From: Keith Burrell [redacted]
Sent: Friday, December 12, 2025 05:11
To: Green Hill Solar <greenhill@planninginspectorate.gov.uk>
Subject: Briefing Note 12th December Green Hill Planning Inspectorate Hearings

Briefing Note 12th December Green Hill Planning Inspectorate Hearings

Very Concerned about the lack of any regard to the impact on surrounding Airspace Users due the absence of 'Glint and Glare' modelling outside of the Safeguarding Aerodrome Guidance (2023) addition to CAA's CAP 738.

a) Not every Flight will be Departing / Arriving at the Named Airfields / Aerodromes mentioned in the PEIR Vol. 3 Chapter 15.

b) No understanding of the Visual Flight Rules (VFR) and degradation of cockpit visual sight lines because of the large geographical acreage area, due to the multi-site Installations of Solar Photovoltaic Panels and 'Glint and Glare'.

c) Effort made to model 'Glint and Glare' impact on LOCAL Airfield and Aerodrome Environment and the attempt to address the need for 'Mitigation' amplifies the point that 'Glint and Glare' is a serious, significant distraction to Pilots on Flight / Approach Paths using VFR?

The Airspace in the vicinity of the Development includes Navigational Way Point of Pitsford Reservoir, the NAVAID 'DTY VOR DME' West of Brixworth / Pitsford Reservoir which are significant Airspace for Visual Flight Rules (VFR and Instrument Flying Rules IFR) Air Traffic therefore used a lot by Pilots.

How much 'Glint and Glare' affecting the Local Airspace has been considered and require a
NOTAM to be issued due to potential Hazard for Pilots using VFR?

Military Low Flying (e.g Nene Valley Low Flying Corridor although changes made to include all of the UK), except specific exclusion areas, is a significant area of Flying Activity where Fast Jets / Military Pilots also have to comply with VFR. How much reaction time will the pilot have on arriving low level to a wide area multi-site 'Glint and Glare' Solar Farm?

d) How is Pre-Flight Planning practical when 'Glint and Glare' is variable due to time of Day, time of Year, outcome modified by fixed and / or tracking Solar Photovoltaic (PV) Panel Installations?

e) With VFR obligations are you now stating that the avoidance of your Multi-Sites will be required because action a Pilot might need to take to safety avoid an in flight hazard (e.g another aircraft etc.) will mean the Pilot will face additional 'Glint and Glare' hazard obscuring cockpit vision / sight lines?

f) The Air Displays performed at Sywell Aerodrome on a regular basis also include the RAF Red Arrows (latest June 2024).

Are Green Hill Solar Farm Developer NOW STATING that Red Arrows Air Displays can no longer be performed? Only a 'Fly Past' Event because of the result of Multi-Site large acreage 'Glint and Glare' impacting Safety / VFR Requirements for Air Displays?

Accidents do occur, Visual Flight Rules (VFR) is there to reduce Risk but its' intention is significantly undermined if the Pilots visibility of the Airspace around his Aircraft is obscured due to 'Glint and Glare' levels not historically experienced in the UK except if the Aircraft Heading is towards the Sun's position in the Sky. I am disturbed by the lack of Official Guidance for Developers etc. to address 'Glint and Glare' away from or outside the Airfields / Aerodromes / Airports immediate 'Safeguard Area'.

We are not talking about the odd PV Panel or small number on some residential roofs. The Schemes NOW being Submitted by Developers to the Planning Inspectorate involve Multi-Sites with Large Acreages with 100,000s PV Panels. The Green Hill Solar Farm (9 Sites, 500MW)) will involve up to a 1,000,000 PV Panels part of which is close to Sywell Aerodrome which hosted the Red Arrows Air Display in June 2024 where they fly low over my house (wonderful)!

The Specification and Design of the Photo Voltaic Panel to be Purchased HAS NOT BEEN STATED.

The Technology of the PV Panel allows for its' Design to incorporate Anti-Reflectance features including Anti-Reflectance / Glare Coating which may often be quoted as a Reflection of 5% or less.
However, If a PV Panel is Tracking the Sun across the sky you might assume '5%' is not too much of a problem for a Pilot (Visual Receptor, Aerial) but multiply the 5% from a Single Large Panel by 10,000 or 100,000 PV Panels over a large acreage.

Example of 2% Reflection (vertical very efficient) : - acreages involving 100,000's of 'Large Photovoltaic Panels (made up by combining Single Panels) which logically means an example of a Single Panel with a Vertical Axis 2% Reflection / Glare not thought to be a hazard BUT when '0.02' is multiplied by 10,000 = '200 Panel' area with 100% Reflection / Glare; if '0.02' is multiplied by 100,000 = '2,000 Panel' area with 100% Reflection / Glare.

Example of 10% Reflection (Sun at angle) : - acreages involving 100,000's of Large Photovoltaic
Panels which logically means an example of a Single Panel with a Vertical Axis 10% Reflection /
Glare might 'not' be thought to be a hazard BUT when '0.1' multiplied by 10,000 = '1,000 Panel' area with 100%
Reflection / Glare; if '0.1' is multiplied by 100,000 = '10,000 Panel' area with 100% Reflection / Glare.
N.B Add -on the impact of nearby multi-sites does 'Glint and Glare' become more meaningful to the
Airspace Users and Air Display Teams (e.g Red Arrows) and the Air Races etc. at Sywell Aerodrome.

1) My Green Hill Submission gave thoughts on an EXAMPLE for a generous 2% Vertical Reflection which related to the Sun being at 90 Degrees to the PV Panel's Horizontal Surface plane
maximising the Anti-Reflectance Coating effect. This detail relates to the limited time the Sun is in
this position w.r.t. Fixed Panels, but of course is a 'constant' for Tracking Panels HOWEVER, 'Tracking' may only be a Single Axis function (compared to the more expensive Dual Axis function)
and therefore Time of Year / Sun's height above horizon also provides a question as to the Sun's
Angle of Incidence to the Panel.

I attach 2 Screenshots taken from the ForgeSolar Help Page 'About Reflectivity' and 'Module
Reflectance Profiles'. These are important, especially for Fixed Panel Installations that the angle of
incidence of the Sun to the Panel Surface may be quite high for many hours providing Reflected
Light percentages greater than 10%. Green Hill has Fixed and Tracking (Single or Dual Axis) Installations. See link [redacted] regarding the ForgeSolar Analysis Software
Tool.

