to minimise “stacking” and at the end of the life of the development, decommissioning and site restoration.

## 9.2 Landscape Sensitivity and Capacity

9.2.1 Understanding landscape character will inform the acceptability of landscape change. Landscape Sensitivity considers the ability of a landscape to accommodate a type and scale of development without changing the landscape character. Landscape capacity further considers this ability by taking into account landscape character change.

9.2.2. It should be noted that LSCA is not a replacement for a LVIA which considers the landscape and visual effects of individual development proposals, but it is a useful informing tool which can guide the scale and type and development. (see Landscape SPG for further information). **For example, developers may wish to undertake a LSCA across the solar LSAs to identify and refine opportunities and establish their long term potential.**

## 9.3 Landscape and Visual Impact Assessment (LVIA)

9.3.1 The effect on the landscape can be measured as changes in the character, the experience and/or value of the physical landscape as a result of a change. The significance of the effect on the landscape will be dependent upon a number of factors including the sensitivity of the landscape and its designation, and the magnitude of the proposed change.

9.3.2 For all types of renewable / low carbon energy, the assessment of landscape and visual effects (including impacts on landscape, seascape, townscape and communities) will be of primary importance. Impacts on skylines, views and panoramas into and out of the proposed development will be important considerations. These impacts should be identified in relation to significant receptors (including local residents or communities, heritage assets and rights of way users) as well as the wider landscape generally.

9.3.3 The impact upon visual amenity can be a subjective one, but ultimately can be measured as being people's responses to a change in the composition of views as a result of changes within the landscape.

9.3.4 Applications shall be accompanied by an appropriate **Landscape and Visual Impact Assessment (LVIA)**. The purpose of the LVIA is to assess visual amenity objectively, and so should follow the steps and which is expected to adhere to the most recent edition of the guidelines issued by the Guidelines for Landscape and Visual Impact Assessment; (currently the Third Edition, April 2013 (GLVIA3)); published by The Landscape Institute and the Institute for Environmental Management and Assessment. This is the industry standard for undertaking landscape and visual impact assessments.

9.3.5 The scope and content of an LVIA for a specific development will depend upon the development typology and context. Guidance on information requirements should be sought from the case planning officer as part of pre-application consultation.

## 9.4 Cumulative Impacts

9.4.1 Cumulative impact can be defined as:

*“the additional changes caused by a proposed development in conjunction with other similar development or as the combined effect of a set of developments, taken together.”*

9.4.2 Where a Cumulative ~~Landscape and Visual~~ Impact Assessment is required, for example for landscape, visual and environmental impacts, an assessment of both combined and additional effects will be required.

9.4.3 **Cumulative impacts assessments** should be carried out where the development may be viewed assessed in conjunction with other renewable energy developments, either associated with or separate from the proposed development, that are already operating, have planning permission or where a planning application has been submitted.

9.4.4 Further guidance on information requirements should be sought from the case planning officer as part of pre-application consultation.

## 9.5 Environmental Impact Assessment

9.5.1 Some renewable energy development proposals require an Environmental Impact Assessment (EIA) under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017 1999 (known as the 'EIA Regulations'). These regulations implement the EU's Environmental Impact Assessment Directive 85/337/EEC as amended by 97/11/EC and 2003/35/EC.



9.5.2 EIA may be required for any renewable energy development falling under Schedule 2 of the Regulations, as set out in **Table 3**. As such, an EIA is not mandatory but the Council **is required to undertake** ~~will provide~~ a 'screening opinion' **or will provide one** on request, indicating whether an EIA is required, based on whether the development is likely to give rise to significant environmental effects. Welsh Government Circular 11/99 states that 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.

9.5.3 In judging the likelihood of significant effects, the Council will also have regard to the thresholds and criteria set out in the Regulations. **Table 3** outlines the thresholds and circumstances in which an EIA may be required for different types of renewable energy development. Where the 'applicable thresholds and criteria' in Column 2 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 Welsh Ministers. Where the 'indicative thresholds and criteria' in column 3 are exceeded, EIA is more likely to be required.

**Table 3: 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 hectares.	EIA will normally be required for power stations which require approval from the Welsh Ministers, i.e. those with a thermal output of more than 50MW.
Installations for hydroelectric energy production (hydro-power)	The installation is designed to produce more than 0.5MW.	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 5MW 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 5MW of new generating capacity.

**9.5.4** It will also be necessary for all proposals to comply with other legislation and regulations, for example, those in respect of common land and the Habitats Directive.

## 9.6 Grid Connection

9.6.1 All grid systems (even very small ones) that do not connect through a residential property will require planning permission for the grid connection works. In many cases the technical details of the connection of a renewable / low carbon energy proposal to the electricity distribution grid will not be a matter for Powys County Council to determine and instead will sit with the Welsh Ministers or the UK Government Secretary of state for Energy planning consideration. However, in some cases, parts of the connection infrastructure, such as sub-stations and kiosks may require separate planning permission as part of the overall scheme. It is recommended that developers conduct initial discussions with the Distribution Network Operator (DNO) and the Council at an early stage in the development of the project in order to identify routes for grid connection infrastructure which avoid areas of high landscape, ecological, cultural, historical or archaeological sensitivity. Preference will be for sub-surface connections where possible. However, a balanced view must be taken of the level of the landscape and visual impact of the type of overhead lines proposed against the costs and other environmental impacts of undergrounding and mitigation. Proactive engagement with network operators, energy companies and the public to mitigate the visual impacts of transmission lines should take place.

9.6.2 New grid connections to connect renewable energy generation will need to have regard to the existing grid network capacity. Where there are gaps in the network to facilitate connections for the renewable energy planned in this SPG, Powys County Council will work with network operators to utilise existing upgraded infrastructure corridors for the required connections. Preference will be given to proposals for upgrading existing grid network and proposals for sharing new network to avoid a proliferation of new networks.

## 9.7 Cultural and Historic Heritage Impacts

9.7.1 Landscape, seascape and townscape can have cultural and historic associations that are important for the local community, visitors and the wider national interest, and renewable energy proposals should take these into account and mitigate against unacceptable impacts.

9.7.2 Cultural associations could include art works or literature (in *English* or *Welsh*) relating to the landscape, while features of historic importance could include listed buildings, scheduled ancient monuments and their settings, conservation areas and registered Historic Landscapes and Parks and Gardens.

9.7.3 Welsh Government (CADW) has guidance regarding development in or adjoining Registered Historic Landscapes and RHL boundaries are periodically revised. Assessment of the Significance of Impacts of Development on Historic Landscape (ASIDOHL2) procedures may be required to be followed in order to assess impacts of renewable energy developments on Historic Landscapes and additional advice can be sought from Clwyd Powys Archaeological Trust (CPAT).

9.7.4 Information and further advice on the historic built environment will be available in the Council's Historic Environment SPG.

## 9.8 Design and Construction

9.8.1 Renewable / low carbon energy developments should be designed as far as possible to minimise visual intrusion. Colour schemes to blend in and mitigate the unnatural appearance of renewable energy installations and ancillary infrastructure with the landscape backdrop should be investigated. Ancillary buildings, storage areas, technical equipment and means of enclosure should be kept to the minimum necessary, be designed to be unobtrusive and be located to be screened from view where possible. In rural areas access tracks should have a rural unmade character as far as possible and electrical cabling connections should wherever possible be underground or carried predominantly on wooden poles.

## 9.9 Waste

9.9.1 The UK applies the waste hierarchy. This ranks waste management options in order of environmental preference and the first priority is waste reduction.

9.9.2 Renewable energy technologies which may be reliant on waste as a feedstock include:

- Anaerobic digestion.
- Direct combustion of waste material in an Energy from Waste plant (incineration).
- Combustion of waste derived fuel (e.g. landfill gas).

9.9.3 Recovering energy from waste is only appropriate for waste that cannot be prevented, reused or recycled with less greenhouse gas emitted. Energy recovery can be a sustainable option for waste that would otherwise go to landfill and create landfill methane emissions.

9.9.4 All energy from waste plants must comply with regulations concerning environmental protection, animal by-products, duty of care, health and safety, waste handling and planning permission where necessary.

9.9.5 The legal duty of care means all reasonable steps must be taken to keep waste safe including feedstock and by-products arising from energy plants which utilise waste. Applicants have a legal responsibility to ensure that the production, storage, transport and disposal of waste occurs without harming the environment, and further advice with respect to environmental permitting should in all instances be sought from Natural Resources Wales.

9.9.6 Within a largely rural County, the Council recognises that a number of users (e.g. farmers) working together to form a jointly owned and managed anaerobic digester for their waste may be the most viable option. All waste developments must accord with LDP policies W1 and W2 as well as meet the necessary regulatory requirements.

## 9.10 Decommissioning / Site Restoration / Duration of Planning Permission

9.10.1 Applications for all renewable energy developments are expected to be accompanied with an agreed decommissioning schedule and details of the restoration and aftercare of the site. Operational lifespans can vary, typically being 25 years for wind and solar developments, but hydro-power installations may have an operational life in excess of 50 years. In restoring the site at the end of the system's its operational life, often after 25 years, it is expected that the developer will assess the environmental impacts and that these will be addressed to enable the

site **will** to revert **completely** as near as possible to its state prior to the construction of the renewable energy generating equipment (e.g. wind turbine/s), **the decommissioning and restoration being in accordance with the prevailing best practice at that time**. All development, ancillary infrastructure and access tracks should be removed and any soils and vegetation restored appropriately. It will be expected that any new field access will be closed and hedgerows re-instated and access tracks removed or grassed over to be fully restored. **Where it is not possible to completely remove structures (e.g. foundation pads) or the landowner has requested their retention (e.g. access tracks), the longer term impacts on, for example, hydrology and ecological restoration may need to be assessed as part of the decommissioning process.**

**9.10.2 Where appropriate, decommissioning bonds (i.e. security) may be sought. The importance of decommissioning security is often of concern to the landowner and is therefore considered in the ground lease and other contractual arrangements with the developer rather than through the consenting process and EIA. If the Council has negotiated a Section 106 agreement the Decommissioning Bond will be put in place prior to commencing construction. Typical values are of the order of £15,000 per MW installed to cover the cost of breaking out foundations to c.1.5m below ground level, track and land reinstatement and removal of cables and substations (see also the Planning Obligations SPG).**

**9.10.3 In many instances it may be appropriate to seek to extend the life of the renewable energy installation. To minimise environmental impact, the Council will apply a hierarchical approach in the consideration of any life extension proposal. In the first instance, the developer should seek to extend the life of the development using the existing infrastructure. If that is not possible, the developer should maximise the re-use of the existing infrastructure (sometimes called “Re-use Max”) including replanting of turbines on existing bases and so enabling the reuse of existing tracks, crane pads and cable trenches. Any recovered material from removed turbines should be treated as high up the waste hierarchy as possible.**

**9.10.4 2** **Whilst life extension and “re-use max” is encouraged, it is anticipated that there will be an increasing number of situations where developers will seek to repower older wind farms either coming to the end of their life span, or in situations where newer more efficient turbines would provide much greater yields, and this is recognised in Planning Policy Wales. Although the existing use of a site as a wind farm will be a material consideration, the same level of scrutiny of the location, scale and design of the repowered wind farm will be applied to ensure consistent decision making in line with Welsh Government aspirations and national and local policies. The onus will remain on the developer to demonstrate the reasons for the new repowered development being acceptable, including minimising the environmental impact of new turbine foundation pads, maximising the re-use of existing and supporting infrastructure and maximising the recovery of materials from the removed turbines in accordance with the waste hierarchy.**

## **9.11 Site Security / Safety / Lighting**

**9.11.1 Any security measures should not cause visual harm to the character of the local area. In rural areas such as those found across Powys, lighting should accord with LDP Policy DM7, be kept to a minimum and if necessary, where required should be infra-red for aviation purposes.**

## 9.12 Planning Obligations, Community Benefits and Ownership

9.12.1 Planning Policy Wales supports commercial developers of renewable energy schemes working together with community based organisations, to meet Welsh Government aspirations and provide opportunities for community ownership as well as community benefits. The net economic benefits of shared ownership are a material consideration that planning authorities should take into account and the Council would be supportive of proposals featuring shared ownership. Where a proposal is acceptable in land use terms and consent is being granted, the Council may wish to engage in negotiations to secure community benefits through planning obligations that are relevant and related in scale and kind to the proposed development (Welsh Office Circular 13/97) and which enable the development to proceed, including for example, highways improvements, habitat management and mitigation.

