WINGSPAN 2026

From Partnerships to Practice

Accelerating Nature-Positive Energy Infrastructure

3 – 5 November 2026
Berlin



Renewables Grid Initiative · TB Raab Technisches Büro für Biologie · SafeLines4Birds · EUROKITE · LIFE EURO BUSTARD · 50hertz | Elia Group · elia group · NATURA 2000 · Co-funded by the European Union

Renewables Grid Initiative

TB Raab
Technisches Büro für Biologie

50hertz
| Elia Group

elia group

SafeLines4Birds

EUROKITE

LIFE EUROBUSTARD
Cross-border protection of the Great & Little Bustard

Co-funded by the European Union

NATURA 2000



WINGSPAN 2026

From Partnerships to Practice

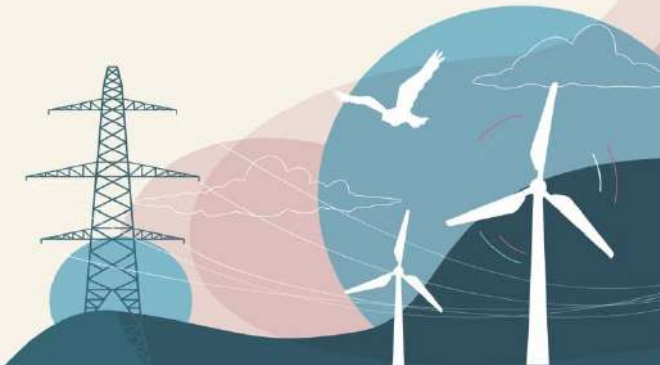
Accelerating Nature-Positive Energy Infrastructure

3 – 5 November 2026
Berlin



Renewables Grid Initiative · TB Raab Technisches Büro für Biologie · SafeLines4Birds · EUROKITE · LIFE EURO BUSTARD · 50hertz | Elia Group · elia group · NATURA 2000 · Co-funded by the European Union

Wingspan Programme and more!



WINGSPAN 2026

From Partnerships to Practice

Accelerating Nature-Positive Energy Infrastructure

3 – 5 November 2026
Berlin



Renewables Grid Initiative · TB Raab Technisches Büro für Biologie · SafeLines4Birds · EUROKITE · LIFE EURO BUSTARD · 50hertz | Elia Group · elia group · NATURA 2000 · Co-funded by the European Union

WINGSPAN 2026

High-level keynote



Thomas Kralinski

Director-General Climate Action

Federal Ministry for the Environment, Climate Action, Nature Conservation & Nuclear Safety



WINGSPAN 2026

Opening Words



Antonella Battaglini
CEO
Renewables Grid Initiative



Dr. Rainer Raab
CEO
TB Raab GmbH



Olivier Feix
Head of Strategy
Elia Group



Simona Bacchereti
Project Advisor
CINEA



WINGSPAN 2026

From Partnerships to Practice

3 – 5 November 2026 | Berlin



Opening Words

Antonella Battaglini

CEO

Renewables Grid Initiative



RGI MEMBERS *across Europe*

Renewables Grid Initiative

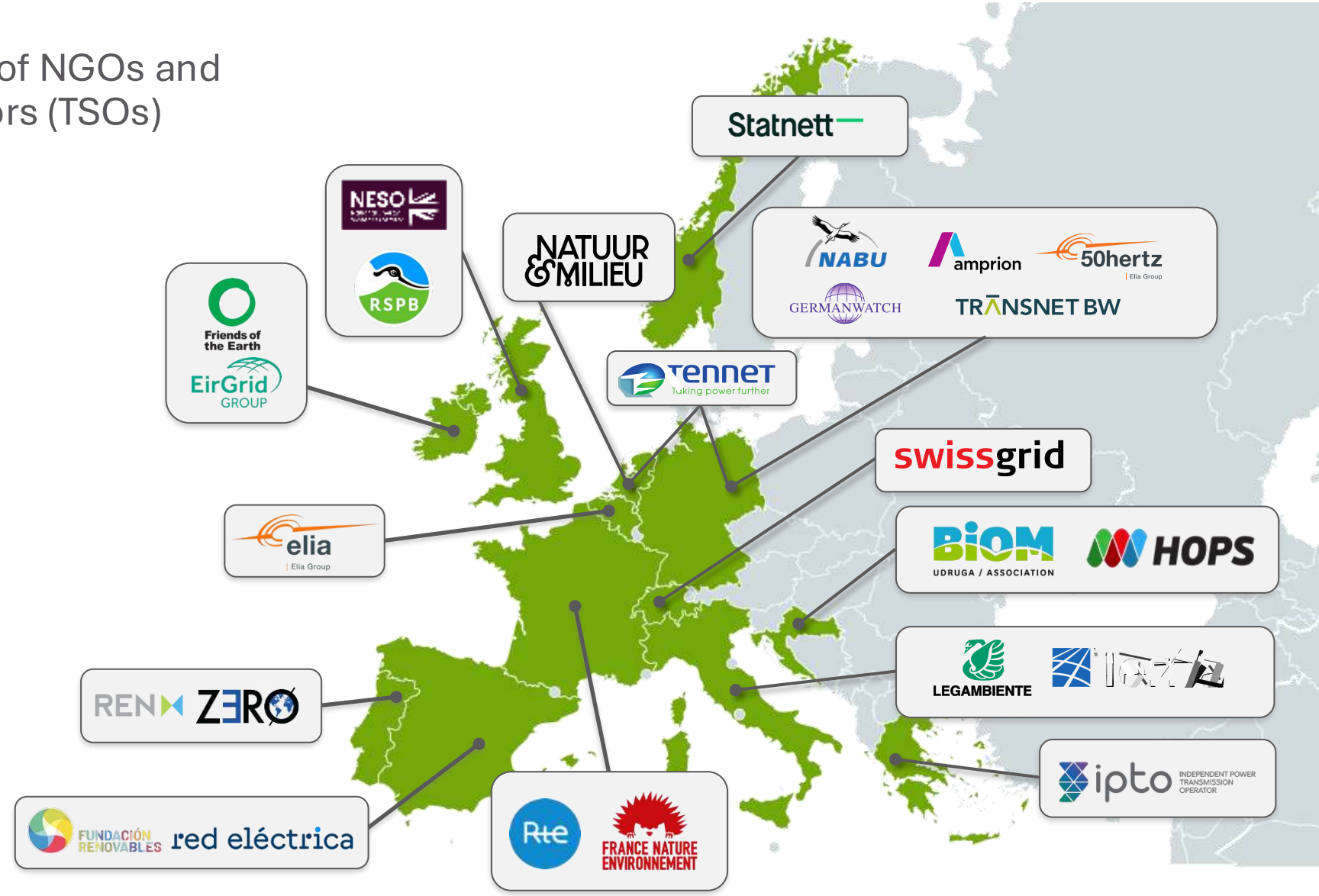
RGI is a unique collaboration of NGOs and Transmission System Operators (TSOs)

EUROPEAN ORGANISATIONS

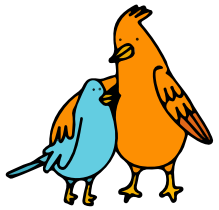
CAN Europe · WWF · BirdLife International / BirdLife Europe · Bellona Europa · EMBER

SUPPORTING MEMBERS

europacable – Try life without us · IUCN · T&D europe



About RGI



We engage in an energy transition ecosystem of actors and promote **fair, transparent, sustainable grid development** to enable the growth of renewables to achieve full decarbonisation in line with the Paris Agreement.

TRANSMISSION SYSTEM OPERATORS (TSOS)

50hertz | Elia Group · amprion · elia | Elia Group · EirGrid GROUP · HOPS · ipto INDEPENDENT POWER TRANSMISSION OPERATOR · NESO National Energy System Operator · REN · red eléctrica · Rte · TenneT · Terna · TRANSNET BW · Statnett · swissgrid

Renewables Grid Initiative

NON-GOVERNMENTAL ORGANISATIONS (NGOS)

BELLONA EUROPA · BirdLife INTERNATIONAL BIRDLIFE EUROPE · BIOM UDRUGA / ASSOCIATION · CAN CLIMATE ACTION NETWORK Europe · EMBER · Friends of the Earth · FUNDACIÓN RENOVABLES · FRANCE NATURE ENVIRONNEMENT · GERMANWATCH · LEGAMBIENTE · NABU · NATUUR & MILIEU · RSPB · zero. · WWF

SUPPORTING MEMBERS

europacable Try life without us · IUCN · T&D europe

Renewables Grid Initiative

WINGSPAN 2026

From Partnerships to Practice

3 – 5 November 2026 | Berlin

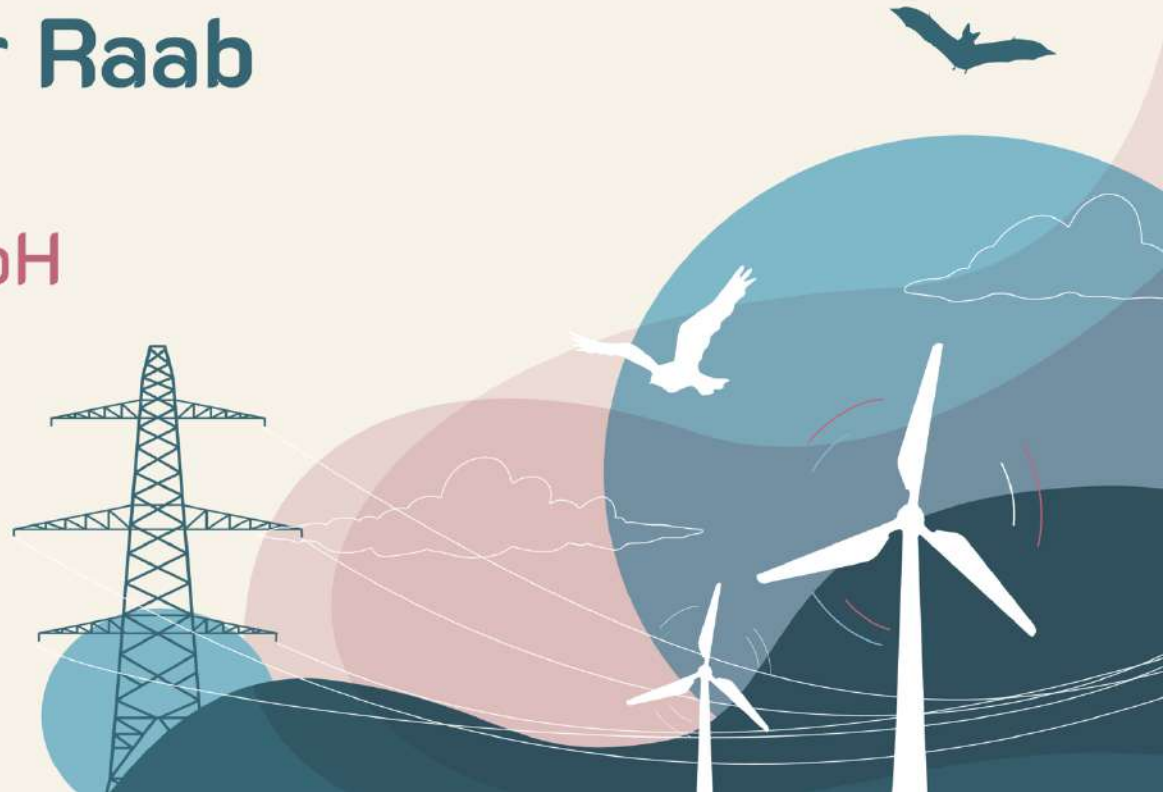


Opening Words

Dr. Rainer Raab

CEO

TB Raab GmbH



WINGSPAN 2026

From Partnerships to Practice

3 – 5 November 2026 | Berlin



Opening Words

Olivier Feix

Head of Strategy

Elia Group



WINGSPAN 2026

From Partnerships to Practice

3 – 5 November 2026 | Berlin



Opening Words

Simona Bacchereti

Project Advisor

CINEA



WINGSPAN 2026

From Partnerships to Practice

Accelerating Nature-Positive Energy Infrastructure

3 – 5 November 2026
Berlin



Renewables Grid Initiative · TB Raab Technisches Büro für Biologie · SafeLines4Birds · EUROKITE · LIFE EURO BUSTARD · 50hertz | Elia Group · elia group · NATURA 2000 · Co-funded by the European Union

WINGSPAN 2026

Setting the scene

From Wingspan 2024 to 2026
Policy, Technical Innovations
and Conservation



Alexandros Fakas Kakouris
Senior Manager - Energy
and Policy Systems
Renewables Grid Initiative



Dr. Andrzej Ceglarz
Director - Energy Systems
Renewables Grid Initiative



Hannah Böing
Team Leader
TB Raab GmbH



We couldn't load the Menti slide

Exit slideshow mode, then select the Menti slide you want to add. After selecting your slide, start the slideshow again.