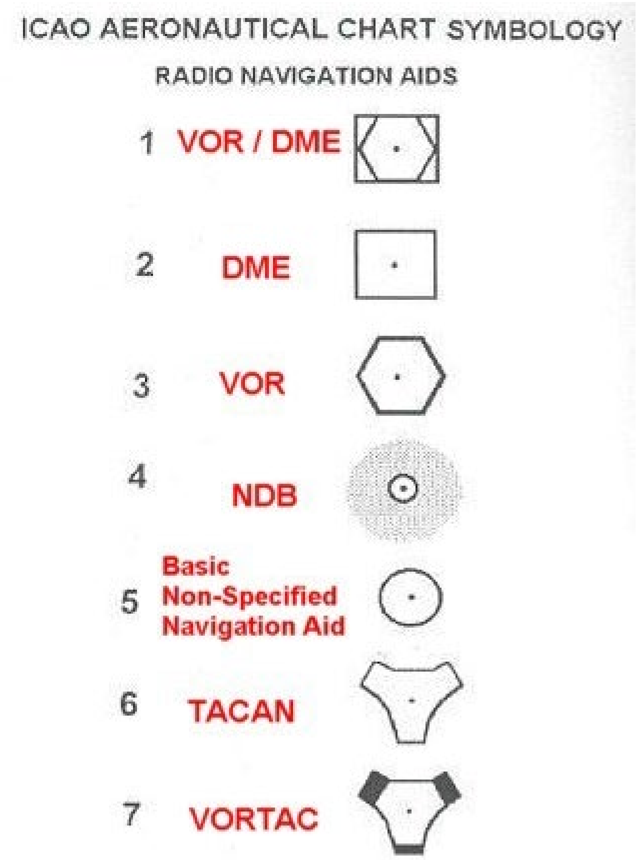
Therefore the 'Glint and Glare' issue could be a significant factor for Airspace Users and others
not screened from the Solar Farm Sites on the ground e.g pedestrians / horse riders / vehicle drivers especially lorry drivers with high cabs not screened by hedges etc. Extrapolation from 'Quality Data' not possible because the **actual PV Panel Model and Specification not yet defined** or
the Fixed mounting angle or if Single or Dual Axis Tracking of the PV Panel which will probably not
be the same on all Sites. N.B For Cost reasons 'Tracking' may only occur as a Single Axis Tracking
installation?

PV Panel technology deteriorates with Age, Anti-Reflectance properties can only be monitored / determined by regular Aerial Observation to check on 'Glint and Glare'. No mention of any ongoing continual Monitoring of this Major Engineering Specification Factor for lifetime of Operation and Panels being withdrawn / covered up when Failing Specification.

2) My Green Hill Submission referred to NAVAIDS , Navigational Waypoints i.e that a Pilot using Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) will make use of to determine Location and Heading Se□ng. Green Hill Solar Photovoltaic Farm covers multi-sites and a wide geographical area.

Subject of 'NAVAIDS and Daventry 'DTY VOR-DME' should prompt looking at an Aeronautical Map / Normal Map showing the NDB / VOR / VOR DME / DME / TACAN (Military) / VORTAC etc. and plot them in relation to the Green Hill Site Areas. The point of this is that most Aircraft will have Cockpit Instrumentation to display the NAVAID information to the Pilot which helps with Flight Course / Aircraft location to assist with following VFR / IFR. Examples of Aircraft Routing / Headings and expectation of using the appropriate NAVAID (e.g NDB, DME, VOR) and flying a Course that takes the Pilot into an Airspace possibly affected by 'Glint and Glare'. It needs to be examined in conjunction with 'Modelling' data that IS NOT LIMITED TO 'Safeguarding Aerodromes' but includes a Common Sense application to local Low Flying Flights (Civil and Military).

See below for Radio Navigational Aids Chart Symbology.



Lastly I come to the Subject of 'Engine Failure After Take Off' known as 'EFATO'. The historical location of the Airfields and Aerodromes amidst Countryside meant Pilots had the opportunity of dealing with Emergency of loss of Power by hopefully trying to land in a nearby field near the Airfield. The Green Hill Solar Farm Developers have TOTALLY IGNORED this aspect of Aviation Risk and the historical factors that allowed Pilots and Passengers to possibly 'Walk Away' from a Landing in a Field. The proposed acres of PV Solar Panel Sites close to Airfields and Aerodromes represents a very serious hazard deliberately introduced without regard to the prospect of a very high risk of serious injury and death when a Pilot is faced with an EFATO event.

g) PV Solar Panel Safeguarding detail missing. If due to Physical Damage to Solar Farm Panel Installations in the Event of an Aircraft having to make an Emergency Landing in the fields / acreage (OR a vehicle leaving the road) these PV panels contain Self Generation of Electrical Power in daylight, is there Automatic Disconnection? No Mention in PEIR.

h) The Physical DAMAGE to Electrical interconnection of the Photovoltaic Panels / Inverters etc. (involving Series or Parallel connectivity to multiply Voltages / Current) the resultant energy potential could be exposed to EMERGENCY RESPONSE PERSONNEL (ERP e.g Fire, Police, Ambulance etc.) arriving to render Life Saving First Aid etc. There is NO STATEMENT how, in practice, electrical safeguarding will be implemented to make SAFE the route for the ERP and crash victims (fire ignition source potential)? Most Sites are unmanned, remote monitoring?

i) If the crash occurred before dawn then it could be Safe to enter the field to access the crash. However, with Sunrise the damaged Photovoltaic Panel Installations / Connections then become 'Live'. No information on the Electrical Configuration within the Fields to allow 'Very Localised' Isolation of the damaged areas for victims to be safety accessed by ERP?

j) Information on Electrical Safeguarding should be built into the Initial Design and not as an after thought when trying to achieve a 'Fire Certificate' at the Commissioning Stage when it is too late to modify economically and the 'Compromise' leads to a 'Second best' outcome to achieve an unsatisfactory 'Electrical Safeguarding' Process Policy.

k) There is no explanation of the substitute facility for achieving 'EXTERNAL MAINS ISOLATION' function for the Site if the Fire Service has to deal with a fire resulting from a crash into the Site?

<u>It is reasonable to expect the Airfield's Fire Tender to be the first on the Crash Scene?</u>

<u>How can they help Save Lives if the EFATO aircraft is located within damaged Infrastructure with Live Voltages?</u>

N.B Attached Files : - CAA SafetySense Leaflet 13 Collision Avoidance Subject; CAST Advice Note 5; ForgeSolar Module Reflectance Profiles Screenshot; ForgeSolar Reflectivity Help Page Screenshot; Schiphol Airport Newsroom 21st August ; TravelTomorrow 25th August 2025 Dangerous Solar Panels Schiphol Airport; SKYWAY Code CAA CAP 1535 Extract re EFATO Engine Failure Pages 1 - 139 - 140.

Yours Sincerely
Keith Burrell
[redacted]
(Living within 2 miles of Site 'B', near Pitsford Reservoir).
Mob. [redacted]

AERODROME SAFEGUARDING ADVICE NOTICE

Date:	Feb 2024
Ref.:	Advice Note 5
Subject:	Renewable Energy Developments
Action required:	For Information

1. Introduction

Aerodrome safeguarding ensures the safety of aircraft and their occupants when in the vicinity of an aerodrome by controlling potentially hazardous development and activity around it. For an overview of the safeguarding process see Advice Note 1 'Aerodrome Safeguarding – An Overview', available at CAST publications | Civil Aviation Authority [redacted]

The types of renewable energy that are known to have an impact on aviation are: solar energy, wind and renewable energy plants. Developers of renewable energy projects should consult early with the respective authorities and any affected aerodromes. This advice notice highlights the potential issues that should be considered.

2. Impact of Solar energy on Aviation

Large-scale solar energy developments on, or off-aerodromes are increasing. In certain situations, the surfaces of the solar energy systems can reflect sunlight and produce glint and glare.

