IBAT briefing note

Considering Biodiversity for Solar and Wind Energy Investments

BirdLife INTERNATIONAL
CONSERVATION INTERNATIONAL
IUCN
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WCMC

Introduction

The Integrated Biodiversity Assessment Tool provides a mechanism for early-stage biodiversity risk screening of commercial operations. The rapid shift in energy investments from fossil fuels to renewable energy requires banks and investors to take new considerations into account to avoid unintended negative environmental impacts from their investments. The International Union on the Conservation of Nature (IUCN) - an IBAT Alliance member - has recently produced new guidelines on '[Mitigating Biodiversity Impacts Associated with Solar and Wind Energy Development]'. This briefing note complements the IUCN/TBC Guidelines and supports IBAT users to understand the potential biodiversity impacts from this fast-growing area of finance.

Large areas of land and oceans are needed to site renewable energy infrastructure to meet rising energy demands in areas of economically viable wind and solar resource. These areas may be isolated from existing energy grids meaning that associated power transmission infrastructure would need to cover large distances to deliver energy to substations, resulting in significant pressures to ecosystems. Poorly-sited renewable energy infrastructure has the potential to cause significant negative impacts on biodiversity including direct impacts, such as mortality of birds and bats at wind farms and indirect impacts, such as the development of new roads which lead to other pressures on the ecosystem. Fortunately, many impacts to the most vulnerable species can be avoided as sensitivity mapping has repeatedly shown that there is ample space to safely deploy renewable energies at the scale needed to meet national targets[1] and avoid globally important places for biodiversity.[2]

Adequate diligence will be required to ensure that responsible investing is applied to renewable energy financing. Instruments, such as green bonds[3] and sustainability-linked loans,[4] equity investment into thematic funds, or sovereign bonds will continue to play a major role in helping to finance this sector. With the increasing appetite for investment in environmentally sustainable projects, there is a danger that biodiversity impacts of green energy projects are not given adequate consideration. In addition to potential reputational risks, investments that adversely impact areas of high biodiversity value can also lead to a credit risk: for example, if turbine curtailment (which affects profitability) needs to be implemented where unanticipated bird/bat mortality has been detected.

[1] European Commission (2020) The Wildlife Sensitivity Mapping Manual: Practical guidance for renewable energy planning in the European Union.

[2] Rehbein, J.A., Watson, J.E., Lane, J.L., Sonter, L.J., Venter, O., Atkinson, S.C. and Allan, J.R., 2020. Renewable energy development threatens many globally important biodiversity areas. Global change biology, 26(5), pp.3040-3051.

[3] Green Bonds are any type of bond instrument where the proceeds will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects and which are aligned with the four core components of the Green Bond Principles.

[4] Sustainability linked loans are any types of loan instruments and/or contingent facilities (such as bonding lines, guarantee lines or letters of credit) which incentivise the borrower's achievement of ambitious, predetermined sustainability performance objectives.

Greater Flamingo
Phoenicopterus roseus
IUCN Red List Least Concern

Potential impacts to biodiversity from wind and solar energy

The following table summarises some main direct impacts that can result from poorly-planned wind and solar energy development. Given the relatively recent growth of the industry, there are knowledge gaps around the potential impacts on numerous habitats and species in many regions. Nevertheless, it is understood that renewable energy can disproportionately threaten certain species, such as migratory soaring birds;[5] which have long generation times and relatively small populations, thus increasing the potential for population-level effects from any fatalities. While individual renewables projects may not have measurable population-level impacts to species, the market trend for multiple medium-sized projects (often concentrated within the same locality), is likely to lead to cumulative impacts on habitats and species which need to be taken into consideration. As with other types of development, solar and wind energy projects (particularly during the construction phase) can lead to unintended impacts, such as introduction of invasive species and impacts to associated ecosystem services (e.g. fisheries, carbon sequestration of peat moorlands or water provision).

Additionally, as renewable energy production increases, so will the area needed for mining to source the constituent materials; this will need strategic planning to avoid impacts on biodiversity.[6]

5 Thaxter, C.B., Buchanan, G.M., Carr, J., Butchart, S.H., Newbold, T., Green, R.E., Tobias, J.A., Foden, W.B., O'Brien, S. and Pearce-Higgins, J.W., 2017. Bird and bat species' global vulnerability to collision mortality at wind farms revealed through a trait-based assessment. Proceedings of the Royal Society B: Biological Sciences, 284(1862), p.20170829.

