Wingspan 2024

Partnerships for a bird-friendly energy transition

Report

November 2024

Content

1. Introduction

Wingspan - Nature-positive energy transition is a biennial conference for nature conservationists, scientists, renewables developers and operators, electricity grid operators, and government and authority representatives to share strategies and solutions for a nature-positive energy transition. Wingspan fosters dialogue and solution-oriented learning by showcasing recent scientific knowledge, state-of-the-art conservation strategies, and nature-inclusive technological innovations.

From 15 – 17 October 2024 in Brussels the inaugural edition of Wingspan, a new biennial conference for a nature-positive energy transition was organised. This year, we showcased partnerships between electricity grid operators, renewables developers and operators, and environmental civil society – and fostered an environment for new partnerships to be born.

This report provides a summary of the first Wingspan Conference in 2024, which was organised together with TB Raab, RGI (Renewables Grid Initiative) and Elia group in the course of the LIFE projects Great Bustard, EUROKITE and SafeLines4Birds.

More information here
TB Raab GmbH
Renewables Grid Initiative (RGI)

2. Wingspan 2024

TB Raab, RGI and Elia group organised in Brussels from 15 to 17 October the 'Wingspan 2024: Partnerships for a bird-friendly energy transition'. This conference was the first in a series of biennial conferences for conservationists, scientists, grid operators, renewable developers, and government representatives to share strategies and solutions for a nature-positive energy transition. Topics designed for an international audience covered recent scientific knowledge, state-of-the-art conservation strategies, and nature-inclusive technological innovations.

With 320 online and in-person attendees (Figure 1 to 3), the event brought together a diverse range of stakeholders - grid operators, NGOs, renewable energy developers, academics, and authorities - from across the globe to address the urgent need for a nature-friendly energy transition. The conference featured insightful panel discussions, scientific presentations, a workshop, a poster session, and a fair showcasing bird protection devices used along power lines and wind energy infrastructure.

Key messages from the conference included:

- The LIFE Programme is a critical funding source for collaborative projects between grid operators, renewable developers, NGOs, and academic institutions, enabling effective mitigation measures and fostering innovation.
- While EU frameworks for nature protection and the deployment of renewable energy are in place, their implementation remains uneven across Member States, requiring further harmonization.
- Risk mapping is a valuable tool for identifying areas suitable for new projects and prioritizing mitigation measures along operational infrastructure.
- Robust data across all represented sectors is crucial for making informed, data-driven decisions for the acceleration of deployment of energy infrastructure.

On the first day of the conference, Wingspan featured an engaging **vendor fair**, showcasing technologies from around the world aimed at reducing the impact of energy infrastructure on bird populations. Exhibitors presented diverse solutions, including bird flight diverters, avian radar systems, and sensor-equipped wind turbine enhancements, all designed to protect avian species while supporting the shift to sustainable energy. Attendees had the unique opportunity to interact directly with manufacturers, gaining insights into the latest innovations in bird-friendly energy infrastructure. List of the manufacturers present at the fair:

- Sens Of Life from France
- TE Connectivity from France, UK and Belgium
- Deák Delta Ltd from Hungary
- Power Line Sentry from USA

- Pitch Aeronautics from USA
- Balmoral Engineering from Australia
- SAPREM from Spain
- Scientias-Energy from Ireland

On the second day, a dedicated **poster session** showcased scientific studies, best practices, and pioneering projects exploring the interactions between power lines, wind farms, and bird populations. Participants had the chance to engage in in-depth discussions, delving into both the scientific methodologies and the practical applications of these initiatives. **All posters are available for download below.**

RGI also hosted a **parallel workshop to discuss the "7 Principles for a Bird-Friendly Grid," endorsed** by Europe's conservation community. This workshop featured breakout sessions where representatives from power grid operators and civil society came together to explore solutions outlined in the document and discussed ways forward. A summary of the workshop's outcomes will be published in the coming months.

On the third day an excursion to explore nature and conservation technologies around Elia's infrastructure took place at Elia's Noordschote substation and the beautiful Blankaert Nature Reserve.

This year's Wingspan emphasized the importance of multi-sector partnerships in ensuring a sustainable energy transition. The best practices, site visit, and connections formed during the event have laid the groundwork for a more nature-friendly approach to energy development. We are looking forward to continuing these discussions at the next edition in 2026.

Wingspan 2024 was organized within the framework of the SafeLines4Birds, LIFE EUROKITE, and LIFE Great Bustard projects.

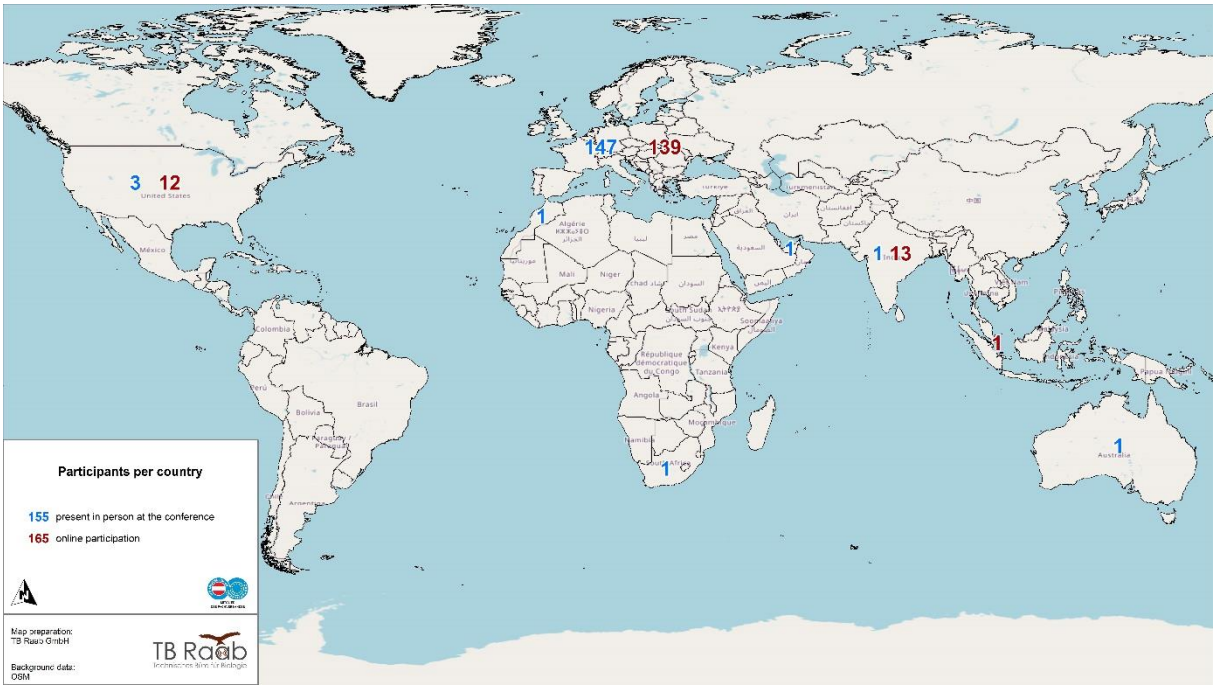

Figure 1: Overview of the participants at the Wingspan Conference 2024 worldwide.

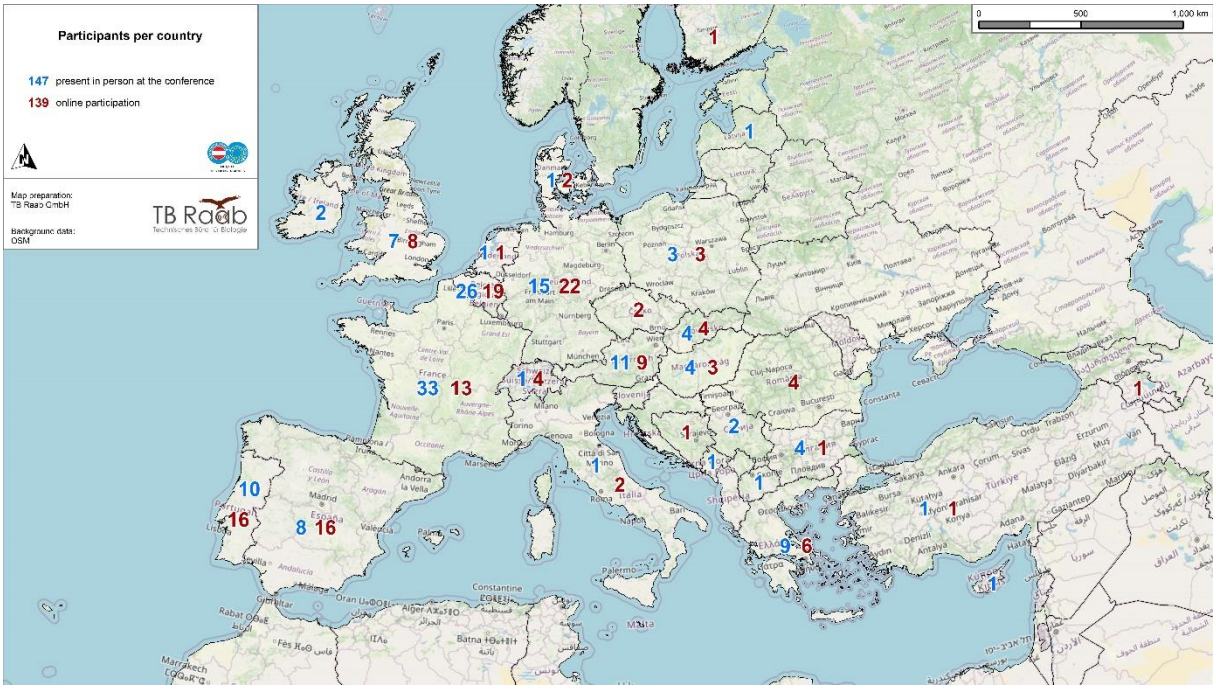

Figure 2: Overview of the participants at the Wingspan Conference 2024 in Europe.

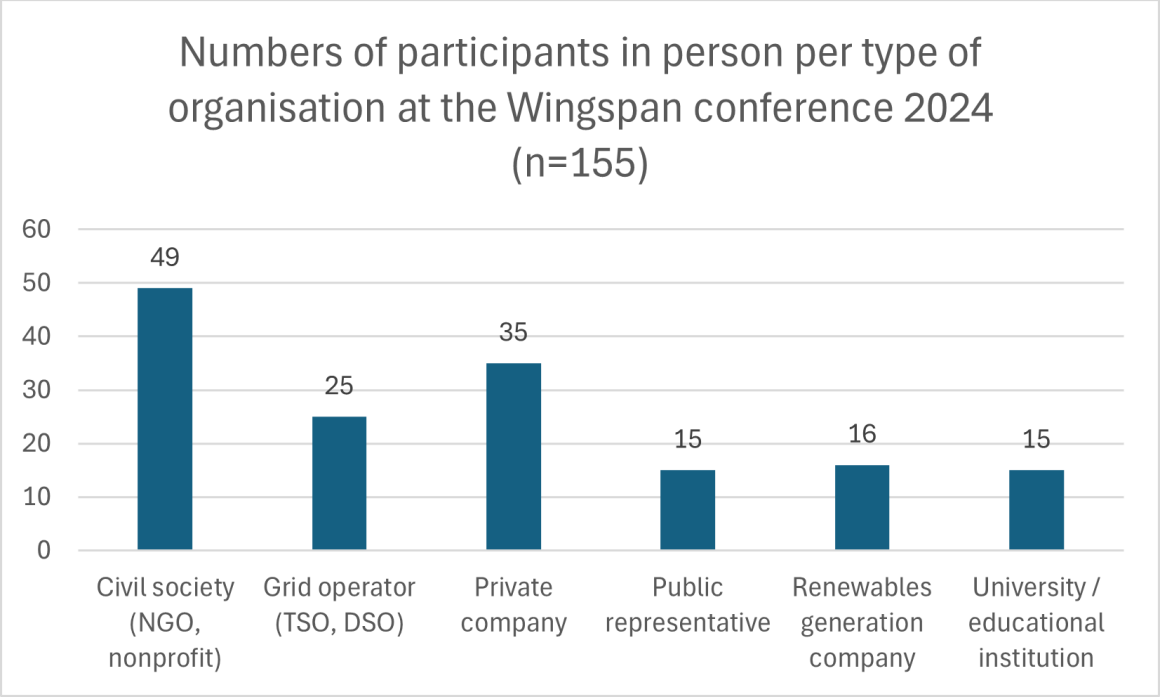

Figure 3: Overview of the participants in person per organization type at the Wingspan Conference 2024.