If the issue persists, please reach out to us at hello@mentimeter.com

Copy diagnostics

WINGSPAN 2026

Setting the scene

From Wingspan 2024 to 2026
Policy, Technical Innovations
and Conservation



Alexandros Fakas Kakouris
Senior Manager - Energy
and Policy Systems
Renewables Grid Initiative



Dr. Andrzej Ceglarz
Director - Energy Systems
Renewables Grid Initiative



Hannah Böing
Team Leader
TB Raab GmbH

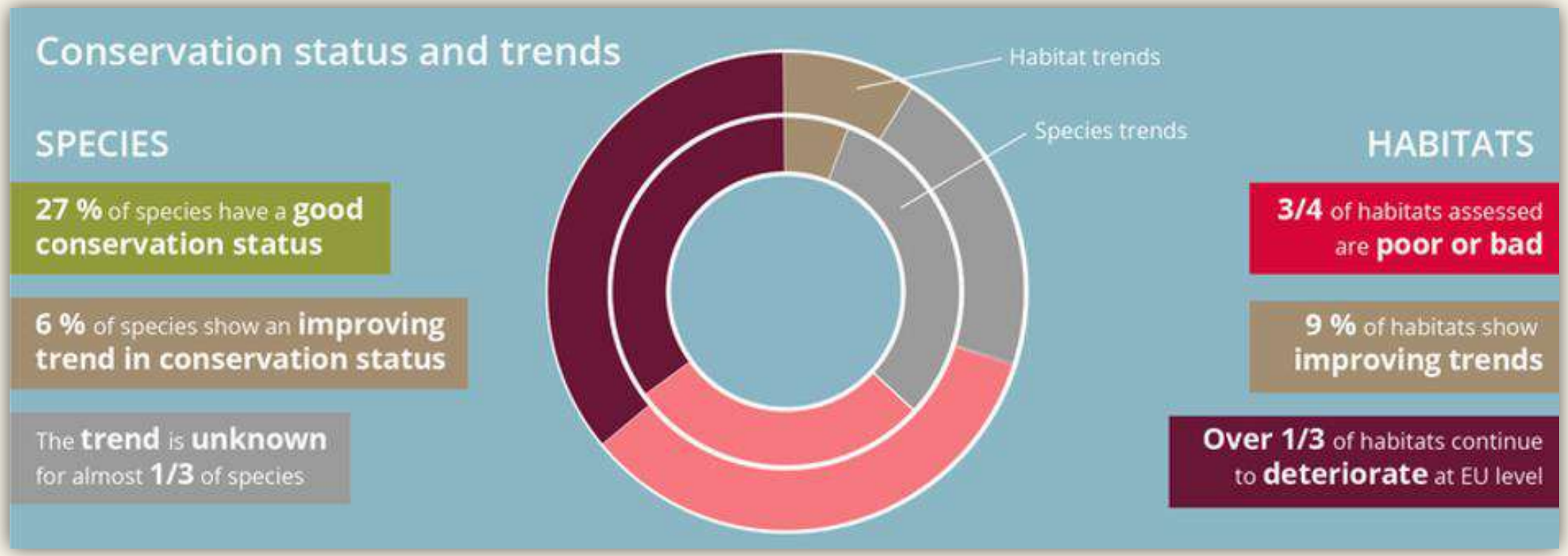


We couldn't load the Menti slide

Exit slideshow mode, then select the Menti slide you want to add. After selecting your slide, start the slideshow again.

If the issue persists, please reach out to us at hello@mentimeter.com

Copy diagnostics



© European Environment Agency (2020)



WINGSPAN 2026

Setting the scene

From Wingspan 2024 to 2026
Policy, Technical Innovations
and Conservation



Alexandros Fakas Kakouris
Senior Manager - Energy
and Policy Systems
Renewables Grid Initiative



Dr. Andrzej Ceglarz
Director - Energy Systems
Renewables Grid Initiative



Hannah Böing
Team Leader
TB Raab GmbH



We couldn't load the Menti slide

Exit slideshow mode, then select the Menti slide you want to add. After selecting your slide, start the slideshow again.

If the issue persists, please reach out to us at hello@mentimeter.com

Copy diagnostics

WINGSPAN 2026

Setting the scene

From Wingspan 2024 to 2026
Policy, Technical Innovations
and Conservation



Alexandros Fakas Kakouris
Senior Manager - Energy
and Policy Systems
Renewables Grid Initiative



Dr. Andrzej Ceglarz
Director - Energy Systems
Renewables Grid Initiative



Hannah Böing
Team Leader
TB Raab GmbH



WINGSPAN 2026

Panel Discussion

Derisking Energy: Investing in Nature, Society and Climate Protection



Dr. Nadine Kanu
Vice President
German Wind Energy Association (BWE)



Olivier Feix
Head of Strategy
Elia Group



Sebastian Bock
Director of Policy
NABU



Moderator

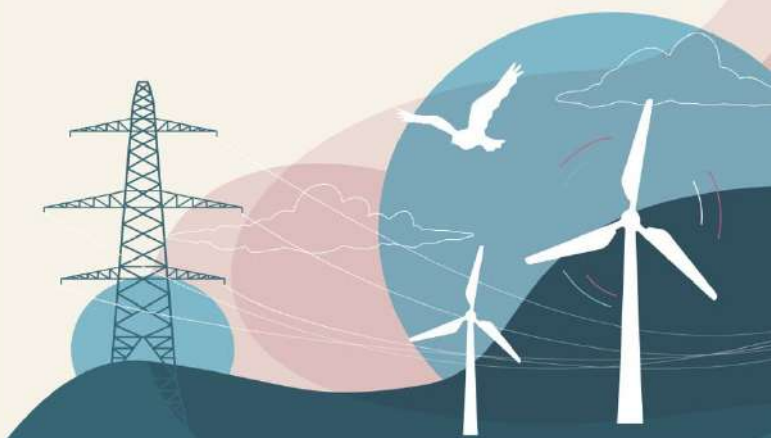
Antonella Battaglini
CEO
Renewables Grid Initiative

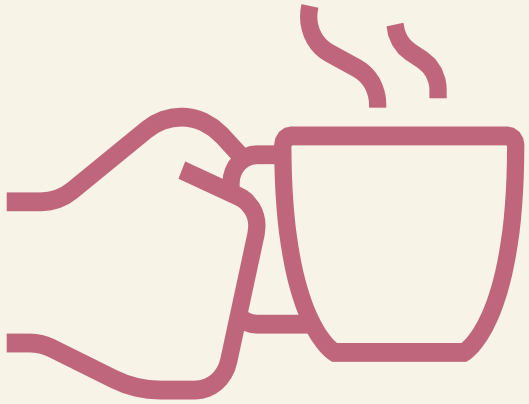


Vendor fair

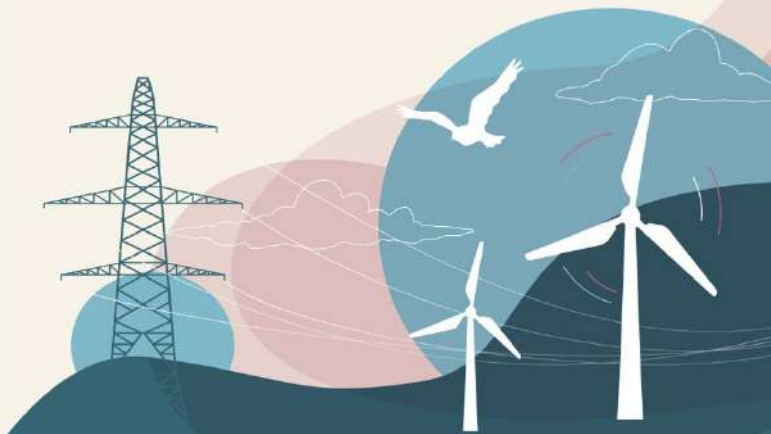
Ten exhibitors

- TE Connectivity Energy GmbH
- S.A. de Preformados Metálicos (SAPREM)
- Skydrone Robotics SAS
- Hammarprodukter AB
- FulcrumAir
- Bioseco SA
- OrniLogic
- E-obs GmbH
- Deák Delta Kft.
- ProtectBird





COFFEE BREAK



WINGSPAN 2026

From Partnerships to Practice

Accelerating Nature-Positive Energy Infrastructure

3 – 5 November 2026
Berlin



Renewables Grid Initiative · TB Raab Technisches Büro für Biologie · SafeLines4Birds · EUROKITE · LIFE EURO BUSTARD · 50hertz | Elia Group · elia group · NATURA 2000 · Co-funded by the European Union

WINGSPAN 2026

Presentations

Bridging the Gap: Leveraging Data Sharing as a Win-Win for Wildlife and Energy Projects



Joana Bernardino
Researcher
CIBIO/BIOPOLIS



José Tavares
Director
Vulture Conservation Foundation



Dr. Mirna Mazija
President
Association For Bat Conservation Tragus



Rainhard Raab
Deputy CEO
TB Raab GmbH



Larissa Biasotto
Senior Science Officer - Birds & Energy
BirdLife International



Margarida Almeida
Conservation Biologist
REN

RISKY

RISKY: Building a Global Open Platform for Wildlife Mortality at Energy Infrastructures

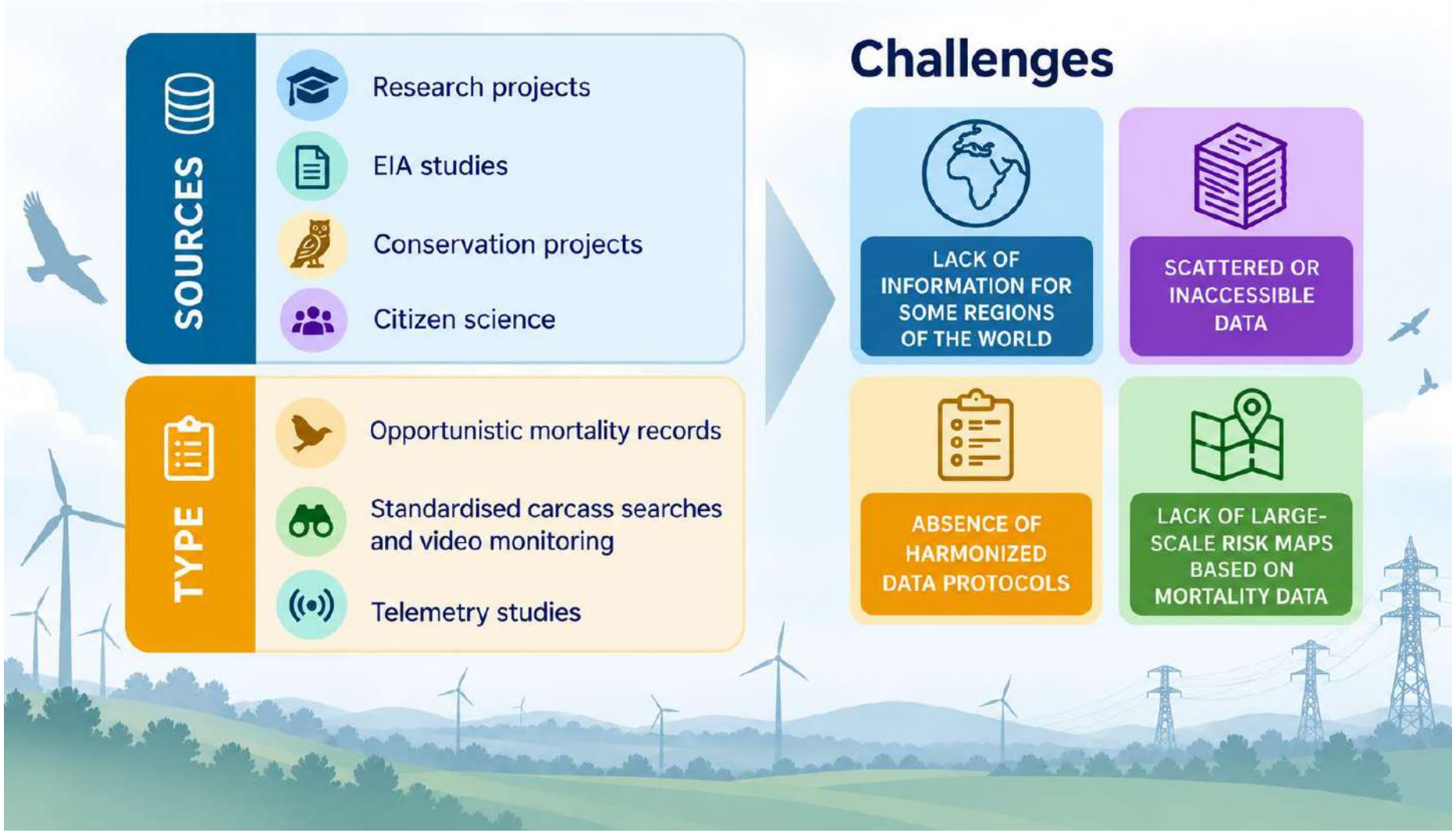
Joana Bernardino, Ana Teresa Marques,
Filipa Coutinho Soares, Tomé Neves, Inês Fonseca & Clara Grilo

BIOPOLIS cibio



Mortality data

Availability a Usage



RISKY



1 **Global records**

Mortality observations from multiple countries and organizations

2 **Data harmonisation**

Compile, validate and standardise datasets

3 **Risk modelling**

Relate mortality patterns to infrastructure and species

4 **Global risk maps**

Identify hotspots and guide mitigation



The RISKY platform

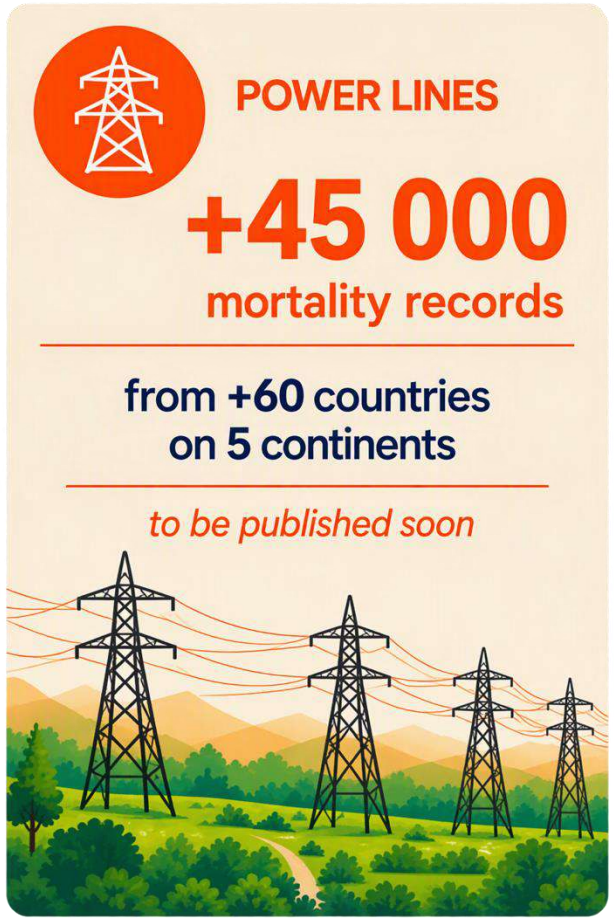
Open-access platform to explore, visualise and analyse global data on wildlife mortality risk.

