



# Solar Energy

RSPB Policy Briefing, December 2014

## Summary

Climate change is one of the greatest threats to birds, wildlife and people worldwide. The RSPB therefore strongly supports the use of renewable energy to reduce the UK's greenhouse gas emissions. This briefing summarises our position on solar energy, focusing mainly on large solar PV arrays in the non-built environment ('solar farms'), including floating solar farms. It also states our position on solar PV arrays in the built environment, concentrated solar power, solar thermal and passive solar.

The RSPB strongly supports the deployment of solar arrays on roofs and other built infrastructure, such as car parks and bridges, where few if any risks are posed to the natural environment. We also support appropriately sited and managed solar farms, and encourage all developers to proactively manage such sites to benefit wildlife. Where the development of a solar farm would have a significant and detrimental impact on biodiversity, however, we would oppose it.

## Background

Climate change is one of the greatest threats to birds, wildlife and people worldwide. The RSPB therefore strongly supports the UK Government's commitment to reduce the UK's greenhouse gas emissions by at least 80% by 2050 (relative to 1990 levels). We also support the Renewable Energy Directive target of generating 15% of UK energy consumption from renewable sources by 2020. The RSPB supports the development of solar energy and other forms of renewable energy in order to contribute to these targets and reduce the UK's greenhouse gas emissions. However, we believe that renewable energy deployment must take place in harmony with the natural environment.

Solar energy can be used for direct space heating (passive solar) or to heat water for direct use and space heating (solar thermal). Photovoltaic (PV) panels convert solar radiation to electricity. At the domestic / small-scale and when deployed on rooftops or within other built infrastructure environments, these technologies do not pose a significant risk to biodiversity; we therefore fully support their deployment as a means of delivering low-carbon energy. Indeed, the RSPB has already installed solar arrays across many of our own sites.

Sunlight can also be concentrated using mirrors or 'heliostats' to generate electricity (concentrated solar power), either by raising steam or using PV. The deployment of concentrated solar power is still at an early stage, with the majority of installed capacity in Spain and the US. It is unlikely to be deployed in the UK as it requires 'intense

sunshine and little cloud cover’ in order to be economic<sup>1</sup>. The focus of the remainder of this policy briefing is therefore solar farms, i.e. large ground-mounted PV arrays in the non-built environment, given that they are increasingly deployed in the UK and can potentially have implications for birds and other wildlife.

## UK policy framework for solar energy

Solar energy is incentivised at different scales through a number of different mechanisms. The Feed-In Tariff (FiT) provides a financial subsidy for electricity generation using solar PV. The tariff applies to installations with an installed capacity up to 5MW, is index linked and the tariff period is 20 years. Solar PV is also incentivised through the Renewables Obligation (RO) which requires licensed UK electricity suppliers to source a proportion of the electricity they provide from eligible renewable sources. However, this support will be removed for solar developments over 5MW from 1 April 2015. Instead, they must bid for support under the Contracts for Difference (CfD) scheme, which provides a fixed electricity price for the generator. The Renewable Heat Incentive provides financial support for domestic and non-domestic energy renewable heat installations, including solar thermal.

## The RSPB’s policy on solar energy

In principle, we support all forms of solar energy technology. Given the absence of significant ecological impacts caused by PV arrays on roofs and within the built environment we believe such installations should be maximised. Large PV arrays mounted in agricultural fields (or other non-urban / unsealed areas) are unlikely to be a concern from a nature conservation perspective provided they are developed in suitable locations. There is no evidence that solar farms displacing agricultural production is a concern at the current scale of deployment. Furthermore, solar farms can in fact provide complimentary opportunities for agricultural activities such as conservation grazing, and may also benefit future production by effectively letting land lie fallow whilst the installation is in place. Table 1 summarises the different types of solar energy available and our position on each.

**Table 1:** Types of solar energy and the RSPB’s policy position on each

Type of Solar Energy	Description	RSPB Position
Ground-mounted solar photovoltaic (PV) arrays	Arrays of PV panels mounted on agricultural fields or other unsealed land.	Supportive at the scale of deployment currently envisaged <sup>2</sup> , unless there are site-specific concerns. Concerns are most likely when located in or close to protected areas or species, or close to water features where

<sup>1</sup> Committee on Climate Change, 2011, ‘The Renewable Energy Review’ (p51)

<sup>2</sup> DECC, UK Solar PV Strategy Part 1: Roadmap to a Brighter Future (2013), p.8