3. Agenda Wingspan 2024

Place: Flagey, Pl. Sainte-Croix 1050 Brussels, Belgium

Tuesday | 15 October 2024

08:00 **Welcome & Registration**

08:45 **Vendor Fair until 17:30**

08:45 **Opening Words**

- Sylvia Barova, Advisor, EU LIFE Programme
- Dr. Rainer Raab, CEO, TB Raab
- Liam Innis, Senior Manager – Energy Ecosystems, RGI
- Olivier Feix, Head of Strategy, Elia Group

09:20 **High-Level Keynotes**

- Andrea Vettori, Head of Unit, Directorate-General for Environment
- Paula Rey, Deputy Head of Unit, Directorate-General for Energy

09:40 **Keynote: Potential impacts of grids & renewables infrastructure on birds**

- Tris Allinson, Senior Scientist, BirdLife International

10:10 **Panel: Unlocking the path to a bird-friendly energy transition**

- Guillaume Marchais, Senior Environmental Specialist, EDP Renewables France
- José Tavares, Director, Vulture Conservation Foundation
- Lisa Garnier, Senior Expert Grid & Biodiversity R&D, RTE

- Stefania Charisiadou, Nature Conservation Policy Officer, DG Environment Moderator: Olivier Feix, Head of Strategy, Elia Group

11:15 **Coffee Break**

11:45 **Keynote: Low and medium-voltage cable undergrounding in Austria**

- Klaus Maras, CEO, BE Energy GmbH

12:15 **Presentations: Technologies & solutions to reduce bird mortality around energy infrastructure**

Preventing wildlife electrocution, global best practices

- Brian McGowan, Founder & Managing Director, Scientias Ireland Limited

Probabilistic predictions of bird collisions at wind turbines and power lines

Dr. Moritz Mercker, Managing Director, Bionum GmbH

Conservation of birds through the insulation of overhead power lines in Bulgaria

- Lyubka Vasileva, Team Leader Innovation & EU Projects, EVN Bulgaria

Video monitoring in Austria and Germany - bird behaviour around power lines

- Rainhard Raab, Deputy CEO, TB Raab

13:30 **Lunch**

14:30 **Panel: From Science to Practice – Translating scientific findings into legislation and effective implementation of measures**

- Dr. Constance Blary, Postdoctoral Researcher, CNRS
- Liam Innis, Senior Manager – Energy Ecosystems, RGI
- Anouk Puymartin, Policy Manager, BirdLife Europe and Central Asia
- Moderator: Frank Vassen, Policy Officer, DG Environment

15:30 **Coffee Break**

16:00 **Presentations: Data & sensitivity mapping to understand and prevent mortality risks for birds**

Mitigating bird-caused electrical faults in a transmission grid in Portugal

- Dr. Joana Bernardino, Researcher, BIOPOLIS/CIBIO

The Avian Sensitivity Tool for Energy Planning

- Bruna Arbo-Meneses, Science Officer Bird & Energy, BirdLife International

Sensitivity maps for collision and electrocution in France

- Ingrid Marchand, Coordinator LIFE Project SafeLines4Birds, LPO France

Habitat use and influence of the energy infrastructure on Great Bustard

- Dr Soňa Svetlíková, Scientist at Comenius University

Results of mortality of red kite in Europe

- Dr. Rainer Raab, CEO, TB Raab

17:20 **Closing Words**

17:30 **End of Day**

Wednesday | 16 October 2024

08:30 **Welcome & Registration**

09:00 **Panel: Balancing nature-positive with accelerated renewable energy deployment**

- Miguel Mascarenhas, Biologist and Environmental Specialist, Bioinsight
- Lukas Zantopp, Head of Environmental Planning & Nature Protection, Amprion
- Zuzana Guziová, Executive Director, Raptor Protection Slovakia
- Dr Sebastian Dunnett, Senior Programme Officer, Nature Economy, UNEP-WCMC
- Moderator: Liam Innis, Senior Manager – Energy Ecosystems, RGI

10:00 **Coffee Break**

10:30 **Presentations: Case studies of successful multi-stakeholder collaborations**

SafeLines4Birds

- Manon Quetstroey, Manager– Energy & Nature, RGI

LIFE EUROKITE

- Dr. Rainer Raab, CEO, TB Raab

Collaboration between nature NGOs and Elia, the Belgian TSO

- Olivia Geels, Environment Expert, Elia
- Jean-Yves Paquet, Director Department of Studies, Natagora

LIFE Great Bustard

- Dr. Rainer Raab, CEO, TB Raab

12:00 **Poster Presentations**

12:15 **Lunch & Poster Session**

14:00 **Group One: Workshop – Connecting Biodiversity 2.0**

Group Two: Poster Session & Networking Opportunity

15:00 **Coffee Break**

15:30 **Group One: Workshop – Connecting Biodiversity 2.0**

Group Two: Presentations – Global Solutions for Global Challenges: Case studies from around the world

Impact of energy infrastructure on vultures and other wildlife in Africa

- André Botha, Vulture for Africa Programme Manager, Endangered Wildlife Trust

Impact of overhead power lines on avifauna in India

- Vidhi Modi, PhD Candidate, M. K. Bhavnagar University

EUFLYNET COST Action - coordinating research for the protection of migratory birds

- Dr. Ivan Maggini, Scientific Coordinator, Austrian Ornithological Centre

Mapping priority areas for reducing bird electrocution of Lear's Macaw in Brasil

- Dr. Larissa Biasotto, Science Officer Birds & Energy, BirdLife International
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16:40 **Closing Remarks**

17:00 **End of Day**

Thursday | 17 October 2024

Get ready for an immersive day exploring nature and conservation technologies around Elia's infrastructure!

We ask all participants to join us at **7:45** to board the buses before we hit the road at **8:00**. We will then head to Elia's Noordschote substation, where we will get an up-close look at the wire markers. Experts from Elia and Natuurpunt will share insights on how their successful collaboration helps preventing bird mortality by collision.

We will arrive at our next stop at **11:00**, the beautiful Blankaert Nature Reserve for a guided tour. The tour involves a walk through the reserve and a stop by the observation tower where we will be able to observe different bird species in the reserve. Afterwards, we will head back to the visitor centre – a total walk of 3 km – for a lunch before our return trip to Brussels.

We will arrive back in Flagey by **15:30**, wrapping up a day filled with exploration, learning, and nature.

4. Panel summaries

Panel 1: Unlocking the path to a bird-friendly energy transition: Key factors and strategies

Moderated by Olivier Feix of Elia Group, the discussion showcased successful bird-friendly energy projects and offer practical strategies for integrating biodiversity protection into power grid and renewable energy development. Experts, including Lisa Garnier-Durand from RTE and Guillaume Marchais from EDP Renewables France, shared insights on mitigating risks to bird populations around the power grid and onshore wind farms in France. José Tavares of the Vulture Conservation Foundation discussed the challenges that vultures face near wind farms and grid networks, alongside other legislative topics. While Stefania Charisiadou from DG Environment highlighted the role of European policies and initiatives in protecting biodiversity to support the success of energy transition. Participants gained valuable, actionable insights to shape future energy projects that prioritise both wildlife and the acceleration of the deployment of energy infrastructure.

Panel 2: From science to practice: Translating scientific findings into legislation and effective implementation of measures

Moderated by Frank Vassen of DG Environment at the European Commission, the panel focused on the importance of effectively translating scientific research into legislation and practical solutions for wind energy and power grid infrastructure to protect birds. Experts like Dr Constance Blary shared insights on bird sensory ecology and how to implement effectively finding into mitigation strategies, while Dr Ricardo Martins introduced the existing collaboration in Portugal between research institutions and REN, the national transmission system operator. Liam Innis discussed the upcoming review document on the effectiveness of bird flight diverters and the challenges of finding comparable studies on industry practices. Finally, Anouk Puymartin provided examples of successful advocacy initiatives for stronger bird protections through policy and shared the role and challenges of civil

society, like BirdLife Europe, to ensure scientific findings are successfully translated into policy. Attendees learned how partnerships between researchers, civil society, industry, and policymakers can lead to effective biodiversity conservation in renewable energy projects.

Panel 3: Balancing nature-positive with the acceleration of renewable energy development: Pathways to success

Moderated by Liam Innis of the Renewables Grid Initiative, the panel explored how to balance biodiversity conservation as a whole with the necessary expansion of renewable energy infrastructure. Panellists shared insights from real-world projects, discussing the challenges of meeting renewable energy goals while reaching nature-positive. Key topics include the successful approaches, where energy projects contribute positively to nature, and how conservation strategies can be integrated into operations. The panel also examined regulatory frameworks like the Nature Restoration Law and the Renewable Energy Directive (RED III). Attendees gained practical insights on tools, metrics, and best practices for achieving nature-positive energy infrastructure.

5. Presentation summaries

The presentations can be found under the following link: https://www.tbraab.eu/en/1166.html

Preventing wildlife electrocution, global best practices

Brian J. McGowan, Founder and Managing Director, Scientias-Energy Convenor of “Methods of reducing electrocution of birds from power lines”

Wildlife electrocution is a global challenge, predominantly evident on overhead distributions lines and in open substations. Hundreds of millions of birds and small animals are electrocuted or maimed on power lines every year often causing costly power outages and equipment damage. This presentation summarize the causes and consequences of wildlife electrocution and communicate the key principles underpinning global best practices for both:
A. Design principles for wildlife safe infrastructure.
B. The use of retrofittable insulation and guards to prevent electrocution
The presentation will also address utility concerns and expectations of utilities which must be met in order to qualify any solution a success; wildlife protection, power continuity, asset protection, fire risk prevention and long durable life time.

Probabilistic predictions of bird collisions at wind turbines and power lines

Dr. Moritz Mercker, Managing Director at Bionum GmbH and researcher at the Heidelberg University, Institute of Applied Mathematics

Bird collisions with wind turbines are a controversial issue. While wind power expansion is essential to combat climate change, it also raises the risk of bird collisions, particularly for large birds and birds of

prey. The specific risks, such as the distance from breeding sites or the landscape's impact on collision likelihood, are often unclear, leading to uncertainties in species conservation assessments during approval processes. The recently developed "RKR model" addresses these uncertainties by mathematically analyzing extensive bird movement data. Applied to red kites during the breeding season, it reliably predicts land use and collision risks for planned projects. This scientific approach not only ensures transparent results but also shortens the approval process. Currently, we are also adapting the model to address bird collisions with power lines.

Conservation of endangered bird species through the insulation of dangerous overhead power lines around the Burgas Lakes

Lyubka Vasileva, Team leader of Innovations and EU funded projects, Elektrorazpredelenie Yug EAD

The project "Conservation of endangered bird species through the insulation of dangerous overhead power lines around the Burgas Lakes" (LIFE20 NAT/BG/001234) aims to protect bird populations threatened at the European level. These include nesting, wintering, and migrating birds at risk of unnatural mortality due to electrocution and collision with power lines in the Burgas Lakes area — a key migration route between Europe and Africa. The project contributes to the EU's Biodiversity Strategy and the European Green Deal by mitigating biodiversity loss. Key activities include developing a GIS database for medium-voltage power lines and bird species distribution, identifying high-risk areas, replacing 58 km of overhead lines with underground cables, and installing bird diverters to reduce collision risks. Monitoring and evaluating the project's ecological and socio-economic impacts are also central. The project runs from September 2021 to September 2026 and involves several partners, including EVN and the Bulgarian Society for the Protection of Birds, with funding from the EU's LIFE program.

Video monitoring in Austria and Germany - bird behaviour around power lines

Rainhard Raab, Deputy CEO, TB Raab GmbH

Power lines can be dangerous and even fatal obstacles for birds due to electrocution and collisions. Death by electrocution or collision affects a wide range of bird species. In December 2012, TB Raab began video-based monitoring of power lines. Studies have since been carried out to analyse bird flight activity on various power lines in Austria and Germany. Thousands of power line crossings by individuals and flocks have been analysed. Collisions mainly involved the mute swan. However, collisions of cormorants, ospreys and mallards were also recorded.