9.12.2 Community benefits in the form of financial contributions **must not** impact on the decision making process (PPW 10 – para 5.9.22), however, where appropriate, developers may be in a position to provide benefits through Planning Obligations to help mitigate and compensate alleviate any negative consequences and to ensure the community benefits from the development, for example, payments to overcome adverse impacts on television reception, or a financial obligation related to decommissioning and site restoration.

9.12.3 A renewable energy scheme developer may wish to create a Community Benefit Fund (CBF). Such schemes are financial contributions and thus cannot be a material consideration or influence the decision making process. CBFs are a voluntary commitment which usually takes the form of an annual payment of a sum linked to the installed capacity of the renewable energy installation, most typically a windfarm. CBFs are intended to support local or community projects of a socially beneficial nature, such as environmental protection or enhancement, inclusion and regeneration and so deliver long term and sustainable benefits.

9.12.4 3 Community investment in or ownership of renewable energy schemes can provide a much needed boost to local economies and allow communities to generate their own energy whilst also having control over how they spend the financial returns.

9.12.5 4 Welsh Government is supportive of local and community ownership of renewable and low carbon energy schemes and expects all renewable energy schemes to have an element of local ownership by 2020, with a target of 1GW of installed capacity being locally owned by 2030.

## 10.0 Monitoring and Review

10.0.1 The implementation of the LDP's Renewable Energy policy, through developments permitted and delivered under the LDP, will be monitored annually and reported in the LDP's Annual Monitoring Report (AMR) (submitted to the Welsh Government by 31st October each year following adoption of the LDP). The AMR will identify any policy that is not being implemented in the anticipated manner. The process will monitor developments that increase the installed capacity of renewable energy generation capacity across the County to confirm that opportunities are realised. The number of developments that do not accord with the criteria in Policy RE1 will also be monitored as required through AMR31.

10.0.2 This SPG will be kept under review and, where necessary, updated to take into account changes in any relevant policy, guidance, evidence of circumstances, and in response to relevant issues raised with the SPG in practice.

## 11.0 Selected Sources for Further Information

AECOM (2017). Powys Renewable Energy Assessment (Report & Appendices):  
[https://en.powys.gov.uk/media/5416/Renewable-and-Low-Carbon-Energy-Assessment-2017-AECOM/pdf/Renewable\\_and\\_Low\\_Carbon\\_Energy\\_Assessment\\_2017\\_AECOM.pdf?m=1537788054193](https://en.powys.gov.uk/media/5416/Renewable-and-Low-Carbon-Energy-Assessment-2017-AECOM/pdf/Renewable_and_Low_Carbon_Energy_Assessment_2017_AECOM.pdf?m=1537788054193)

<https://en.powys.gov.uk/media/5415/Renewable-and-Low-Carbon-Energy-Assessment-2017-part-1-maps>:  
[https://en.powys.gov.uk/media/5415/Renewable-and-Low-Carbon-Energy-Assessment-2017-part-1-maps-AECOM/pdf/Renewable\\_and\\_Low\\_Carbon\\_Energy\\_Assessment\\_2017\\_part\\_1\\_maps\\_AECOM.pdf?m=1537788053183](https://en.powys.gov.uk/media/5415/Renewable-and-Low-Carbon-Energy-Assessment-2017-part-1-maps-AECOM/pdf/Renewable_and_Low_Carbon_Energy_Assessment_2017_part_1_maps_AECOM.pdf?m=1537788053183)

<https://en.powys.gov.uk/media/5414/Renewable-and-Low-Carbon-Energy-Assessment-2017-part-2-Biomass>:  
[https://en.powys.gov.uk/media/5414/Renewable-and-Low-Carbon-Energy-Assessment-2017-part-2-Biomass-AECOM/pdf/Renewable\\_and\\_Low\\_Carbon\\_Energy\\_Assessment\\_2017\\_part\\_2\\_Biomass\\_AECOM.pdf?m=1537788052607](https://en.powys.gov.uk/media/5414/Renewable-and-Low-Carbon-Energy-Assessment-2017-part-2-Biomass-AECOM/pdf/Renewable_and_Low_Carbon_Energy_Assessment_2017_part_2_Biomass_AECOM.pdf?m=1537788052607)

British Horse Society (2015). Advice on Wind Turbines and Horses – Guidance for Planners and Developers:  
<http://www.bhs.org.uk/.../access-leaflets/wind-turbines-planners.ashx?la=en>

CADW – Historic Parks and Gardens:  
<https://cadw.gov.wales/historicenvironment/protection/historicparksandgardens/?lang=en>

CADW (2007): Guide to Good Practice on using the Register of Landscapes of Historic Interest in Wales in the planning and Development Process Revised (2<sup>nd</sup>) Edition including Revisions to the Assessment Process (ASIDOHL2):  
[https://cadw.gov.wales/docs/cadw/publications/LandscapesRegisterGoodPractice\\_EN.pdf](https://cadw.gov.wales/docs/cadw/publications/LandscapesRegisterGoodPractice_EN.pdf)

Clwyd Powys Archaeological Trust - Register of Historic Landscapes:  
<http://www.cpat.org.uk/projects/longer/hisland/asidohl/asidohl2.pdf>

Energy Saving Trust: <https://www.energysavingtrust.org.uk/>

Enplan (2017). Powys Renewable Energy Assessment: Landscape Sensitivity Study for Solar Farm Development (Report & Appendix):  
[https://en.powys.gov.uk/media/5413/ED060\\_REA\\_Landscape\\_Sensitivity\\_Study\\_for\\_Solar\\_Farm\\_Development\\_NoAppendix\\_12May2017/pdf/ED060\\_REA\\_Landscape\\_Sensitivity\\_Study\\_for\\_Solar\\_Farm\\_Development\\_NoAppendix\\_12May2017.pdf?m=1537788051047](https://en.powys.gov.uk/media/5413/ED060_REA_Landscape_Sensitivity_Study_for_Solar_Farm_Development_NoAppendix_12May2017/pdf/ED060_REA_Landscape_Sensitivity_Study_for_Solar_Farm_Development_NoAppendix_12May2017.pdf?m=1537788051047)

[https://en.powys.gov.uk/media/5411/ED060\\_REA\\_LSS\\_for\\_Solar\\_Farm\\_Development\\_AppendixA\\_12May2017/pdf/ED060\\_REA\\_LSS\\_for\\_Solar\\_Farm\\_Development\\_AppendixA\\_12May2017.pdf?m=1537788048833](https://en.powys.gov.uk/media/5411/ED060_REA_LSS_for_Solar_Farm_Development_AppendixA_12May2017/pdf/ED060_REA_LSS_for_Solar_Farm_Development_AppendixA_12May2017.pdf?m=1537788048833)

Jones et al (2015). The Economic and Social Impact of Small and Community Hydro in Wales  
<http://www.regenwales.org/upload/pdf/071015091201Impact%20of%20Small%20and%20Community%20Hydro%20in%20Wales.pdf>

Jones et al. (2016). Energy and Development in the Periphery: A regional perspective on small hydropower perspectives).  
<https://journals.sagepub.com/doi/abs/10.1177/0263774X16662029>

Jones, (2018). The Economic Impact of Energy Transition in Wales, Institute of Welsh Affairs,  
<https://www.iwa.wales/wp-content/uploads/2018/09/EconomicImpactofEnergyTransition-2.pdf>



Landscape Institute (2013). Guidelines for Landscape and Visual Impact Assessment (Third Edition):

<https://www.landscapeinstitute.org/product/guidelines-for-landscape-and-visual-impact-assessment/>

National Air Traffic Service (NATS):

<https://www.nats.aero/services/information/wind-farms/safeguarding/>

Planning Portal:

[https://www.planningportal.co.uk/wales\\_en/](https://www.planningportal.co.uk/wales_en/)

Welsh Assembly Government. Renewable Energy and Your Historic Building. Installing Micro-Generation Systems: A Guide to Best Practice.

Welsh Government (2012). Collections, Infrastructure and Markets Sector Plan:

[https://gweddill.gov.wales/topics/environmentcountryside/epg/waste\\_recycling/publication/cimsectorplan/?skip=1&lang=en](https://gweddill.gov.wales/topics/environmentcountryside/epg/waste_recycling/publication/cimsectorplan/?skip=1&lang=en)

Welsh Government Guidance:

<https://beta.gov.wales/planning-permission-generating-your-own-energy>

#### **Other Useful Sources:**

Town & Country Planning (General Permitted Development) Order 1995 (see Schedule 2).

Town & Country Planning (General Permitted Development)(Amendments)(Wales) Order 2012.

Town & Country Planning (General Permitted Development)(Amendments)(Wales)(No.2) Order 2012.

Town & Country Planning (General Permitted Development)(Amendments)(Wales) Order 2013.

Town & Country Planning (General Permitted Development)(Amendments)(Wales) Order 2014.

Town and Country Planning (Environmental Impact Assessment)(Wales) Regulations 2017.

## Appendix 1: Local Search Areas for Solar PV Farms

The need to identify Local Search Areas (LSA) is derived from the Toolkit and the Ministerial Letter of December 2015. This Appendix provides a summary of landscape sensitivity to stand alone solar PV farm energy development for each LSA within Powys. The outcomes and potential capacities are informed by the *Landscape Sensitivity Study for Solar Farm Development* (LSS), commissioned from Enplan by the Council in February 2017.

Each category of overall landscape sensitivity to solar PV farm development has been defined as set out in Table A1. Areas identified in the Powys Renewable Energy Assessment 2017 subsequently assessed in the LSS as falling within the two highest sensitivity level categories were not considered suitable for inclusion as solar LSAs and were not included in the adopted LDP.

**Table A1: Landscape Sensitivity Categories**


Sensitivity Level	Definition
<b>Very High</b>	Key characteristics and qualities of the landscape are highly vulnerable to change from the development type. No potential for locating the development type.
<b>High</b>	Key characteristics and qualities of the landscape are vulnerable to change from the development type. Highly limited potential for locating the development type.
<b>Medium-High</b>	Most of the key characteristics and qualities of the landscape are vulnerable to change from the development type. Limited potential for locating the development type.
<b>Medium</b>	Some of the key characteristics and qualities of the landscape are vulnerable to change from the development type. Some potential for locating the development type.
<b>Medium-Low</b>	Few of the key characteristics and qualities of the landscape are vulnerable to change from the development type. Potential for locating the development type.
<b>Low</b>	None of the key characteristics and qualities of the landscape are vulnerable to change from the development type. Clear potential for locating the development type.

The landscape sensitivity assessment is supported by a narrative discussion as to the key issues that have determined the sensitivity outcome and define the judgements regarding where within each LSA there may be potential solar farm development capacity and the level of that potential capacity, according to the three development typologies.

