

APPENDIX 18.1: LEGISLATION, POLICY AND GUIDANCE

LEGISLATIVE FRAMEWORK

The applicable legislation includes:

- The National Development Framework (Future Wales, 2021)
- Planning Policy Wales Edition 11 (2021)
- Caerphilly County Borough Council Local Development Plan (2010)

The National Development Framework – Future Wales – The National Plan 2040 (2021)

The Future Wales – The National Plan 2040 is the national development framework which sets out the direction for development in Wales to 2040.

Policy 17 relates to Renewable and Low Carbon Energy and Associated Infrastructure. It states that:

“The Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet our future energy needs.

In determining planning applications for renewable and low carbon energy development, decision-makers must give significant weight to the need to meet Wales’ international commitments and our target to generate 70% of consumed electricity by renewable means by 2030 in order to combat the climate emergency.

In Pre-Assessed Areas for Wind Energy the Welsh Government has already modelled the likely impact on the landscape and has found them to be capable of accommodating development in an acceptable way. There is a presumption in favour of large-scale wind energy development (including repowering) in these areas, subject to the criteria in policy 18.

Applications for large-scale wind and solar will not be permitted in National Parks and Areas of Outstanding Natural Beauty and all proposals should demonstrate that they will not have an unacceptable adverse impact on the environment.

Proposals should describe the net benefits the scheme will bring in terms of social, economic, environmental and cultural improvements to local communities.

New strategic grid infrastructure for the transmission and distribution of energy should be designed to minimise visual impact on nearby communities. The Welsh Government will work with stakeholders, including National Grid and Distribution Network Operators, to transition to a multi-vector grid network and reduce the barriers to the implementation of new grid infrastructure.”

Policy 18 relates to Renewable and Low Carbon Energy Developments of National Significance. This policy states:

“Proposals for renewable and low carbon energy projects (including repowering) qualifying as Developments of National Significance will be permitted subject to policy 17 and the following criteria:

- 1. Outside of the Pre-Assessed Areas for wind developments and everywhere for all other technologies, the proposal does not have an unacceptable adverse impact on the surrounding landscape (particularly on the setting of National Parks and Areas of Outstanding Natural Beauty);*
- 2. The proposal is designed to minimise its visual impact on nearby communities and individual dwellings, and the cumulative impact of the proposal, with other existing or proposed development, is acceptable;*
- 3. There are no adverse impacts on international and national statutory designated sites for nature conservation (and the features for which they have been designated), protected habitats and species;*
- 4. The proposal includes biodiversity enhancement measures to provide a net benefit for biodiversity;*
- 5. There are no unacceptable adverse impacts on statutorily protected built heritage assets;*
- 6. There are no unacceptable adverse impacts by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance;*
- 7. There are no unacceptable impacts on the operations of defence facilities and operations (including aviation and radar) or the Mid Wales Low Flying Tactical Training Area (TTA-7T);*
- 8. There are no unacceptable adverse impacts on the transport network through the transportation of components or source fuels during its construction and/or ongoing operation;*
- 9. The proposal includes consideration of the materials needed or generated by the development to ensure the sustainable use and management of resources;*
- 10. There are acceptable provisions relating to the decommissioning of the development at the end of its lifetime, including the removal of infrastructure and effective restoration.”*

Planning Policy Wales Edition 11 (2021)

Planning Policy Wales sets out the land use planning policies of the Welsh Government. Regarding renewable and low carbon energy it states:

“Local authorities should facilitate all forms of renewable and low carbon energy development and should seek cross-department co-operation to achieve this. 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. Planning authorities should seek to maximise the potential of renewable energy by linking the development plan with other local authority strategies, including Local Well-being plans and Economic/ Regeneration strategies.”

Caerphilly County Borough Council Local Development Plan (2010)

The Local Development Plan (LDP) is a development framework that the planning authority is statutorily required to produce. One of the aims of the LDP is to *“to ensure that new development minimises emissions of greenhouse gases as far as is practically possible in order to mitigate the effects of climate change.”*

One of the key objectives of the LDP is to *“Improve energy, waste and water efficiency while promoting environmentally acceptable renewable energy to maintain a cleaner environment and help reduce our impact on climate change.”*

The Development Strategy state:

“energy conservation makes a positive contribution to the protection of the environment through a reduction in the release of harmful emissions into the atmosphere. In addition, renewable energy technologies such as microgeneration have an important role to play in the built environment. However, there are a number of renewable energy sources that have the potential to have an adverse impact on valued aspects of the countryside, for example the potential impact of wind generated energy on the landscape. The energy provision benefits of renewable energy schemes therefore need to be balanced against the potential impact of such development on the landscape and on sites of ecological interest.”