Mitigating bird-caused electrical faults in a transmission grid increasingly used by nesting white storks: the successful Portuguese case study

Dr. Joana Bernardino, Researcher, BIOPOLIS/CIBIO

In Portugal, the white-stork *Ciconia ciconia* population has significantly increased since the mid1980's, along with the number of nests in the transmission grid managed by REN (Rede Eléctrica Nacional, S.A.). Breeding on transmission pylons (particularly at ≥150 kV) is a major concern due to electrical faults caused by nest material or bird droppings. Therefore, in the mid-1990s REN started a nest management program including annual monitoring and translocation/removal of nests in hazardous locations of pylons, installation of deterrents (mainly "anemometers") in those locations and nesting-platforms in safe locations of pylons. In this work, framed in the partnership between REN and BIOPOLIS/CIBIO research centre, we evaluated the overall success of the nest-management program in reducing bird-related fault rates in the 2001-2018 period, despite a 3-fold increase in the number of stork-nests on transmission pylons. We also evaluated the effectiveness of "anemometers" (alone) in preventing nest-reconstruction and found opportunities for reducing nest-management efforts.

AVISTEP: a sensitivity mapping tool to improve bird conservation in energy planning

Bruna Arbo Meneses, Science Officer, Birds and Energy at BirdLife International

To meet renewable energy targets in a nature-safe manner, it is essential to integrate information on biodiversity early in the planning process. No wildlife group is more sensitive to renewable energy infrastructure and overhead powerlines than birds. As a result, the creation of avian sensitivity maps is increasingly seen as an essential precursor to large-scale renewable energy expansion. Launched in 2022, AVISTEP: the Avian Sensitivity Tool for Energy Planning (avistep. birdlife.org) provides detailed assessments of avian sensitivity concerning a range of energy infrastructure types, namely wind energy (both on- and offshore), solar photovoltaics, and powerlines (both high voltage transmission lines and lower voltage distribution lines). Initially covering India, Nepal, Thailand and Vietnam, it expanded to Uzbekistan, Kenya, Egypt, Laos in September 2024. BirdLife's aim is to rapidly expand AVISTEP to become the preeminent planning tool providing information on bird and biodiversity sensitivity to inform the responsible expansion of renewable energy worldwide.

Development of avian sensitivity maps to rank the risks of collision and electrocution for avifauna and prioritise the lines to be neutralised in France

Ingrid Marchand , SafeLines4Birds project coordinator, LPO France

The network of power lines constitutes an obstacle on the aerial grid and is the cause of fatal collisions and electrocutions for avifauna. Some sectors are particularly sensitive, either because of the diversity of species that frequent them, or because of the presence of species that are highly sensitive to these risks. For this reason, one of the actions of the LIFE SafeLines4Birds project is to develop a tool for spatially prioritising the sensitivity of avifauna to the risk of collision and electrocution in France. This tool is based on naturalist field data and supplemented by statistical modelling and spatial processing in order to build up a homogeneous knowledge base on the distribution of sensitive bird species that

nest and winter in France. These sensitivity maps will enable DSOs and TSOs to create an intervention strategy to reduce the impact of the power lines on avifauna.

Habitat use & influence of the grid infrastructure on the Great Bustard population

Mgr. Soňa Svetlíková, PhD., Research assistant, Comenius University, Faculty of Natural Sciences, Bratislava

The Great Bustard *(Otis tarda)* is an prominent example of a globally threatened bird whose survival is almost exclusively restricted to agricultural land and largely depends on habitat conservation measures. However, with increasing intensification and the development of renewable energy sources, the pressure on existing habitats still persists. The main objective of this study was therefore to examine more than 179,614 bustard observations together with more than 20 habitat variables that operate in a human-altered world. The main aim was to understand the critical habitats for bustard survival along with identifying the most important stepping stones by mapping potential movement corridors between suitable habitats. The results of this study can provide new insights into the habitat use of the bustard, which is essential information for the implementation of conservation measures to mitigate the risk of extinction of this large agricultural bird.

Results of mortality of red kite in Europe

Dr. Rainer Raab , CEO, TB Raab

Impacts of human activities on wildlife are undeniable, however, major threats often remain unclear and how these differ across geopolitical borders. We used state-of-the-art GPS satellite telemetry to detect red kite *(Milvus milvus)* mortality events and their causes across Europe. By tracking 2,346 red kites throughout their continental range between 2013 and 2022, we obtained data for 979 mortality events of which 821 were conclusive. For 624 post-fledgling birds, for which mortality causes were conclusive, human-related mortality accounted for 69.1% of deaths. Among them, major mortality causes included poisoning (25.2%), road (10.9%) and rail (5.4%) collisions, shooting/trapping (8.7%), collisions with or electrocution on power lines (9.9%), and collisions with wind turbines (3.8%). Predation was the most prevalent natural mortality cause totaling 25.3% of all cases. We see significant potential for policy-makers and businesses involved with the transition toward renewable energy to reduce anthropogenic mortality in raptors.

SafeLines4Birds – Reducing bird mortality along power lines

Manon Quetstroey, Manager Energy & Nature, Renewables Grid Initiative

LIFE SafeLines4Birds is a 6-year project which aims to reduce the mortality of 13 bird species around power lines in France, Belgium, and Portugal. The project relies on four objectives: reduce

bird collision, electrocution and disturbance, and improve and share knowledge across Europe. To tackle collision risk, existing anti-collision devices will be installed, and new devices will be tested, such as the American ultra-violet Avian Collision System Avoidance. The performance of these installed devices will be evaluated using cameras. To reduce electrocution, dangerous power poles will be retrofitted and insulated, and deterrence devices, platforms, and perches to protect roosting and nesting individuals will be installed. Finally, grid maintenance methodology will be adapted to avoid disturbance and nest abandonment during the breeding season.

LIFE Great Bustard

Mag. Dr. Rainer Raab, CEO, TB Raab GmbH

Austria and Hungary have been very active in Great Bustard conservation for more than 20 years. Based on the positive effects of the measures taken within the former LIFE projects, one of the objectives of LIFE Great Bustard is to reduce the threat of collision with power lines – for many years the number one mortality factor for immature and adult Great Bustards. Not only the world population, but also the population of Europe has declined by more than 30 % in 11 years. However, thanks to the conservation efforts and the cooperation with farmers and hunters, the West Pannonian population of Great Bustards (including parts of Austria, Hungary and Slovakia) increased from 286 individuals in 2005 to 681 in 2024. Between 2005 and 2023 a total of 293 km medium voltage power lines were removed, and 162 km high voltage power lines were marked in Austria and Hungary.

Collaboration between nature NGOs and Elia, the Belgian TSO

Olivia Geels, Environment Expert, Elia
Jean-Yves Paquet, Director of Studies Department, Natagora

Elia, the Belgian TSO, collaborates with nature organizations to understand how to reduce bird mortality along power lines. Natuurpunt and Natagora, the two BirdLife partners in Belgium, joined forces to create in 2012 the first sensitivity map for bird collision. The whole Belgian grid was then given a collision risk score, that Elia uses to plan mitigation actions (identify on which lines and spans to place bird deterring devices). New versions of the risk map were produced in 2015 and 2021 from most recent bird distribution derived from citizen science monitoring. In the meantime, Elia introduced the objective of marking all the most dangerous lines for birds (200 km in Belgium) in its “ActNow” sustainability program. For more than 10 years, Natagora and Natuurpunt have kept bringing their expertise to Elia, including to identify the best way to equip power lines. The presentation will focus on this successful collaboration.

LIFE EUROKITE

Mag. Dr. Rainer Raab, CEO, TB Raab GmbH

The main goal of the LIFE EUROKITE project is to reduce anthropogenic causes of mortality of the red kite in Europe. The efficient protection of the red kite requires the detailed understanding of overall mortality reasons, especially focusing on those caused by legal and illegal human activities. The LIFE EUROKITE project focuses on a Europe-wide representative sample which is achieved by using high-resolution GPS telemetry tracking of more than 3,000 tagged red kites from 15 European countries, allowing fast and exact locating of dead birds. This considerable database is only possible through cooperation and data exchange with multiple international partners. Within the LIFE EUROKITE project different actions are carried out. One of them is the underground cabling and marking. With the help of the telemetry data of tagged red kites we selected most relevant sections of power lines and made them safer by underground cabling in Austria. This measure also saves the lives of other bird species.

The Great Unknown - impact of energy infrastructure on vultures and other wildlife in Africa

André Botha, Vultures for Africa Programme Manager, Endangered Wildlife Trust, South Africa

More than 60% of the human population in Africa does not have regular or reliable access to electrical power and there are various large-scale plans to address this ever-growing need across the continent over the next 30 years. Existing energy generation and transmission systems are often outdated and pose a significant risk of electrocution on and collision with infrastructure to vultures and other large soaring birds. Despite this known risk, there has been limited effort across the continent to monitor and assess the impact of existing networks and to implement measures to ensure that planned developments are done within acceptable environmental guidelines and policies. There are however a few excellent examples from Africa of multi-sector cooperation and engagement to reduce the risk and mitigate the risk posed by energy infrastructure. We will share some examples of this and make suggestions on how this can be expanded across the continent.

Impact of Overhead Powerlines on Avifauna of Important Bird Areas in Coastal Taluka (Abdasa) of Kutch district, Gujarat, India

Vidhi Modi, PhD candidate at M.K. Bhavnagar University & Senior Research Fellow at The Corbett Foundation

From 2021 to 2023, we studied bird mortalities from powerline collisions in saltpans and coastal grasslands in Western India, a part of the Central Asian Flyway. The area hosts ~390 migratory and resident avian species, including two critically endangered bustard species. We assessed the persistence rate and efficacy of four types of Bird Flight Diverters (BFDs) on 11kV and 66kV powerlines. We also studied bird crossings, carcass searches and carcass persistence rates. The BFD persistence revealed that 72% of the total installed BFDs (n=747) became non-functional within 18 months. The observations of ~2400 hours revealed 33,000 individuals of 113 bird species crossing the powerlines. A total of 58 bird mortalities, belonging to 25 species, were found. Annual mortalities of 759 birds-km

for 11kV and 140 birds-km for 66kV were estimated. Considering the area's ecological significance, it is imperative to mitigate the threat of powerline-induced avian mortalities.

The EUFLYNET COST Action - coordinating research for the protection of migratory landbirds

Ivan Maggini, Scientific Coordinator Austrian Ornithological Centre – University of Veterinary Medicine Vienna, Austria

The EUFLYNET COST Action was officially launched in November 2023 with the goal of creating a network of researchers to coordinate efforts for the effective conservation of migrant landbirds in Europe and beyond. During the four years of the Action, we hope to achieve the preparation of multiple Species Action Plans to be submitted to the relevant authorities. One of the main aims is to put together the scientific community and the relevant stakeholders to address common issues and find sustainable solutions. Therefore, we are addressing partners in the energy sector, as well as in the policy-making, economy, agroforestry, and education sectors. In this presentation, I will introduce the Action hoping to provide a chance of starting a dialogue that may be brought forward by scientists and energy providers together.

Mapping priority areas for reducing bird electrocution: a case study of the Lear's Macaw

Dr. Larissa Biasotto, BirdLife International. Science Officer, Birds & Energy

Installing new powerlines is fundamental to transporting energy and supplying the growing demand, reaching remote human communities without energy access. However, the expansion of the distribution grid is not devoid of biodiversity impacts, notably bird electrocutions. It is urgent to identify and mitigate powerlines that threaten bird populations and advocate for more bird-friendly powerlines. In this presentation, I will share some preliminary outcomes by using a model approach to assess the risk of electrocution and spatially prioritize mitigation efforts, using Lear's Macaw as an example. Lear's Macaw is endemic to Caatinga, Brazil, and is classified as Endangered in the IUCN Red List. Due to unique morphological and behavioural characteristics, its population has been jeopardized by numerous events of electrocutions. Our approach demonstrates the ability to identify priority areas for electrocution mitigation, encouraging energy companies to systematize the implementation of mitigation measures, even when data is scarce.