In addition to glint and glare, there are other considerations such as engine failure after take-off (EFATO), physical safeguarding, effects to rescue and firefighting services and wildlife. The potential Electromagnetic Interference (EMI) effects upon CNS (Communication, Navigation & Surveillance) may also be a consideration.

In all instances, where a developer is proposing an on or off-aerodrome solar energy development, early consultation with the aerodrome authority is recommended.

2.1 Safety Considerations

Safety considerations should be assessed in relation to Air Traffic Services (ATS) personnel, pilots and 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 energy does not significantly hinder the view from a control tower's visual control room (VCR).

- **Pilots** – 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)

- **CNS equipment** – Where CNS infrastructure is present, consideration of specific safeguarding criteria may be required to safely develop solar energy. There may be a requirement to apply a setback distance to nearby solar panels, or other mitigation measures.

2.2 Safety Impacts

2.2.1 Glint & Glare

A key safety concern when considering a solar energy development on- or off-aerodrome is commonly referred to as 'glint and glare' caused by reflections of sunlight from the array. 'Glint and Glare' is the general term used to describe the reflection of sunlight from a reflective surface, typically one that can produce specular solar reflections.

The definition of glint and glare is as follows:

- **Glint** – A momentary flash of bright light typically received by moving receptors or from moving reflectors.
- **Glare** – A continuous source of bright light typically received by static receptor or from large reflective surfaces.

Typical surfaces that are considered with respect to glint and glare are glass, metallic structures e.g. roofs and solar panels. The orientation of a solar panel (azimuth and elevation angle) as well as its height will determine whether glint and glare effects are possible towards the assessed receptors.

It is essential to conduct an aviation perspective glint and glare assessment when a reflective surface is to be located on or immediately adjacent to an aerodrome. In most cases, an assessment should be undertaken for a solar energy development which is being proposed within a specific distance from an aerodrome as determined by the aerodrome authority. 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.

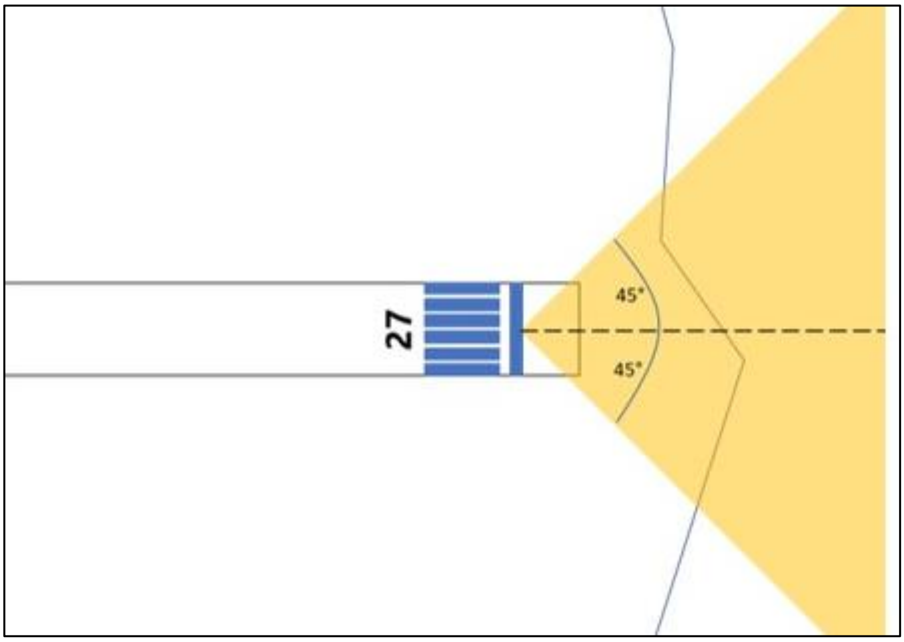
The UK CAA and US FAA have produced guidance with respect to glint and glare, however, neither of them mandates a specific methodology for assessing the effect of glint and glare.

The effects of glint and glare may mean that some solar energy developments are unacceptable, however layout modifications such as changes to panel tilt, panel type, and elevation angle can often alleviate these concerns and overcome objections. The benefit of early consultation with the aerodrome authority cannot be understated.

2.2.2 Engine Failure after Take-Off (EFATO)

An engine failure after take-off (EFATO) may result in an aircraft having to conduct a forced landing in an area around the aerodrome, often off the end of a runway and often not within the aerodrome's land ownership. Following an EFATO, it is recommended that a pilot does not conduct a turn greater than 45 degrees straight ahead to ensure airspeed and height are maintained as much as possible to facilitate a safe forced landing.

There is no defined safeguarding area for an EFATO, however, considering the above, an area extending 45 degrees either side of the extended runway centreline can be established, and this is shown below. There is no given distance for this area and the image is not to scale.



EFATO zone based on recommended aircraft manoeuvres

Given there is no official safeguarding criteria for safeguarding against an EFATO even for licensed or certificated aerodromes, the safeguarding of this area must be considered reasonably and pragmatically by both an aerodrome operator and a solar developer. Both parties are likely to benefit from the implementation of a cooperative solution that can accommodate an EFATO area. The benefits being:

- The aerodrome will benefit because it will reduce the risk of collision in the unlikely event that an EFATO occurs;
- The developer will benefit as there is a lesser risk of damage to a solar PV development if an EFATO (or other aviation accident) occurs.

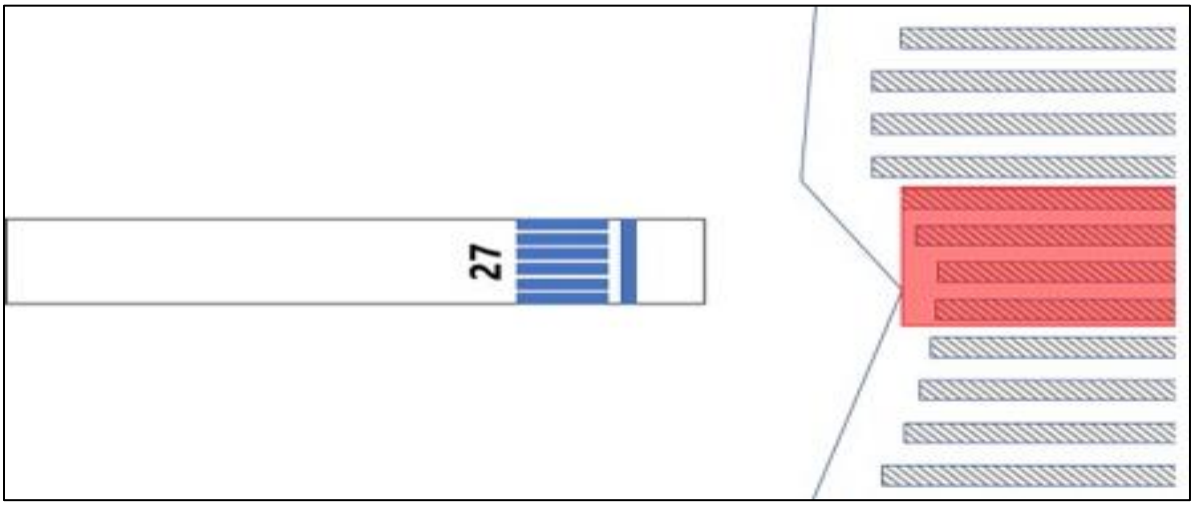
On this basis, a designated EFATO safeguarded area could be considered for any proposed solar energy development that is to be located along the extended runway centre line (dashed line as per the image above).