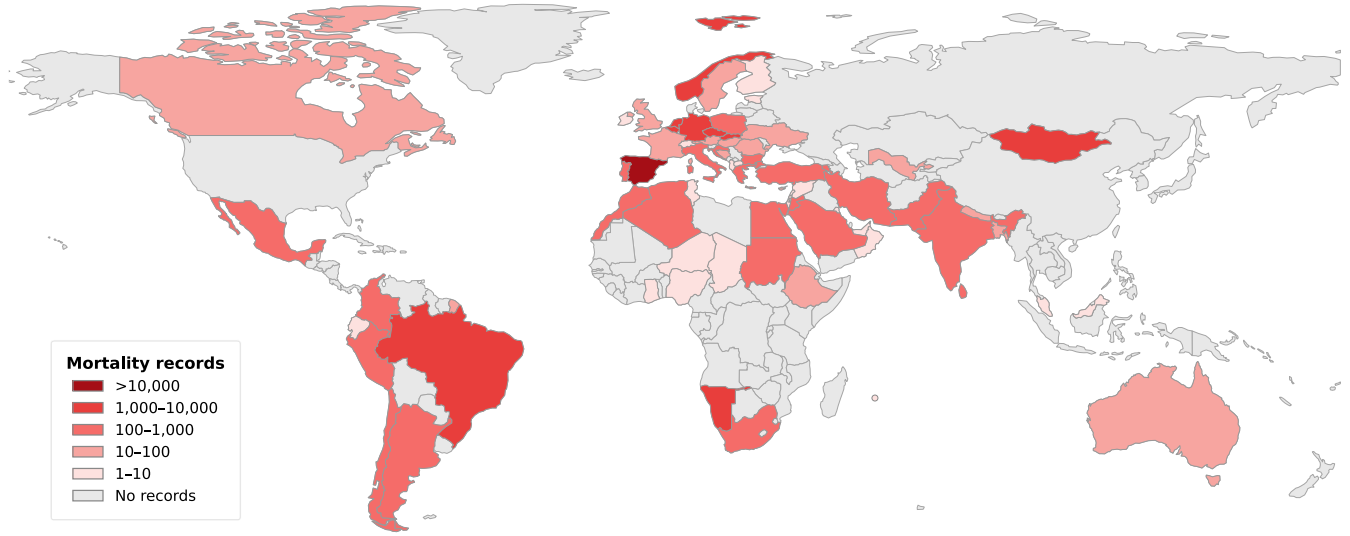
- Interactive maps
- Harmonised datasets
- Analysis tools
- Data access

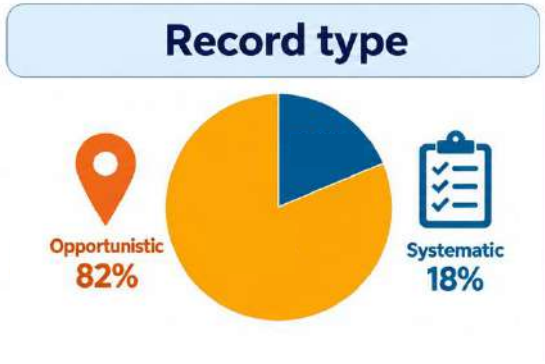
Mortality locations

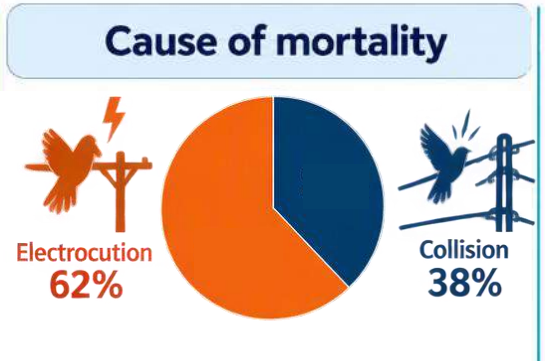


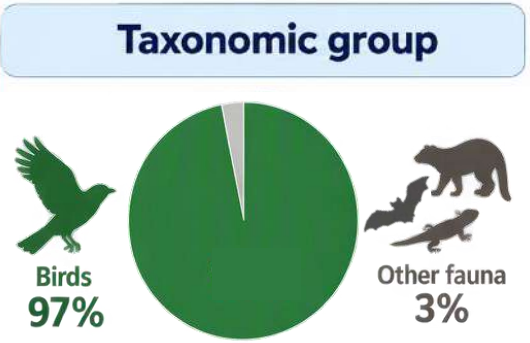
Mortality locations







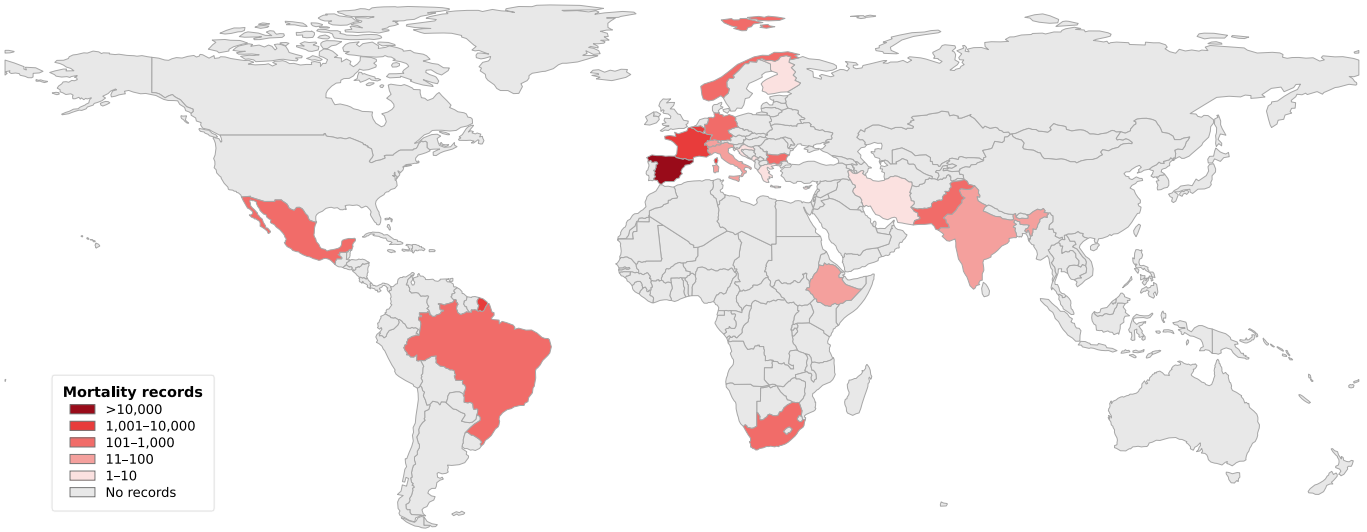


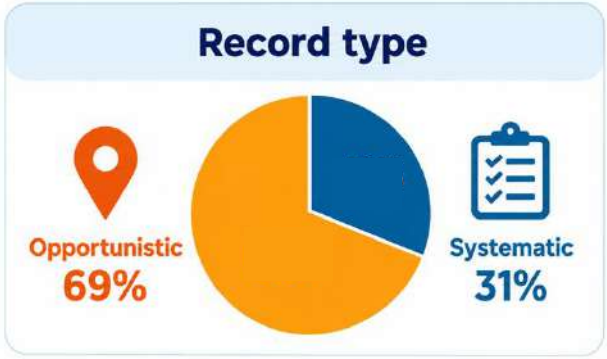


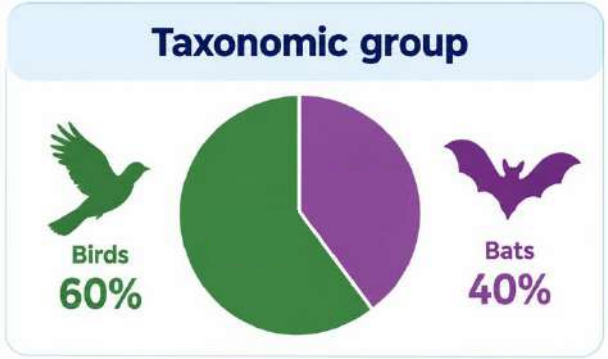
Other variables: Record Date; Species; Power line type, Voltage; Configuration; Mitigation measures; Survey type & effort; etc.

Mortality locations









Other variables:

Record Date; Species; Turbine type, Turbine power; Nacelle height; Mitigation measures; Survey type & effort; etc.

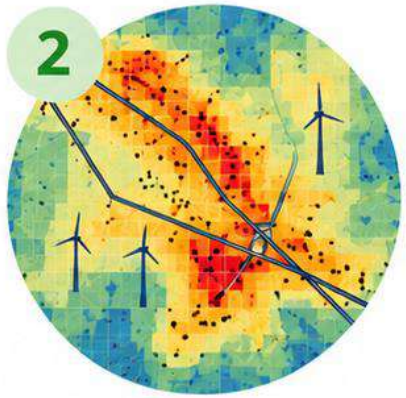
From data to knowledge



1

How much?

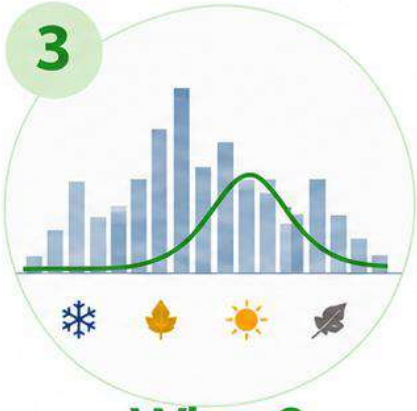
Magnitude of mortality (collision and electrocution)



2

Where?

Spatial patterns and hotspots around power lines and wind farms



3

When?

Temporal patterns and seasonality



4

Why?

Drivers and risk factors (e.g. infrastructure design, environmental conditions, species traits)



5

Population consequences?

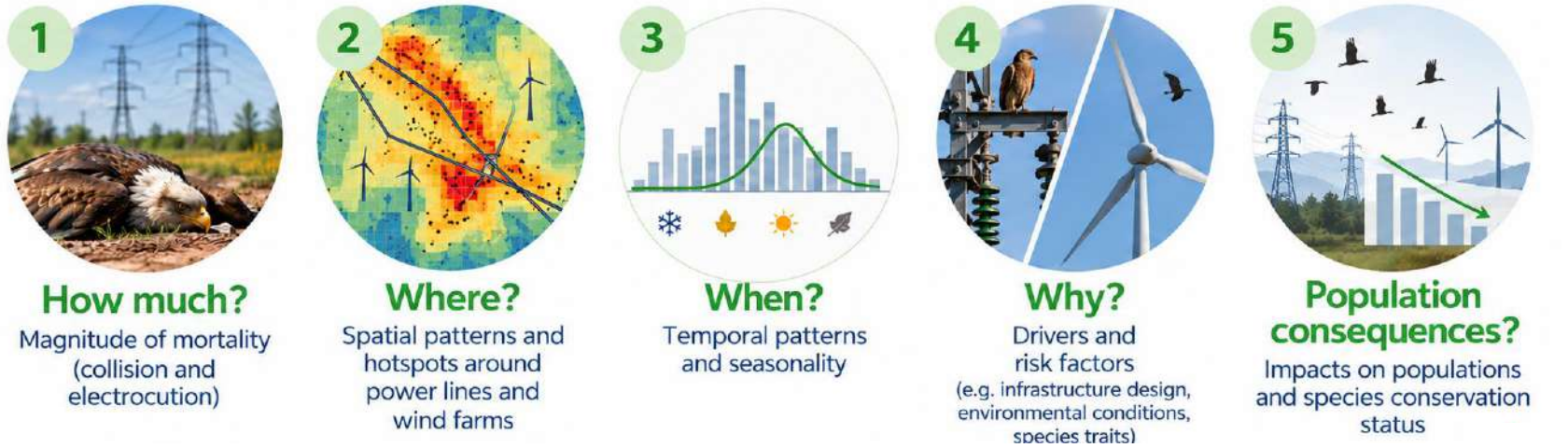
Impacts on populations and species conservation status

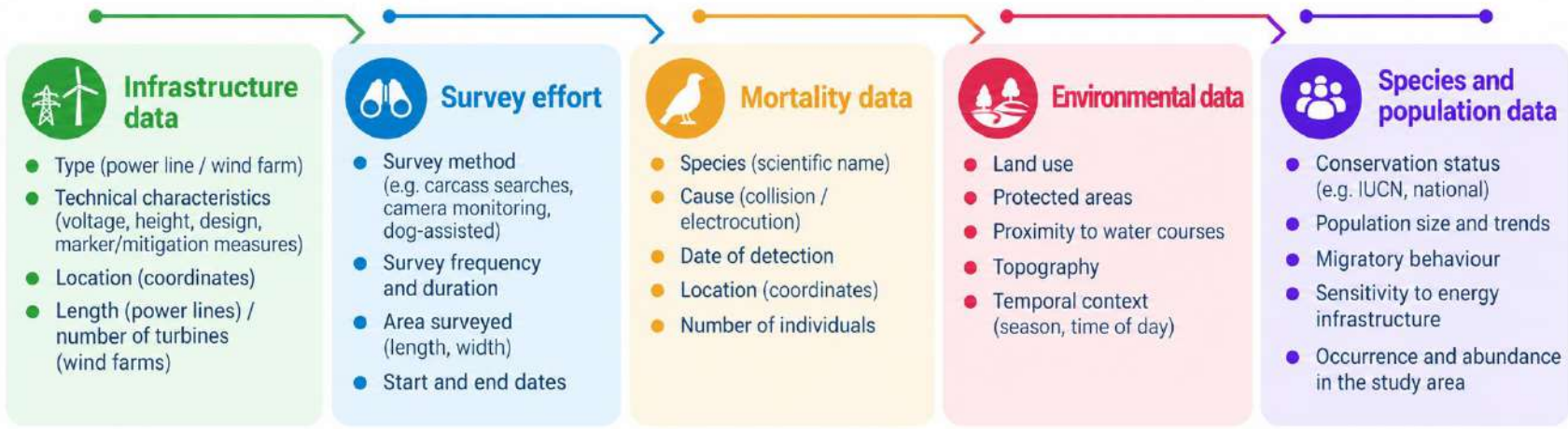
These questions help to support where interventions are most needed, what measures may be most effective and which impacts are most important to address.