6. Poster session

The importance of high-quality data about wind energy infrastructures for biodiversity conservation

Jacopo Cerri, PhD, Postdoc researcher, Department of Veterinary Medicine, University of Sassari

Reconciling wind energy development with biodiversity conservation requires accurate maps. We used satellite images from Google to assess the accuracy of three publicly available maps at portraying

onshore turbines in Sardinia (Italy). Then we overlapped these maps with feeding events (n = 1,562) of Griffon Vultures (Gyps fulvus), to quantify existing bias in collision risk estimation. We mapped 1,155 turbines, far more than those reported by other datasets. Collision risk calculated with these datasets was lower than that obtained from truly operative turbines. Planned wind farms would increase turbines by 89% and in turn significantly raise collision risk. Our findings raise serious questions about bias in wind energy maps and highlight that such bias might in turn affect collision risks estimates. Developing transparent and reliable maps of wind energy infrastructures is a priority for biodiversity protection.

Conservation of threatened birds trough retrofitting of hazardous overhead powerlines in Natura 2000 sites in Western Bulgaria

Mariya Georgieva, Project manager, Electrodistribution Grid West, Head of sector “Ecology”

The high expectations that today’s consumers have for electricity distribution companies, the need to ensure quality and safe power supply, as well as the highly developed responsibility for the protection of endangered bird species, leads to the implementation of various measures to secure the risk poles and overhead power lines. Part of the set goals of EDG West for the protection of birds are achieved through the implementation of the LIFE BIRD ON POWER LINES project, in partnership with the Bulgarian Society for the Protection of birds. The main actions are related to conducting field surveys, because of which the riskiest power lines for birds are identified and subsequently secured. The development of bird-friendly pole and its installation on site is the project’s greatest achievement. The monitoring shows that the implemented activities have a high positive effect and minimize bird mortality caused by electrocution, nest ignition and/or collision with overhead power lines.

Cumulative impact of wind energy on red kite population in Wallonia and feedback on the use of two automatic bird detection systems

Arnaud Beckers, Senior project manager, CSD Engineers

The impact of wind energy on European raptor populations is a matter of concern considering the high number of carcasses found under wind turbines. We studied the impact of existing and planned wind turbines in Wallonia (Belgium) on the European-endemic red kite through systematic carcass searches and population viability analysis (PVA). Results of the PVA are highly dependent on the estimated carrying capacity and initial population growth rate. If wind energy capacity is multiplied by 3.4 as planned by the regional government, and if current red kite population growth continues, the population trend is expected to remain positive and the population in 2052 would be 4-12% smaller than what we would expect without new wind turbines. The population trend would start to decrease if population growth rate decreases to 1-3% (without the impact of new turbines). Finally, we present 2 bird detection systems that can help to reduce this conflict.

Effects of wind turbine dimensions on the collision risk of raptors: a simulation approach based on flight height distributions

Dr. Tonio Schaub, Mediterranean Institute of marine and terrestrial Biodiversity and Ecology (France) / ENGIE Lab CRIGEN (France) / University of Groningen (Netherlands) / Dutch Montagu's Harrier Foundation (Netherlands); postdoctoral researcher

Informed selection of wind turbine dimensions could mitigate the collision risk of birds. Using a simulation approach based on flight height distributions and a collision risk model, we showed that turbine dimensions indeed had substantial effects on collision risk in six European raptor species. With increasing ground clearance of wind turbines, collision risk decreased in the five species showing flight height distributions with a low mode (< 30 m agl; e.g. Red Kite), while it increased in Short-toed Eagles (mode between 120-260 m agl). Moreover, when the rotor diameter increased at fixed ground clearance, the collision risk per MW decreased in the species with low mode. Given these species-specific effects, wind energy planning should consider the composition of the local bird community when selecting wind turbine dimensions. An online tool allowing practitioners to apply our simulation approach for wind energy projects is currently under development.

We make the power lines along the Danube River safe for birds

RNDr. Marek Gális, PhD., Scientific coordinator LIFE project Danube Free Sky, Raptor Protection of Slovakia

One of the biggest threats for many bird species is electrocution and collisions with power lines causing thousands of avoidable deaths and injuries. These impacts are targeted by the LIFE Danube Free Sky project, representing a unique example of wide transnational cooperation of 15 partners from Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, and Romania, along one of the most important migration corridors, stop-over sites, and wintering places for many bird species in Europe - the Danube River. Over 80 field assistants carried out a field survey (01/2021 - 10/2022), that covered almost 1,580 km of power lines and 12,535 poles in project area, including 25 SPAs and 9 IBAs. 2,098 bird carcasses (103 bird species) were identified. Under the project almost 270 km of power lines identified as a top-priority will be marked with bird flight diverters and more than 4,000 poles were selected for measures to avoid electrocution.

Toward a better understanding of avian collision causes in wind farms using data from Automatic Detection Systems

Dr. Charlène Gémard, Postdoctoral fellow at CEFE-CNRS (Montpellier, France)

Wind energy facilities (WEFs) are flourishing worldwide, but this rapid expansion has direct negative impacts on biodiversity, including on avifauna through collisions with turbines. To further our understanding of the causes of bird collisions, we examined multiple species, sites, factors, and years together to simultaneously assess the effects of behavioral and environmental factors on bird sensitivity (presence of birds in the risk zone around the rotor) and exposure (frequency with which birds fly inside the WEF) to collision risks. To do this, we used, for the first time, data from 14 WEFs in

Europe, recorded by automatic detection systems (ADS) between 2018 and 2023. As expected, the results show that bird sensitivity and exposure were higher during periods of high activity and in conditions that reduce birds' visual perception of turbines. In addition, sensitivity and exposure varied with factors related to flight height (temperature, wind speed).

Mitigating Bird Electrocution: Conservation Efforts and Successes in Andalusia, southern Spain

Jose Rafael Garrido & Victor Fiscal, Agencia de Medio Ambiente y Agua, Junta de Andalucia Devica Russ, BOKU University

In Andalusia, southern Spain, there are 150,000 potentially dangerous power line supports for birds. Up until 2015, these caused an estimated mortality of 4,000 birds annually, nearly driving endangered species such as the Spanish imperial eagle to extinction and constituting the primary limiting factor for Bonelli's eagle populations. Since then, a synergistic approach involving the identification of priority intervention points through an updated database of electrocutions, along with cooperation with electric companies, has enabled the detection and retrofitting of the most dangerous points. Consequently, the supports where mortality was concentrated have been identified and retrofitted, constituting 20% of the total, effectively eliminating this mortality cause as a threat to bird populations. We estimate that by 2027, we will have all major mortality hotspots under control and no species will be threatened with extinction due to electrocution on power lines. We have also developed programs for cooperation to identify and minimize these impacts in in North Africa, promoting the conservation of European birds also in their migration and wintering areas.

The value of cooperation and knowledge transfer to reduce raptor mortality due to power lines in the Western Mediterranean

Helena Clavero-Sousa[1] & Justo Martín-Martín[2],
[1]Biodiversity Knowledge and Action Programme Officer - IUCN Centre for Mediterranean Cooperation, Spain,
[2]JMM Consultant, Spain - Consultant on biodiversity conservation and IUCN advisor

Bird electrocution and collision on power lines may represent a conservation problem for certain species, some of which are threatened in the western Mediterranean. IUCN-Med has been working in collaboration with other actors, such as the Spanish or Andalusian governments, the competent authorities and NGOs in North-West Africa to promote cooperation and knowledge transfer in identifying and minimising these impacts. First hotspots of high mortality and high-risk areas have been identified in Morocco, field work has been promoted to improve knowledge of the populations and their threats, NGOs have started to work on monitoring these threats, training and experience exchange workshops have been held between electricity companies, authorities and civil society in Morocco, Tunisia and Algeria, with Spanish and international experts, among others. Thanks to this joint work, Red Lists and conservation strategies have been developed, as well as a toolkit with technical guidelines and an app for data collection.

Predict to protect: developing trait-based vulnerability indices to wind energy development for birds and bats

Arnaud Vansteenkiste, PhD student, University of Liège

The impact of wind farms on biodiversity, especially birds and bats, requires urgent solutions at local and global scales. In particular, we need data to assess the impact of projects on species based on their vulnerability. We also need to assess whether current policies are protecting the vulnerable species. The main goal of my PhD project is to propose new tools to mitigate mortality caused to birds and bats by wind power development (onshore and offshore). These tools are vulnerability indexes to identify the most vulnerable species, and risk maps to identify the most sensitive areas. I will implement my approach on two territories: the European Union and the USA. Moreover, I will assess the different protection policies frameworks between the two continents. These tools will help consulting firms, wind energy developers and decision makers to act in the best interests of birds, bats and humans.

Effective collaboration method between NGOs and Grid operators in Spain

Alfonso Godino Ruiz, AMUS-Acción por el Mundo Salvaje, LIFE EUROKITE Project Coordinator

The reinforcement of the red kite´s population in SW of Spain is an action implemented by AMUS in the framework of the Eurokite LIFE project to promote the long-term conservation of the small and threatened population of red kite in that region. To minimize one of the main threats for the species, the electrocution, a collaboration with E-Distribución (the main electric company present in the releasing area) was focused on the correction of electric pylons, and specially in those areas frequently used by the released red kites. This company corrected and isolated 582 electric pylons during the period 2020-2023 and it is planned to correct 117 pylons during 2023-2027. As a result, no red kites were electrocuted in the releasing area (50.000 ha), being this action a practical measure to reduce the mortality, one of the main aims of this LIFE project, but also for all the birds in the area, specially raptors.

WE MAKE BIRD-SAFE POWER LINES IN WESTERN BULGARIA

LIFE BIRDS on POWER LINES, LIFE16 NAT/BG/000612

Power infrastructure often exposes the life of wild birds at risk.
lifebirds.eu

Project challenges

1) prevention of electrocution - When a bird alights on electric pole, it may cause electrocution resulting in its death and power interuption.

2) prevention of collicion with power lines - While flying, birds can, collide into overhead power lines as they are hardly visible, especially in bad weather conditions and low visabilility.

Introduced solutions

- Making bird-dangerous electric poles safe with the use of various insulation covers;
- Instalation of "diverters" to be hanged along the overhead power lines at specific distance to make cables visable for the birds;
- Making risky stork nests safer by lifting them on special metal platforms in order to increase the distance between the nest and the power lines;
- Installation of bird-friendly poles on site.

Project objectives

- Reduction of bird mortality caused by electrocution upon alighting on distribution poles and crashing into overhead power lines;
- Ensuring safe nesting places for white stork (Ciconia ciconia) in Western Bulgaria;
- Reinforcing the support of the society and the stakeholders in solving the conflict between wild birds and overhead power lines.
- Promotion of general benefits for biodiversity and people.

Methods

- Field surveys to check birds mortality caused by electrocution/ collision.
- Assessment of the number of platforms occupied by White Storks.
- Assessment of the number and trends in the local population of White Storks.
- Analysis of the reasons of power outages.

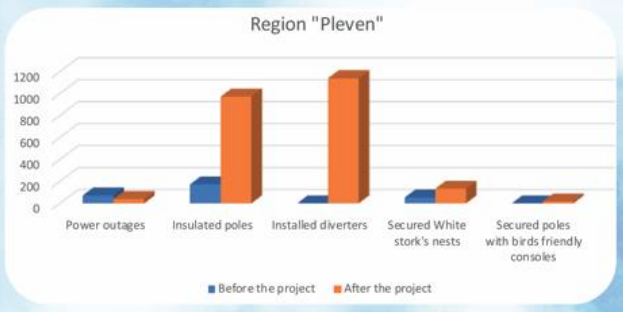
Main project activities

- Indefication of power lines that are dangerous for the birds;
- Creating of GIS database of risk sections;
- Carring out field researches about bird mortality in conflict areas with the power distribution system;
- Making power distribution poles safe by installation of insulation and protective products that protect birds against electrocution;
- Making overhead power lines with diverters;
- Making 900 risky stork nests safe by installation of metal platforms;
- Design of pole prototype that is safe for the birds and instalation of such pole in key project areas;
- Raising awareness of key institutions and other stakeholders about the nature of challenges and solutions.

Results

- After the field survey in 2022 two victims of collision were found. No victims were found in 2023.
- About 97% of the installed platforms are occupied by White Storks.
- Increased public awareness.
- The highest percentage in power outages is achieved in "Pleven" region – app. 45%.