Considerations of the size and scale of this zone should include:

- Specific aerodrome operations
- Availability of additional land for use in an EFATO should the solar energy development be built
- Size and scale of the solar energy development

- Distance of the solar energy development from the runway threshold
- Frequency of air traffic movements
- History of air traffic incidents
- Availability of other runways

The image below shows an example of where solar panels are proposed along the extended runway centreline (rows of blue/grey diagonally filled zones). The panels with the red area may be omitted for the benefit of aviation safety in the event an EFATO occurs. It is also potentially limiting risk to the solar PV developer.



Potential exclusion zone for solar development (image not to scale)

2.2.3 Physical Safeguarding

For the most part, it is unlikely that a solar PV development will infringe an Obstacle Limitation Surface[1] (OLS) due to their typically low mounting height when located on the ground (typically up to 3m for static panels, 1-2m more if tracking). However, when locating solar panels on a roof or near a runway, infringements are possible. Infringements of the 'Approach', 'Take-Off Climb' and 'Transitional' surfaces are most likely for ground mounted PV. The possible surface affected by roof mounted panels would depend on the size and location of the building. There will almost certainly be the presence of an Obstacle-Free Zone (OFZ) near the runway whereby all objects should be mounted to a frangible structure, with any such objects being essential to aviation operations, for example runway lights.

[1] The OLS completely surround the airport and generally extend out to 15km, however this can vary. They are designed to protect aircraft from obstacles when manoeuvring on the ground, taking off, landing or flying in the vicinity of the airport. It is important that these surfaces are not infringed by development. [redacted]

Careful consideration should be made when mounting panels near to a runway or on buildings that are already close to the limit of the OLS.

An OLS assessment can be undertaken for unlicensed and licensed / certificated aerodromes, with these surfaces being strictly applicable to licensed / certificated aerodromes. Ensuring there is no breach of any applied surface can bring benefits to both the operations at an unlicensed aerodrome and reduce risks for a solar energy developer. For licensed and certificated aerodromes, any infringement would likely be unacceptable unless a suitable safety case is made, or the principle of shielding has been applied through review of other obstructions such that no significant operational impact is expected.

There will be enhanced safety implications where ATS personnel have comprehensive views over an aerodrome. Therefore, if a proposed solar energy development is predicted to affect visibility from a visual control room, there will likely be concerns from an aerodrome operator.

Impacts to Instrument Flight Procedures (IFPs) could also be possible if the solar energy development is located in an operationally sensitive location. Early liaison with the aerodrome authority will likely reveal any issues with installations of height impacting IFPs. See Advice Note 1 ‘Aerodrome Safeguarding an Overview’ for further details available at CAST publications | Civil Aviation Authority [redacted]

2.2.4 Birds and Wildlife

The potential for solar panels to attract nesting birds or other wildlife should be a consideration when developing a solar array. For birds, the risk is mostly associated with bird strike, whereby a bird collides with an aircraft. Of greatest concern is large bird species, however, large numbers of small birds can also cause a problem. For other land-based fauna, the concerns are typically the intrusion to operational areas e.g. entering the runway or taxiways and collision with aircraft.

The typical concerns include birds using the solar array as a potential nesting site. For both birds and land-based fauna, they may also use the array for shelter. Separately, both may be attracted to the planting associated with the biodiversity improvements across a site as part of the solar development. The requirement to enhance biodiversity could lead to an increased number of fauna if the location and type of flora to be planted is not considered carefully.

A developer should therefore consider:

- The type/species of planting
- The location of planting
- Having a wildlife hazard management plan in place

The aim of a developer should be to not encourage any birds or wildlife that may affect aviation safety and therefore certain steps may need to be taken to avoid encouraging certain species onto the site of a solar development. See Advice Note 3 'Wildlife Hazards Around Aerodromes' for further details available at [CAST publications | Civil Aviation Authority] [redacted]

2.2.5 Rescue and Firefighting Services (RFFS)

Developers / aerodrome operators should be aware of the potential hazards to RFFS from a solar panel/ Battery Energy Storage Systems (BESS) installation which can be categorised as:

- Fire and explosion
- Electrical
- Stored energy (BESS)
- Physical
- Chemical

These hazards should be considered for RFFS because they impact RFFS's ability to protect the environment when firefighting and should be identified as part of the planning process. Furthermore, the aerodrome operator should be familiar with the water runoff/containment and site access arrangements as part of the installation.

Developers in conjunction with the aerodrome operator should ensure adequate and suitable surfaces and routes are provided for emergency vehicles as part of the site access arrangements especially if off-aerodrome.

RFFS personnel should have an understanding of the "safe design" concept regarding such installations and the guards and protective devices that have been installed. It's essential that RFFS have access to information about how the facility operates.

2.2.6 Communication, Navigation & Surveillance

Solar panels are relatively passive pieces of equipment. The DC-power that they create is converted to AC-power. The DC-power cabling and the inverters used can create electromagnetic interference (EMI).

Poorly wired cable looms are a prime source of interference. Certified inverters can, despite their certification, still generate interference at various frequencies. The frequency range that is most susceptible to interference is 100 to 200 MHz which may affect aeronautical radio frequencies dependent on the location of the development. Aerodrome operators should assure themselves that there is no risk of electromagnetic interference affecting any part of their ATS infrastructure (if applicable).

Simplistically, electromagnetic interference is produced by varying voltage and/or current through an electrical system which in turn produces an electromagnetic field around its location of origin. This field can impact upon other electronic infrastructure however most commercial electronic equipment is built to national and European standards whereby EMI would not be expected. It may however be a consideration where equipment that operates with high voltage or current is proposed next to CNS equipment.

As an initial assessment, it is worth considering the safeguarding surfaces defined within the relevant Civil Aviation Publication (‘CAP 168: Licensing of Aerodromes’ available at [redacted] or ICAO DOC 015. ICAO guidance dictates Building Restricted Areas (BRAs) around CNS equipment. Similar guidance is also presented within ‘CAP 670: Air Traffic Services Safety Requirements’ available at [redacted] The results of this type of assessment may have implications upon the panel layout and height, however it is anticipated that the requirement for this type of assessment is limited mostly to on-aerodrome developments or those located close to a navigation aid.

Early contact and liaison with the aerodrome authority will allow for the identification of potential issues and thus the need or otherwise of assessment.

2.2.7 Aerodrome Operator Safety Assurance

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 energy developments / BESS on or in the vicinity to their aerodrome and within the aerodrome’s physical and technical safeguarded areas, in order to ensure the safety of the overall operation. 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)
- impacts to CNS facilities (if applicable) up to a distance specified by the aerodrome (typically 6km) from the ARP
- A wildlife hazard safety assessment

In addition to the safety survey, developers should provide the aerodrome operator and / or ATS provider with adequate technical and safety assurance documentation which addresses the safety impacts provided in sections 2.2.1 to 2.2.6. Further consideration may be given to the following:

- turbulence
- thermal plume
- 1000m off aerodrome RFFS response areas
- access routes for fire and rescue vehicles
- passenger evacuation
- damage to aircraft slides impeding passenger self-evacuation
- electrical hazards
- interference with CNS equipment and meteorological equipment
- HV cable routes which may interfere with compass swing bases or other
- sensitive items
- any lighting employed on the development
- frangibility of structures (where required)
- site fire risk and prevention measures

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

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

Developers should apply the same principles for safety assurance for unlicensed aerodromes and airfields as they would for licenced or certificated aerodromes.