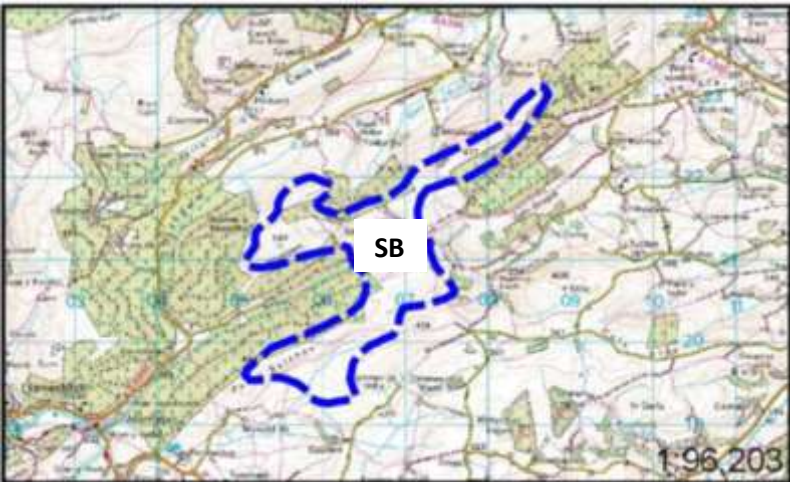
The capacity assessment is very broad in its approach and is not definitive. It is based on an assessment of a potential area, for example part of a particular valley floor, and a calculation of the area of solar farm development within this area that could be undertaken without unacceptable landscape and visual effects.

This high-level assessment is to be tested at the planning application stage, both in terms of where and how much development is potentially acceptable, but the table below, informed by the Landscape Sensitivity Study provides a guidance, or a steer, as to location and quantum.


**LSA - SA: BACHRYDRADA**

	Details
<b>LSA Location:</b>	<p>2km east of Tregeiriog</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	2.3 sq. km
<b>LSA Description:</b>	<p>Overlooked upland plateau pasture, circa 400m AOD.</p> <p>Complex topography at and beyond the southern edge but simpler, more level plateau-like topography within the LSA. Medium-large scale. Some visual enclosure from forestry in the east of the LSA, all semi-improved pasture with some moorland/mire within the minor watercourse valley in the west and hedgerows in the easternmost fields. Overlooked by high ground of Foel Rhiwlas and Craig-yr-hwech to the immediate south and by more distant Berwyn Mountains (11km west).</p>
<b>Landscape Sensitivity</b>	<b>Medium - High</b>
<b>Landscape Commentary:</b>	<p>The western sector is the most plateau-like, generally well-concealed from the lower surrounding landscapes but exposed from the higher Foel Rhiwlas to the south and Berwyns in the west.</p> <p>The eastern sector benefits from some visual cover from forestry blocks, within and outside of the LSA, and some hedgerow field boundaries.</p>
<b>Guidance and key sensitivities:</b>	The more suitable areas for solar would appear to be in the eastern sector subject to visual impact on the Llwybr Ceiriog Trail long distance footpath which crosses the LSA twice and other potential visual effects.
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW).</b>

**LSA - SB: ABERTRIDWR**

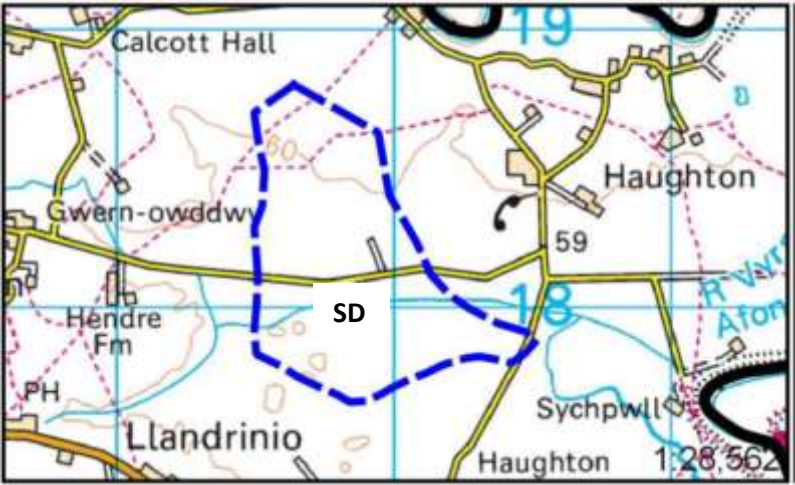
	<b>Details</b>
<b>LSA Location:</b>	<p>3km east of Lake Vrynwy</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	3.7 sq. km
<b>LSA Description:</b>	<p>Two parallel, undulating ridges, circa 350-540m AOD.</p> <p>Two long parallel undulating ridges, strong afforested context to boundaries of much of the LSA. Northern ridge of the LSA occupied by semi-improved grazing and Open Access Land (Open Country and Common Land).</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	<p>Large-scale landscape. Areas of the northern ridge are visually enclosed by virtue of the topography and the adjoining forestry.</p> <p>South facing pasture slopes also semi-improved but more visually exposed than enclosed northern area.</p>
<b>Guidance and key sensitivities:</b>	<p>Subject to conflicts with the Open Access Land and effects on public amenity, areas away from the hillsides on the northern ridge offers some limited potential for small-scale solar PV farm development.</p> <p>The top of the southern ridge has some potential but the south facing slopes are visually exposed and less suitable.</p>
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW).</b>

**LSA - SC: FFRIDD LLWYDIARTH**


	Details
<b>LSA Location:</b>	<p>2km north of Dolanog</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	1 sq. km
<b>LSA Description:</b>	<p>Undulating upland pastures, circa 250-300m AOD.</p> <p>Undulating upland, improved and semi-improved pasture.</p>
<b>Landscape Sensitivity</b>	<b>Medium - Low</b>
<b>Landscape Commentary:</b>	<p>Open hilltops with crossed by a belt of maturing forestry of medium-scale with well-hedged smaller-scale fields on the lower slopes. Not especially visually well linked to adjacent landscapes, open hilltops most exposed.</p>
<b>Guidance and key sensitivities:</b>	<p>The larger-scale open hilltops have limited or no potential due to their visual exposure from adjoining landscapes. The lower areas of hedged pasture have some potential for accommodating solar development subject to detailed landscape and visual effects.</p> <p>Glyndŵr's Way National Trail crosses the lower land within the LSA and any proposals would need to ensure no significant visual effects on users of this long distance trail.</p>
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW).</b>



**LSA – SD: DOMGAY**


	Details
<b>LSA Location:</b>	<p>1km north-west of Llandrinio</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	0.6 sq. km
<b>LSA Description:</b>	<p>Low lying mixed agricultural land.</p> <p>Low lying, flat, medium-scale mixed agricultural fields, including some arable uses. Good hedgerow structure across most parts of the LSA together with occasional lines of hedgerow trees.</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	Medium-scale landscape. The LSA is divided into two by Hendre Lane (C class road). To the north the fields are medium scale with hedges but fewer hedgerow trees, to the south hedgerow trees are frequent with some lines of hedgerow trees. Views from Breidden Hill may be partially screened by this vegetation.
<b>Guidance and key sensitivities:</b>	Long visual link with Breidden Hill 4km to the south otherwise limited visual connections with other landscapes.
<b>Recommendation:</b>	<b>Potential for medium-scale solar PV farm development of up to 25MW.</b>

**LSA SE: BUTTINGTON**

	Details
<b>LSA Location:</b>	<p>2km north-east of Welshpool</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	1.1 sq. km
<b>LSA Description:</b>	<p>Low lying mixed agricultural land.</p> <p>Low lying, flat, medium-scale mixed agricultural fields, including some arable uses. Relatively weak hedgerow structure but with more substantive vegetation along the course of the River Severn and disused railway line.</p>
<b>Landscape Sensitivity</b>	<b>Medium - Low</b>
<b>Landscape Commentary:</b>	Medium to large-scale landscape. The southern sector of the LSA lies in close proximity to Long Mountain and also to the A483 and A458 which would all provide opportunities for local views.
<b>Guidance and key sensitivities:</b>	<p>In the northern sector there is some greater cover provided by vegetation and would be more concealed from local viewpoints. <b>Developers should consider hedgerow planting to provide additional screening.</b></p> <p>Visual connections with Breidden Hill, Long Mountain and wooded hills beside A483.</p>
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW).</b>

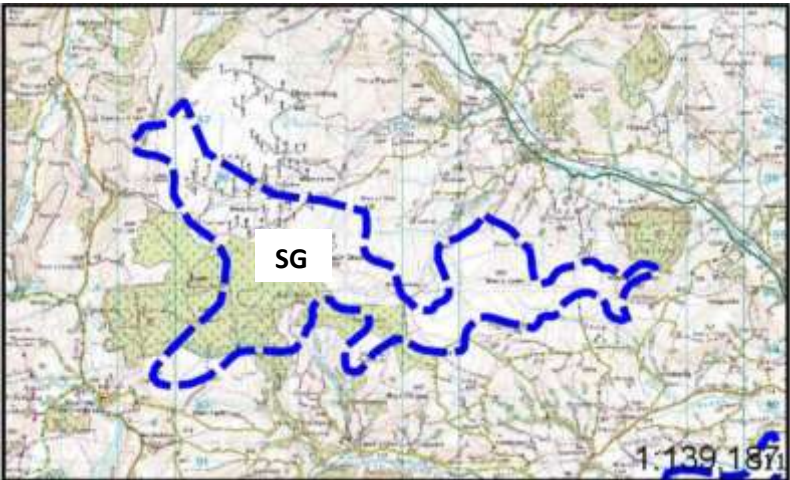


**LSA SF: HELDRE HILL**

	<b>Details</b>
<b>LSA Location:</b>	6km east of Welshpool  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	0.9 sq. km
<b>LSA Description:</b>	Upland plateau pasture, circa 350m AOD.  Undulating, upland plateau, medium-large scale landscape. Semi-improved pasture within Open Access Land in northern sector, improved pasture in southern with fences, scattered/broken hedgerows, woodland limited to minor valleys. Dispersed farmstead settlement. Open but limited visual links with other upland areas and not visible from adjoining settled lowlands.
<b>Landscape Sensitivity</b>	<b>Low</b>
<b>Landscape Commentary:</b>	The Open Access Land (Common Land) within the LSA, to the north of the road which bisects the LSA, is semi-improved pasture, open and large-scale.  The remaining land, including that outside of the OAL to the north of the road, is visually isolated from the wider landscape, except in distant views from the Shropshire Hills AONB (5.5km to SE), because of its overall high plateau nature.
<b>Guidance and key sensitivities:</b>	The Open Access Land access status could be compromised by solar development.  Consistent improved pasture throughout, excluding the OAL, but with limited tree or hedge cover to provide local screening. Consequently, LSA is visually exposed within its immediate context. Minor valley in SE of LSA is more enclosed but is steep-sided and may be physically unsuitable.