6 Sonter, L.J., Dade, M.C., Watson, J.E. and Valenta, R.K., 2020. Renewable energy production will exacerbate mining threats to biodiversity. Nature communications, 11(1), pp.1-6.

Table of potential impacts to biodiversity and vulnerable species[7]

Solar

Including photovoltaic (PV), concentrated solar power (CSP) and associated infrastructure

Key potential impacts

- Habitat loss and alteration through fragmentation and the removal of significant quantities of vegetation and surface grading.
- Habitat degradation due to changes in hydrology and water availability and quality (particularly in arid environments where solar plants can use a large proportion of available water for cleaning the panels).
- Birds being singed by the concentrated solar energy at CSP plants.
- Wildlife drowning in poorly-managed reservoirs for evaporation of wastewater from CSP plants.

Key vulnerable species

- Raptors and other large birds that favour elevated perches (at risk of electrocution with poorly designed distribution line pylons) .
- Species with high wing loading e.g. bustards, cranes, flamingos, storks, larger game birds, waterfowl and vultures (at risk of collision due to low manoeuvrability).
- Species that are vulnerable to habitat fragmentation, including migratory and nomadic species, such as desert tortoises.
- N.B. Given habitat loss is the most significant impact associated with solar, potential impacts to species from solar energy are more variable and site-specific.

Onshore & Offshore Wind

Including turbines, sub-stations, access roads with cabling, high voltage power line and other transmission lines

Onshore - Key potential impacts

- Habitat loss and alteration through noise and light pollution, fragmentation, clearance and displacement (as some species avoid wind farms, especially offshore).
- Bird and bat collisions (and injuries) with turbines blades and/or associated transmission lines.
- Bird and bat mortality through electrocution on associated distribution lines.

Offshore - Key potential impacts

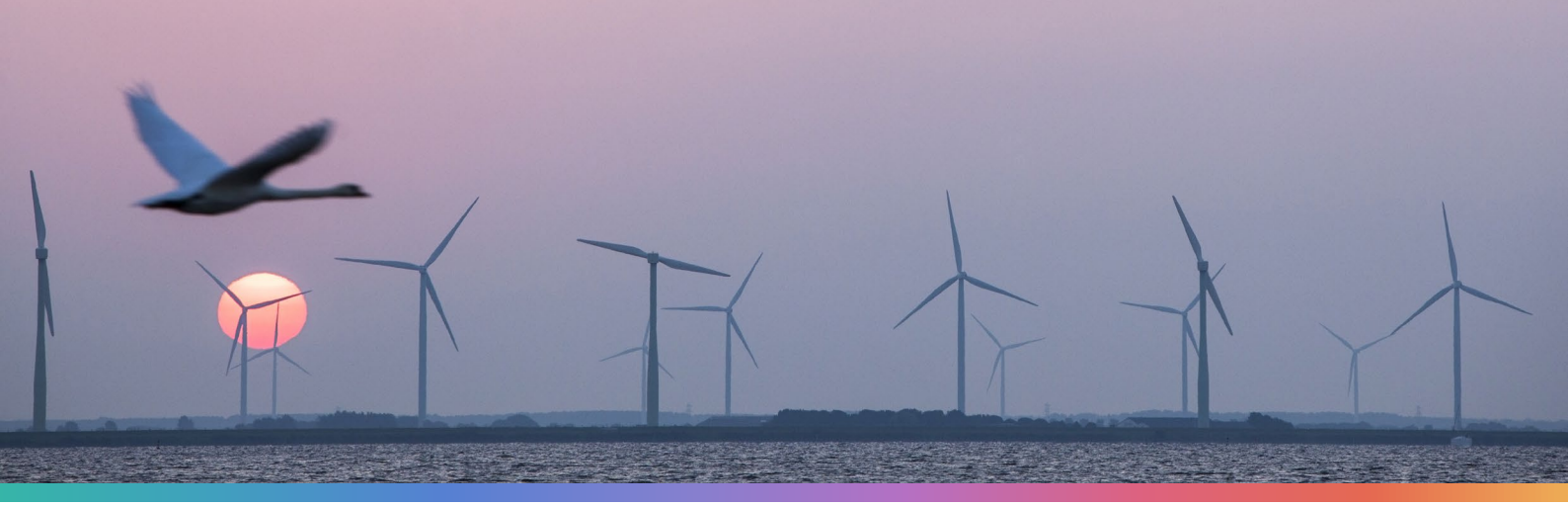
- Habitat loss and barrier effects through light pollution, birds exhibiting avoidance behaviours and direct displacement of birds that would have foraged in the area.
- Marine mammal mortality and or injury associated with turbine collisions and behavioural effects associated with increased underwater noise (especially during construction).
- Ecosystem changes through alteration of sediment movement, alteration of marine habitats and resultant trophic cascades.