From data to knowledge

Questions

Collect the right information

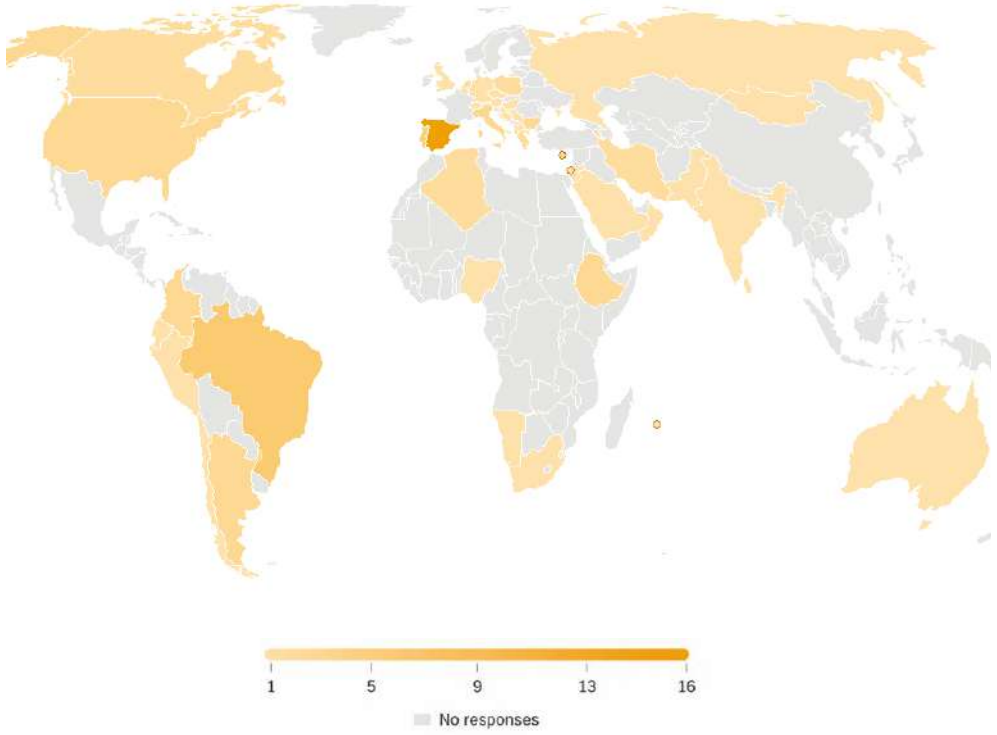


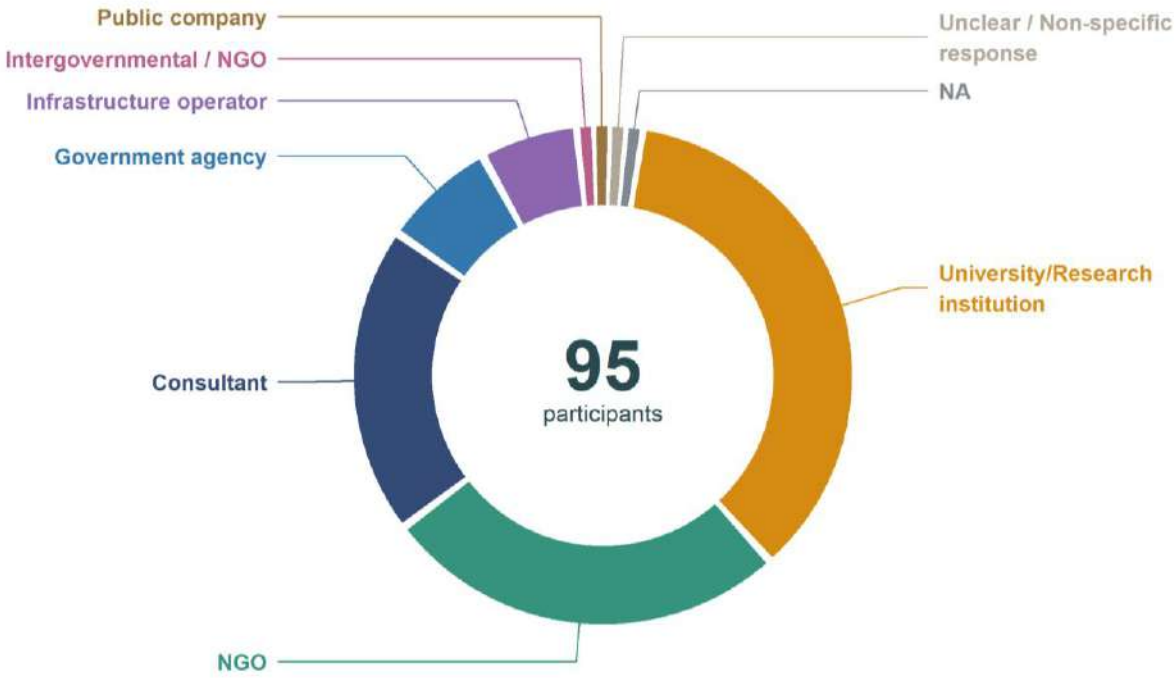


From data to knowledge

RISKY Questionnaires

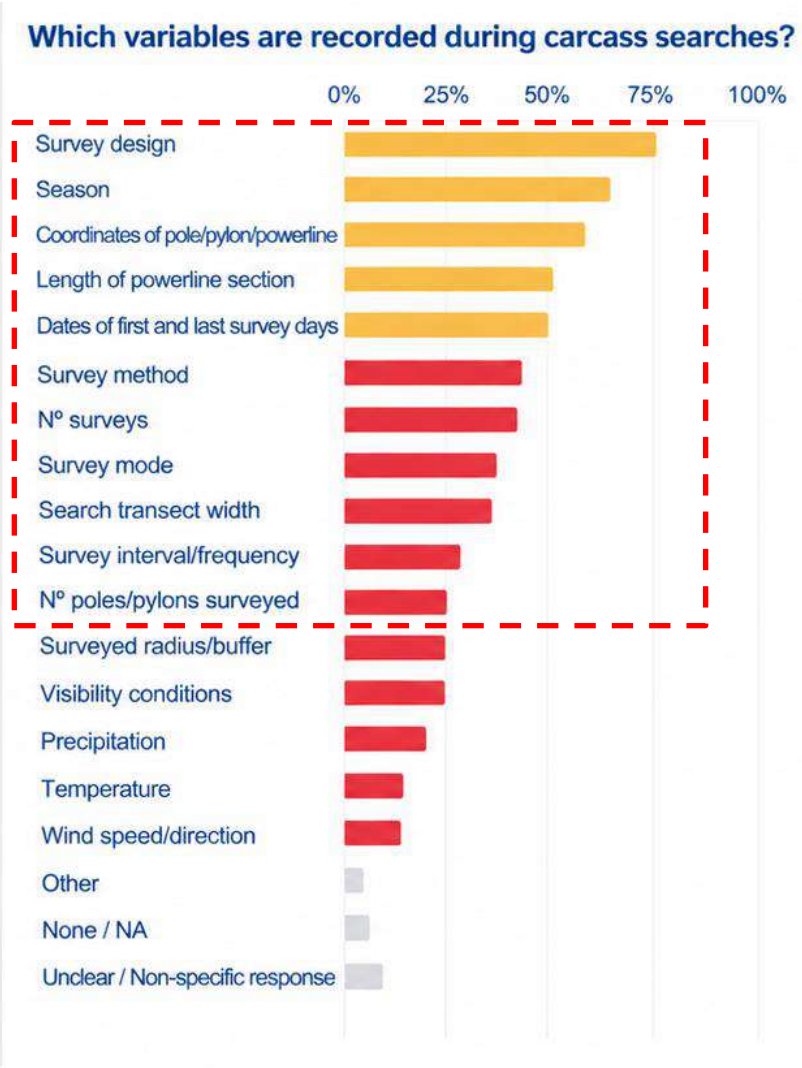
POWER LINES

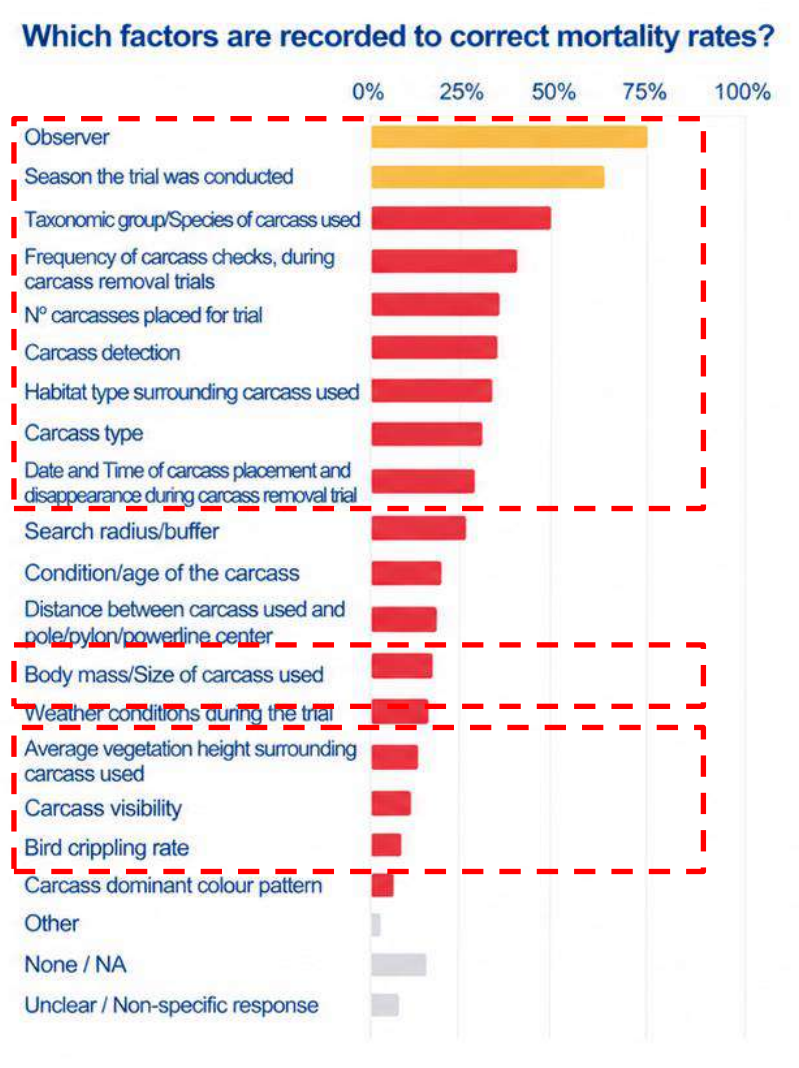




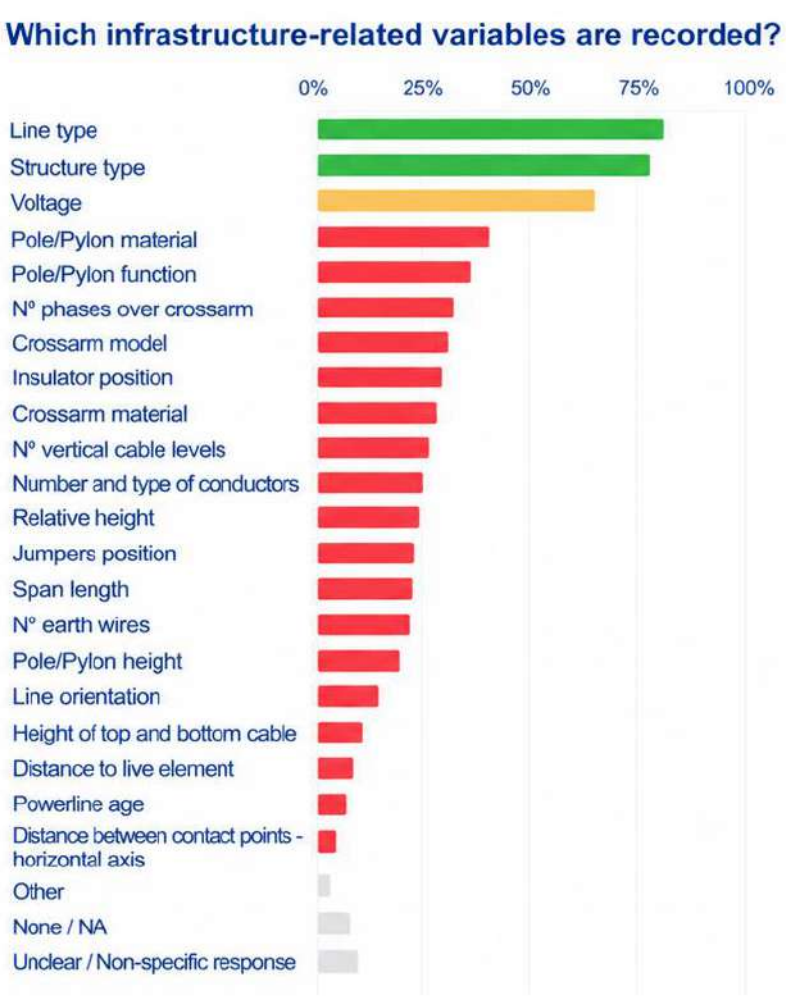
From data to knowledge

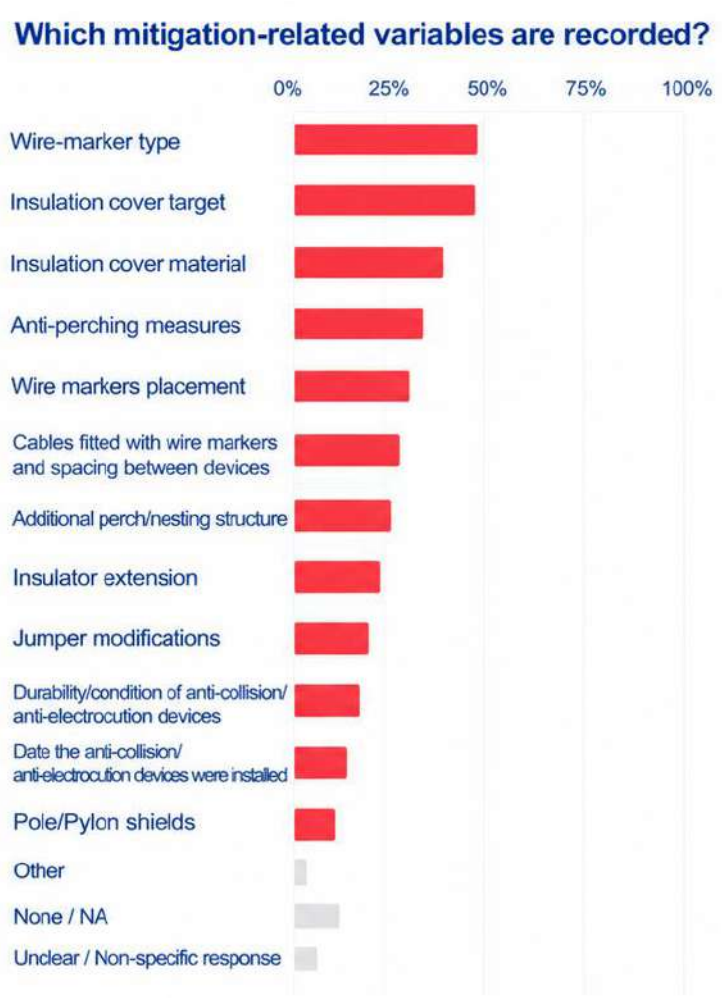


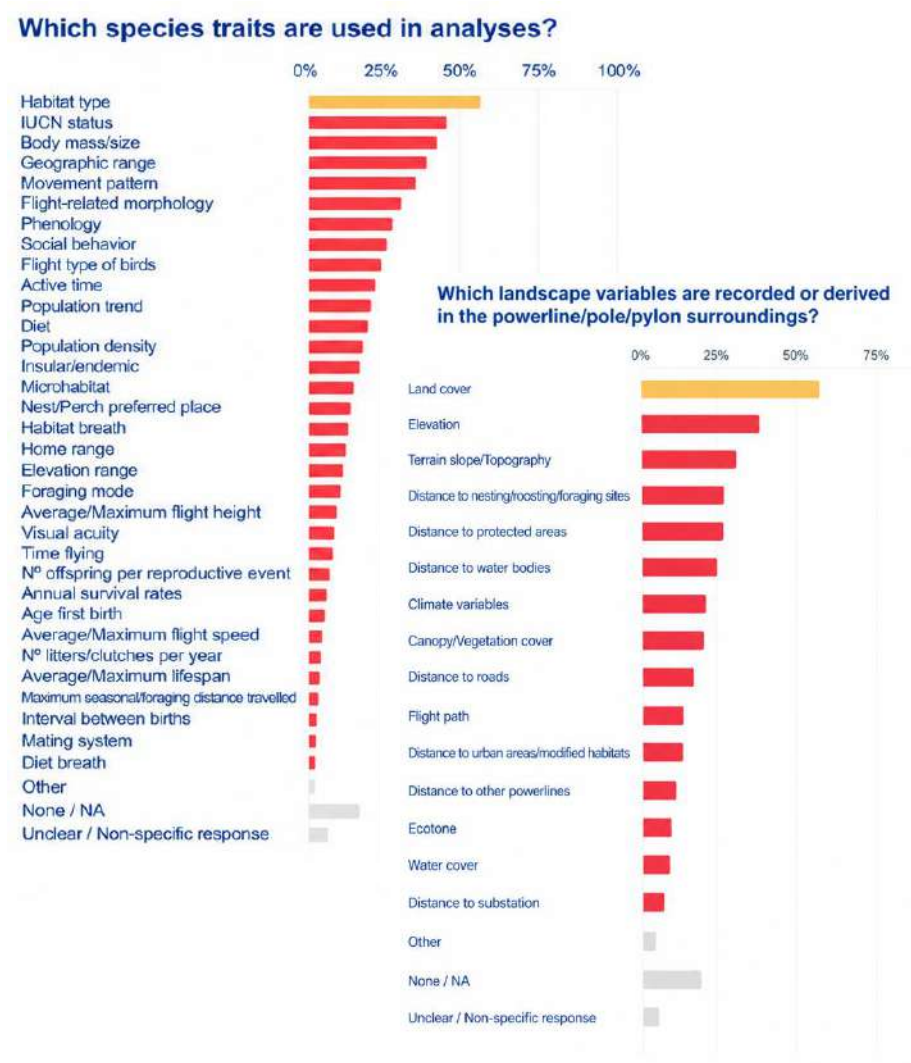




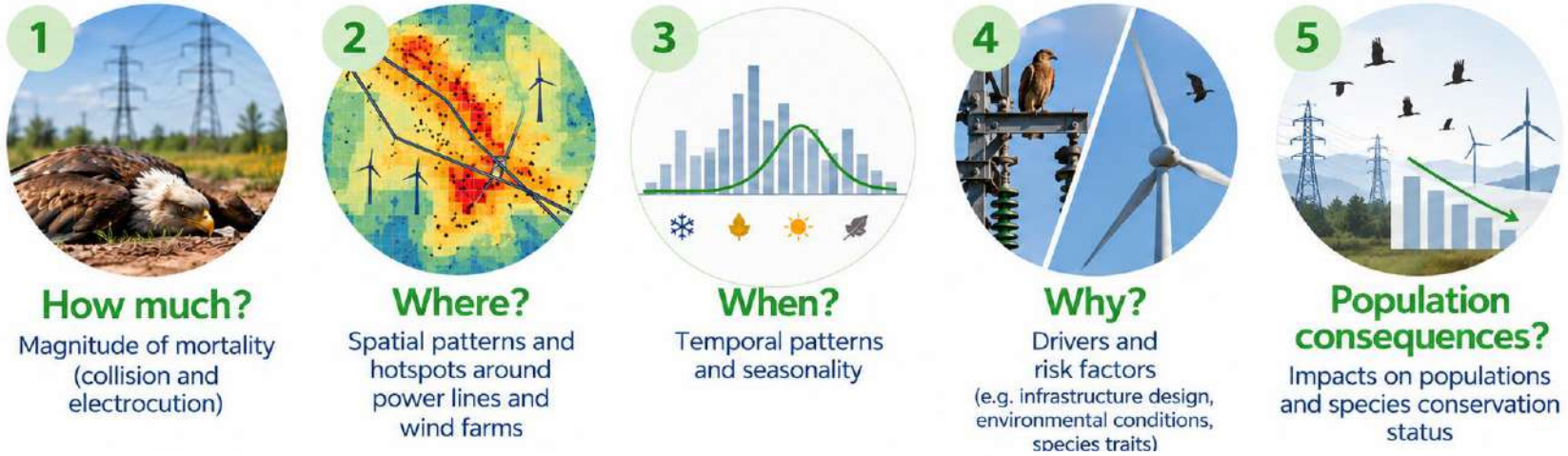
From data to knowledge

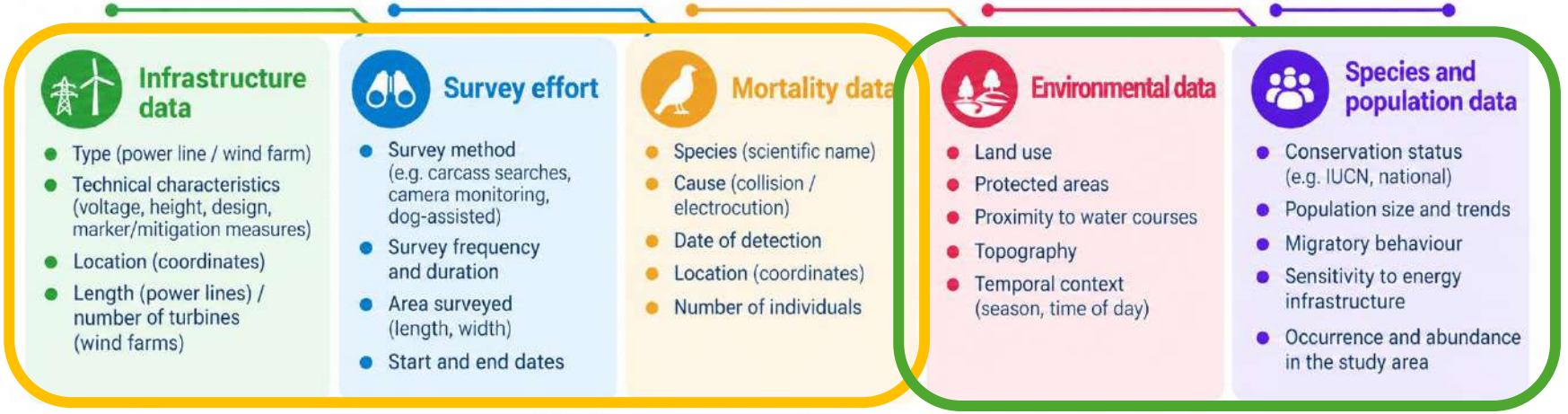






From data to knowledge