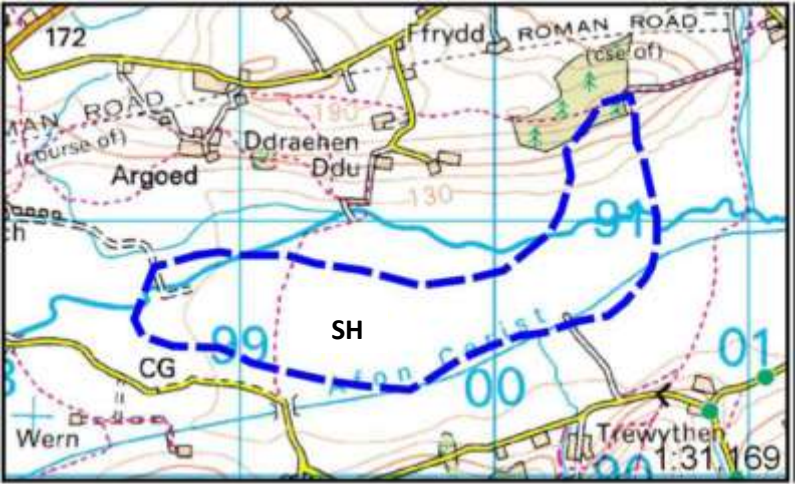
<b>Recommendation:</b>	<b>Potential for medium-scale solar PV farm development of up to 25MW.</b>
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**LSA SG: STAYLITTLE**

	Details
<b>LSA Location:</b>	<p>1km east of Staylittle</p>  <p><small>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</small></p>
<b>LSA Size:</b>	14.4 sq. km
<b>LSA Description:</b>	<p>Undulating plateau edge, circa 400-450m AOD.</p> <p>Undulating and indented plateau edge. Presence of Carno Wind Farm within the north-west sector of the LSA sited on the open moorland Open Access Land (Open Country and Common Land). Considerable forestry coverage both within and at the edges of the LSA, interspersed with improved pasture along plateau edge.</p> <p>Open upland moorland to north of forestry.</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	<p>Strong visual links with Dylife and Clwydog landscapes.</p> <p>Much of the LSA in the west is afforested but there may be potential within the forest areas with an appropriate land management change subject also to the consented but, as yet, unbuilt, Carno III Wind Farm. To the north of these forests the plateau is open moor, Open Access Land and occupied by the operational Carno Wind Farm. To the east, at Waun Garno, the land is also open moor and Open Access Land.</p>
<b>Guidance and key sensitivities:</b>	<p>Open moorland has higher landscape susceptibility. Some fields outside of the Open Access Land in the east may have some potential subject to a detailed assessment of effects, ensuring that there would no significant cumulative effects with this infrastructure.</p> <p>Land to the south of the forests may have some potential, at Mawnog Bryn-glas for example.</p>


<b>Recommendation:</b>	<b>Potential for medium-scale solar PV farm development of up to 25MW.</b>

**LSA SH: TREFEN**


	Details
<b>LSA Location:</b>	<p>1km east of Trefeglwys</p>  <p><small>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</small></p>
<b>LSA Size:</b>	0.9 sq. km
<b>LSA Description:</b>	<p>Low lying mixed use agricultural land</p> <p>Low lying, flat, medium-scale enclosed pasture, with some fields in arable use. Well-tended hedgerows with scattered hedgerow trees frame most of the irregular shaped fields. More significant vegetation along the course of the Afon Trannon.</p> <p>Land north of river which rises up to Park Wood, more exposed.</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	Some degree of visual connection with higher ground to the south, west and north-west.
<b>Guidance and key sensitivities:</b>	<p>The low-lying and locally enclosed character of much of this LSA make it potentially suitable for solar development, notwithstanding this landscape's Outstanding LANDMAP value for Historic Landscape Integrity and Rarity.</p> <p>The rising land north of the river by Park Wood is potentially more susceptible and sensitive as it is more visually exposed.</p>
<b>Recommendation:</b>	<b>Potential for medium-scale solar PV farm development of up to 25MW.</b>



**LSA SI: GLYNHAFREN**

	Details
<b>LSA Location:</b>	<p>1.5km south of Lyn Clwydog</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	2.3 sq. km
<b>LSA Description:</b>	<p>Long domed ridgeline, circa 350-450m AOD.</p> <p>Narrow LSA that occupies part of a long domed ridgeline. Mainly semi-improved and improved fenced grazing with some semi-natural moor and Open Access Land (Open Country) at Bryn Mawr. Occasional small forestry blocks and afforested areas along the southern edge.</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	Visually exposed with strong visual links with landscapes to the south and south-west with the hilltops exposed to views from the high land around Lyn Clwydog.
<b>Guidance and key sensitivities:</b>	The higher parts of the LSA are open and visually exposed to wide areas of adjoining landscapes. There are some more discreet parts of the LSA towards the lower southern edge where the lower elevation, folds in the landform and visual enclosure provided by the adjoining forestry areas provide some small-scale potential.
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW) away from the hilltops and where the adjoining forestry provides some visual enclosure.</b>


**LSA SJ: BRYN BLAEN**

	Details
<b>LSA Location:</b>	<p>2km north-west of Llangurig</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	3.2 sq. km
<b>LSA Description:</b>	<p>Gently undulating upland, circa 400-440m AOD.</p> <p>Gently undulating upland plateau with one more pronounced valley feature. A mix of semi-natural, semi-improved and improved pasture enclosed with fences, scattered small-scale forestry blocks. Some Open Access Land (Open Country) coincident with the semi-natural moor.</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	<p>Open to some views from surrounding high ground within the context although the plateau, away from the edges, is concealed from the adjoining lower landscapes.</p> <p>The hillside areas along the eastern and south-western edges are exposed to some local views from the adjoining lower ground, although the extent of this visibility is not especially broad. The central plateau areas and the south facing slopes of the central valley are generally well contained visually. Much of the relatively intensely grazed land use is less susceptible to solar development than the semi-natural moor and semi-improved pastures.</p>
<b>Guidance and key sensitivities:</b>	<p>The LSA is crossed by the Prince Llewellyn Ride (regional trail) and development proposals should ensure that there would be no significant visual effects upon users.</p> <p>The LSA is the site of the consented Bryn Blaen Wind Farm and detailed proposals should seek to ensure that there would be no significant cumulative effects with this infrastructure.</p>



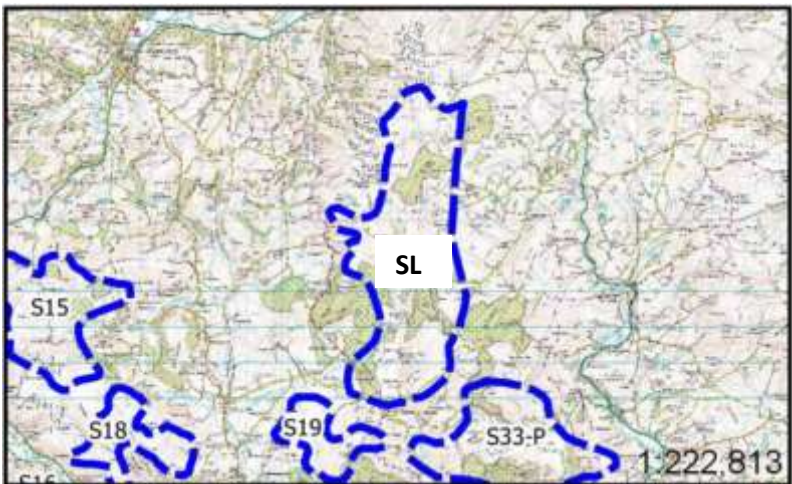
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW).</b>
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**LSA SK: BRYN TITLI**

	Details
<b>LSA Location:</b>	<p>1.5km south-east of Llangurig</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	8.4 sq. km
<b>LSA Description:</b>	<p>Undulating upland plateau, circa 400-480m AOD.</p> <p>Undulating upland plateau with the topography generally tilted to the east and one distinct valley feature (headwaters of the Afon Dulas). Large areas of semi-natural moor which is largely Open Access Land (mainly Open Country) and also large areas of fenced semi-improved grazing. Some forestry blocks within and adjoining the LSA.</p>
<b>Landscape Sensitivity</b>	<b>Medium - Low</b>
<b>Landscape Commentary:</b>	<p>Large-medium scale landscape. The western edge above the Wye Valley has strong visual links to upland landscapes west of the valley but the eastern fringes and valley are much more visually contained without such strong visual links. Bryn Titli Wind Farm lies partly within the LSA at the southern edge.</p> <p>The western half is of High LANDMAP Scenic Quality and is more susceptible than that in the east due to its intrinsic landscape character and because it is visually exposed to high landscapes to the west of the Wye Valley.</p>
<b>Guidance and key sensitivities:</b>	<p>The western half may have some limited potential for solar development/ The eastern half, with its topography shaped around the valley head of the Afon Dulas, relatively contained visual context, and presence of forestry blocks which could provide some degree of screening.</p> <p>Proposals should ensure no significant cumulative landscape and visual effects with the Bryn Titli Wind Farm and its related infrastructure.</p>


<b>Recommendation:</b>	<b>Potential for medium-scale solar PV farm development (up to 25MW) away from the more sensitive western edge and north-western corner of the LSA.</b>
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**LSA SL: WAUN DDUBARTHOG**

	Details
<b>LSA Location:</b>	<p>North of Bwlch y Sarnau</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	20.5 sq. km
<b>LSA Description:</b>	<p>Upland undulating plateau and wide valley, circa 330-500m AOD.</p> <p>Undulating upland plateau away from the valley sides of the broad Marteg Valley. The upland plateau areas are large-scale partly improved fenced pasture and partly open moor which is largely also Open Access Land (Open Country) and significant areas of forestry but with only long distance visual links with other high landscapes. The valley is overlooked from south but is otherwise visually contained, medium-scale with improved hedged pasture and forestry. The head of the valley despoiled by motocross activities. The P&amp;L Wind Farm lies just beyond the northern edge.</p>
<b>Landscape Sensitivity</b>	<b>Low</b>
<b>Landscape Commentary:</b>	<p>There is potential across much of the LSA but excluding the northern fringe, due to their high intrinsic value, open moorland, Open Access Land and potential for significant cumulative effects with the P&amp;L Wind Farm and its related infrastructure, plus the valley sides of the Marteg Valley and where these meet the plateau edge.</p> <p>Within the Marteg Valley well-sited solar development may be successfully subsumed into the landscape as viewed from Bwlch y Sarnau village.</p>
<b>Guidance and key sensitivities:</b>	Siting should ensure no significant visual effects on receptors at and near to the village or to users of Glyndŵr's Way (National Trail) which crosses the southern edge of the LSA.


	On the plateau along, back from the edge of the eastern side of the valley, there is potential around the forestry blocks at Brondre-fach Hill.
<b>Recommendation:</b>	<b>Potential for large-scale solar PV farm development of (up to 50MW) away from the northern fringe, valley sides and plateau edge.</b>

**LSA SM: DRYSGOL**

	<b>Details</b>
<b>LSA Location:</b>	<p>3.5km north of Rhayader</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	4.3 sq. km
<b>LSA Description:</b>	<p>Upland undulating plateau, circa 350-475m AOD.</p> <p>Upland undulating plateau with rounded hills cut by the incised minor valley of Marcheini Fawr. Generally semi-natural moor and semi-improved fenced pasture. Open Access Land (Open Country) across much of the moorland.</p>
<b>Landscape Sensitivity</b>	<b>Low</b>
<b>Landscape Commentary:</b>	The west edge and top of the plateau visually exposed from high land west of the Wye Valley but with more visually enclosed semi-improved pasture areas in the east.
<b>Guidance and key sensitivities:</b>	There is some potential within this LSA in the more visually contained semi-improved pastures in the eastern part of the LSA, away from the more visually sensitive edge with the Wye Valley and outside of the semi-natural grazing Open Access Land and sensitive Marcheini Fawr minor valley.
<b>Recommendation:</b>	<b>Potential for medium-scale solar PV farm development (up to 25MW).</b>