Key vulnerable species

- Soaring birds, birds with limited frontal binocular vision (e.g. Gyps vultures), birds regularly flying or foraging in the rotor swept area.
- Raptors and other large perching birds (at risk of electrocution with poorly designed distribution line pylons).
- Species with high wing loading e.g. bustards, cranes, flamingos, storks, waterfowl and vultures (at risk of collision due to low manoeuvrability).
- Skuas, pelicans, terns and gulls with high collision vulnerability. Divers, grebes, sea ducks, and auks with high displacement vulnerability.
- Cetaceans.

Please see the full IUCN report for appropriate mitigation measures for these potential impacts.

7 N.B. This is a non-exhaustive list of potential impacts and vulnerable species and while impacts are not limited to these groups, further research will likely identify additional species vulnerable to wind and solar technologies. It is recommended that experts with specific local knowledge are used to accurately inform impact assessments and diligence. Renewable energy projects can also directly and indirectly impact local communities through impacts on customary habits, their livelihoods, and ecosystem services, all of which require further study.

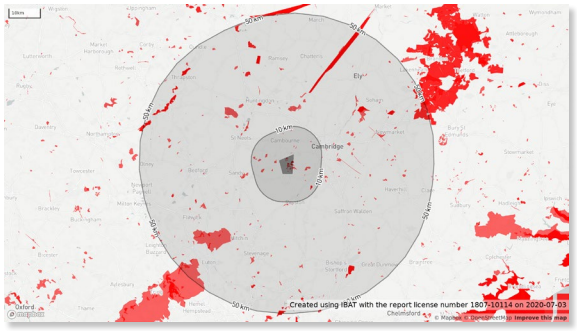


How to understand biodiversity for wind and solar investments

Understanding the potentially negative impacts of wind and solar energy on biodiversity allows investors to align their investments with the mitigation hierarchy[8] and avoid sensitive locations. To help inform an investor's due diligence process, it can be helpful to understand if a site corresponds with, for example, species at high risk of collision with wind turbines, protected areas or other areas of high biodiversity significance, such as Key Biodiversity Areas:

- Sensitivity mapping tools, such as the Soaring Bird Sensitivity Mapping Tool for the Rift Valley/Red Sea flyway, compile and map relevant data on vulnerable species (often alongside data on resource opportunity and constraints) and highlight the relative risk of developing renewable technologies (predominantly wind) in a given area;
- Strategic Environmental Assessments (SEA) such as the SEA for Wind Energy and Biodiversity in Kenya can help to identify zones for sustainable development of wind at scale and provide quick references to determine the risk of investing in a particular development.

Sensitivity mapping and Strategic Environmental Assessment are recognised as best practice for identifying risks associated with wind energy to inform project siting (see the Wildlife Sensitivity Mapping Manual) but in areas where these analyses have not yet been conducted, the next best solution for responsible investing is to consult the available local, national or regional platforms.



IBAT report output screening against Protected Areas within 50km of a project.

The Integrated Biodiversity Assessment Tool - provides a rapid, easy and desk-based solution to help identify whether developments may impact areas of high biodiversity value and Critical Habitat[9] through risk screening reports and data licencing for protected areas, Key Biodiversity Areas and IUCN Red List of Threatened Species range maps, including International Finance Corporation (IFC) Performance Standard 6 (PS6) screening reports[10] (highlighting Critical Habitat). However, due to its wide variety of applications, IBAT does not provide tailored reports that highlight the specific risks for renewables, and further diligence will be required to interpret IBAT as an early-stage risk tool in this context.