	Before the project	After the project
Power outages	72	39
Insulated poles	173	973
Installed diverters	0	1140
Secured White stork's nests	53	133
Secured poles with birds friendly consoles	0	16

EDG WEST

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The importance of high-quality data about wind energy infrastructures for biodiversity conservation

Jacopo Cerri[1*], Chiara Costantino[1], Ilaria Fozzi[1], Davide De Rosa[1], Fiammetta Berlinguer[1]

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Introduction

Research question

Onshore wind power is being developed steadily across the Mediterranean, with wind farms that are often proposed in biodiversity hotspots. Zonation policies are needed to minimize their impacts. Although these policies are using maps of wind turbines that are produced by open-source initiatives and/or research groups, to the best of our knowledge no research validated these against high-quality satellite and/or aerial images. In this study we compared 3 available datasets of wind-energy infrastructures against aerial images for Sardinia (Italy).

Methods

Mapping existing turbines

We downloaded the location of wind turbines that are operating in Sardinia from Smeraldo et al. (2020), Open Street Map (https://openinframap.org) and Atla Impianti, the official dataset of turbines receiving governmental incentives (https://www.gse.it/dati-e-scenari/atlaimpianti).

Creating a buffer and a grid

After having pooled together the three datasets, we created a buffer with a radius of 5 km around each turbine. Then this area was divided into a 500 m grid, with a total of 24,631 cells spanning across 8,123 km² or 33.8% of the area of Sardinia.

Fig. 1. An example of a wind turbine, detected from an aerial picture on Google Satellite at a 1:500 scale (picture obtained from Google).

Using aerial pictures

We overimposed high-resolution aerial images from Google Satellite to the grid. Then, we checked the number of wind turbines that occurred in each cell at a 1:500 resolution. Wind turbines were counted by three independent researchers.

Retrieving future wind power projects

To map the potential number of wind turbines that are expected to be built over the next few years, we downloaded each wind farm project that had been submitted to the Italian Ministry of the Environment since 2020 (https://va.mite.gov.it/it-IT).

Mapping planned turbines

For each wind power project we manually georeferenced the coordinates of its planned wind turbines, from maps that were contained in preliminary environmental impact assessment reports.

Current issues

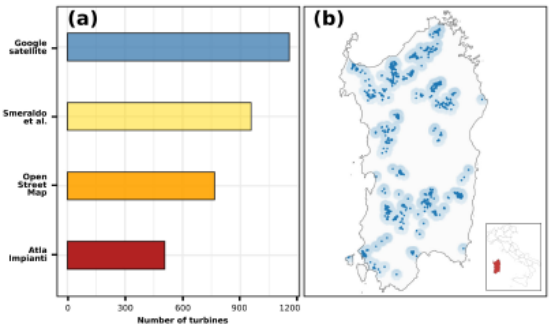

Fig. 2. Comparison between the different number of turbines according to the different data sources (a) and the area covered by our sampling (b, turbines in dark)

Major discrepancies

The analysis of aerial images allowed us to identify 1,155 operating turbines. This value was much higher than turbines reported by Smeraldo et al. (n = 914), Open Street Map (n = 766) and Atla Impianti (n = 507).

Hotspots of wind energy development

Wind tubines are concentrated on two major belts in Northern and Southern Sardinia. With minor hotspots also on the West Coast. These areas are key for the Griffon vulture (*Gyps fulvus*), due to the presence of two colonies and a release site.

A major increase in the near future

When considering wind power projects submitted to the Ministry for the Environment, these envision a total of 1,026 new turbines. Therefore, onshore turbines in Sardinia will increase by up to 89%, a dynamic that could significantly increase their cumulative impacts.

Key points

High-quality data

Our findings emphasize the need to assess existing maps of wind energy infrastructures and define clear quality standards. Existing datasets might seriously underestimate operating turbines and/or accumulate major bias in a few years. In turn this could bias impact assessments.

Aerial images: a powerful tool

Aerial images are a powerful tool for conservation zonation. We developed an accurate map covering an area of 8,123 km², in a time of approx. 3 months. This shows that even small conservation groups can engage in the participatory mapping of wind energy at conservation hotspots.

The way ahead

Future studies should focus on develop large-scale maps depicting the density of energy-related infrastructures. Spatially-balanced sampling can be used to interpolate densities across large spatial scales, while checking aerial images on few sampling sites. Sampling schemes can also be used for the periodic monitoring of infrastructure development. These maps can be combined with data about animal movement, obtained from GPS telemetry, and species distribution models, to identify potentially problematic areas for renewable energy development and assist zonation and/or the implementation of mitigation measures.

Acknowledgements and funding

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Cerri, J., et al.(2024). Satellite images reveal major discrepancies between mapped and operating wind turbines in a hotspot of wind energy development. EcoEvoRxiv. https://doi.org/10.32942/X27K6X

Smeraldo, S., et al. (2020). Modelling risks posed by wind turbines and power lines to soaring birds: The black stork (*Ciconia nigra*) in Italy as a case study. Biodiversity and Conservation, 29, 1959-1976. https://doi.org/10.1007/s10531-020-01961-3

Cumulative impact of wind energy on Red Kite population in Wallonia (Belgium)

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Introduction

The impact of wind energy on European raptor populations is a matter of concern considering the high number of carcasses found under wind turbines (WT). We studied the impact of existing and future wind turbines in Wallonia (Belgium) on the European-endemic Red Kite, considering the ambitious goal of the regional government to multiply by 3 the wind power capacity in the next 6 years. Wallonia hosts ~550 breeding pairs, mainly in the Eastern side of the region.

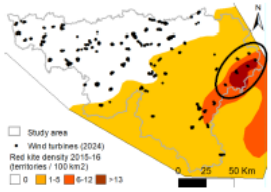
Methods

1 Measuring present-day fatality rate in the core breeding range

- Core breeding range = ~800 km² in Eastern Belgium, 31 WT in 2024
- 10 WT monitored in 2018, 9 WT in 2023
- **1.000 carcass searches**, radius of 100 m around WT (transects with human + UAV)
- Searcher efficiency and carcasses persistency tests with dead raptors

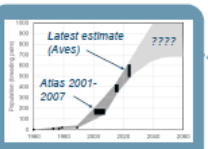
2 Extrapolation to the whole region

- Assumption : fatality rate per wind turbine decreases linearly with Red Kite density



3 Scenarios for future wind energy development (2024-2054)

- We developed 7 scenarios around the government's target, including repowerings of existing wind farms
- Repowering increases fatality rate per WT by ~1.25 (Schaub, 2024)



Red Kite population in Wallonia (breeding)

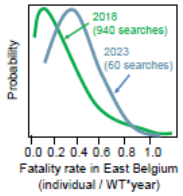
4 Link between wind energy development and fatality rates

5 Population viability analysis (2024-2054)

- We used the EolPop tool (French MAPE project)
- Static approach : all new wind turbines are already built in 2025
- Specific analyses to estimate the carrying capacity from demographic data (challenge !)

Results

- Present-day fatality rates in the core breeding range (Eastern Belgium, 31 WT) : ~6 individuals / year
- Present-day fatality rate in Wallonia (590 WT) : **~21 individuals per year**
- 7 scenarios for future wind energy development between 2,000 and 10,000 GWh/yr (table)
- Population viabiltiy analysis:
  - Results are very sensitive to initial population growth rate (4 to 6,8 %) and estimated carrying capacity
  - In most scenario combinations, trends remain positive, but the impact on the final population size is clear (0 to 37%)



Results of the systematic carcass searches in East Belgium

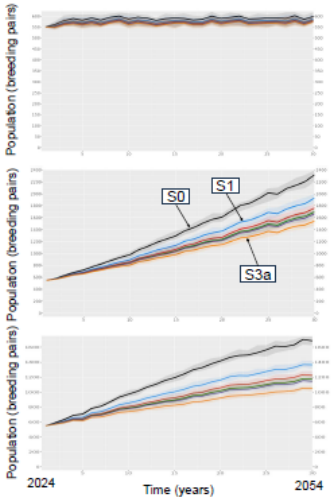
Scenarios for future (2054) wind energy development in Wallonia and estimated annual fatality

Name	Description	Number of wind turbines	Annual wind power production (GWh)	Estimated annual Red Kite fatality (individuals and rate at the beginning of each simulation)
S0	All wind turbines are dismanteld after 2024	0	0	0 (0 %)
S1A	No new wind turbine after 2024, no new repowering	596	2,205	21 (1.1 %)
S1B	No new wind turbine after 2024, repowering of old turbines (>= 20 yrs)	596	3,854	22 (1.1 %)
S2A	The objective of 6,200 GWh/yr in 2030 is reached . After 2030, the increase is slower due to the progressive saturation of the territory. Spatially homogeneous growth	931	7,877	37 (1.9 %)
S2B	Same as S2A but lower growth in East Belgium to protect the Red Kite core breeding range	931	7,877	30 (1.6 %)
S3A	Same as S3A but stronger growth after 2030	1,108	10,000	45 (2.3 %)
S3B	Same as S2B but stronger growth after 2030	1,108	10,000	34 (1.8 %)

Low growth rate (4-4.2 %/yr); low carrying capacity (595 breeding pairs)

High growth rate (6.6-6.8 %/yr); high carrying capacity (3,340 breeding pairs)

High growth rate (6.6-6.8 %/yr); medium carrying capacity (2,018 breeding pairs), fatality rate per WT increased by 50 % to consider potential underestimate



Automatic bird detection systems

- CSD Engineers was involved in the testing of SafeWind (field tests in 2022 with ornithologists in West Belgium, target species : Harriers) and parameterization of BPS (advice in the parameterization in Luxemburg in 2024, no field test, target species : Red Kite)
- SafeWind :
  - Good detection performances in a radius of 100-150 m
- Bioseco :
  - Many stops when the reaction distance was set up at 400 m
  - We advised to reduce to 300 m and add an altitude threshold
- These tools (+ others like IdentiFlight) seem very relevant to mitigate the collision risk for large birds
- If used to completely avoid the risk, detection and reaction distances need to be very large and could induce significant production losses in areas where the densities of target species or very similar species are high (e.g. Common Buzzards). We advise to consider these tools as **mitigation measure**

Conclusion and recommendations

- **As long as the natural growth in the Red Kite population is ≥ 3-4% / yr, wind farm development in Wallonia is unlikely to hinder population growth**
- **However, without mitigation measures, wind farms are expected to kill annually 21 to 45 Red Kites and will have an impact on population size**
- **We recommend to improve the monitoring of raptor population size and productivity in Wallonia (Red Kite, Common Buzzard and Kestrel) to make sure that the impact of wind energy will not become a threat in the future**

This research project is partially funded by the *Service public de Wallonie (SPW) (2023-2024)*

Effects of wind turbine dimensions on the collision risk of raptors: a simulation approach based on flight height distributions

Tonio Schaub[1,2,3,4], Raymond H. G. Klaassen[3,4], Caroline De Zutter[2], Pascal Albert[5], Olivier Bedotti[6], Jean-Luc Bourrioux[5], Ralph Buij[7], Joël Chadœuf[5], Celia Grande[8], Hubertus Illner[9], Jérôme Isambert[10], Kjell Janssens[4,11], Eike Julius[12], Simon Lee[13,14], Aymeric Mionnet[15], Gerard Müskens[16], Rainer Raab[12], Stef van Rijn[17], Judy Shamoun-Baranes[18], Geert Spanoghe[11], Benoît Van Hecke[5], Jonas Waldenström[19] & Alexandre Millon[1,5]

BACKGROUND

Informed selection of wind turbine dimensions could mitigate the collision risk of birds.

But: Effects of turbine dimensions still unknown for many species!

Methodological problem: Fatality data associated with strong biases

→ Alternative approach:
Simulations based on **flight height data** allowing to keep confounding factors constant (e.g. bird abundance and behaviour)

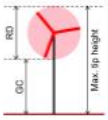


Figure 1: Illustration of the considered size parameters of wind turbines. GC = ground clearance; RD = rotor diameter.

METHODS

275 GPS-tagged individuals of **six raptor species** in 15 study areas in FR, BE, LU, NL, DE and SE

High-frequency GPS tracking to obtain accurate flight height data (6,126 h of HF flight tracks ↓)

Figure 2: Example of high-frequency flight track (GPS interval of 3 s).