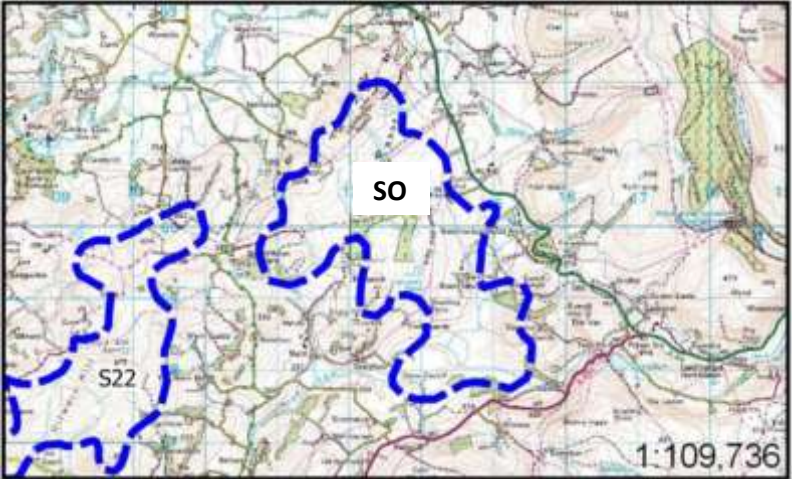


**LSA SN: BWLCH Y SARNAU**

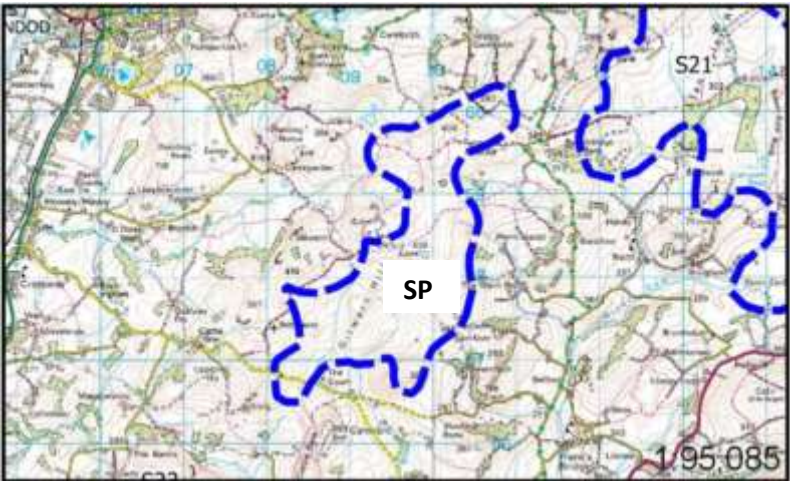
	Details
<b>LSA Location:</b>	<p>1km south-west of Bwlch y Sarnau</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	3.4 sq. km
<b>LSA Description:</b>	<p>Undulating round-topped hills and flat valley floor, circa 320-470m AOD.</p> <p>Undulating round-topped hills with flat valley floor (Moelfre) to the west. Large-scale fenced improved and semi-improved pasture on some hillsides and hilltops otherwise semi-natural moor which is Open Access Land (Open Country) on the hillsides and all of the flat valley floor within this small LSA.</p>
<b>Landscape Sensitivity</b>	<b>Medium - Low</b>
<b>Landscape Commentary:</b>	The hillsides and tops are highly visually exposed from surrounding settled landscapes. Glyndŵr's Way (National Trail) runs through the eastern part around Lan-fraith.
<b>Guidance and key sensitivities:</b>	There may be some limited potential away from the visually exposed hillsides and hilltops, the semi-natural moorland and Open Access Land. This might include land south of the byway and should ensure no significant visual effects on users of Glyndŵr's Way.
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW).</b>



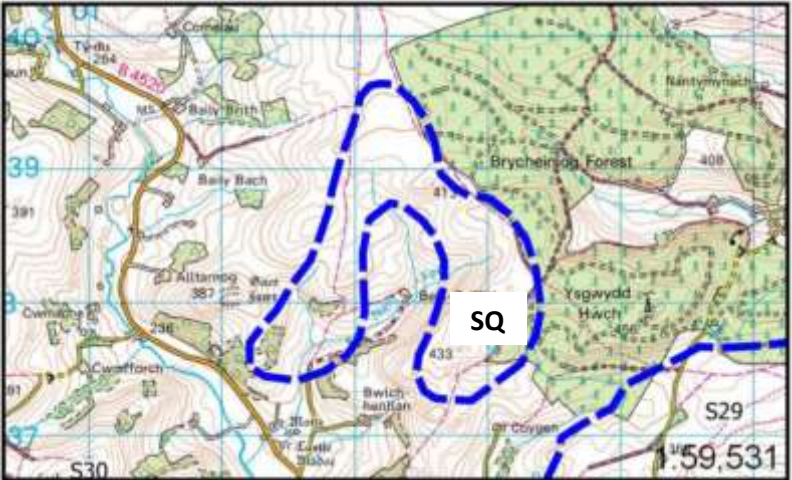
**LSA SO: LLANDEGLE Y RHOS**

	Details
<b>LSA Location:</b>	<p>1.5km south of Llandegley</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	8 sq. km
<b>LSA Description:</b>	<p>Rugged hills and broad valley feature, circa 250-430m AOD.</p> <p>Rugged Llandegley Rocks along the northern edge of the LSA, otherwise part of a broad vale between adjoining higher ground and visually exposed from the west edge of the Radnor Forest uplands and Gwaunceste Hill to the south. Mixed land use of semi-natural, semi-improved and improved pasture with some forestry blocks which provide visual enclosure. Some Open Access Land (Open Country and Common Land).</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	Varied scale of generally medium landscape but small-scale along the lower eastern slopes.
<b>Guidance and key sensitivities:</b>	There may be some limited potential for small-scale solar development within the larger-scale pastures and close to the forestry blocks which may provide some useful screening in what is otherwise visually exposed from adjoining higher and sensitive landscapes.
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW) away from the hilltops, small-scale landscapes and where the forestry may provide some visual enclosure.</b>

**LSA SP: GILWERN HILL**

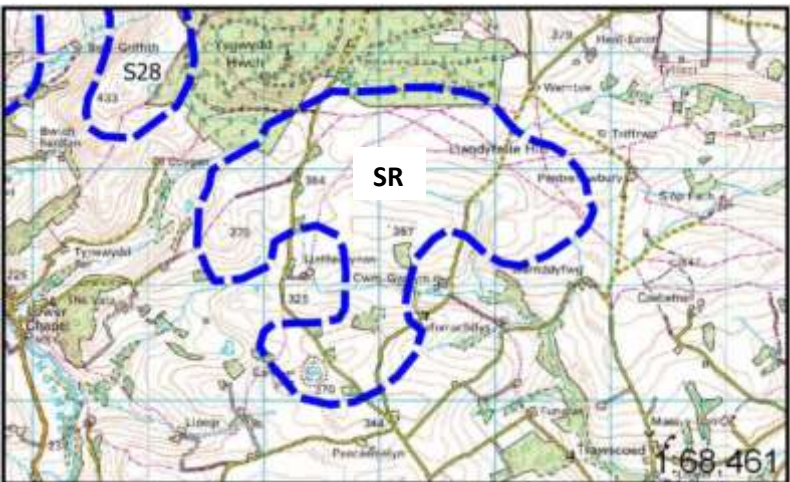
	Details
<b>LSA Location:</b>	<p>2.5km north-west of <b>Franksbridge</b> <b>Frank's Bridge</b></p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	4.5 sq. km
<b>LSA Description:</b>	<p>Domed hilltops, circa 350-420m AOD.</p> <p>A series of domed hilltops with a mixed land-use of large-scale semi-natural moorland, semi-improved and improved fenced pastures. The moorland is Open Access Land (Open Country and Common Land).</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	The LSA is visually exposed from other high sensitive landscapes, although not adjoin the LSA, but also the edges are partially visually exposed from the settled lower lying areas to the east and west.
<b>Guidance and key sensitivities:</b>	There may be some limited potential for small-scale solar development away from the visually exposed hillsides and from the more susceptible areas of open moorland/Open Access Land. Such small sites may be at the flatter parts of the hilltops where these sites are less visually exposed from the settled lower landscape and not overtly exposed from the more distant higher landscapes.
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW) away from the Open Access Land and the visually exposed hillsides.</b>

**LSA SQ: NANT FAWR**

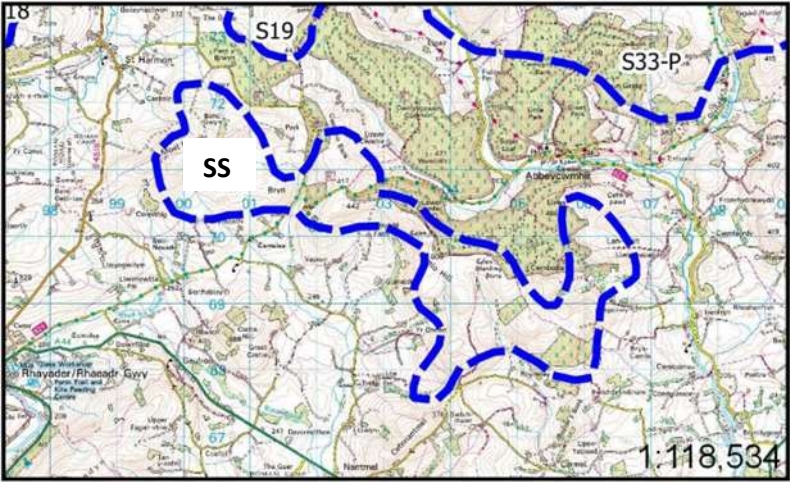
	<b>Details</b>
<b>LSA Location:</b>	<p>2km north of Lower Chapel</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	2.3 sq. km
<b>LSA Description:</b>	<p>Gently undulating upland and hillside, circa 300-410m AOD.</p> <p>Complex landform including a gently undulating upland with steeply sloping hillsides around the twisting valley of the Nant Fawr. Some semi-natural moor and Open Access Land (Open Country and Common Land), but predominantly large-scale semi-improved fenced pasture on the upper areas and medium-scale hedged pastures on the hillsides with some deciduous woodlands. Brycheiniog Forest provides a distinct afforested backdrop to the LSA in views from the west.</p>
<b>Landscape Sensitivity</b>	<b>Medium</b>
<b>Landscape Commentary:</b>	The complex topography of this LSA dictates the degree of visual exposure in views from the west, the LSA being entirely screened by the Brycheiniog Forest to the east. The upper plateau areas undulate such that there may be the potential for some limited solar development where the landform provides good levels of visual exposure.
<b>Guidance and key sensitivities:</b>	More prominent parts of the undulating plateau landform would be likely to be unsuitable including the moorland Open Access land in the north. The steeply sloping valley hillsides, whilst in part visually contained from the wide landscape would be unlikely to be developed without significant local landscape and visual harm.
<b>Recommendation:</b>	<b>Limited potential only for small-scale solar PV farm development (5-10MW) along the eastern fringes with the adjoining forestry but away from the Open Access Land and the visually exposed uplands and valley sides.</b>




**LSA SR: LLANDEFALLE HILL**

	<b>Details</b>
<b>LSA Location:</b>	<p>2km east of Lower Chapel.</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	4.9 sq. km
<b>LSA Description:</b>	<p>Rolling, domed hills, circa 300-370m AOD.</p> <p>Rolling landform including domed hilltops including Llandefalle Common and site of Twyn-y-Gaer hillfort, together with the gentle valley of Nant Dulas. Extensive open moorland and Open Access Land (Common Land) across Llandefalle Hill, otherwise semi-improved and improved pasture with hedges away from the hilltops and some deciduous woodland cover.</p>
<b>Landscape Sensitivity</b>	<b>Medium - Low</b>
<b>Landscape Commentary:</b>	Llandefalle Common and Twyn-y-Gaer are visually exposed from adjoining landscape whilst the valley is much more contained.
<b>Guidance and key sensitivities:</b>	There is some potential for solar development within the Nant Dulas valley and valley sides, although this should ensure that there would be no significant landscape or visual harm to Llandefalle Common and its users.
<b>Recommendation:</b>	<b>Potential for medium-scale solar PV farm development (up to 25MW) away from the domed hilltops and Llandefalle Common.</b>