Additional tools may be worth consulting for further information about species of concern. For example, The Critical Sites Network Tool - provides information on the globally important sites for nearly 300 species of waterbirds in Africa and Western Eurasia and The Important Marine Mammal Areas (IMMA) e-Atlas, maps areas of importance for marine mammals globally.

8 The mitigation hierarchy is a tool designed to help users limit, as far as possible, the negative impacts of development projects on biodiversity and ecosystem services. It involves a sequence of four key actions—'avoid', 'minimize', 'restore' and 'offset'—and provides a best- practice approach to aid in the sustainable management of living, natural resources by establishing a mechanism to balance conservation needs with development priorities (CSBI 2015).

9 Critical Habitat is defined by IFC PS6 on Biodiversity and Sustainable Management of Living Natural Resources and identified based on five criteria that address habitat of significant importance to threatened, endemic, congregatory and migratory species, threatened or unique ecosystems, and key evolutionary processes.

10 This Briefing Note is intentionally focused on wind and solar energy, but IBAT can also be used to understand biodiversity risks for all types of infrastructure and energy development, including other renewable technologies, such as hydropower where IBAT can provide a Freshwater Report detailing freshwater species upstream and downstream of a specified location.

Potential diligence questions for investors[11]

When screening potential investments in wind and solar, the following diligence topics represent some key questions banks and investors should consider:

Golden Eagle
Aquila chrysaetos
IUCN Red List Least Concern

Asset/project-specific financing considerations for biodiversity:

- Is the project included in an area that has a land use plan/marine spatial plan or that has undergone a Strategic Environmental Assessment (SEA)?
- Has the project been sited and designed based on the implementation of the mitigation hierarchy i.e. avoid, minimise, restore and offset biodiversity impacts? (e.g. for wind energy, has the project demonstrated that it has avoided any potential impacts on disproportionately vulnerable species groups)?
- Has the project committed to post-construction fatality monitoring using a recognised fatality rate estimator for both the wind or solar site and for the associated transmission lines?
- If there are significant residual impacts, is there a credible plan for how these will be offset to achieve either at a minimum no net loss or preferably net gain?
- Can the project clearly demonstrate it will not lead to a net reduction in the global/national/regional populations of any priority biodiversity species throughout the lifecycle of the project?
- Is there a Biodiversity Action Plan or Biodiversity Management Plan in place, which details a set of management and monitoring actions that will lead to biodiversity enhancement?
- Will impacts to biodiversity affect local communities or Indigenous Peoples, and if so, is there a management plan in place to address these?
- Has the project factored curtailment (the intentional halting of turbine blades) into its energy yield assessment, so this contingency is planned for?
- Has the project or client been subject to any adverse NGO/civil society attention or subject to legal review (e.g. court hearings, re-submission of EIAs) due to its potential environmental impact? If so, have these concerns been addressed?

11 This list of questions is not intended to be a comprehensive check list of diligence questions, nor is it intended to be a check list for transactions which fall under the Equator Principles and trigger the application of IFC PS6. Application of PS6 is highly site-specific, depending on the species, ecosystems, quality of baseline data and existing biodiversity management. Fulfilling the requirements of PS6 is a significant undertaking, hence alignment is best initiated at the very start of project planning, and integrated with the development of an environmental impact assessment.

Considerations when reviewing project Environmental Impact Assessments

- Has an Environmental Impact Assessment (EIA) or equivalent study been conducted for the project (and associated infrastructure)?
- Did the EIA include a Critical Habitat assessment?
- Do the findings of the EIA align with an IBAT Report in relation to Critical Habitat or the proximate threatened species, protected areas and Key Biodiversity Areas)?
- Does the EIA include appropriate biodiversity baseline surveys undertaken across seasons and with appropriate scope (e.g. bird and bat baseline surveys ideally undertaken over two years)?
- Were appropriate stakeholders and experts consulted to better understand biodiversity risks?
- Were qualified specialists brought in to collect baseline data using the correct methodologies (e.g. acoustic detection for bats), assess biodiversity risks (e.g. the extent of collision and displacement risk) and identify appropriate mitigation measures (e.g. burying on-site collector systems and cables or installing bird flight diverters on transmission lines where necessary)?
- Did the EIA account for the cumulative effects of multiple renewable energy developments (and associated infrastructure) within the wider landscape, flyway or seascape?