3. Impact of Wind Turbines on Aviation

Wind Turbine developments have the potential to impact on aviation interests in a number of ways. Further guidance for aviation stakeholders, wind energy developers and Local Planning Authorities (LPAs) when assessing the viability of wind turbine developments is available within 'CAP 764: Policy and Guidelines on Wind Turbines' available at [redacted] Useful information can also be found in 'EUROCONTROL Guidelines for Assessing the Potential Impact of Wind Turbines on Surveillance Sensors' available at [redacted]

Aviation stakeholders should review wind turbine development proposals within a minimum of a 30km radius or in the vicinity of a civil aerodrome. The individual aerodrome operator and air navigation service provider should be consulted by the Local Planning Authority.

3.1 Physical Impact

The height of wind turbines can potentially infringe aerodrome safeguarding surfaces. Further information is given in Advice Note 1 'Aerodrome Safeguarding – An Overview', available at CAST publications | Civil Aviation Authority [redacted]

Similarly, cranes and other tall equipment might require permission when used in the construction of wind turbines. Further information with regards to the construction process is available in Advice Note 4 'Cranes and Other Construction Issues' available at CAST publications | Civil Aviation Authority [redacted]

The addition of aviation warning lights or marking of obstacles and tall structures is intended to reduce the hazards to aircraft. The aerodrome safeguarding process will determine whether a wind turbine(s) will need to be fitted with one or more obstacle lights. This is applicable to temporary obstacles such as cranes or anemometer masts in addition to permanent structures. For further information please refer to Advice Note 2 'Lighting Near Aerodromes' available at CAST publications | Civil Aviation Authority [redacted]

Guidance with regard to obstacle lighting requirements can be found in CAA Publication 'CAP 764: CAA Policy and Guidelines on Wind Turbines' available at [redacted]

Anemometer masts installed to test wind conditions prior to the installation of a wind turbine(s), should be assessed individually by the aerodrome operator in relation to aerodrome safeguarded protected surface infringements and obstacle lighting. Permission for anemometer masts does not preclude the requirement for wind turbine development proposal assessments.

Any tall and narrow profile structures located in areas used for military low flying are assessed and managed separately by the Ministry of Defence.

3.2 Technical Impact

3.2.1 Radar and Electronic Aids to Air Navigation

There are two principal types of radar system in use at aerodromes - Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) and both systems can be impacted by wind turbines.

In order to determine whether the wind turbine development will have an impact on radar performance, a line of sight (LOS) assessment is a useful basic indication. However, to ascertain whether a turbine is likely to be detected by a radar, a propagation assessment will be required. This study can be carried out by NATS En Route for the radars they operate or by other specialist organisations. Such an assessment will consider a number of factors such as: terrain profile, maximum height of the wind turbines, signal levels and operational range of the radar.

In low visibility conditions pilots are entirely dependent on the accuracy of the information displayed on the instruments in the cockpit to navigate and land aircraft. Similarly, air traffic controllers rely on the accuracy of the information displayed on radar screens to maintain safe separation between aircraft. It is essential, therefore, that this information has not been distorted by interference to the radio signals involved in the operation of the navigation aids.

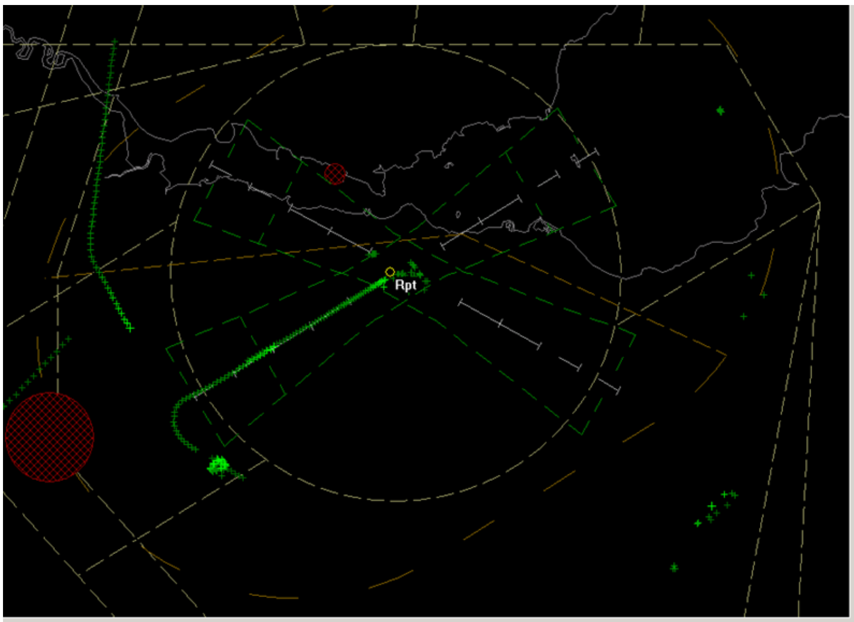
Signal processing can be used to filter buildings, birds, weather, and other objects and prevent them from producing radar returns on the screen – so-called radar ‘clutter’ but, this is not effective in reducing returns from wind turbine blades. Experience of wind turbine developments that have been constructed show that the turbine blades will regularly produce radar returns that are identical to and easily confused with, those produced by small or slow-moving aircraft. In addition, radar clutter produced by the turbines can mask any aircraft within the airspace above the wind turbine development that is not using SSR.

3.2.2 Primary Surveillance Radar (PSR)

PSR systems send out pulses of energy which are reflected back to the radar head and the position of objects detected is plotted on the radar screen. These primary ‘returns’ show only the position of an aircraft or any other object that is detected by the radar system and not the height.

PSR can be affected by wind turbines and may produce moving radar returns on the radar screen when the turbine blades are ‘visible’ to the radar head. The apparent movement of the turbines is caused by the rotation of the turbine blades ‘confusing’ the PSR circuitry and bypassing the radar filtering, just as real moving targets (i.e aircraft) do.

Aerodromes will often raise concerns to any wind turbine proposal within (radar) line of sight of its PSR equipment. Whether an objection will follow will depend on several site specific factors including (but not limited to): the location and size of the development, the amount of 'clutter' it is likely to generate, the rules relating to the operation of the airspace, how heavily the area is trafficked, the proximity to potential areas of conflict such as glider or GA facilities or other wind turbines and, ultimately the controllers perception on whether they consider safety would be compromised. Each wind turbine proposal must therefore be assessed on its own merits.



Example of Clutter on a Radar Screen

3.2.3 Secondary Surveillance Radar (SSR)

SSR systems send out an interrogation signal to a transponder, a piece of equipment located on board the aircraft. The on-board equipment responds with a signal that produces both the position of the aircraft and other data such as height and identification data.