**LSA SS: CAMLO HILL**

	Details
<b>LSA Location:</b>	<p>4km north-east of Rhayader.</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	9.9 sq. km
<b>LSA Description:</b>	<p>Undulating hills and incised hillsides, circa 365-505m AOD.</p> <p>A complex series of undulating rugged and round topped hills and hillsides incised with multiple minor valleys. Some moorland and Open Access Land (Open Country) at Camlo Hill but largely unimproved and semi-improved large-scale fenced open grazing.</p>
<b>Landscape Sensitivity</b>	<b>Medium - Low</b>
<b>Landscape Commentary:</b>	Forest enclosure along some of the northern edge and within the east end of the LSA but otherwise exposed to views from lower settled landscapes to the south. Moel Hywel is an open rounded hill and visually exposed to all sides.
<b>Guidance and key sensitivities:</b>	There is potential for solar development within this large LSA although probably provided as a number of separate developments, away from the slopes of Moel Hywel, Camlo Hill and exposed slopes in the far east at Lan-wen with its visual relationship with the valley of the Clwydog Brook. Best located next or close to the forestry uses within and at the edge of the LSA in the south-east.
<b>Recommendation:</b>	<b>Potential for medium-scale solar PV farm development (up to 25MW).</b>

**LSA ST: DDYLE**

	Details
<b>LSA Location:</b>	<p>2km north of Abbeycwmhir</p>  <p><i>Crown copyright and database rights (2018) Ordnance Survey 100025371. Additional information © Powys County Council (2018). No additional copies should be made without the permission of the Council</i></p>
<b>LSA Size:</b>	10.9 sq. km
<b>LSA Description:</b>	<p>Complex undulating valley and hill system, circa 270-480m AOD.</p> <p>A complex heavily undulating series of hills around the valley of the Ffwrdd Wen. Some open moorland and Open Access Land (Open Country) at Ysgwd-fford, with the remainder comprising large-scale landscapes of semi-improved fenced pasture on the hilltops with medium to small-scale landscapes of improved hedged pasture on the valley sides and floors. Extensive forestry in the southern half at Cwmcynydd Bank.</p>
<b>Landscape Sensitivity</b>	<b>Medium - High</b>
<b>Landscape Commentary:</b>	The valley sides and floor are visually contained from adjoining landscapes whilst the hilltops have a degree of exposure to other high landscapes beyond.
<b>Guidance and key sensitivities:</b>	There may be some limited potential for small-scale solar development away from the visually exposed hillsides and from the more susceptible areas of open moorland/Open Access Land. Such small sites may be towards the valley floor where these sites are less visually exposed from the surrounding landscape and not overtly exposed from the more distant higher landscapes.
<b>Recommendation:</b>	<b>Some limited potential for small-scale solar PV farm development (up to 10MW), although probably provided as a number of smaller developments, away from hilltops and the higher, more open hillsides.</b>

## Appendix 2: Anaerobic Digester Regulations

All anaerobic digester operators in the UK must comply with regulations concerning environmental protection, animal by-products, duty of care, health and safety and waste handling.

### Environmental Permitting

Environmental permitting (EP) is for regulating business activities that could have an impact on the environment and human health. All AD plants will be required to obtain a permit or exemption to operate and to spread digestate. An application form must be completed with the relevant technical information and demonstrating competency to operate the plant.

To apply for an environmental permit operators must demonstrate their technical competence.

There are three levels of permitting:

#### 1. **Exemption** – for small scale, non-waste facilities.

Applicants are still required to register with NRW and provide some technical information. There are a number of activities that entitle an operator to an exemption:

- **T24:** anaerobic digestion at premises used for agriculture and burning of resultant biogas. There are specific waste types that can be used under this exemption (including manures, slurries and plant tissue) and a total quantity of waste treated or stored at any one time must not exceed 1,250 cubic metres. The appliance used must have a net rated thermal input of less than 0.4 megawatts.
- **T25:** anaerobic digestion at premises not used for agriculture and burning of resultant biogas

This exemption allows the treatment of food and other biodegradable wastes by anaerobic digestion to produce a digestate which can be used for providing benefit to land. The gas produced must be used for generating energy. With this exemption the AD operator cannot treat wastes that are animal by-products without an appropriate authorisation from Animal Health. The operator can treat up to 50 cubic metres of waste at any one time. Any biogas produced must be burned in an appliance with a net rated thermal input of less than 0.4 megawatts.

#### 2. **Standard** – for plants which fit within a number of pre-defined standard rules, including throughput, output and nature of material being digested (fixed charges apply).

The Standard Rule Permit SR2012 No12 "Anaerobic digestion facility including use of the resultant biogas" applies to England and Wales, and enables anaerobic digester operators (processing no more than 100 tonnes per day) to carry out anaerobic digestion of wastes and also combustion of the resultant biogas in gas engines. The rules also allow use of gas turbines, boilers, fuel cells and treatment and/or upgrading the biogas to biomethane. Permitted wastes include those controlled by the Animal-By-Products Regulations but do not include hazardous wastes.

#### 3. **Bespoke** – for all plants which do not comply with one or more of the standard rules (variable charges apply). This process is more costly and time consuming, but provides greater coverage and flexibility in plant operations.

### Permits for Spreading Digestate

Material that has reached PAS 110 and Quality Protocol standards is no longer regarded as a waste. However, to spread waste material (prior to achieving PAS110 accreditation) to agricultural and non-agricultural land to confer benefit or ecological improvement it is necessary to apply for a permit or register for an exemption.



Spreading exemptions relate only to digestate produced under T24 or T25 with a quantity limit of 50 tonnes per hectare and a storage limit of 200 tonnes, at any one time.

- U10: spreading of digestate from pre-defined feedstock on agricultural land to confer benefit
- U11: spreading of digestate from pre-defined feedstock on non-agricultural land to confer benefit.

There is a standard rule permit for spreading waste material to land (if the criteria for an exemption do not apply). Standard permit SR2010 No.4 allows the spreading of no more than 250 tonnes per hectare and that no more than 3,000 tonnes of waste material is stored at any one time and for no longer than 12 months. For each spreading of material to land there is a charge related to the type of material being spread, relating to lower risk, medium risk and high risk.

### **Animal By-Products Regulations**

Animal by-products (ABPs) are animal carcasses, parts of carcasses or products of animal origin that are not intended for human consumption. The Animal By-Products Regulations (ABPR) permit the treatment in approved composting and biogas premises of low-risk (category 3) ABPs and catering waste which contains meat or which comes from a premises handling meat.

High risk (Category 2) ABPs cannot be used as feedstock in biogas plants, except where they have first been rendered to the 133°C/3 bar/20 minute EU pressure-rendering standards. Manure and digestive tract content are classified as a category 2 ABP, but they can be used without processing as raw material in a biogas plant. However, where manure or digestive tract content is sent to a biogas plant for treatment with other ABPs (including catering waste) the plant **must** be approved and the mixture treated to approved standards.

Further information can be obtained from the Animal and Plant Health Agency (APHA).

### **Health and Safety**

Anaerobic digestion can be regarded as a chemical process with all the associated risks: flammable atmospheres, fire and explosion, toxic gases, confined spaces, asphyxiation, pressure systems, COSHH, etc. In addition, it also incorporates gas handling and gas storage. Therefore, it is essential that thorough hazard and risk assessments are carried out at each stage of a project from design to installation to commissioning to implementation and operation.

The Renewable Energy Association operate a Safety Alert service to incidents affecting safety and the environment that have occurred in the Anaerobic Digestion and biowaste industries. Serious incidents related to slurries and manures on farms outside the industry will also be included. The service is intended to raise standards and reduce incidents by building trust across the industry to report, share and learn.

## Appendix 3: Renewable Energy and Domestic Permitted Development

Householders can make certain types of minor changes to their home without needing to apply for planning permission. These are called "permitted development rights".

In some areas of the county permitted development rights are more restricted, such as in areas designated as a Conservation Area. In such designated areas, planning permission for certain types of work may be needed which do not need an application in other areas. There are also different requirements if the house is a listed building.

In some areas, the Council may have removed some permitted development rights by issuing an **Article 4 Direction**. This will mean that a planning application must be submitted for work which normally does not need one. Article 4 directions are made when the character of an area of acknowledged importance would be threatened. They are most common in conservation areas. Householders are advised to check or seek advice from the Council prior to starting work.

<https://beta.gov.wales/planning-permission-generating-your-own-energy>

### Domestic

<p><b>Air Source Heat Pumps</b></p> <p>These typically look like a large Air-conditioner attached to the side of a dwelling. They extract heat from the air around it and use it to provide a background heat to the interior of the building.</p> <p>They are considered a low-carbon technology, however they are powered by electricity which may not come from a renewable source.</p>	<p>Installation of one air source heat pump is normally permitted, provided that it complies with the relevant standards, is no more than one cubic metre in size, and is no less than 3 metres from the boundary.</p> <p>However, there are restrictions on what kind of roof an air source heat pump may be installed upon.</p> <p>They must be sited to cause minimal visual impact. For more details on restrictions applying to the installation of air source heat pumps, contact the planning department.</p>
<p><b>Biomass Boilers</b></p> <p>Burn wood, usually in the form of pellets or chips.</p> <p>They are deemed carbon neutral because the carbon emitted during burning is the same as that absorbed during growth. There can be some concerns about the smoke/particles that they emit and the visual impact of the boiler and flue.</p>	<p>Boilers will largely be located inside a dwelling and consequently in most circumstances will not require planning permission. Consent may be required for internal alterations in listed buildings. New buildings to accommodate a boiler will usually require planning permission.</p>

	<p>The flue is not permitted on the principal or side elevation of a property within a designated area or a listed building.</p> <p>Outwith these areas permission is not needed for an external flue on a rear or side elevation providing that its height is no more than one metre above the highest part of the roof (excluding an existing chimney). (see section on Flues below)</p> <p>If the project also requires an outside building to store fuel or related equipment the same rules apply to that building as for other extensions and garden outbuildings.</p>
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<p><b>Flues and Chimneys</b></p> <p>All domestic boilers, including those using renewable or low carbon fuels, such as biomass or micro-combined heat and power, will require some sort of flue or chimney to vent exhaust gases away from the property.</p>	<p>Fitting, altering or replacing an external flue or chimney is normally considered to be permitted development, not requiring planning consent, if the conditions outlined below are met:</p> <ul style="list-style-type: none"> <li>• Flues on the rear or side elevation of the building are allowed to a maximum of one metre above the highest part of the roof.</li> <li>• If the building is listed or in a designated area it is advisable to check with the Council before a flue is fitted.</li> <li>• In a designated area the flue should not be fitted on the principal or side elevation that fronts a highway.</li> </ul> <p><b>Please note:</b> The permitted development allowances described here apply to houses and not to:</p> <ul style="list-style-type: none"> <li>• Flats and maisonettes</li> <li>• Converted houses or houses created through the permitted development rights to change use</li> <li>• Other buildings</li> </ul>
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<p><b>Ground or Water Source Heat Pumps</b></p> <p>These are usually a self-contained unit, rather like a large Air-conditioner or boiler. They extract heat from the ground or water, through a loop of piping that is buried underground or submerged underwater, and use it to provide a background heat, or hot water to the interior of the building.</p> <p>They are considered a low-carbon technology, however they are powered by electricity which may not come from a renewable source.</p>	<p>The installation of a ground source heat pump or a water source heat pump on domestic premises is usually considered to be permitted development, not needing an application for planning permission. However water source heat pumps may need extra infrastructure which may then need planning permission. It is also necessary to check that any ground disturbance will not impact on existing services such as sewerage or other utilities. Similarly if the property is listed or in a designated area then permission may need to be gained before any excavations begin.</p>
<p><b>Hydro Electricity</b></p> <p>Key features of a small hydro electricity scheme include:</p> <ul style="list-style-type: none"> <li>• a hydraulic 'head' - vertical distance from water source to the turbine.</li> <li>• a water intake above a weir or behind a dam</li> <li>• a pipe or channel to take water to the turbine</li> <li>• a turbine, generator and electrical connection</li> <li>• an outflow, where the water returns to the watercourse</li> </ul>	<p>These elements raise a number of important planning issues and planning permission will usually be needed.</p> <p>The elements of a small-scale hydro electricity scheme create potential impacts on:</p> <ul style="list-style-type: none"> <li>• landscape and visual amenity</li> <li>• nature conservation</li> <li>• the water regime.</li> </ul> <p>Some form of environmental assessment is essential when it comes to applying for planning permission and environmental licenses.</p> <p>Under the <a href="#">Town and Country Planning (Assessment of Environmental Effects) Regulations 1988</a>, the planning application for any development that the Council considers likely to have a significant impact on the environment must be accompanied by an Environmental Statement.</p> <p>This document provides an assessment of the project's likely environmental effects, together with any design, construction, operational and decommissioning</p>