Collaboration between operators, consultants, NGOs and researchers becomes essential.

The RISK platform

RISKY

News & Events Join Us

RISKY EXPLORE ANALYTICAL TOOLS SENSITIVITY MAPS CITIZEN SCIENCE APPS SCIENCE & SOLUTIONS

HOME

Explore

Open Access Data



Search Mortality Data

Find and filter wildlife mortality data by species, location, infrastructure type and other criteria, and download the data for further analysis.

Search data



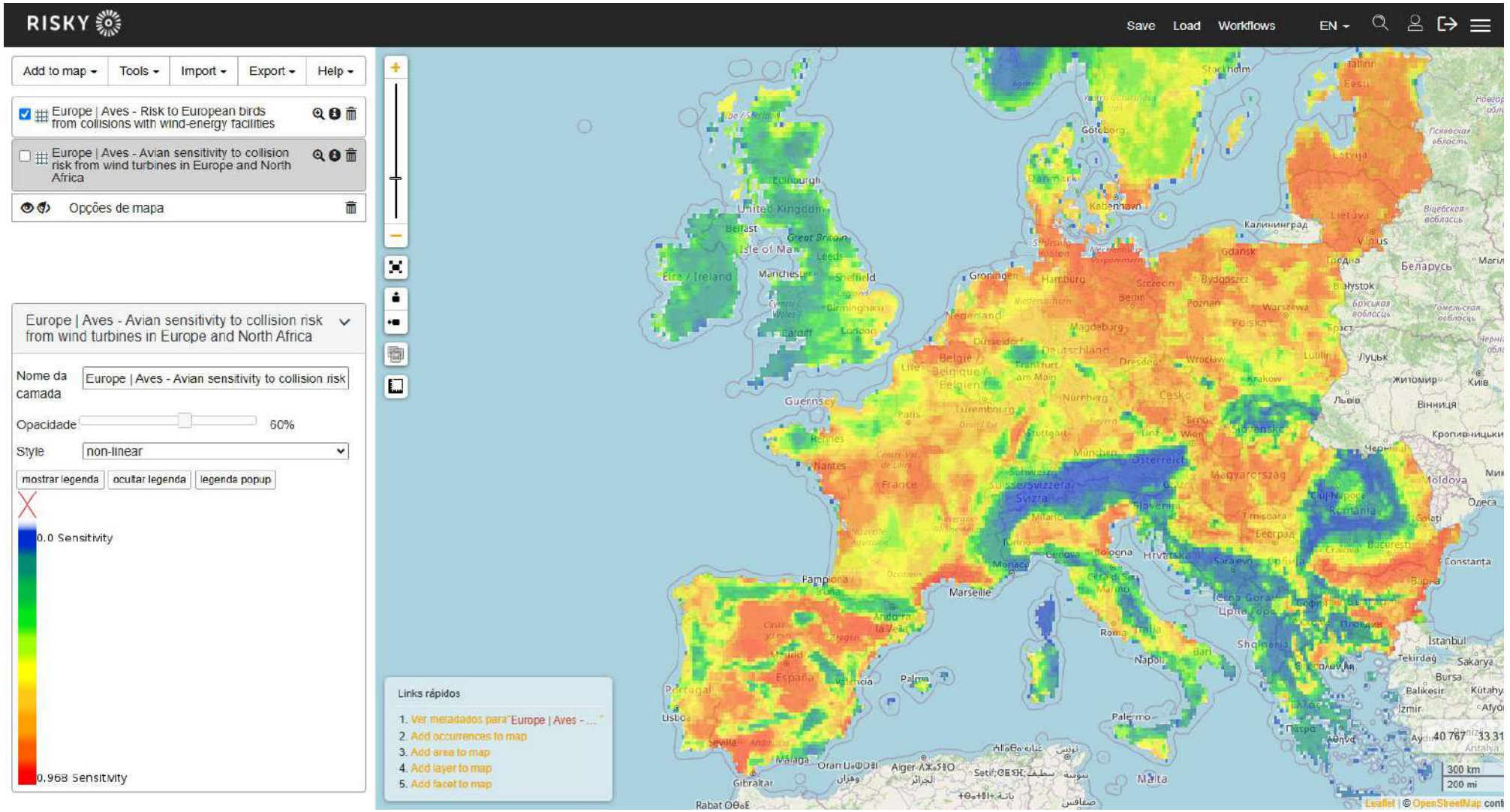
Explore the Map

Discover spatial patterns of wildlife mortality and sensitivity through an interactive global map. Search, visualize and download mortality data and sensitivity maps.