The propagation of the SSR radar signal in space can be affected by wind turbines where the wind turbine structures are sufficiently close. Civil aerodromes may raise concerns to wind turbine developments inside this distance if the turbines are also within (radar) line of sight of its SSR equipment.

3.2.4 Wind Turbine Wake turbulence

Depending on the size of the wind turbine rotors a wind turbine can generate wake vortices that might potentially generate risks to nearby flying aircraft.

Wind turbine wake turbulence guidance is provided in ‘CAP 764: Policy and Guidelines on Wind Turbines’ available at [redacted]

3.3 Mitigation Solutions

A number of mitigation solutions have been developed to mitigate the effect of wind turbines on radar performance. Each proposal needs to be assessed individually to determine the best solution that can be implemented depending on the location and type of degradation. Several mitigation solutions are available and can be categorised in several key types: workarounds, in-fill radar, 3-dimensional radars, high PRF radars, use of spectrum filters, predictive and multi-sensor trackers or use alternative technologies, less susceptible to wind turbine interference, and stealth technology.

The analysis and acceptance of the mitigation solution rest with the airport licence/certificate holder (or aerodrome operator at military aerodromes) and it needs to consider present and future implications on their operations. Guidance for the ANSPs is detailed in Civil Aviation Authority (CAA) Publication ‘CAP 764: Policy Guidance on Wind Turbines’ and ‘CAP 670: Air Traffic Services Safety Requirements’ available at [redacted]

4. Impact of Renewable Energy Plants

Biomass and biogas plants have the potential to pose a risk to the safety of flight by their physical height, bird attraction, visual impacts of vapour and, by the production of gasses which create thermal plumes.

4.1 Physical Impact (Aerodrome Safeguarded Surfaces)

Depending on the location of the Biomass / Biogas energy development, infringements of the safety clearances against aerodrome safeguarded surfaces should be assessed by the aerodrome operator, especially as proposals can use high stacks for the plant. Power plants can also present a physical obstruction to radar and other communication signals.

4.1.1 Thermal Plume Turbulence

Thermal plume turbulence is caused by the release of hot air from a power plant. The thermal plume rises causing upward moving air turbulence. As aircraft pass within the vicinity of the structure they could become subject to the turbulence without warning. Modelling tools are available to assess and model any potential impact on air safety, it is recommended that such tools are utilised when doing safety assurance assessments.

4.1.2 Visual Impacts of a Vapour Plume

Vapour plumes produce a vapour cloud that can result in localised visual impairment to pilots who rely on the ability to see clearly during visual conditions.

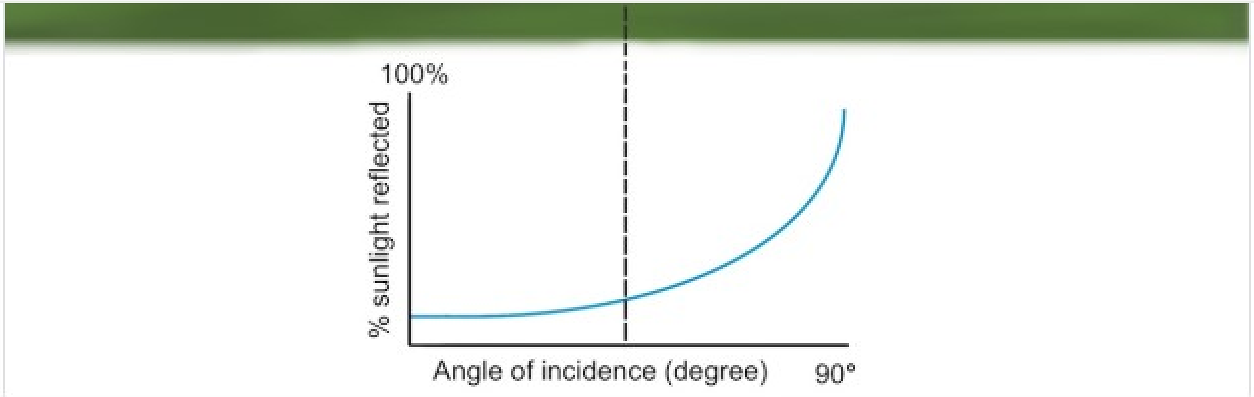
4.1.3 Radar Clutter

Thermal plumes can cause clutter on the radar screen which may affect the accuracy of detection for aircraft. A radar clutter impact assessment should be taken if the location is close to the approach areas for the aerodrome.

4.1.4 Birdstrike Avoidance

Due to the materials used at Biomass and biogas plants they may attract species of birds that are hazardous to aircraft; therefore, operators of the plants may be required by a nearby aerodrome to employ effective bird hazard management practices.

Further CAST Safeguarding Information is available at [redacted]



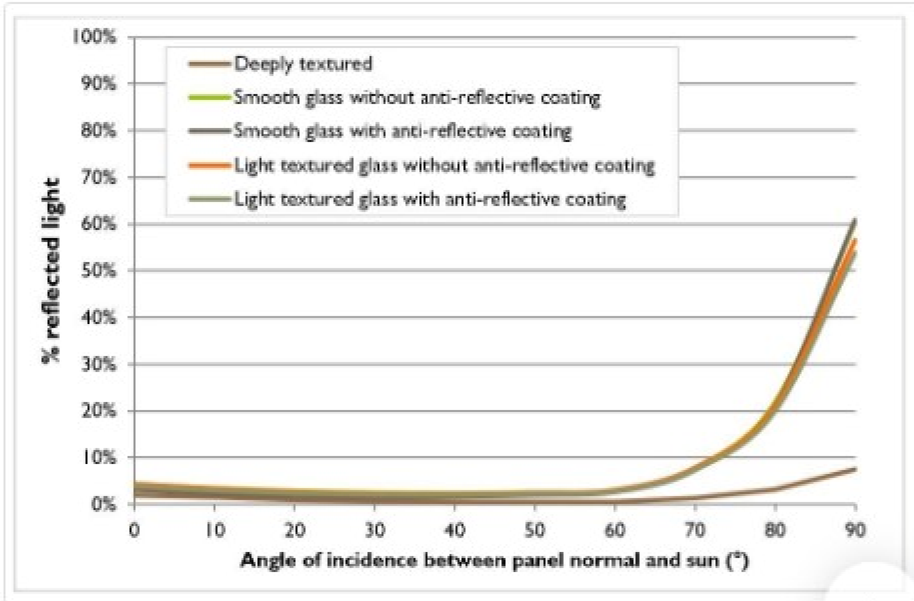
PV panel reflectance depends on incidence angle between panel normal (i.e. facing) and sun position. Large incidence angle yields more reflected sunlight.

Module Reflectance Profiles

Sandia National Laboratories developed five generic PV module material reflectance profiles by analyzing over twenty PV module samples. These profiles are available in ForgeSolar and allow for customizing the material properties of the PV array during analysis.

The figure to the right illustrates the reflectance of each material profile as a function of incidence angle, where an angle of 0° implies the panels are directly facing the sun. For example, a high glancing angle near 90° for panels with 0° tilt (lying flat) occurs daily at sunrise and sunset.