	<p>measures that are to be taken to minimise them.</p> <p>It would typically cover such issues as flora, fauna, noise levels, traffic, land use, archaeology, recreation, landscape, and air and water quality.</p> <p>It should be noted that NRW must also be consulted about water extraction licences because the water is not owned by the landowner.</p>
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<p><b>Micro Combined Heat and Power Plants</b></p> <p>These are similar in size and shape to ordinary, domestic boilers and like them can be wall hung or floor standing.</p> <p>Domestic micro-CHP systems are currently powered by mains gas or LPG. Although gas and LPG are fossil fuels rather than renewable energy sources, the technology is still considered to be a 'low carbon technology' because it can be more efficient generating electricity at its point of use than just burning a fossil fuel for heat and getting electricity from the national grid.</p> <p>They are essentially modified diesel engines. The heat they produce is used to heat a building and, just like a car engine, they also generate electricity which is used in the property, or sold back to the grid if not needed.</p>	<p>Planning permission is not normally needed when installing a micro-combined heat and power system in a house if the work is all internal. If the installation requires a flue outside, however, it will normally be permitted development provided certain conditions are met (see section on Flues and Chimneys above).</p> <p>If the project also requires an outside building to store fuel or related equipment the same rules apply to that building as for other extensions and garden outbuildings:</p>
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<p><b>Solar Photovoltaic (PV) and Solar Thermal Panels</b></p> <p>Typically, PV panels can be very thin, flat, black or iridescent panels which can be mounted on rooftops, walls or as freestanding units on the ground.</p>	<p>The installation of solar PV panels and equipment on residential buildings, or buildings situated within the curtilage of a dwelling house is permissible if certain criteria are met.</p>
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<p>They generate electricity via a chemical reaction inside the sealed unit which depends upon daylight, as opposed to direct sunlight. As such they typically have no moving parts but are connected by wires to a unit inside the property which collects the combined output ready for consumption, storage or selling on to the National Grid.</p> <p>Solar thermal panels work through the absorption of heat from sunlight, which is then used to heat water and stored in a large tank inside the property. As such they work better under direct sunlight. The heat collected is then usually used to provide a supply of hot water. They are usually thicker than PV panels as they contain fluid filled pipes, under a glass surface.</p>	<p>Panels <b>must not</b> protrude more than 20cm above the existing plane of the wall or roof slope, or if the highest part of the equipment were to exceed the existing highest point of the roof (excluding the chimney).</p> <p>If installed on a flat roof however the equipment must not be less than a metre from the edge of that roof or protrude more than a metre in height above the existing roofline.</p> <p>There are other important limits and conditions which must be met to benefit from permitted development rights especially where a building is listed or in a designated area.</p> <p>Proposals should be discussed with the Council to determine whether all of the limits and conditions will be met.</p>
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<p><b>Wind Turbines</b></p> <p>Consisting of a rotor or blades mounted on a pole, to provide the height to catch the wind. On turning, the rotors, connected to a turbine or transformer of some type, generate electricity for consumption or storage at the property or export onto the National Grid.</p> <p>At the domestic scale they can be freestanding or building mounted.</p>	<p>Under permitted development rights in some cases it is possible to install domestic wind turbines without the need for an application for planning permission, so long as specified limits and conditions are met.</p> <p>For example, providing any turbine complied with Microgeneration Certification Scheme (MCS) Planning Standards; would not result in the presence of more than one turbine within the curtilage of the dwelling; be under a height of 11.1 metres (including blades); and the distance between ground level and the lowest part of any blade is no less than 5 metres, then it may qualify for permitted development.</p> <p>However other limits and conditions also apply so please make sure all development proposals are discussed with the Council beforehand.</p>
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	In all other cases planning permission will be required to add a domestic wind turbine to a dwelling, or erect a turbine in the grounds surrounding the dwelling.
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**More information can be obtained from:**

~~<https://beta.gov.wales/planning-permission-generating-your-own-energy>~~

~~The Planning Portal~~

~~The Energy Saving Trust~~

**Other Sources:**

~~Town & Country Planning (General Permitted Development) Order 1995 (see Schedule 2)~~

~~Town & Country Planning (General Permitted Development)(Amendments)(Wales) Order 2012~~

~~Town & Country Planning (General Permitted Development)(Amendments)(Wales) No2 Order 2012~~

~~Town & Country Planning (General Permitted Development)(Amendments)(Wales) Order 2013~~

~~Town & Country Planning (General Permitted Development)(Amendments)(Wales) Order 2014~~

~~<https://beta.gov.wales/planning-permission-generating-your-own-energy>~~

<http://www.cpat.org.uk/projects/longer/histland/asidoh1/asidoh12.pdf>

## Appendix 4: NATS Frequently Asked Questions for Wind Turbines

### 1. Who are NATS?

NATS is the company that provides air traffic control (ATC) services in the UK. Our service is provided at 15 of the UK biggest airports and “en-route” i.e. in the airspace above the UK and over the north-eastern part of the Atlantic Ocean.

### 2. What is NATS's involvement in the wind farm industry?

In order to provide safe air traffic services, both NATS and aircraft rely on a number of ground based radars, navigation aids and communication stations. This infrastructure can be negatively affected by wind turbines, which can ultimately affect the safety of air traffic.

### 3. What is safeguarding?

Safeguarding is the process of protecting an infrastructure. Service providers such as NATS, Energy suppliers, Water companies, broadcast and telecommunications companies all have a duty to safeguard their infrastructure.

With regards to aviation, NATS and other agencies providing Air Traffic Services (ATS) use radars to monitor aircraft traffic, provide ground-based navigation aids to enable aircraft to navigate along their route and to land at airports. Air-ground-Air (AGA) communication stations are used by both ground based agencies (control towers and ATC centres) and aircraft to communicate with each other.

Safety is NATS's first and foremost priority and in order to provide a safe service and to meet the terms of the licence granted by the Civil Aviation Authority, this equipment needs to be continuously in operation and must be protected by any form of interference or disturbance.

The NATS Safeguarding process is supported by legislation which ensures that any anticipated obstruction or development is assessed against its impact upon specific assets.

### 4. Are planning applications for all turbines to be consulted with NATS?

Yes. All turbines for which planning permission is sought, are to be consulted by LPAs with NATS. This is irrespective of their site or location.

### 5. What legislation details the safeguarding of aerodromes and technical sites?

*Annex 1 – The Town And Country Planning (Safeguarded Aerodromes, Technical Sites And Military Explosives Storage Areas) Direction 2002.*

The Act means that UK Local Planning Authorities (LPAs) have a legal obligation to consult NATS with regards to any development that has the potential to impact upon its operations.

Fixed obstacles and constructions are assessed against safeguarding criteria lodged with all affected LPAs.

The impact of wind turbines however, has a more significant effect as they can have an impact over a much greater distance. In the case of radars, a wind turbine can have an impact tens of kms away.

The safeguarding legislation requires all UK LPAs to consult NATS on any wind turbine application, irrespective of size or location.

The direction also requires any planning authority minded to grant planning permission against NATS's advice, to notify the Secretary of State, NATS and the Civil Aviation Authority in advance of granting planning permission.

### 6. Are there any exceptions to this requirement?

Yes, but only for those turbines that can be installed under The Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2011.

These however, must meet a number of criteria that include a height of no more than 15m and that of not being installed on safeguarded land.

**Notes:**

Details of the legislation can be found at:

<http://www.legislation.gov.uk/ukxi/2011/2056/made>

Details of the tool which allows to determine whether land is safeguarded, can be found at:

<http://aviationtool.planningportal.gov.uk>

Details of the notification from DECC informing all UK LPA's can be found at:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/8015/111205-](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/8015/111205-Letter_to_Chief_Planning_Officers-Householder_permitted_development_rights_for_micro_wind_turbines_and_air_source_heat_pumps.pdf)

[Letter to Chief Planning Officers-](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/8015/111205-Letter_to_Chief_Planning_Officers-Householder_permitted_development_rights_for_micro_wind_turbines_and_air_source_heat_pumps.pdf)

[Householder permitted development rights for micro wind turbines and air source heat pumps.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/8015/111205-Letter_to_Chief_Planning_Officers-Householder_permitted_development_rights_for_micro_wind_turbines_and_air_source_heat_pumps.pdf)

## **7. How does safeguarding work?**

For construction and fixed obstructions, all NATS assets are notified to Local Planning Authorities via maps that are lodged with and detail consultation criteria. LPAs will consult NATS when a planning application that conflicts with safeguarding is received.

For wind turbines, the process is different because of the major impact a wind turbine can have on the NATS infrastructure. As such consultation with NATS is compulsory and planning authorities will consult NATS for all wind turbine planning applications over the whole of the UK territory.

**NATS is a statutory consultee for all wind turbine planning applications in the UK.**

## **8. What are the technical issues due to obstacles and wind turbines?**

Common examples of interference that affect our infrastructure are:

- effects of wind turbines upon radar (radar shadows, false radar returns)
- degradation of radio and radar signals due to fixed obstructions or turbines

## **9. Where can I find out more of the technical issues with wind turbines?**

Civil Aviation Publications CAP764 and CAP670 contain relevant information and are available on the Civil Aviation Authority's website ([www.caa.co.uk](http://www.caa.co.uk)).

## **10. How will I know if a wind turbine application will be granted or objected to?**

With respect to wind turbines and their impact upon NATS, the safeguarded area encompasses the whole of the UK and consultation with NATS is mandatory. Planning authorities will consult NATS during the planning process. NATS will state whether a planning proposal is acceptable or not.

## **11. Can I find out if a wind turbine application is likely to be granted or objected to before submitting a planning application?**

Applicants for wind turbines may wish to ascertain whether their application is likely to be objected to or not by NATS in advance of submitting for planning. NATS provides two routes for ascertaining an impact. One option is to carry out a self-assessment (free of charge) or undertake a pre-planning assessment (chargeable).

NATS can provide a variety of services, for any other query or request for consultancy, the contact us form on the website should be used ([www.nats.aero/windfarms](http://www.nats.aero/windfarms)).

## **12. What are the NATS self-assessment and pre-planning assessment?**

The **self-assessment** is a process whereby prospective wind turbine planning applicants can get a preliminary idea of whether their proposed application is likely to be granted or not, or whether it is advisable to request a pre-planning assessment. The service is free and relies on theoretical radar coverage maps for different obstacle heights. These are available on our website.