Explore map

The RISK platform

WIND FARMS



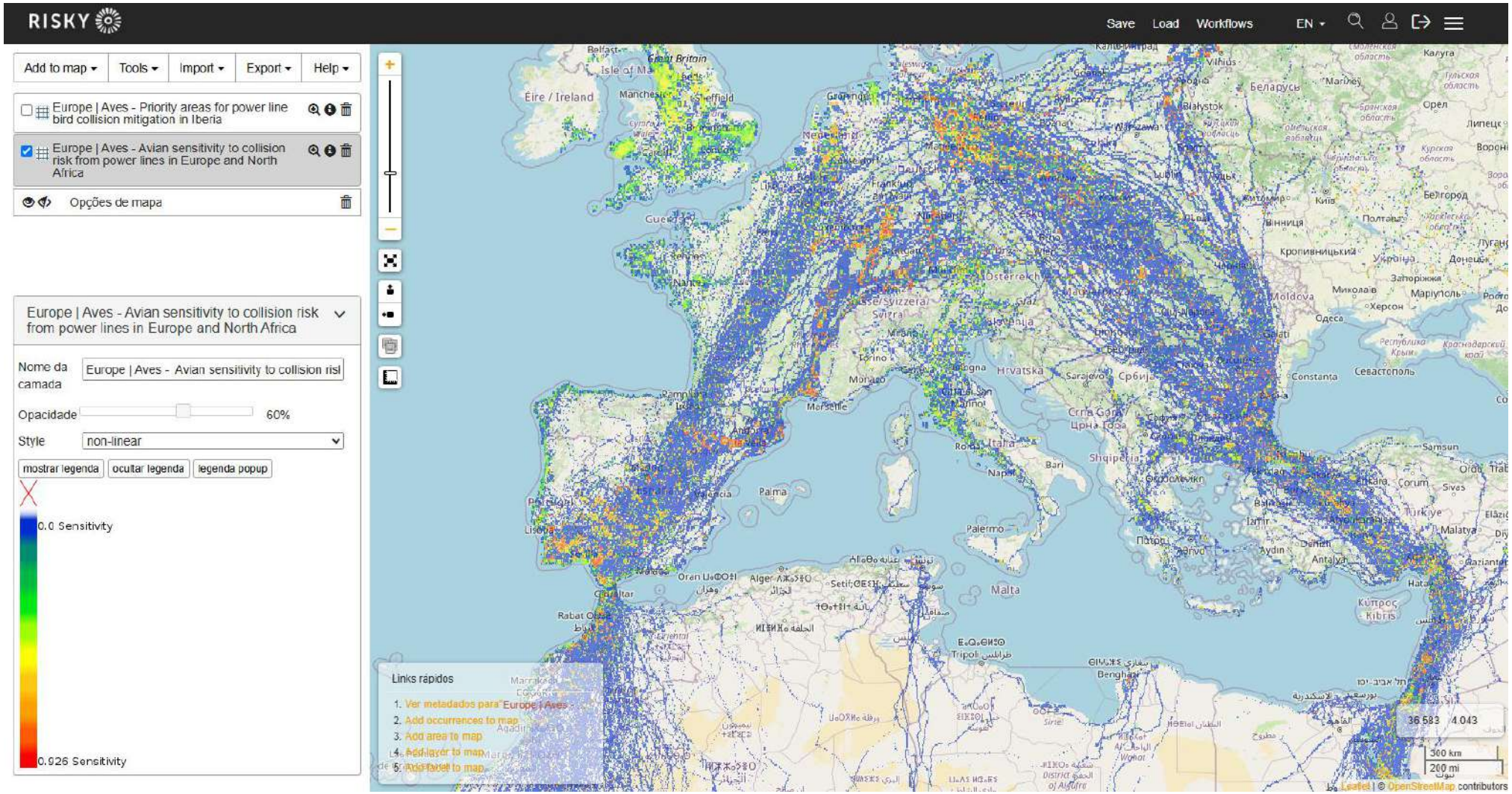
Etard *et al.* (2026)

https://doi.org/10.1016/j.biocon.2026.111875

'WIMBY' project

The RISK platform

POWER LINES



Gauld *et al.* (2022)

https://doi.org/10.5061/dryad.jm63xsjcw

RISKY

Sensitivity maps



Harmonised datasets

Analysis tools



Cooperation

Open-access platform to explore, visualise and analyse global data on wildlife mortality risk.

Contribute with more data!

Join the global community!

THANK YOU FOR YOUR INTEREST!

RISKY

www.risky.pt

Joana Bernardino

jbernardino@cibio.up.pt

BIOPOLIS cibio

BIOPOLIS Global Biodiversity Information Facility PORTUGAL Cerema UMR 5175 Centre d'Écologie Fonctionnelle & Évolutive OFB Office français de la biodiversité Renewables Grid Initiative

cibio GBIF.ES universität freiburg Wildlife Institute of India iDiv

OSCARS Open Science Clusters' Action for Research & Society

Funded by the European Union

WINGSPAN 2026

Presentations

Bridging the Gap: Leveraging Data Sharing as a Win-Win for Wildlife and Energy Projects



Joana Bernardino
Researcher
CIBIO/BIOPOLIS



José Tavares
Director
Vulture Conservation Foundation



Dr. Mirna Mazija
President
Association For Bat Conservation Tragus



Rainhard Raab
Deputy CEO
TB Raab GmbH



Larissa Biasotto
Senior Science Officer - Birds & Energy
BirdLife International



Margarida Almeida
Conservation Biologist
REN

03 - 05 November| 2026 Berlin, Germany

Wingspan 2026



LIFE Aegypius Return

Reconciling energy transition with biodiversity: the LIFE Aegypius Return experience

Milene Matos, José Pedro Tavares | VCF

LIFE AEGYPIUS RETURN

Co-funded by the European Union

NATURA 2000

VCF VULTURE CONSERVATION FOUNDATION

Palombar

Herdade da Contenda

spea

LPN liga para a protecção da natureza

FAIA BRAVA

GNR GUARDA NACIONAL REPUBLICANA

anpc

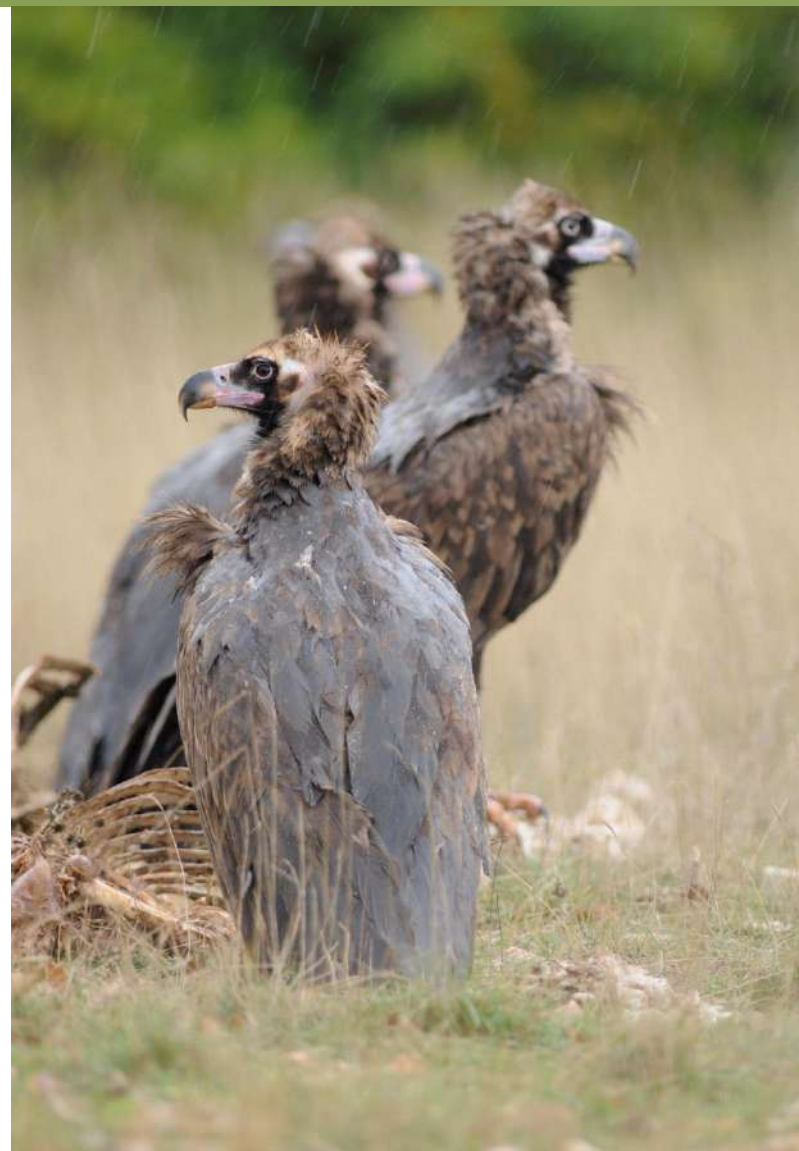
LIFE Aegypius Return - General objectives

Sustainably **improve the conservation** status of the Cinereous Vulture in Portugal,

through the **consolidation** of its recolonization,

improvements in its **habitat** and **food availability**,

and the **minimization of threats**.



LIFE AEGYPIUS RETURN

Co-funded by the European Union

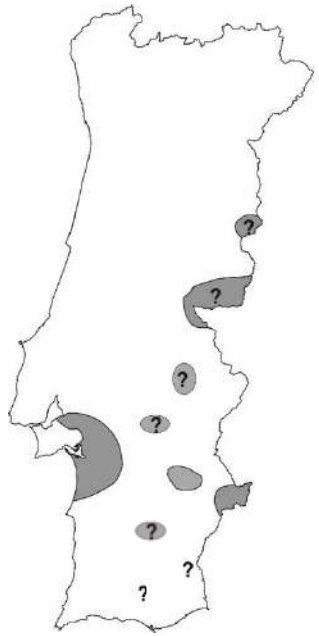
NATURA 2000

Cinereous Vulture in Portugal



Early 1900

Common (?)