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/249277/UK\\_Solar\\_PV\\_Strategy\\_Part\\_1\\_Roadmap\\_to\\_a\\_Brighter\\_Future\\_08.10.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/249277/UK_Solar_PV_Strategy_Part_1_Roadmap_to_a_Brighter_Future_08.10.pdf)

		development could pose risks to aquatic invertebrates.
Solar PV (built environment)	Small PV arrays (or single panels) mounted on domestic or commercial roof tops, or within the built environment more generally such as car parks, bridges, railways, etc.	Supportive. Possible risks of disturbing roof-nesting / roosting birds and bats. Installation should take place outside the breeding season, and avoid blocking access points.
Concentrated solar power	Use of mirrors to concentrate solar energy for thermal or PV electricity generation.	Supportive, as long as our potential concerns are addressed (see below). However, this is technology is unlikely to be deployed in the UK.
Solar thermal	Panels used to raise water temperature for space heating and/or hot water supply. Usually roof-mounted.	Supportive. Similar issues to solar PV (built environment).
Passive solar	Use of building orientation and design (e.g. large areas of south-facing windows) to reduce space heating loads.	Supportive.
Floating solar (PV)	PV panel arrays mounted on floats installed on bodies of water e.g. reservoirs, lakes.	Supportive, as long as developments meet the appropriate planning criteria and the ecological quality of the water is maintained or improved.

## Impacts on wildlife

The wildlife impact of a ground-mounted solar array scheme will be largely determined by location. Where proposals are not within or close to protected areas and functionally linked land, it is unlikely that the RSPB will have major concerns. However, this will depend on the ecological characteristics of the site and its sensitivity to the proposed changes. In all cases, we should seek to ensure implementation of appropriate mitigation and enhancement measures (see the following section for suggestions).

### *(i) Direct impacts on birds*

There is little scientific evidence for fatality risks to birds associated with solar PV arrays. However, birds can strike any fixed object so this lack of evidence might reflect absence of monitoring effort, rather than absence of collision risk. Structurally the risk is broadly similar to many other man-made features, though PV arrays may be more likely to be developed in sensitive locations. Developments will need to be connected to the grid, and there would be concerns where overhead wires and supports pass through areas used by birds susceptible to collision risk or electrocution. The RSPB would like to see investment in monitoring and developing our understanding of the collisions risks associated with solar PV.

There is some evidence to suggest that concentrated solar power installations can cause bird fatalities through collisions and burns; as birds fly through the concentrated rays of sunlight created by the heliostats, the intense heat can cause feather 'singeing'<sup>3</sup>. This is a significant concern and we strongly support further research into the extent of this problem and how it can be mitigated. However, this technology is unlikely to be deployed in the UK.

### *(ii) Impacts on other wildlife*

Insects that lay eggs in water (e.g. mayflies, stoneflies) may mistake solar panels for water bodies due to reflection of polarised light<sup>4</sup>. Under certain circumstances insects have been found to lay eggs on their surfaces, reducing their reproductive success and food availability for birds. This 'ecological trap' could affect the population of these insects, so it may not be appropriate to site solar arrays close to water bodies used by rare or endangered aquatic invertebrates, or where such insects are an important food source for birds using the locality. There is evidence that this potential effect can be mitigated by white grid partitioning on solar panels to reduce or eliminate their reflection of polarised light.

For floating solar farms, we may have concerns if developments are sited in ecologically sensitive locations. In particular, if located within an area of multiple water bodies, some of these bodies may be designated and others not; this may mean that undesignated bodies are developed upon yet perform an important supporting role to the designated site. Development proposals will need to be considered on a case-by-case basis.

Security fencing around PV arrays could become a barrier to the movement of wild mammals and amphibians, and represent a collision risk for some bird species. Loss of habitat for rare arable weeds, invertebrates etc. may be a concern at some sites.

### *(iii) Impacts due to land use change*

Ground-mounted solar arrays could result in:

- direct habitat loss;
- habitat fragmentation and/or modification; and
- disturbance / displacement of species (e.g. through construction/ maintenance activities).

If the site has low wildlife value e.g. intensive arable or grassland, the impacts are unlikely to be significant and may be positive. Some sites may have strong potential to become more valuable for wildlife e.g. land behind sea walls identified for future

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<sup>3</sup> Rebecca A. Kagan, Tabitha C. Viner, Pepper W. Trail, and Edgard O. Espinoza 'Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis', National Fish and Wildlife Forensics Laboratory (2014)

<sup>4</sup> Horváth, G. et al. (2010) Reducing the maladaptive attractiveness of solar panels to polarotactic insects. Conservation Biology 24:6, 1644-1653

managed realignment; land suitable for entry into agri-environment schemes; and strategic parcels of land for landscape-scale conservation initiatives. Realising this potential can in some cases be compatible with solar power development, but in other cases such potential may render sites unsuitable for development. If the site is already valuable for wildlife, particularly if it is in or near a protected area, the scheme will require greater scrutiny as there is potential for significant impact.