The **pre-planning assessment** is a chargeable service that NATS offers to prospective wind turbine applicants. This provides an opportunity for developers to gain a further insight into whether a proposed installation is likely to be objected to or not by NATS prior to submitting a planning application. In order to reach a decision, NATS carries out a range of studies and investigations to determine whether a wind turbine is likely to cause an impact on air traffic safety or not.

### 13. Why has my application been objected to while neighbouring ones have not?

When consulted on an application, NATS has to consider a number of factors, these include but are not limited to:

➤ geography and terrain shielding between turbine and NATS equipment

*Line of sight (terrain shielding) can vary significantly over a relatively small distance. This can mean that a specific turbine can be objected to while neighbouring ones are not.*

➤ specific equipment used

*NATS operates a variety of equipment, often of varying technical specifications. Likewise aircraft can use a multitude of equipment of a differing age, specification and technology.*

➤ class/use of the airspace above

*Different geographical areas also have a bearing on how many visible turbines can be accepted. An area of no interest to air traffic control may permit a greater number of visible turbines to be acceptable, as air traffic controllers would not be using the part of their radar display which is cluttered by turbines. Conversely, in areas of relevance (such as under busy airspace or approach/departure routes) a single "false radar plot" due to a turbine, may cause an air traffic controller to have to take action and manoeuvre air traffic around the clutter. This is because the controller has no way of confirming whether the clutter is a wind turbine or another aircraft that is not under their control.*

➤ signal levels and characteristics

*Aerodrome radar and radio communications tend to operate at a much closer range (< 100km) than in an en-route environment (+300km). As such, signal levels are potentially much stronger and less susceptible to interference from a turbine.*

*e.g. A wind turbine that obstructs the line of sight path between a transmitter/receiver and an aircraft is more likely to have a greater effect if the aircraft ATC are talking to is 250km away than if it is 25km away. This is because the signal strength is much weaker and the effect of the turbine much greater in proportion to it.*

➤ turbine characteristics

*Different turbine materials and blade orientation (vertical and horizontal axis) can affect the impact of a turbine. NATS assesses all turbines in the same way but does take into account the characteristics when consulted. For example, in certain instances NATS has been able to withdraw an objection to a development close to an AGA communications station subject to a planning condition requiring turbines to be fitted with non-conductive blades (e.g. with their integral lightning protection removed).*

➤ neighbouring turbines (cumulative impact)

*Another crucial factor affecting turbine applications is the cumulative impact.*

*In some cases a number of turbines at a specific location are deemed to be acceptable, despite having an impact (e.g. being visible to radar). Ultimately in these cases however, a point is reached where no more turbines can be tolerated. As such while NATS would appear not to object to developments in a specific area, at some point objections are raised to all new applications.*

*The reason for the refusal is often due to the pre-existing turbines (either built, or having planning consent). From NATS's perspective, all the turbines in a locality may be acceptable in isolation or in small clusters, however it is the overall number and proximity to each other that compounds their effect and as such leads to a NATS objection. Effectively pre-existing turbines are the cause for objecting to newer applications.*

*The cumulative impact scenario is further complicated by the way radar processing works. The Radar system routinely processes false plots or clutter but can usually determine whether this is significant or not. It does this by considering the distance that a radar reflection appears to move and discards it if it*

appears to move too slowly or too fast to be an aircraft. It also can disregard clutter that appears randomly and intermittently as being due to sporadic reflections.

The issue with turbines in proximity is that they can cause returns at different times and different positions.

While birds, weather, road and rail traffic can all cause radar reflections (clutter) this is usually filtered out by radar processing. This is possible since reflections due to the above are usually:

- of varying strength
- generated in effectively the same position
- generated over too vast an area
- appear not to move
- appear to move too quickly.

The main issues with clutter generated by wind turbines are:

- it is frequently of a sufficient and constant strength
- it is created by the blade as it sweeps through its swept area and as such can effectively move along a distance equal to the blade diameter
- depending on the rotation speed, the apparent speed of the clutter is comparable to that of aircraft

if there are a number of turbines, usually more than 2, in the right circumstances there can be reflections from different blades of different turbines which appear as a target moving along its path. If these returns are adequately spaced, follow realistic trajectories (e.g. straight lines, smooth curves) and are adequately timed, the radar processing will NOT be able to determine that these are due to the same object, i.e. return 1 at position X, return 2 at position Y and return 3 at position Z all within a realistic valid time interval.

In this situation, exactly the opposite will occur, the radar processing will determine that due to the spacing and the timing (i.e. speed) of the reflection, the target is a valid moving object. In these cases the radar procession deems the reflection to be a valid aircraft track and presents it to the air traffic controller display. An air traffic controller, essentially faced with a valid moving target would have no choice but to take evasive action and manoeuvre real aircraft around this clutter.

This has a range of consequences including inconvenience, delay, additional fuel burn and ultimately safety.

#### 14. What's the problem with my small wind turbine?

It is important to note that while something of the order of 30-40m may be relatively small in wind turbine terms, especially when compared to a 100m+ wind farm scale turbine, small aircraft such as a Piper PA28 or Cessna 172 only have a wingspan of around 10m.

NATS radars are able to detect aircraft such as these at a distance well in excess of 100km. If a 34m turbine (with 3 x ~17m blades) is placed at a distance similar or inferior to this from a NATS radar, it becomes apparent how much more energy can be reflected back to the radar. It can then be seen how a wind turbine can be visible to a radar that is designed to detect something much smaller and much further away.

#### 15. Why has someone 200km+ away objected to my turbine?

As part of the NATS report which accompanies any objection, an operational assessment summary will be included. This will detail the Air Traffic Unit that has objected to the wind turbine.

In certain cases a seemingly distant ATC Unit may have objected to a turbine (e.g. the Prestwick air traffic control centre may have objected to a turbine in Aberdeenshire or Aberdeen airport may have objected to a turbine in Norfolk).

This is because NATS operates a network of radars covering a vast area of UK airspace. The data from these radars is fed into a number of air traffic control centres who control an airspace of thousands of square kilometres. The Prestwick Centre for example provide a service to aircraft flying in the Scottish Flight Information Region (FIR) and in order to do this, use a number of radars located throughout the UK.



#### 16. Who are the stakeholders who can object?

When carrying out the technical assessment, NATS engineers determine whether the turbine is likely to be visible to radar. This is done considering many factors such as signal levels, terrain, propagation modelling etc.

If the turbine is deemed to be detected by radar, the users of that radar are consulted to see whether they consider the impact to be acceptable or unacceptable.

NATS users of the radar will be Civil or Military air traffic controllers based at either the Swanwick or Prestwick air traffic control centre (known as London Control and Scottish Control respectively). Also, the NATS unit at Aberdeen carries out a number of en-route services which are not part of the airport operation and as such are NATS's responsibility.

In addition to the controllers, NATS engineering and radar data processing stakeholders are consulted as processing too many false returns due to turbines, can impact on the performance of the radar and affect its ability to process real air traffic returns.

#### 17. Are NATS responsible for, or do they answer on behalf of local airfields, flying strips and for aviation stakeholders in general?

No. NATS's role in any wind turbine consultation, is solely related to its provision of En-Route air traffic services and therefore to the impact of wind turbines upon its own electronic infrastructure.

When consulted on wind turbine applications, NATS carries out a study to determine the likelihood of these impacting on its network of radars and communication and navigation stations. It then objects or not, as the study indicates. NATS cannot object on behalf of other stakeholders or on grounds other than an impact on its own operations.

Where NATS envisages an impact upon another stakeholder however, it would normally advise them of the fact. However it has no obligation to do so and stakeholders are advised to engage directly with planning authorities and relevant bodies.

This applies especially to those stakeholders who may be perceived as being protected under NATS's statutory role (e.g. users of NATS radar data, air service operators etc).



### **18. Do NATS safeguard airports?**

No. While NATS provides Air Traffic Control or Engineering services at a number of UK airports, the safeguarding responsibility lies with the airport owner/operator. While NATS will provide the technical expertise to airports regarding consultations, an LPA will consult the airport operator and the airport operator will provide the consultation response (albeit based on NATS's advice).

**Note:** Aberdeen airport has a dual role in that the NATS unit there carries out both an airport function, for which the airport operator is responsible; however it also carries out an en-route (e.g. North Sea) function for which NATS is responsible.

As such, consultations on developments affecting radars used by Aberdeen give rise to two responses. The two responses may be different as an impact on the airport may not correspond to an impact on en-route operations and vice-versa.

### **19. Can the impact upon NATS's infrastructure be mitigated?**

In many cases the impact on NATS's infrastructure can be mitigated. For AGA and navigation aid sites, although technically not a lot can be done, mitigation usually takes the form of relocating (micro-siting) single turbines, altering the layout of a wind farm, or reducing the size of the turbines. In some cases one make or model of turbine may be preferable over another.

With regards to radar impact, mitigation can often be in the form of a modification to the radar system. Radar blanking allows the radar to be modified in order not to process and display radar clutter generated by a wind turbine. While this obviously removes the impact of the radar, it also prevents any aircraft flying over the turbines (in the blanked area) from being displayed. This is analogous to cutting a hole through radar cover. As such there is a limit to how mitigation can be deployed. Radar blanking is normally appropriate only for small areas (usually covering a few hundred metres across).

For larger areas, an infill radar may be required. This is where a larger hole is cut in the cover of one radar, but it is replaced with data from another radar that covers the same part of the sky (and air traffic) but that is not affected by the wind development (no line of sight between this infill radar and the turbines).

### **20. How do I find out about mitigation?**

NATS's intention ultimately is to confirm whether mitigation is possible as part of its objection statement, however mitigation should currently be requested via the "contact us" form at [www.nats.aero/windfarms](http://www.nats.aero/windfarms).

### **21. Can all turbines affecting radar be mitigated?**

No. Mitigation relies on blanking a radar in order to remove the clutter due to a turbine. Since this also causes a loss of real aircraft targets flying through the area that is blanked, there is a limit to how close blanking zones can be to each other. Should an aircraft fly through the blanked zone over a single turbine, the radar detecting and tracking it could lose sight of it for one detection. However due to the speed of the aircraft, the size of the blanked zone, and the way the radar processing works this would be detected at the next update and the single "loss of detection" would not have any impact on air traffic controller's operation.

Should a blanked zone be too large or a number of blanked zones be placed in close proximity to each other, the potential exists for the radar to be unable to detect and track an aircraft. To alleviate this issue, infill radar would be required.

As such, mitigation is also dependent on the surrounding area, on the number of blanks, their size and their distribution i.e. the cumulative impact of blanked areas.

Mitigation is therefore not an infinite resource but is dependent on a number of factors, which also include engineering and other considerations.

## **22. Is an offer for mitigation open-ended?**

Where mitigation is identified, it is important to recognise that this is based on a snapshot of the cumulative impact at the time and as such is not an open-ended offer. NATS's commercial process and communication with an LPA will normally emphasize the time-dependency of radar mitigation.

## **23. Where mitigation has been identified can NATS withdraw its objection subject to planning (suspensive) conditions?**

When a tangible mitigation solution is identified, there is necessarily a period of time required to successfully implement it. In these cases NATS can withdraw its objection subject to a condition being imposed by the planning authority on the developer. This allows the developer to proceed with their work but provides NATS with the certainty that its infrastructure will not be negatively impacted. The condition however, relies on the specific mitigation scheme being not only defined and planned, but also agreed to contractually between the two parties.

Due to the fact that LPAs require certainty, and that suspensive conditions must be based on a time frame in keeping with the planning process, these are normally appropriate only for radar blanking (+ infill where required).

In other cases, history and experience have shown that despite NATS being keen to investigate new technology or other mitigation schemes, suspensive conditions have not been acceptable to the LPA as they did not provide adequate evidence of a realistic solution within an appropriate time frame.

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