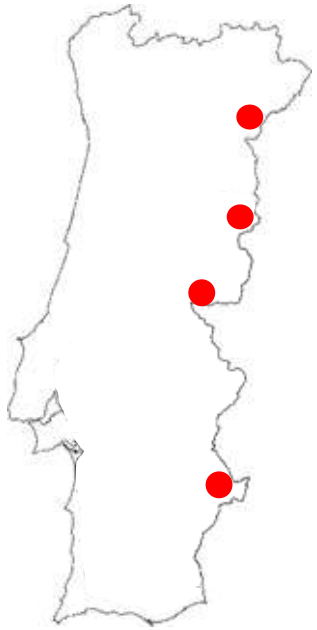
1960 – 1970

A few colonies left



1970s

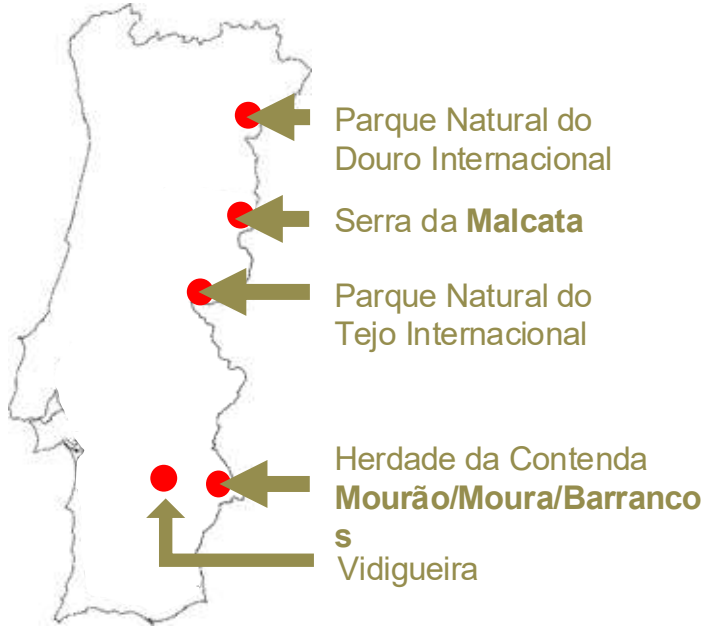
Extinction (breeder)



2023

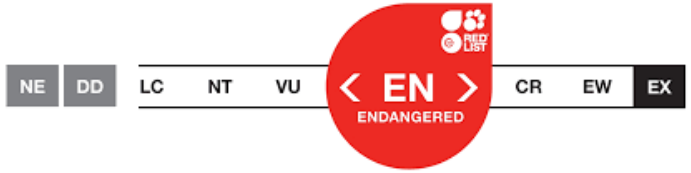
LIFE Aegypius Return

4 Colonies
~80 B.Pairs



2025

5 Colonies
~120 B.Pairs



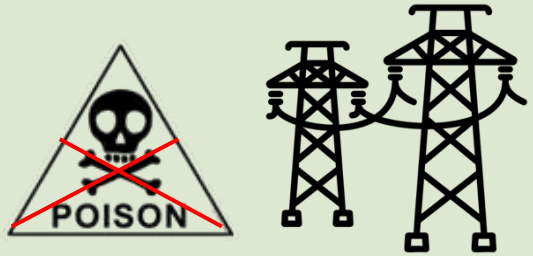
Intervention areas



Breeding success



Population reinforcement



Reducing mortality



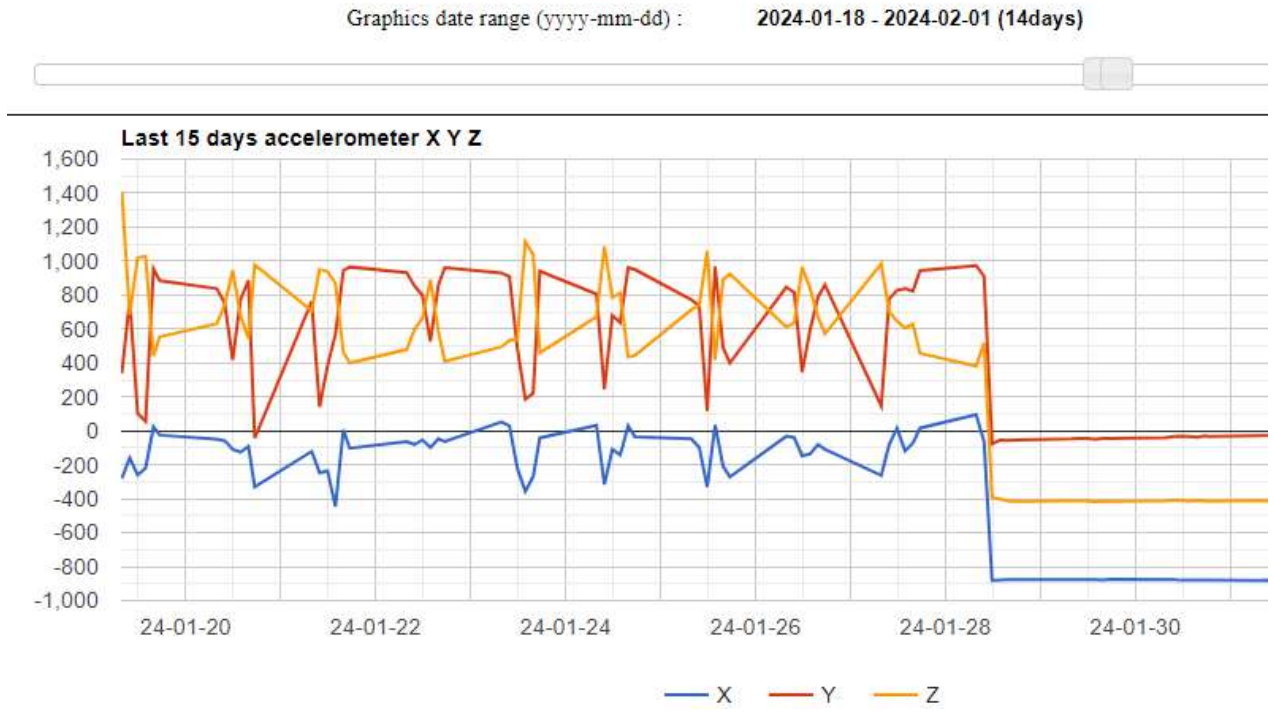
Food availability

LIFE AEGYPIUS RETURN

Co-funded by the European Union

NATURA 2000

Powerlines: detect mortality 80 Vultures tagged





3 cases of collision with transmission lines

LIFE AEGYPIUS RETURN

Co-funded by the European Union

NATURA 2000

Powerlines: notify and accelerate corrections





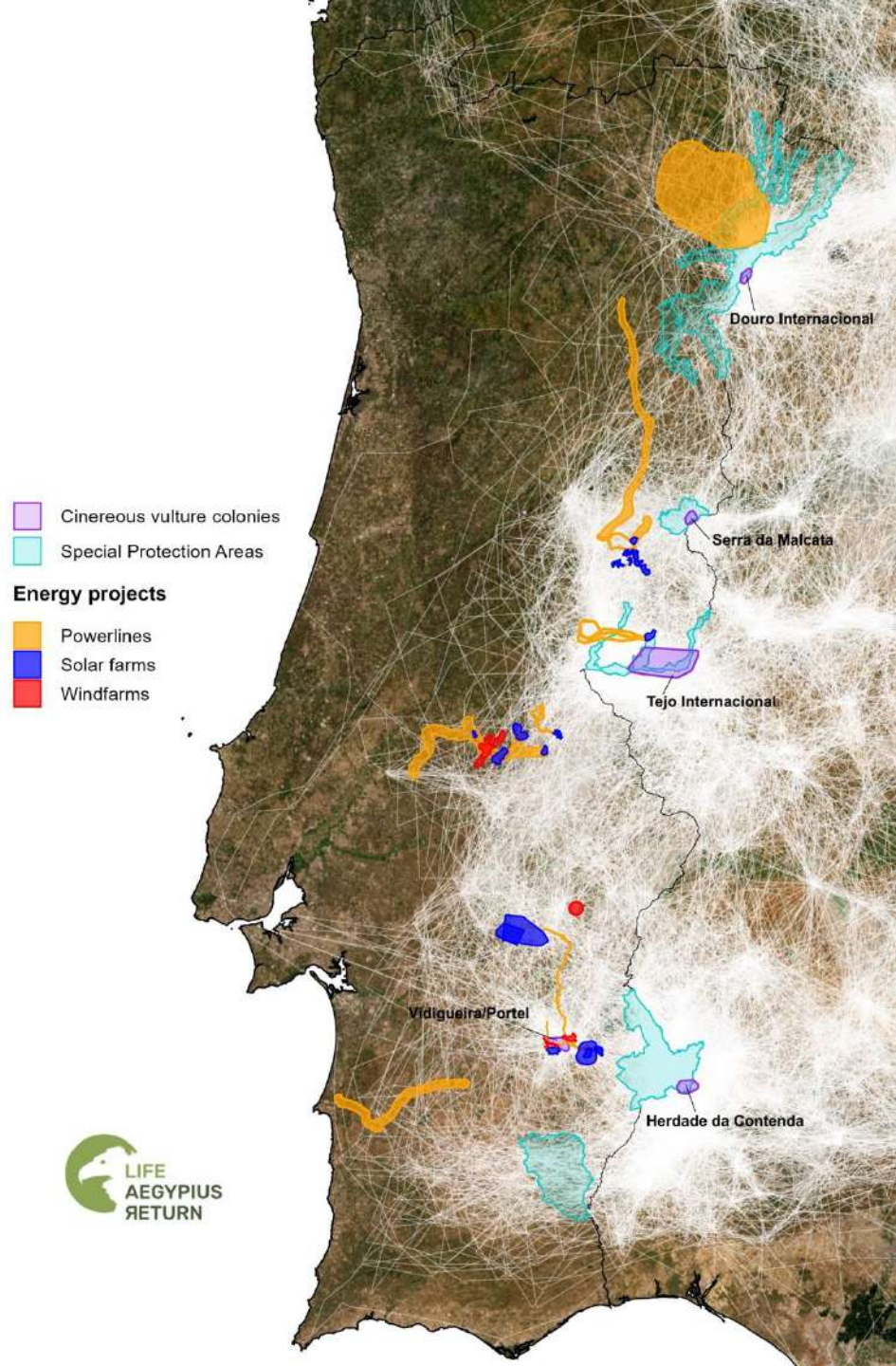
LIFE AEGYPIUS RETURN

Co-funded by the European Union

NATURA 2000

Issue technical reports

- 67 Technical reports
- 40+ Renewable energy projects

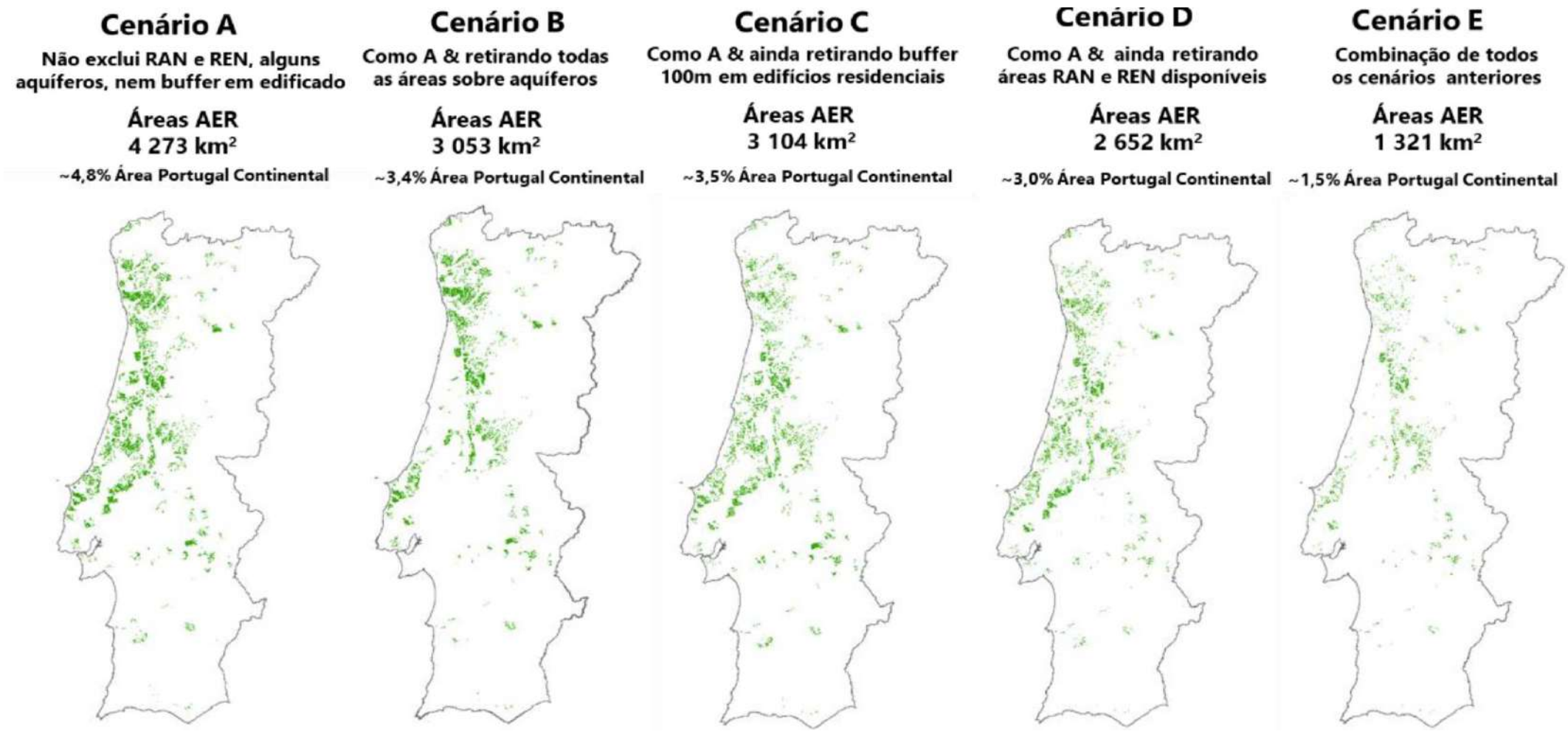


LIFE AEGYPIUS RETURN

Co-funded by the European Union

NATURA 2000

One of the main issues: delay in the definition of the renewable energy acceleration zones



Potential go-to areas for renewable energy projects

Produce technical guidelines (own data)

Wind energy and safety distances: new guidelines to protect the Cinereous Vulture

- **Conservation first:** 21,3 km
- **Compromise:** 17,5 km
- **Industry first:** 7,7 km