Stochastic Band Collision Risk Model (sCRM) applied to range of wind turbine models using:

- Species-specific flight height distributions
- Rotation speed as a function of rotor diameter

RESULTS (1): Flight height distributions

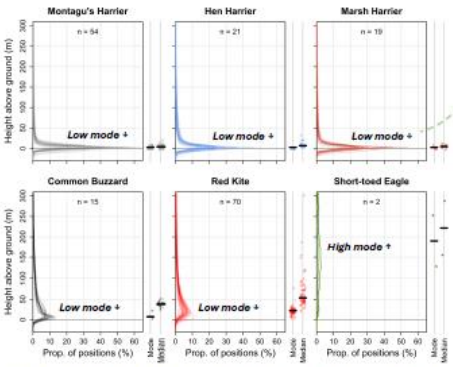


Figure 3: Flight height distributions per species in height bins of 5 m. Every line represents one individual bird; the mode and median per individual are indicated right of the panels (thick horizontal line: medians across individuals). Prop. = proportion.

RESULTS (2): Effects of turbine dimensions

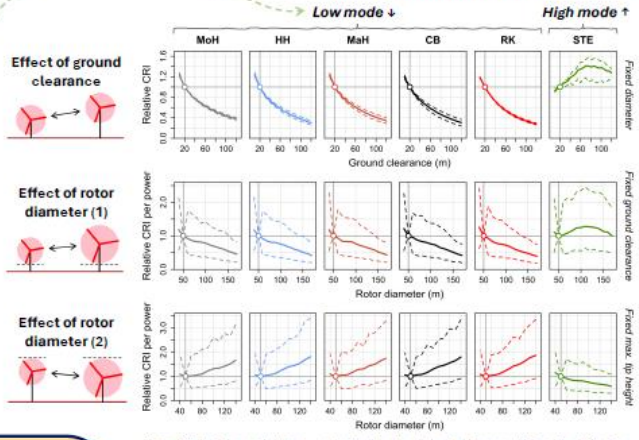


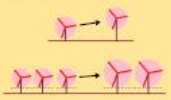
Figure 4: Effect of ground clearance and rotor diameter of wind turbines on collision risk relative to a reference level (thick vertical line). Panels show either collision risk index per turbine (first row) or per rated power (second and third row). Thick lines: means; dashed lines: 95% confidence intervals.

CONCLUSIONS:

Opposite effects of wind turbine dimensions on collision risk for different raptor species depending on the flight height distribution (low mode vs. high mode)

For **species with low mode**: Collision risk reduced when using

- turbines with **higher ground clearance**
- **less turbines with larger diameter** instead of more turbines with smaller diameter to achieve given total power (at fixed ground clearance)



FURTHER READING:

Schaub et al. 2024 *Sci. Total Environ.*

PhD thesis Tonio Schaub

UP NEXT:

Development of publicly available **online tool** allowing to apply approach to real-world wind energy projects

If you want to keep updated, feel free to send an email! ↓

1. Aix Marseille Univ, CNRS, IRD, Avignon Univ, Institut Méditerranéen de Biodiversité et d'Écologie, FR
2. ENGIE Lab CRIGEN, FR
3. Conservation Ecology Group, University of Groningen, NL
4. Dutch Montagu's Harrier Foundation, NL
5. Groupe d'Études et de Protection des Busards, FR
6. ENGIE Laborelec, BE
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8. Landscape Ecology Group, Carl von Ossietzky Universität Oldenburg, DE
9. Arbeitsgemeinschaft Biologischer Umweltschutz e.V., DE
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16. Müskens Fauna, NL
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WE MAKE THE POWER LINES ALONG THE DANUBE RIVER SAFE FOR BIRDS

Wingspan 2024: Partnerships for a bird-friendly energy transition, Brussels, 15-17.10.2024

Marek Gális, Lucia Deutschová, Zuzana Guziová, Raptor Protection of Slovakia
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LIFE DANUBE FREE SKY (2020-2026)

One of the biggest threats for the wild living species of birds is electrocution and collisions with power lines causing thousands of avoidable deaths and injuries. These threats are targeted by the LIFE Danube Free Sky project, representing a unique example of wide transnational cooperation along with one of the most important migration corridors, stop-over sites, and wintering places for many bird species in Europe - the Danube river.

A total of 15 partners (electricity companies, nature conservation authorities, non-governmental organisations, railway company) from 7 countries are cooperating on implementation of the project to achieve common goals. Our mission is to increase safety of power lines in 25 Special Protection Areas (SPAs) and 9 Important Bird Areas (IBAs) along the Danube river not only for 12 priority target bird species: *Anser erythropus, Aquila heliaca, Botaurus stellaris, Branta ruficollis, Clanga clanga, Clanga pomarina, Coracias garrulus, Crex crex, Falco cherrug, Falco vespertinus, Otis tarda, Pelecanus crispus,* but also for many other bird species that are at risk of electrocution and/or collision.

82 trained field assistants.

A field survey was carried out (01/2021 - 10/2022), covered almost 1,580 km of 8 types of the above ground power lines (10 kV, 20 kV, 22 kV, 35 kV, 110 kV, 220 kV, 400 kV, and electric railway lines) and 12,535 poles in 25 SPAs and their adjacent areas located in Austria, Slovakia, Hungary, Croatia, Bulgaria, Romania, and in 9 IBAs in Serbia.

For 1,833 individuals belonging to 93 species and 18 orders, it was possible to determine the exact cause of death. Electrocutions accounted for 55% (1,009 ind.), belonging to 35 bird species; collisions accounted for 45% (824 ind.), involving 78 bird species.

The eurasian magpie (*Pica pica*) was the most frequently detected and associated with 27 % (n=193) of all electrocutions. The second highest mortality was observed for the common buzzard (*Butao buteo*) with 22% (157 ind.). The mute swan (*Cygnus olor*) was the most common bird detected with 20 % (155 ind.) of all identified collisions.

More than 2,100 bird carcasses were found from 103 species.

Several types of bird flight diverters were used, new types were developed and tested.

Almost 270 km of power lines were identified as a priority for increasing the visibility via installation of bird flight diverters and use of insulated conductors.

The glow in the dark effect of some of the installed diverters.

Different methods of installation of bird flight diverters were applied.

Using a special drone to install the diverters reduces conflicts between the farmers and the electricity companies. There is no need to pay compensation for destroyed crop. At the same time, there is no need to shut down the line during the installation of the diverters.

More than 4,000 utility poles insulated or modified to avoid electrocution. The elements must be installed properly to ensure safety for birds.

Danube River – European Amazon
Attracts millions of birds from hundreds of species
- migration
- breeding and roosting sites, foraging areas

Thousands of birds saved each year!

Safe railway lines in Austria.

Co-funded by the European Union

MINISTRY OF ENVIRONMENT OF THE SLOVAK REPUBLIC

The LIFE Danube Free Sky – Transnational conservation of birds along the Danube river (LIFE19 NAT/SK/001023) project has received funding from the LIFE Programme of the European Union and the Ministry of Environment of the Slovak Republic.

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

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Towards a better understanding of bird collisions in windfarms using data from ADS

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CONTEXT

The rapid expansion of wind power energy has direct negative impacts on biodiversity, such as birds colliding with turbines. A better understanding of the causes of collision is key to improve mitigation efforts.

However, to date, potential risk factors have mostly been assessed individually, in a few species of interest and/or at small spatiotemporal scales, despite the multifaceted nature of collision risk[1].

To fill this gap, we here aim at assessing which factors increase collision risk with the endgame of identifying high-risk situations in which mitigation measures must be improved.

METHODS

We conducted a global analysis including several bird species, 14 Wind Energy Facilities (WEFs) in Europe, environmental factors and 6 years to simultaneously assess the effects of environmental factors on birds' :

- **exposure** (number of birds detected),
- **sensitivity** (intrusion duration within risk zone),
- **vulnerability** (sensitivity*exposure) to collisions.

We analysed 205,879 bird trajectories from 14 WEFs in Europe, recorded by ADS between 2018 and 2023.

ADS data collection
Gathering ADS data (videos from 2D ADS + bird 3D positions during the detection from 3D ADS)

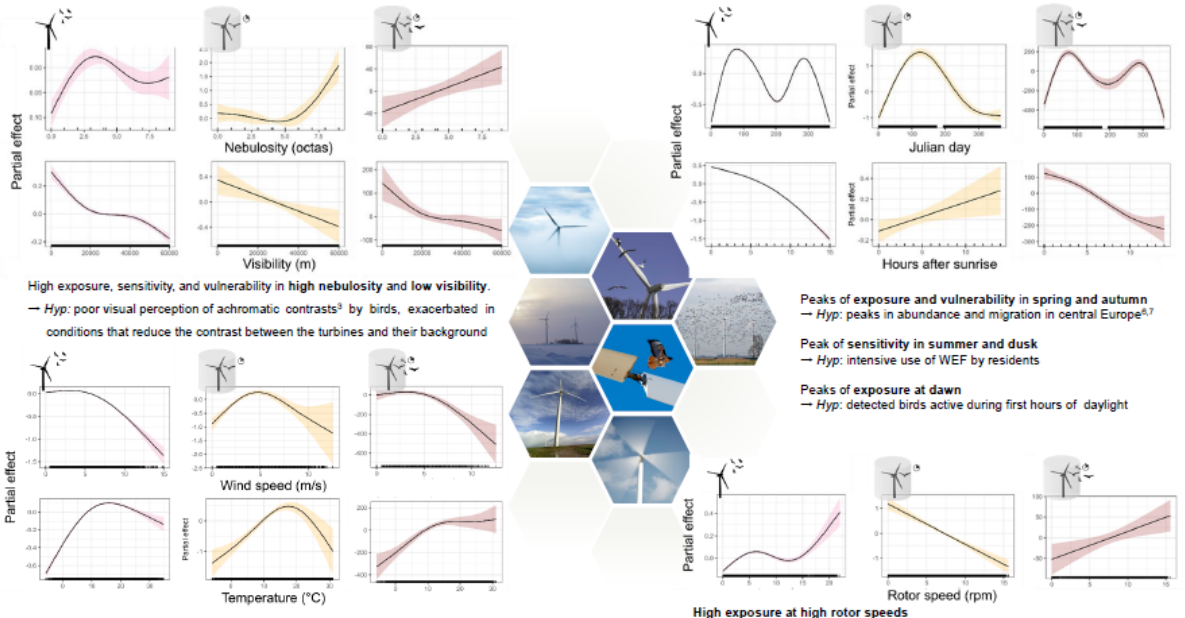
Contextual data collection
Gathering SCADA data, weather (Météo France), landscape context (CLC), and WEF features

Video analysis
Extracting 2D position of birds in each video frame, using a software developed by WIPSEA

Flight behaviour analysis
Reconstructing and characterising flight trajectories of birds, then classifying to discriminate two flight types (transit *vs* foraging flights)[2]

Statistical analysis and modelling
Running GAMM to assess the combined effect of environmental factors and bird flight behaviour on sensitivity, exposure, and vulnerability.

RESULTS & DISCUSSION



High exposure, sensitivity, and vulnerability in **high nebulosity** and **low visibility**.
→ *Hyp:* poor visual perception of achromatic contrasts[3] by birds, exacerbated in conditions that reduce the contrast between the turbines and their background

Peaks of exposure and vulnerability in spring and autumn
→ *Hyp:* peaks in abundance and migration in central Europe[6,7]

Peak of sensitivity in summer and dusk
→ *Hyp:* intensive use of WEF by residents

Peaks of exposure at dawn
→ *Hyp:* detected birds active during first hours of daylight

High exposure, sensitivity, and vulnerability at **low and moderate wind speeds**
→ *Hyp:* when updraft airflows used by birds to fly are weak[4,5]

High exposure, sensitivity, and vulnerability at **medium temperatures** (10-20°C), contrary to our expectations, based on the birds' use of thermal updrafts to fly[5].
→ *Hyp:* mix of species with different ecologies and behaviors, potentially leading to oversimplification

High exposure at high rotor speeds
→ *Hyp:* related to strong winds, when large detected soaring birds have a high activity

High sensitivity at very low rotor speeds
→ *Hyp:* at low speeds, some bird species perceive the turbines as stationary[8] and are more likely to approach

CONCLUSIONS

- Bird sensitivity, exposure and vulnerability were high:
  - during periods of **high bird activity**
  - in conditions **reducing visual perception** of turbines
  - in conditions influencing **flight height**
- Site and inter-specific heterogeneity should be the focus of future research to obtain a deeper understanding of bird collisions.
- The non-synchronicity of exposure and sensitivity peaks highlights the importance of **examining both aspects**[9].
- Our results plead for a **wider use of ADS** to assess collision risks in anthropogenic facilities.