Suitable sites for large PV arrays are limited in terms of climate, topography, access, existing land use (usually lower-grade agricultural land), shading and proximity to grid connections. Therefore, proposed developments are likely to cluster together and potentially give rise to concerns about cumulative environmental impacts. Ideally, cumulative impacts should be assessed at the district or county level, to inform site selection.

## **Mitigation and enhancement**

If correctly sited (so as not to impact on sensitive sites and species) and with appropriate land / habitat management and other mitigation measures employed, the deployment of solar could be of benefit to wildlife and the wider countryside. The following are suggestions for mitigation and enhancement measures that can be adopted by solar developers to reduce their environmental impact and enhance biodiversity on solar sites. A more extensive document – produced by the BRE National Solar Centre in conjunction with the RSPB and other conservation organisations – is available [here](#). It is important to note, however, that mitigation and enhancement should be considered on a case-by-case basis, and not all of these measures will necessarily be relevant to any particular case.

### ***(i) Mitigation***

- Avoid legally protected areas (SACs, SPAs, Ramsar sites, SSSIs etc.), and other ecologically sensitive sites such as Important Bird Areas (IBAs) and some freshwater aquatic features.
- Landscape features such as hedgerows and mature trees should not be removed to accommodate panels and/or avoid shading. If removal of a section of hedge is essential, any loss of hedges should be mitigated elsewhere on the site.
- All overhead power lines, wires and supports should be designed to minimise electrocution and collision risk (for example, bird deflectors may be necessary).
- Power lines passing through areas where there are species vulnerable to collision and/or electrocution should be undergrounded unless there is adequate evidence that mitigation measures will reduce the risk to an acceptable level.
- Time construction and maintenance to avoid sensitive periods (e.g. during the breeding season).
- Whilst solar farms generally do not have moving parts, any risk to grazing animals or wildlife from moving parts that are present must be avoided.

- White borders and white dividing strips on PV panels may reduce attraction of aquatic invertebrates to solar panels (Horváth et al., 2010).

Vegetation will grow under the solar panels and this will require management. Grazing by sheep, chickens or geese should be acceptable, and are preferable to mowing, spraying or mulching. Ideally sites should be maintained without chemicals, fertilisers and pesticides. In terms of future management, it is important the current interest is maintained or enhanced in line with national and local planning policies. So whilst grazing may be appropriate, there may be more appropriate management options for arable wildlife and farmland birds that could be incorporated.

### *(ii) Enhancement*

Because panels are raised above the ground on posts, greater than 95% of a field utilised for solar farm development is still accessible for plant growth and potentially for wildlife enhancements. Furthermore, solar sites are secure sites with little disturbance from humans and machinery once construction is complete. Most sites have a lifespan of at least 20 years which is sufficient time for appropriate land management to yield real wildlife benefits.

- Biodiversity gains are possible where intensively cultivated arable or grassland is converted to extensive grassland and/or wildflower meadows between and/or beneath solar panels and in field margins. The best results are likely to come from sites that contain both wild flower meadows and areas of tussocky un-cropped grassland.
- Planting wild bird seed or nectar mixes, or other cover crops could benefit birds and other wildlife. For example, pollen and nectar strips provide food for pollinating insects through the summer period, and wild bird seed mixes provide food for wild birds through the winter.
- Bare cultivated strips for rare arable plants, and rough grassland margins could also be beneficial. For instance, small areas of bare ground may benefit ground-active invertebrates.
- It may be possible for panels to be at a sufficient height for regular cutting or grazing to be unnecessary. Rough pasture could then develop, potentially providing nesting sites for birds.
- Boundary features such as hedgerows, ditches, stone walls, field margins and scrub can provide nesting and foraging areas, as well as a means for wildlife to move between habitats.
- A variety of artificial structures can be built to provide suitable habitat for nesting, roosting and hibernating animals such as hibernacula for reptiles and amphibians, log piles for invertebrates, and nesting or roosting boxes for birds and bats. Built structures such as control buildings can be designed to promote access e.g. by providing access to loft spaces.

- 'Community benefit' funds may provide money for local environmental enhancement such as energy conservation measures or nature conservation initiatives.
- Biodiversity enhancements should be selected to fit the physical attributes of the site and should tie in with existing habitats and species of value on and around the site.

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