Anti-reflective coatings (ARC) and surface texturing can reduce panel reflectivity, but this reduction is typically less than 8% (Yellowhair, 2015). In addition, greater surface texturing can increase the size of the subtended source angle (i.e. glare spot).

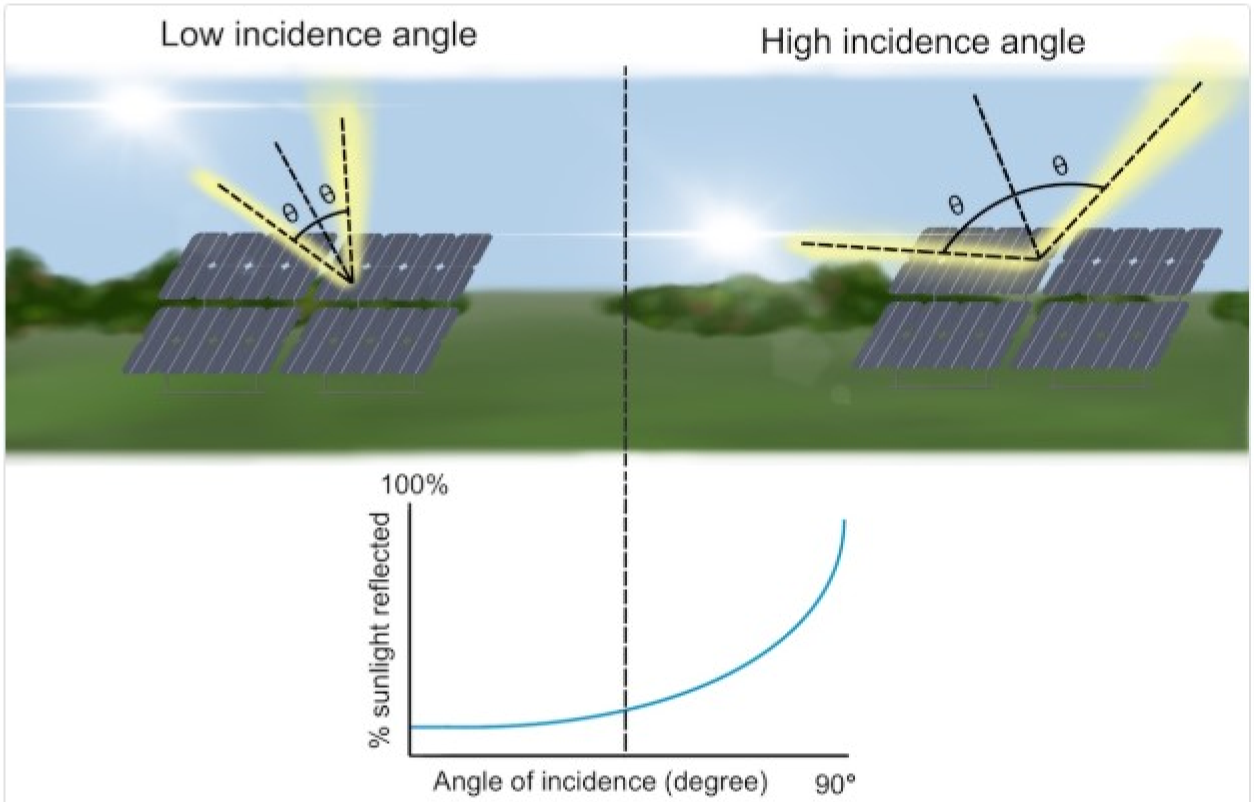


Reflectance profiles of typical PV module materials (Yellowhair, 2015).

About Reflectivity

Reflections from PV panels may impair observers. Studies have found that 7 W/m^2 is enough to cause an after-image lasting 4 to 12 seconds (Ho, 2009). This represents a reflection of only 1-2% of typical solar irradiance (incoming sunlight) for a given location, which typically ranges between 800-1000 W/m^2.

A key factor of reflectance is the position of PV modules relative to the sun. A panel that absorbs 90% of direct sunlight may reflect up to 60% when not directly facing the sun. This situation is common for low-tilt panels during sunset and sunrise (Yellowhair, 2015). **The oft-repeated claim that PV panels reflect less than 5% of sunlight only holds true when the panels directly face the sun.** For fixed-mount panels, this claim only applies during a few minutes of the day, at most.



NL | EN
21
August
2025

Arrangements regarding solution for solar park near Schiphol

After intensive consultations, Schiphol, De Groene Energie Corridor (DGEC), the municipality of Haarlemmermeer and the Ministry of Infrastructure and Water Management (I&W) have found a solution for the solar park located beneath the approach routes of the Polderbaan and Zwanenburgbaan runways. To eliminate the current safety risk, the removal of the solar panels has begun. All solar panels are to be covered with a special film that prevents glare, so that the solar park can coexist safely with the airport.

The solution
The parties have agreed to dismantle the solar panels, cover them with anti-reflective film and then reinstall them. All parties will make a financial contribution to this. These arrangements offer the prospect of a permanent solution for the solar park, subject to the wishes and reservations of the Haarlemmermeer municipal council.

This solution has been investigated by independent parties. Calculations show that the remaining reflected glare from the solar park is such that, on that basis, this solution is deemed safe by the Integral Safety Management System (ISMS), in which the aviation sector works together to ensure safe aviation.

‘

'Safety is always top priority, both at and around our airport. We've been working hard to achieve this over the past few months. We're pleased to be on our way to a solution that ensures safe air traffic, reliable airport operations and sustainable energy. This will initially involve temporarily removing the solar panels and working together to find a safe solution. But also making long-term arrangements, as good neighbours, to ensure that the solar park can safely coexist with the airport. We appreciate DGEC's constructive approach and understand the significant impact this process has on them.'

[redacted], Chief Operations Officer Schiphol

X Post

‘We are pleased that we have reached an overall solution together with Schiphol, the municipality and the ministry. The energy transition sometimes presents challenging issues. Thanks to the good cooperation with all parties involved, we can combine sustainable energy and flight safety. This is an important step, not only for this project, but also for other sustainable energy projects throughout the Netherlands.’

[redacted], Director of DGEC

X Post

'Haarlemmermeer is making a significant and essential contribution to the energy transition for both residents and businesses. We, Schiphol, the Ministry of Infrastructure and Water Management, and DGEC support this, but in practice, we encountered unforeseen glare. With this joint solution, we are focusing on both aviation safety and the energy transition. However, the added value lies primarily in our collaborative approach to future solutions from various perspectives, so we can further develop the solar block around the airport in a safe way.'

[redacted]ij, Councillor for Climate & Energy, and Beryl van Straten, Councillor for Spatial Planning

X Post

'We've seen that the glare from the solar panels poses problems for flight safety. In addition, there was a risk to airport operations, with potentially many delayed and cancelled flights, as well as a prolonged change in runway usage, which would result in additional noise nuisance for the surrounding area. Therefore, I've decided that the ministry will help to resolve the problem, together with the parties involved.'

[redacted] Infrastructure and Water Management
,

X Post

Current situation and temporary measures

DGEC has already begun dismantling fields A and B (78,000 solar panels), as recently ordered by the court. Fields C and D (150,000 solar panels) will be dismantled as soon as possible, carried out in phases. This takes time, and so the ISMS has been forced to take temporary measures to ensure the safety of air traffic.