The Upper Rhymney Velly is mentioned within Section C: Area Specific Policies. It states

“The Upper Rhymney Valley offers the most significant potential in terms of energy production within the county borough due to the presence of coal resources at Nant Llesg and the potential of the Upper Rhymney Valley area in terms of renewable energy generation. However, the area is also a principal gateway to the northern end of the County Borough and is particularly prominent when viewed from the A465 Heads of the Valleys Road. The Plan seeks to balance the merits of renewable energy schemes and the safeguarding and potential development of minerals in this area against the objective of safeguarding the landscape from further degradation and, where possible, securing landscape enhancement.

Due to its prominence, any proposals for development associated with energy generation within the Upper Rhymney Valley will need to recognise that development must be undertaken in an environmentally acceptable manner. Development proposals should, where appropriate, secure effective landscape rehabilitation and enhancement as an integral part of the scheme. Proposals will also need to be consistent with the wider regeneration strategy and enhanced recreational and tourism role envisaged for this part of the Plan area.”

GUIDANCE

BRE: Site Layout Planning for Daylight and Sunlight: A guide to good practice

In the UK at the domestic level the closest guidelines regarding glint are the BRE guidelines on 'Site layout planning for Daylight and Sunlight'¹.

With regard to solar dazzle these state that:

"Glare or dazzle can occur when sunlight is reflected from a glazed façade or an area of metal cladding. This can affect road users outside and the occupants of adjoining buildings. The problem can occur where there are large areas of reflective glass or cladding on the façade, or where there are areas of glass or cladding slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long-term problem for some heavily glazed (or mirror clad) buildings. Photovoltaic panels tend to cause less dazzle because they are designed to absorb light.

If it is likely that a building may cause solar dazzle the exact scale of the problem should be evaluated. This is done by identifying key locations such as road junctions and windows of nearby buildings, and working out the numbers of hours of the year that sunlight can be reflected to these points. BRE information paper IP 3/87 gives details.

Glare to motorists approaching the building can be an issue. The worst problems occur when drivers are travelling directly towards the building and sunlight can reflect off surfaces in the drivers direct line of sight (usually this will be off the lower parts of the building)."

After setting out a methodology for calculating solar reflections from sloping glazed facades, BRE information paper IP 3/872 summarises effects as follows:

"Initial experience suggests that, in Europe and the USA at least, the greatest problems occur with facades facing within 90o of due south, sloping back at angles between 5o and 30o to the vertical. Where the façade slopes at more than 40o to the vertical (less than 50o to the horizontal) solar reflections are likely to be less of

¹ Site Layout Planning for Daylight and Sunlight: A guide to good practice. (2nd Edition) Paul Littlefair, BRE Trust, First published 2011.

a problem, unless nearby buildings are very high; and facades which slope forward, so that the top of the building forms an effective overhang, should also cause few problems in this respect. In the northern hemisphere, north facing facades should only cause reflected solar glare on a few occasions during the year, if at all."

In the domestic setting the guidelines therefore suggest that glare and dazzle are only likely to be issues if the facade (or panel in this case) is within 40 degrees of the vertical or 50 degrees of the horizontal. Beyond this angle, incident light will be reflected primarily skywards. This is because the angle of reflection of light from a point source will always be the same as the angle of incidence.

Aviation Guidance (CAA)

The UK Civil Aviation Authority (CAA) issued interim guidance in relation to solar farms in December 2010². The formal policy was cancelled in September 2012, however in the absence of formal policy, the guidance is still relevant. It refers to solar farms as Solar Photovoltaic Systems (SPV).

CAA Interim Guidance

This interim guidance makes the following recommendations (p.2-3):

"8. It is recommended that, as part of a planning application, the SPV developer provide safety assurance documentation (including risk assessment) regarding the full potential impact of the SPV installation on aviation interests.

9. Guidance on safeguarding procedures at CAA licensed aerodromes is published within CAP 738 Safeguarding of Aerodromes and advice for unlicensed aerodromes is contained within CAP 793 Safe Operating Practices at Unlicensed Aerodromes.

10. Where proposed developments in the vicinity of aerodromes require an application for planning permission the relevant LPA normally consults aerodrome operators or NATS when aeronautical interests might be affected. This consultation procedure is a statutory obligation in the case of certain major airports, and may include military establishments and certain air traffic surveillance technical sites. These arrangements are explained in Department for Transport Circular 1/2003 and for Scotland, Scottish Government Circular 2/2003.