This work is part of MAPE, a collaborative research program that aims to produce knowledge to efficiently mitigate bird fatalities at onshore WEFs. We are very grateful to all MAPE participants, especially members of the steering committee for their guidance, windfarm managers who agreed to share data for their contribution, and ADS manufacturers for their support in data collection.

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Mitigating Bird Electrocution: Conservation Efforts and Successes in Andalusia, SE Spain

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Introduction

Bird electrocution on power lines is a significant conservation issue, particularly for endangered species. In Andalusia, Spain, there are approximately 150,000 power line structures that pose a risk to birds, causing an estimated 4,000 deaths annually until 2015. This high mortality rate nearly drove species like the Spanish imperial eagle to extinction and was the main limiting factor for Bonelli's eagle populations. Since the late 20th century, the Andalusian government has worked to mitigate this problem by correcting dangerous power lines and developing legislation for utility companies. However, it wasn't until 2015 that efforts became more effective, with the systematic collection of data and collaboration with major electric companies. This collaboration deepened in 2019 through an agreement with Enel-Endesa, enabling urgent modifications to the most dangerous power lines, particularly those responsible for bird deaths or located in critical areas for endangered species. This presentation aims to showcase the effectiveness of these efforts in reducing bird electrocution and its threat to the extinction of bird populations, especially endangered species, through targeted infrastructure modifications

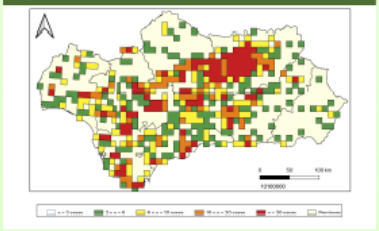
Method

To assess whether efforts in Andalusia have effectively reduced bird electrocution on power lines as a threat to avian extinction, an analysis was conducted using the Andalusian government's updated mortality database. The study examined changes in the number of electrocution black spots over three periods. The first period (1990-2015) saw no systematic data collection or targeted modification of dangerous power lines. The second period (2016-2019) included systematic data collection and adaptations based on electrocutions, along with regional (Decree 178/2006) and national legislation (Royal Decree 1432/2008) focused mainly on protected areas. The third period (2020-2023) continued systematic data collection but involved collaboration with Enel-Endesa under an agreement, allowing modifications to the most dangerous structures, regardless of their location within protected areas. Electrocution black spots were defined as 10x10 km UTM grid squares with more than 10 electrocutions per period. Six categories of electrocution frequency were identified: fewer than two, 2 to 5, 5 to 10, 11 to 20, and more than 20 electrocutions, with black spots defined as those with more than 10. A Chi-square test was performed to assess significant differences in the number of grid squares with over 10 electrocutions across the three periods, compared to the total number of squares with more than one electrocution

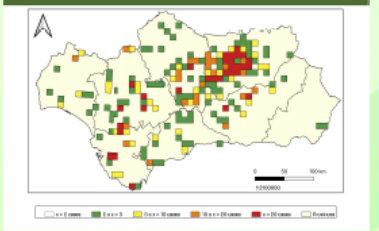
Result

Since 1990, 8,172 electrocutions of 70 different species have been recorded, including 7 species listed as threatened under Andalusian legislation (see table). During this period, around 35,000 dangerous power line structures have been modified in Andalusia, with 25,000 adapted by 2019. This has led to a significant reduction in the number of 10x10 km grid squares classified as electrocution black spots (see maps), decreasing from 41.5% of grid squares with more than 2 electrocutions in the first period, to 30.7% in the second, and to 18.8% in the 2020-2023 period (Chi-square=26.45, 2 degrees of freedom, $p<0.001$). The greatest reduction occurred in the last period, despite only 8,500 supports being modified, as these were targeted in the most critical areas for sensitive species distribution.It is noteworthy that most of the affected species now show increasing breeding trends (see table), including storks and medium to large raptors. Among the threatened species with negative trends, only the red kite remains vulnerable to electrocution due to its small population size in the region. In contrast, electrocutions of Egyptian vultures and Montagu's harriers are rare, but given their poor conservation status, further efforts to reduce these incidents are still needed.

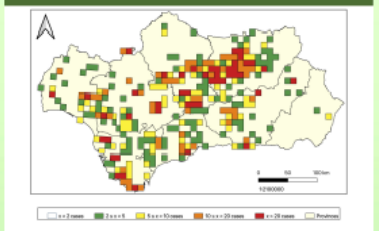
Electrocutions 1990-2023



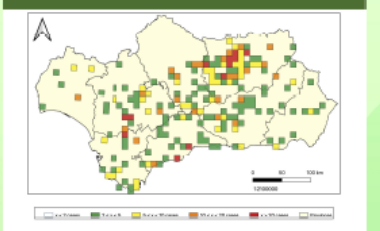
Electrocutions 2016-2019



Electrocutions 1990-2015



Electrocutions 2020-2023



Scientific name	Common name	Threat category	No. electrocutions	%	Breeding trend
Ciconia ciconia	White stork	NON THREATENED	1.818	22	↑
Bubo bubo	Eurasian eagle-owl	NON THREATENED	1.032	13	↑
Corvus corax	Northern raven	NON THREATENED	998	12	↓
Buteo buteo	Common buzzard	NON THREATENED	904	11	=
Gyps fulvus	Griffon vulture	NON THREATENED	373	5	↑
Circaetus gallicus	Short-toed snake eagle	NON THREATENED	305	4	↑
Milvus migrans	Black kite	NON THREATENED	301	4	=
Aquila fasciata	Bonelli's eagle	VU	255	3	=
Falco tinnunculus	Common kestrel	NON THREATENED	169	2	↓
Falco naumanni	Lesser kestrel	NON THREATENED	155	2	↓
Aquila adalberti	Spanish imperial eagle	EN	115	1	↑
Aquila pennata	Booted eagle	NON THREATENED	114	1	↑
Aquila chrysaetos	Golden eagle	NON THREATENED	113	1	↑
Corvus monedula	Western jackdaw	NON THREATENED	96	1	↓
Accipiter gentilis	Northern goshawk	NON THREATENED	94	1	=
Sturnus unicolor	Spotless starling	NON THREATENED	85	1	↓
Hieraaetus pennatus	Northern Dalc Ble	NON THREATENED	43	1	↑
Milvus milvus	Red kite	EN	41	1	↓
Elanus caeruleus	Black-winged kite	NON THREATENED	33	0	=
Bubulcus ibis	Cattle egret	NON THREATENED	31	0	↓
Pandion haliaetus	Osprey	VU	20	4	=
Ciconia nigra	Black stork	EN	15	3	=
Aegypius monachus	Cinereous vulture	VU	13	3	=
Circus pygargus	Montagu's harrier	VU	6	1	↓
Neophron percnopterus	Egyptian vulture	EN	6	1	↓
Other species (<45			1.255	15	
Total (n=70 species)	-	-	8.172	100	-

Discussion

The results obtained indicate that the conflict between birds and power lines no longer represents a cause of extinction for bird species in Andalusia. Although the conflict persists and power lines continue to cause bird deaths due to the extensive electrical network and the growing populations of sensitive species, such as the Spanish imperial eagle, which are colonizing new areas previously considered non-critical, we are making progress toward eliminating this threat as a factor in extinction. Continuing in the same vein of collaboration with electric companies to adapt power lines, prioritizing the most sensitive areas, we estimate that by 2027-2030, no bird populations will be threatened by power lines. However, significant challenges remain, such as the adaptation of dangerous power lines owned by small proprietors who are unable to make these modifications themselves. In this regard, the regional government continues to work on securing funding for their adaptation. We believe that the solutions adopted in Andalusia, which are similar to those implemented elsewhere in Spain where have proven equally effective, should serve as a model for other European countries with less experience in addressing this issue. Andalusia collaborates in this area by developing cooperation programs with the IUCN Mediterranean Cooperation Center to identify and minimize these impacts in North Africa, thus promoting the conservation of European birds also in their migration and wintering areas, as well as producing reference documents and manuals for a global audience.

Junta de Andalucía

UICN

The value of cooperation and knowledge transfer to reduce raptor mortality due to power lines in the Western Mediterranean

H. Clavero-Sousa[1], J. Martín[2], J.R. Garrido[3] & C. Numa[1]

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INTRODUCTION

Capacity building and knowledge transfer are key tools to engage and empower stakeholders and citizens in conservation. Since 2015, the IUCN Centre for Mediterranean Cooperation has been working in collaboration with its Members and other actors - mainly the regional government of Andalusia and the Ministry of Environment (Spain) and competent authorities and NGOs in Northwest African countries - to promote cooperation and knowledge transfer in identifying and minimising the impacts of power lines on birds.

METHODS

Several training and experience-sharing workshops on the identification, mitigation and prevention of the wildlife impacts of electricity infrastructure have been organised, involving the participation of authorities, grid operators and civil society in Morocco, Tunisia and Algeria, along with Spanish and other international experts.

Field work has been carried out in collaboration with local and national authorities and NGOs, to better understand raptor populations and their threats in these three countries, accompanied by training on monitoring programmes, censuses and protocols.

Technical and financial support has been provided to projects on monitoring (e.g. by GPS) and conservation of threatened raptors (e.g. through wildlife recovery centres) carried out by NGOs in Morocco.

Development of tools to better understand the interactions between wildlife and electricity grids, to disseminate the most effective solutions, and for standardised data collection, adapted to the North African context, in collaboration with experts on the topic as well as national stakeholders.

Promotion and coordination of networks for data and knowledge exchange, in each country and at the regional level.

Practical training session on identifying power lines dangerous for wildlife (Algeria, 2024)

MAIN RESULTS

ACTIONS

- The impact and distribution of threats is being monitored by an international network of 25+ organisations to support the development of preventative and mitigation measures.
- 200+ relevant actors from environmental authorities, electricity companies and NGOs, among others, have been trained on this subject thanks to the organisation of or participation in eight training workshops.
- First power line monitoring in Morocco: survey of 550+ km of power lines in different areas of Morocco, characterising dangerous power lines and identifying the first hotspots of bird mortality from this cause in North Africa.
- Creation of a database of power lines and wildlife fatalities, with nearly 3,000 characterised pylons and 420 mortality records of 18 species (mainly birds of prey in Morocco).

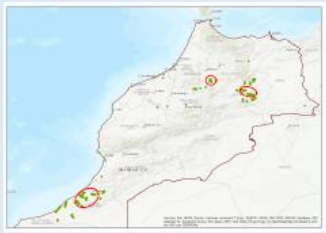
REPORTS

- Results of the first census of diurnal cliff-nesting raptors in Morocco (2019-2020), with data on mortality due to power lines.
- Results of the analysis of hazardous power lines in the Guelmin area (western Morocco, 2016), where a very high mortality rate was detected on certain pylons.
- Action plan for remediating the most dangerous power lines and pylons in the Guelmin area.
- Avian sensitivity mapping regarding electrocution and collision with power lines in Morocco.

TOOLS (available in various languages)

- Guidelines to prevent and mitigate wildlife mortality associated with electricity grids.
- Mobile app for the characterisation of power lines and recording of associated mortality, supported by a web platform for data management, visualisation and download.
- Online course (MOOC) on birds and power lines.