Starting 28 August 2025, the Zwanenburgbaan Runway will be unavailable for landing aircraft at certain times in the afternoon in sunny weather. The exact times vary per day, depending on the position of the sun. These periods will be between 14:40 and 17:00, ranging from a few minutes to a maximum of one hour. At these times, landing aircraft will be diverted to the Schiphol-Oostbaan Runway if necessary. This measure will remain in effect until 29 September 2025 or until the solar panels in question have been removed. Every day, weather forecasts will be used to assess whether the Zwanenburgbaan Runway is safe for use.

VERSION 4

UK Civil Aviation Authority

THE SKYWAY CODE

EMERGENCIES

Engine failure

GUIDANCE

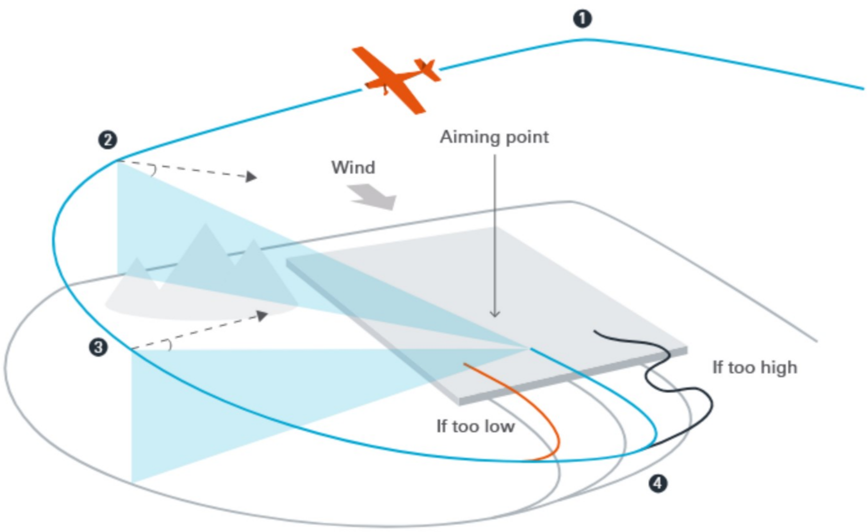
- Know your best glide speed and procedures for your aircraft.
- Particularly at low level, focus on maintaining speed and control. Provided you keep the aircraft at flying speed and under control, engine failures are unlikely to be fatal.
- If a failure happens shortly after take-off, landing ahead is safer than attempting to turn back. Assess the area immediately in front of you and pick the place that is likely to cause the least damage.
- If you have some height, check for common causes of failure such as fuel tank selection or carb icing – know the specific drill for your aircraft.
- Partial engine failures can confuse the decision making process. Assess whether the failure is likely to become worse – for example if rapidly losing oil pressure, the engine may not run for much longer. Take a positive decision to either put down in a field or continue to an aerodrome, depending on your judgement of the problem.
- The Australian ATSB have published useful advice on partial engine failures in single engine aircraft titled: Managing partial power loss after takeoff in single-engine aircraft. [redacted]

FIELD SELECTION

- If required to conduct a forced landing in a field, assess:
  - **Wind direction** – try to land into wind;
  - **Size** – the bigger the better;
  - **Surroundings** – avoid power lines or other obstructions;
  - **Shape** – square gives the best range of touch down options;
  - **Surface** – grass is one of the better surfaces, ploughed fields or crops are less desirable since they may flip the aircraft; and
  - **Slope** – avoid significant slopes.
- You should consider what would happen in the event of a forced landing – for example if planning to fly over the Scottish mountains in the winter, it would be prudent to have warm clothing and appropriate provisions in the aircraft, including cooking apparatus.

EMERGENCIES

Engine failure



An effective forced landing technique is that of the 'constant aspect' approach. The full pattern assumes a height of around 2,000 ft or more, although the main principle applies at any height. If you are sitting on the left side of the aircraft, it is easier to complete in a left hand direction.

1. Enter the pattern at a point appropriate to your height, adjusting the horizontal distance from the field as required. If you are at 2,500 ft AGL or above, you should be able to arrive abeam the field with enough height to fly a circuit pattern around it.

2. At around 45° to the intended landing spot, assess the visual angle to it. The aim is to keep that visual angle (the 'constant aspect') the same until touch down. As you are turning around the landing site, if the angle starts to shallow, move closer. If it steepens, widen the turn to take you further away.

3. Fly an arc around the edge of the field, tightening or widening the turn to keep the visual angle constant. If you intend to land with full flap or lower the landing gear, aim further into the field to account for the extra drag once they are deployed.

4. As you approach the field adjust the turn as necessary and side slip or S-turn if too high. Once configured for landing, ensure as much as possible (magnetos, master switch, fuel etc) is switched off.

Dangerous solar panels at Schiphol Airport to be solved by anti-reflection coating

▲ © Schiphol

by [redacted]

26 August 2025 - 11:24

Aviation Transport Netherlands

A disputed solar panel installation that dazzled pilots with reflections and forced closures on sunny days at one of Europe's busiest airports has found a reprieve in the face of demolition demands.

Originally an initiative from four Dutch landowners, the Groene Energie Corridor (DGEC) is run by Benelux energy firm Energy Solutions Group, and occupies around 100 hectares situated immediately below busy runways at Amsterdam's Schiphol Airport. It can generate approximately 123 GWh of green energy annually, which is equivalent to the energy consumption of approximately 40,000 households.

But earlier this year, the solar farm had been threatened with removal due to the disruption caused by significant glare from its panels, which pilots said were affecting visibility and endangering planes and passengers.

Courts heard that the DGEC panels, put into place in 2024, were not textured enough to limit reflections and therefore were unsuitable for the location, in violation of the firm's duty of social care and legal responsibilities to the airport. Around a third of the installation was ordered to be removed.

But removing the installation comes at a huge cost, and could risk potential bankruptcy for the owners, who, while cooperating with authorities, have argued that they undertook extensive research prior to construction, based on internationally recognised Federal Aviation Administration (FAA) guidelines and had received positive feedback from stakeholders and expert assessments, including one from the Netherlands Aerospace Centre (NLR).

They also pointed out on their website that the solar farm's design keeps at least 25% of the land remaining green and maintains "unobstructed views from the polder ribbons" while possessing "flower-rich grassland and kilometres of green borders, which enhance biodiversity with flower and butterfly meadows and elephant grass."

Now, to avoid unsustainable losses to the DGEC, which invested €90 million in the project in 2024 and had raised €125 million, the park's panels, instead of being demolished, will be temporarily taken down, covered with an anti-reflection film, and put back into position.

The costs reportedly will be shared by the Ministry of Infrastructure and Water Management, Schiphol, the municipality of Haarlemmermeer, and DGEC, as long as the proposed solution is given the green light by the Haarlemmermeer council.

Bert Creemers, director of DGEC and CEO of Energy Solutions Group, said in a press release: "The energy transition sometimes presents challenging issues. Thanks to the excellent cooperation with all parties involved, we can combine sustainable energy and aviation safety."