² Civil Aviation Authority, 2010. "Interim CAA Guidance - Solar Photovoltaic Systems"

11. In the event of SPV developments proposed under the Electricity Act, the relevant government department should routinely consult with the CAA. There is therefore no requirement for the CAA to be separately consulted for such proposed SPV installations or developments.

12. If an installation of SPV systems is planned on-aerodrome (i.e. within its licensed boundary) then it is recommended that data on the reflectivity of the solar panel material should be included in any assessment before installation approval can be granted. Although approval for installation is the responsibility of the ALH10, as part of a condition of a CAA Aerodrome Licence, the ALH is required to obtain prior consent from CAA Aerodrome Standards Department before any work is begun or approval to the developer or LPA is granted, in accordance with the procedures set out in CAP 791 Procedures for Changes to Aerodrome Infrastructure.

13. During the installation and associated construction of SPV systems there may also be a need to liaise with nearby aerodromes if cranes are to be used; CAA notification and permission is not required.

14. The CAA aims to replace this informal guidance with formal policy in due course and reserves the right to cancel, amend or alter the guidance provided in this document at its discretion upon receipt of new information.

15. Further guidance may be obtained from CAA's Aerodrome Standards Department via aerodromes@caa.co.uk."

The CAA Civil Aviation Publication (CAP) 738 document³ notes:

"In 2010 the CAA published interim guidance on Solar Photovoltaic Cells (SPCs). At that time, it was agreed that we would review our policy based on research carried out by the Federal Aviation Authorities (FAA) in the United States, in addition to reviewing guidance issued by other National Aviation Authorities. New information and field experience, particularly with respect to compatibility and glare, has resulted in the FAA reviewing its original document 'Technical Guidance for Evaluating Selected Solar Technologies on Airports', which is likely to be subject to change, see link;

³ Civil Aviation Authority - Safety and Airspace Regulation Group, 2020, CAP 738, "Safeguarding of Aerodromes".

<https://www.federalregister.gov/documents/2013/10/23/2013-24729/interimpolicy-faa-review-of-solar-energy-system-projects-on-federally-obligated-airports>

In the United Kingdom there has been a further increase in SPV cells, including some located close to aerodrome boundaries; to date the CAA has not received any detrimental comments or issues of glare at these established sites. Whilst this early indication is encouraging, those responsible for safeguarding should remain vigilant to the possibility.”

Renewable energy developments: solar photovoltaic developments CAST Aerodrome Safeguarding Guidance Note⁴.

As of July 2023, Industry body, The Combined Aerodrome Safeguarding Team (CAST), has released its guidance document titled ‘Renewable energy developments: solar photovoltaic developments CAST Aerodrome Safeguarding Guidance Note’.

With regard to glint, it suggests that the developer should supply:

“... a glint and glare survey when a development is within a distance specified by the aerodrome from an Aerodrome Reference Point (ARP) (5km in most cases)”.

The document also states that:

“For many aerodromes, 5km is the distance of choice but it could be considered out to 10km. In exceptional circumstances, assessments may be required beyond 10km.”

The document provides some considerations on safety and states:

“Safety considerations must be assessed for the design of the planned solar photovoltaic development for Air Traffic Services (ATS) personnel, pilots and for CNS equipment:

- *ATS personnel – The control tower (if applicable) is the most important location for visual surveillance across an aerodrome for monitoring operations on the ground as well as in the air. It is therefore of critical importance that the development of solar photovoltaic developments does not significantly hinder the view from a control*

⁴ Combined Aerodrome Safeguarding Team (CAST), 2023, “Renewable energy developments: solar photovoltaic developments CAST Aerodrome Safeguarding Guidance Note” Available at: [cast-renewable-energy-developments-solar-july-2023.pdf \(caa.co.uk\)](https://www.caa.co.uk/consultations-and-licensing/consultations/consultation-2023/cast-renewable-energy-developments-solar-july-2023.pdf)

tower's visual control room (VCR). This may be from redesigning the layout and design of the proposed solar development to avoid glare from the solar panels or by avoiding the physical blocking of key viewpoints.

- *Pilot – A pilot's ability to safely navigate the airspace around an aerodrome is paramount. A pilot is required to look for other aircraft and obstructions on the ground, as well as navigate towards a runway or reference points. This applies to both pilots of fixed wing aircraft and helicopters in the air, and sometimes on the ground. The standard operations that should be considered are:*

- *pilots on approach*
- *pilots in a visual circuit*
- *pilots on the ground (departing and taxiing aircraft)."*

The document also makes note of other available guidance:

"The UK CAA and US FAA have produced guidance with respect to glint and glare however neither of them mandates a specific methodology for assessing the effects of glint and glare. The effects of glare may mean that some solar PV developments are unacceptable, however layout modifications (such as changes to panel tilt and elevation angle) can often alleviate these concerns and overcome objections. The benefit of early consultation with the aerodrome authority cannot be understated."