Actions



SPECIES		N
Gyps fulvus	Griffon vulture	2
Gyps rueppellii	Rüppell's vulture	1
Pandion haliaetus	Osprey	2
Aquila chrysaetos	Golden eagle	14
Aquila fasciata	Bonelli's eagle	86
Aquila adalberti	Spanish imperial eagle	6
Buteo rufinus	Long-legged buzzard	69
Circaetus gallicus	Short-toed snake eagle	10
Milvus migrans	Black kite	1
Falco tinnunculus	Common kestrel	2
Falco biarmicus	Lanner falcon	11
Falco peregrinus	Peregrin falcon	1
Bubo ascalaphus	Pharaoh eagle-owl	7
Bubulcus ibis	Cattle egret	1
Ciconia ciconia	White stork	122
Corvus corax	Common raven	60
Corvus ruficollis	Brown-necked raven	1
Genetta genetta	Common genet	1
TOTAL		420

Map: Location of monitored and characterised power lines in Morocco in 2019, included in the database of hazardous power lines. Red circles: main areas of electrocution. Table: Power line fatality data recorded in Morocco (during fieldwork carried out between 2016 and 2020). Source: Map: Premier dénombrement national des rapaces rupicoles diurnes du Maroc. IUCN & DEF, 2020 (Available at: https://portals.iucn.org/library/). Table: IUCN Mortality Database (available on request).

Results of a day's work monitoring power lines (Morocco, 2019)

Bonelli's eagle electrocuted

Golden eagle electrocuted

Monitoring mortality on power lines and electricity grids

Training courses in Morocco and Tunisia

International team participating in a field mission to monitor grids in Morocco

Lanner falcon electrocuted

Common genet electrocuted

IUCN Toolkit

Guidelines to prevent and mitigate wildlife mortality associated with power lines (English & French)

Online training course "Birds and Power Lines"
https://www.conservationtraining.org/

e-faunalert mobile APP and website
http://e-faunalert.org

Reports

Unpublished report (available on request)

OUTLOOK

Our work is an example of the importance of inter-institutional and transnational collaboration in preserving bird populations and enabling their coexistence with electricity infrastructure, as these species do not recognise borders, nor the areas of competence of the institutions involved in their conservation.

In the coming years, we hope to continue with training activities and the promotion of new cross-sector collaborations, in partnership with new actors, to help ensure that the best technologies are integrated into the deployment of new electricity grids associated with the fight against climate change in the Mediterranean region, especially in North Africa.

Please contact us if you are interested in collaborating.

Email: medspecies@iucn.org

Predict to protect: developing trait-based vulnerability indices to wind energy development for birds and bats.

Arnaud Vansteenkiste, Charlotte Roemer, Esteban Fernandez-Juricic, Jocelyn Behm, Nicolas Magain

LIÈGE université · MUSEUM NATIONAL D'HISTOIRE NATURELLE · TEMPLE UNIVERSITY · PURDUE UNIVERSITY

INTRODUCTION

The wind power industry is rapidly developing across the whole planet with ambitious goals in the short and long terms. The impact of wind farms on biodiversity, especially birds and bats, requires urgent solutions at local and global scales. The main goal of my PhD project is to propose new tools to mitigate mortality caused to birds and bats by wind power development (onshore and offshore). These tools are vulnerability indexes to identify the most vulnerable species, and risk maps to identify the most sensitive regions for aerial biodiversity. These tools will contribute to better wind energy development planning regarding bird and bat protection.

Wildlife mortality by windmills is a global issue. However, I decided to implement my approach on two large territories: the European Union (EU) and the United States of America (USA). These two regions are among the top producers of wind energy and have the most data available on bird and bat distributions, and impact of windmills on birds and bats. They harbor different policies and wind farm development approaches, which will be compared during my project.

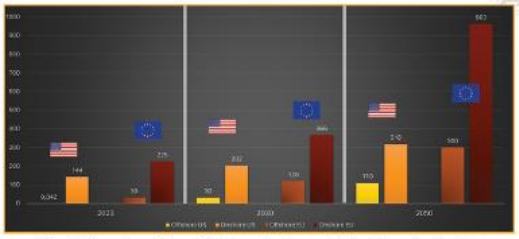


Figure1: Present and future wind farms development in the EU and in the USA

1st OBJECTIVE

Develop a method to calculate the demographic sensitivity, and the displacement and collision vulnerabilities to wind turbines for each species of raptor, seabird and bat in the EU and the USA. Use them to compute a global risk assessment score of the species to wind turbines. Validate the results using existing mortality data for the vulnerable species.

Figure 2: schematic representation of the risk score assessment

2nd OBJECTIVE

Aggregate maps of species distributions for birds and bats in Europe and the USA, to map the vulnerability of biodiversity to wind turbines. For this, the risk assessment score will be used to weigh species. Cross them with maps of present and future development of wind turbines. Define regions of high risk and regions of low risk suitable for present and future wind energy development.

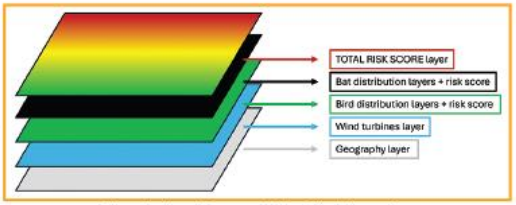


Figure 3: schematic representation of the risk map layers

3rd OBJECTIVE

Assess the policies framework implemented in the EU and in the USA to protect the vulnerable species determined by the risk assessment and compare the approaches between the two continents.

The EU Birds and Habitats Directives · MIGRATORY BIRD TREATY · CONVENTION DE BERNE BERN CONVENTION · CMS

PURPOSE

At the end of the project, I will provide a synthesis of the vulnerable species on both continents,with a map of sensitive regions where the development of wind farms is more likely to harm bird and bats biodiversity. In addition to generating invaluable biological knowledge, these tools will help consulting firms, wind energy developers and decision makers to act in the best interests of birds, bats and humans.




EFFECTIVE COLLABORATION METHOD BETWEEN NGOs AND GRID OPERATORS IN SPAIN

Godino, A.; Marrero, S.; Romero, C.; Machado, C.; Guerrero, A.

1.- INTRODUCTION

The reinforcement of the red kite´s (*Milvus milvus*) population in SW of Spain is an action implemented by AMUS in the framework of the Eurokite LIFE project, to promote the long-term conservation of the small and threatened population of red kite in this region.

Based on the IUCN Guidelines for Reintroductions and Other Conservation Translocations (IUCN/SSC, 2013), threats for the species involved in conservation translocation projects must be identified, detected and reduce or minimized to guarantee or improve the success of this action. For the red kite, electrocution with power lines is an important threat in Europe (Mattson *et al*., 2022) and probably in wintering areas in Northern Africa (pers. obs), being an important step for the reinforcement project in SW Spain to try to reduce this threat.

2.- STUDY AREA

The area included in the feasibility study for the red kite´s reinforcement covers 600.000 ha. in northern part of Huelva province (Andalusia region) and southern part of Badajoz province (Extremadura region), SW of Spain.

The habitat of the area meets the ecological conditions of the species from the point of view of orography, height, structure and density of vegetation, etc. The landscape is defined by extensive dehesas along with pasture, forestry and olive groves. This has allowed the existence of contrasts of vegetation cover, the alternation of thinned-out forests of holm oaks and cork oaks, with denser cover of these species accompanied by understory, areas of crops or pastures and shrubs. The mosaic landscape with significant forested areas, where silvo-pastoral use occupies a large part of the surface area, are conditions positively selected for by the red kite.

The release place is a private estate of 660 ha, in addition with two continue public estates with 16.000 ha. These estates have a 10 years wildlife conservation agreement with AMUS and they were selected, from 4 release places proposed, by the committee of experts of the project due to the best characteristics from the point of view of habitat, threats´ control, food availability and social support.

3.- AIMS

With the goal of minimizing the impact of electrocution in the red kite´s reinforcement project, it was stablished a collaboration between AMUS and E-Distribución, the electric company responsible for the power lines net in the area. This company has a plan to correct and isolate electric pylons in the study area, based on the regional and national legislation to prevent birds' electrocution.

Fig. 1 – Map of the study area. The red circle indicates the releasing area selected for the reinforcement of the red kite in the SW of Spain, in the LIFE Eurokite project.

Fig. 2 – Wild red kite, in the SW of Spain.

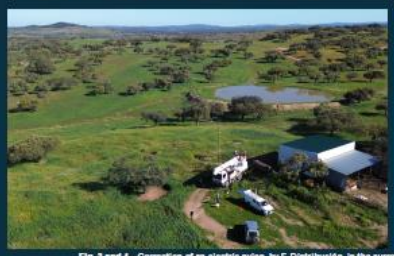


Fig. 3 and 4 – Correction of an electric pylon, by E-Distribución, in the surroundings of the releasing area.

Fig. 5, 6 and 7 – Red kite released by the Eurokite LIFE project, with the wing tag X, in an electric pylon. On the left the electric pylon as before the correction by E-Distribución. On the middle and on the right the electric pylon was already been corrected and it was added a birds' perch, increasing the distance between the bird and the critical area of the pylon.

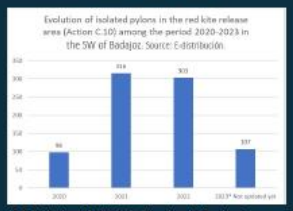


Fig. 8 – Number of isolated electric pylons in the releasing area, from 2020 until 2023. Source: E-Distribución.

4.- METHODOLOGY

There were two types of corrections :

A).- Urgent: When a bird was electrocuted, the pylon was isolated with covers adapted to each kind of upperpart pylon design. In the cases where the pylons were used frequently, additional birds´ perches were installed at the top of the pylon with the goal of separate the birds of the dangerous components.

B). Planned: Every year this company isolates randomly a number of electric pylons as a prevent measure to avoid birds´ electrocution.

Based on this planification to correct electric pylons, several meetings between AMUS and E-Distribution established the priority to focus the correction of electric pylons in the releasing area and other areas with an intensive spatial use of the red kites detected throughout the GPS of each released bird.

5.- RESULTS

Several meetings between AMUS and E-Distribution added two new criteria to prioritize the correction of power lines in 2023 and after:

- To focus the correction of electric pylons in the red kite´s releasing area and other areas with an intensive spatial use of the red kites detected throughout the GPS of each released bird.
- To prioritize the correction of dangerous electric pylons designs (pin-type insulators and jumpers, disconnectors and derivation of power lines) instead of the correction of all pylons of determinate power lines.

During the period 2020-2023, more than 824 electric pylons were corrected in the southern Badajoz province (Spanish Extremadura region). In the northern half of the feasibility study area for the red kite´s population reinforcement (300.000 ha), 582 disconnectors and dangerous pylons have been registered and E-Distribution established a plan to correct 117 pylons/year during 2023-2027 period. The mid/long term result of this plan will correct all disconnectors pylons in this area.

6.- CONCLUSIONS

Being the electrocution an important threat for birds´ conservation, it is possible and necessary to joint effort between electric companies, bird´s conservation organizations and wildlife authorities to reduce or minimize the impact of power lines. In spite of public economical support to implement this action in many countries of the European Union and the existence of technology and material to isolate electric pylons, the collaboration and exchange of information between all stakeholders involved will improve the effectiveness of this measure and a better optimization of public funds to prevent bird´s mortality.

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7. Pictures and videos

All pictures and the livestream of the Wingspan conference can be found under the following link.: https://www.tbraab.at/de/wingspan/wingspan-2024.html

Livestream Day 1: https://youtu.be/YqrhUjhBLws

Livestream Day 2: https://youtu.be/V4oasPnQ1cw

Selection of photos Networking dinner (14/11/2024)

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TB Road
PredictBird

Selection of photos Day 1 (15/11/2024)

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LIFE Programme
CINEA
CEO
TB Raab
balmoral engineering

Selection of photos Day 2 (16/11/2024)

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Selection of photos Field trip (17/11/2024)

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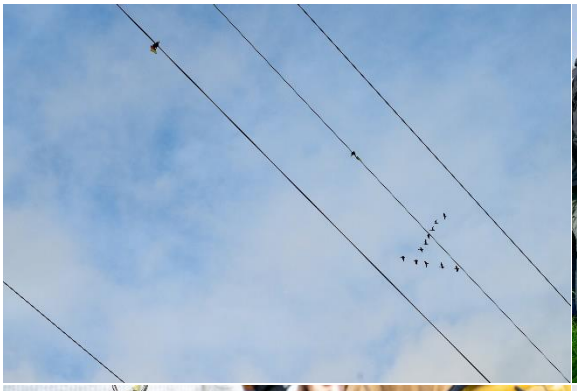






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