Corporate-level financing considerations

E.g. for a renewables or utility companies

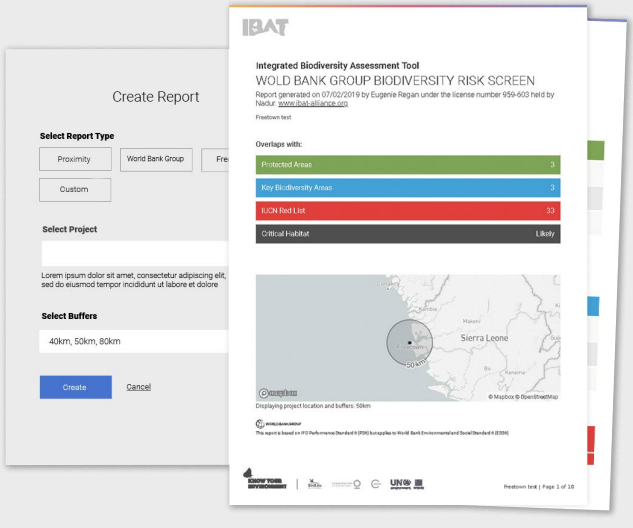
- Within the developer's organisational structure, is there appropriate senior buy-in, expertise and capacity (both at corporate and site level) to effectively manage biodiversity risk and align projects with international good practice standards, such as IFC PS6?
- Is there reporting on biodiversity risk and impact to the Board?
- Across the corporate portfolio, where projects correlate with areas of high biodiversity, is there evidence that the project(s) has followed the mitigation hierarchy and are able to achieve no net loss and/or net gain of priority biodiversity?
- Across the corporate portfolio, where developments are located near multiple other projects, is there evidence that the project(s) considered the cumulative impact on biodiversity across the region?
- Across the corporate portfolio, have any projects been subject to any adverse NGO/civil society attention or subject to legal review (e.g. court hearings, re-submission of EIAs) due to its potential environmental impact? If so, have these concerns been addressed?

Integrated Biodiversity Assessment Tool (IBAT)

IBAT is a web-based map and reporting tool that provides fast, easy and integrated access to three of the world's most authoritative global biodiversity datasets: The IUCN Red List of Threatened Species, the Database on Protected Areas, and the World Database of Key Biodiversity Areas.

IBAT can also help users understand the "range rarity" (rarity-weighted species richness) of certain locations, which considers the number of species present at a given location and the relative importance of that location for the species, in terms of the proportion of its global range that it represents.

IBAT provides a variety of reports that help understand biodiversity risk at a selected site.



IBAT PS6 and ESS6 Report suitable for screening against IFC and World Bank standards

Further references

Key reference:

This briefing note is predominantly based on the IUCN/TBC Guidelines on Mitigating Biodiversity Impacts Associated with Solar and Wind Energy.

Further reading and resources:

Convention on Biological Diversity.

CSBI (2015). A cross-sector guide for implementing the mitigation hierarchy. Prepared by the Biodiversity Consultancy on behalf of IPIECA, ICMM and the Equator Principles Association: Cambridge UK.

Environmental, Health & Safety Guidelines Wind Energy (IFC, 2015).

European Commission (2020) The Wildlife Sensitivity Mapping Manual: Practical guidance for renewable energy planning in the European Union.

European Commission 2030 Biodiversity Strategy.

How to make biodiversity surveys relevant to your project, Industry Briefing Note of The Biodiversity Consultancy (TBC, 2018).

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

International Renewable Energy Agency (IRENA).

Performance Standard 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC, 2012).

Solar Energy: Managing Biodiversity Risks, Industry Briefing Note of The Biodiversity Consultancy (TBC, 2018).

The Science Based Targets Network (SBTN).

Wind Energy: Managing Biodiversity Risks, Industry Briefing Note of The Biodiversity Consultancy (TBC, 2019).

IBAT

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