The document comments on the Aerodrome Operator's Safety Assurance stating:

"The aerodrome operator in conjunction with any ATS personnel should, as part of the change management process in their safety management system, consider all the potential hazards posed by solar photovoltaic developments... The developer should provide the aerodrome with a safety survey which should include:

- *a glint and glare survey when a development is within a distance specified by the aerodrome from an Aerodrome Reference Point (ARP) (5km in most cases)*

The aerodrome operator should also ensure both impact and safety assessments are undertaken to provide assurance that any on- or off-aerodrome planned development does not introduce unacceptable hazards to aircrew, ATS personnel, RFFS and aerodrome vehicle operators undertaking their tasks.

As part of the aerodrome and or ATS change management process, safety assurances should take into account any potential adverse effect to critical ATS infrastructure and equipment.

The assessment must also consider any impacts to aircraft utilising instrument flight procedures and aircraft in the visual circuit.

Developers should apply the same principals for safety assurance for unlicensed aerodromes and airfields as required by this policy that are not officially safeguarded.

The developer in conjunction with the aerodrome operator, ATS personnel, RFFS and aerodrome operations should develop adequate mitigation to mitigate any risks identified.

Should risk mitigation or agreement not be possible, the aerodrome operator should follow Local Planning Authority procedures and lodge an objection regarding the development under their statutory obligations.”

Aviation Guidance (FAA)

The most comprehensive guidance setting out a methodology for assessing solar farm developments near aerodromes was produced November 2010 by the US Federal Aviation Administration (FAA) in a document entitled ‘*Technical Guidance for Evaluating Selected Solar Technologies on Airports*’. This was updated in Oct 2013 in the ‘*Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports*’. In April 2018 the FAA released a new version (Version 1.1) of the ‘*Technical Guidance for Evaluating Selected Solar Technologies on Airports*’, and in May 2021 it provided a further set of guidance entitled ‘*14CRF Part 77 - FAA Policy: Review of Solar Energy System Projects on Federally Obligated Airports*’.

In this last review the FAA concluded, contrary to its initial beliefs, that:

“...in most cases, the glint and glare from solar energy systems to pilots on final approach is similar to glint and glare pilots routinely experience from water bodies, glass façade buildings, parking lots, and similar features. However, FAA has continued to receive reports of potential glint and glare from on-airport solar energy systems on personnel working in ATCT cabs. Therefore, FAA has determined the scope of agency policy should be focused on the impact of on airport solar energy systems to federally obligated towered airports, specifically the airport’s ATCT cab.”

Operational Examples

There are a considerable number of large-scale solar installations that are already operating and located near to airports overseas. These include Newquay Airport in Cornwall, UK and

Dunsfold Aerodrome in Surrey, also in the UK. Figure 1 shows a large-scale solar farm similar to the proposed scheme constructed at Dusseldorf Airport, glint from the solar farm has not affected flight operations.



Figure 1: Solar Farm Adjacent to the Runway at Dusseldorf Airport (Aviation Pros, 2013⁵)

A ground-mounted array of panels has also been installed at London Gatwick on land adjacent to the runway and taxiway (see Figure 2). Consultation was undertaken between the developer and the Gatwick aerodrome safeguarding team, National Air Traffic Services (NATS), and NATS (En Route) Plc (NERL) (Crawley Borough Council, Planning Ref: CR/2011/0602/CON). These consultees did not object to the proposal on any grounds including glint.

⁵ Aviation Pros, 2013. 'Düsseldorf International Airport Goes Solar' [Online] Available at: <http://www.aviationpros.com/news/10599152/dsseldorf-international-airport-goes-solar> [Accessed 23 July 2022]



Figure 2: Solar Array next to Gatwick Runway (Business Green, 2013⁶)

It is not expected that the potential for glint generated by the proposed solar farm could cause any serious operational effects to aircraft but since the position of the sun in the sky and the angle of the panels will be known, it is possible to predict exactly when there would be any chance of affecting a particular flight path and hence it would be possible to forewarn any pilots.

⁶ Business Green, 2013. 'Gatwick solar system hailed a runway success'. [Online] Available at: <http://www.businessgreen.com/bg/news/2156392/gatwick-solar-cleared> [Accessed 23 July 2022]