LIFE AEGYPIUS RETURN

Co-funded by the European Union

NATURA 2000

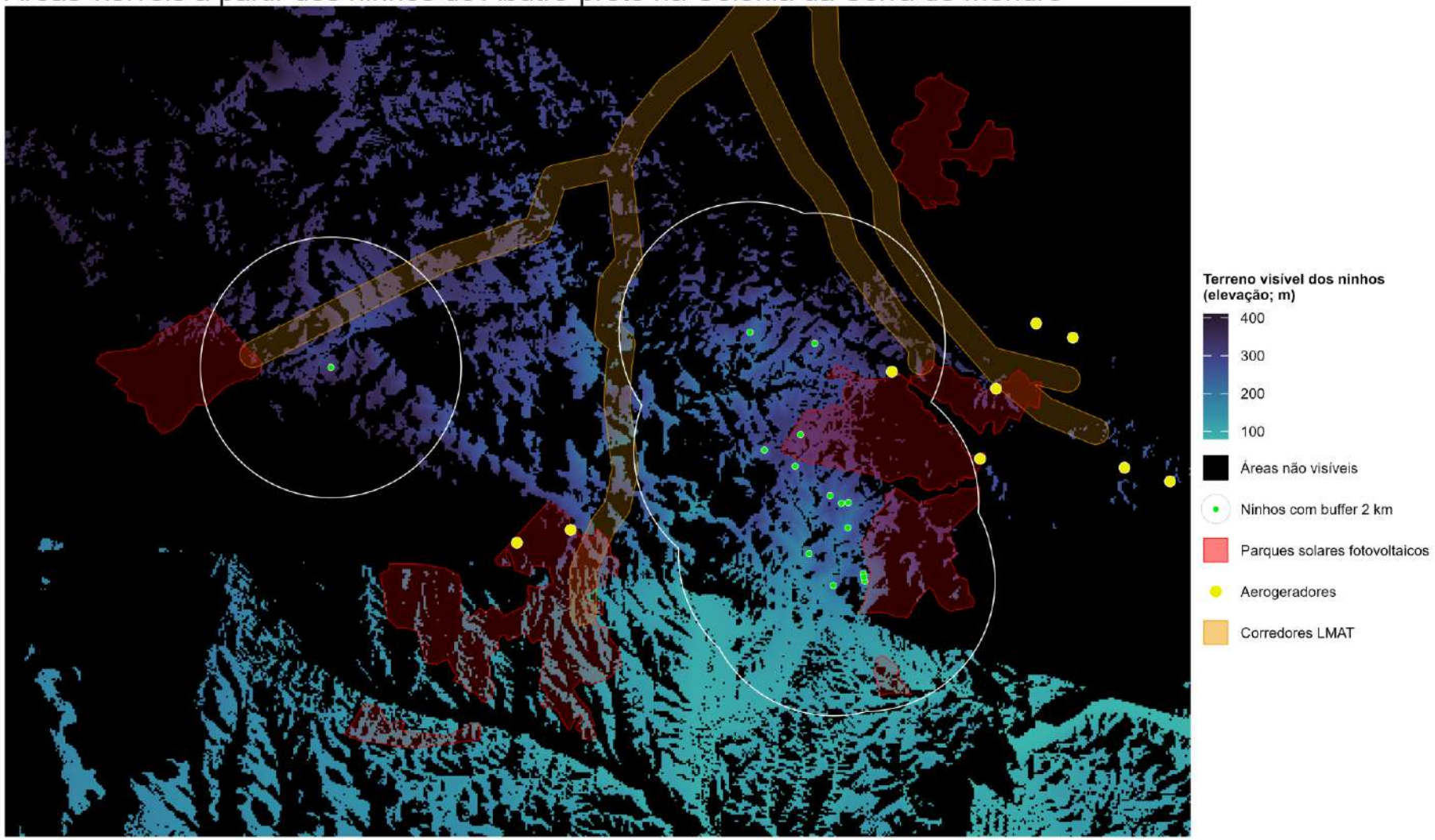
Produce technical guidelines – other metrics

Distance from vulture nest to transmission line 1km
Distance from vulture nest to photovoltaic panels 2 km

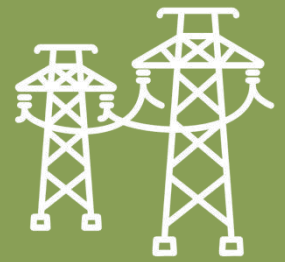


The Vidigueira cinereous vulture colony conundrum

Áreas visíveis a partir dos ninhos de Abutre-preto na Colónia da Serra do Mendro



The Vidigueira cinereous vulture colony conundrum



- 3 windfarms, 5 different photovoltaic farms
- 3 companies
- Several transmission lines
- 12 breeding pairs of cinereous vulture
- Renewable energy projects started before cinereous vulture recolonisation. Some companies have invested hundreds of thousands of € locally
- No N2000 or protected area
- Win-win solution

Advocate for good practice





©EMER



©EMER

LIFE AEGYPIUS RETURN

Co-funded by the European Union

NATURA 2000

Communicate



Strategic Cinereous Vulture colony in southern Portugal under serious threat

September 15, 2025



Wind energy and safety distances: new guidelines to protect the Cinereous Vulture

September 11, 2025



A weakened 2025 chick was rescued, rehabilitated, and released back into the wild

September 4, 2025



Several Cinereous Vulture nests burned in the Douro Internacional Nature Park, in northern Portugal

August 21, 2025



Clean energy yes, but not at the cost of biodiversity!

November 28, 2025



Nature conservation authority and biodiversity conservation NGOs cooperate to protect the Cinereous Vulture in central Portugal

November 12, 2025



Cinereous Vulture gave biodiversity a voice at renewable energy conference

November 6, 2025



Two Cinereous Vultures electrocuted on power lines in Tejo Internacional, Portugal

September 23, 2025



Human factors dominate Cinereous Vulture mortality in the Iberian Peninsula

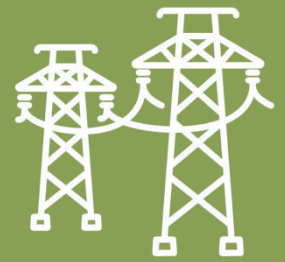
February 12, 2025



Portugal joins international efforts to combat wildlife crime

June 24, 2025

The Vidigueira cinereous vulture colony - strategy



- Totally transparent in terms of data – location of nests, movements of tagged birds (data sharing agreements)
- Meetings, joint analysis, issue of cumulative impacts
- Clear metrics and coherence
- No windfarms within 8 km of nests, no photovoltaic panels within 2km = cancellation of all windfarms (3 projects) plus reduction of 50% of panel area in 2 of the 5 photovoltaic farms
- Authorities cancelled 1st windfarm. Two to go (still in early stages of project planning-permitting)
- Promoters not very flexible or accommodating – no change even when we engaged at start of the project

LIFE AEGYPIUS ЯETURN

Obrigada!



LIFE AEGYPIUS ЯETURN
Co-funded by the European Union
NATURA 2000

WINGSPAN 2026

Presentations

Bridging the Gap: Leveraging Data Sharing as a Win-Win for Wildlife and Energy Projects



Joana Bernardino
Researcher
CIBIO/BIOPOLIS



José Tavares
Director
Vulture Conservation Foundation



Dr. Mirna Mazija
President
Association For Bat Conservation Tragus



Rainhard Raab
Deputy CEO
TB Raab GmbH



Larissa Biasotto
Senior Science Officer - Birds & Energy
BirdLife International



Margarida Almeida
Conservation Biologist
REN

From Data Silos to Shared Solutions: Collaboration for Bat-Smart Wind Energy



Mirna Mazija

Association for Bat Conservation Tragus



ACTIVE AT NIGHT

Bats are active from dusk to dawn.



USE LANDSCAPE FEATURES

They navigate and forage along landscape features such as valleys, forest roads and water bodies.



Valleys and gullies



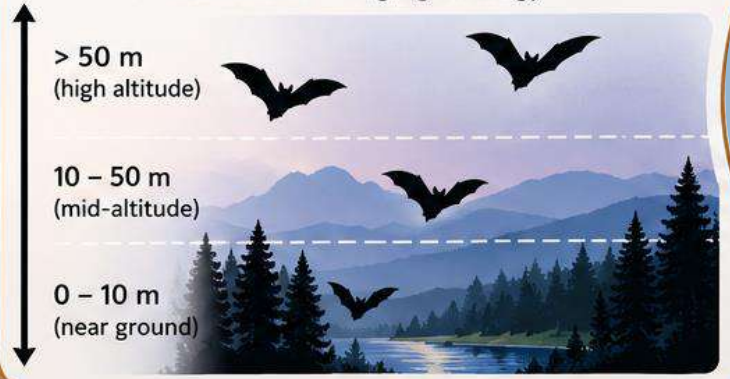
Forest roads and trails

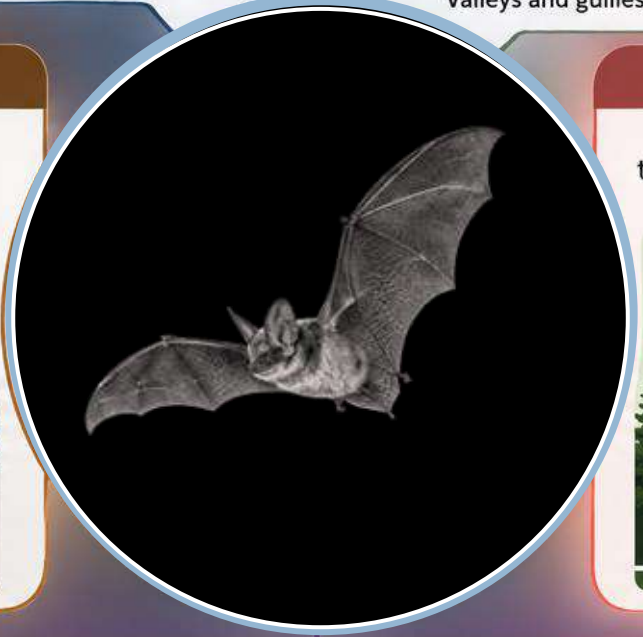


Ponds and water bodies

FLY AT DIFFERENT HEIGHTS

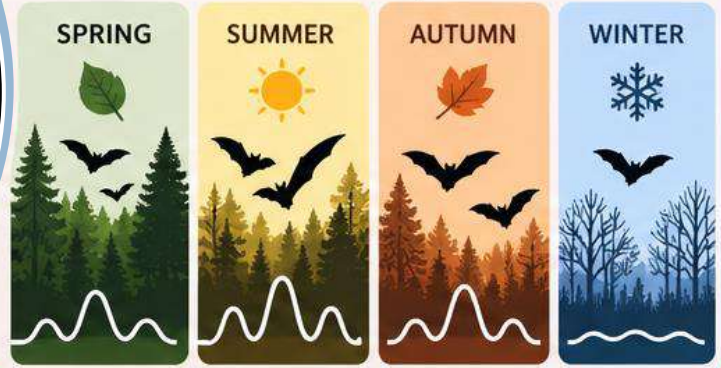
Bats use the airspace from near the ground to high altitudes, depending on species., habitat and foraging strategy.





ACTIVITY VARIES SEASONALLY

Timing and intensity of bat activity change throughout the year, linked to life cycle and resource availability.



USE A VARIETY OF HABITATS

Different bat species prefer different habitats for foraging, commuting and roosting.



Forests



Open grasslands

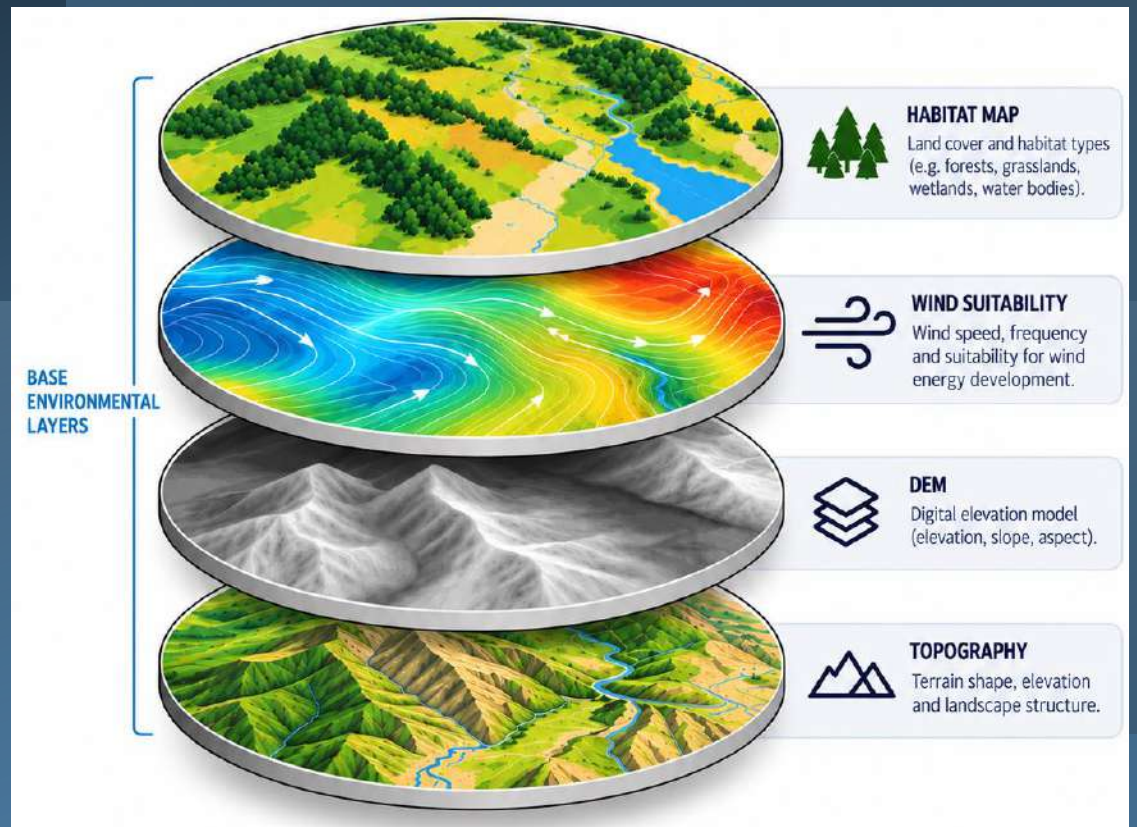


Caves and underground sites

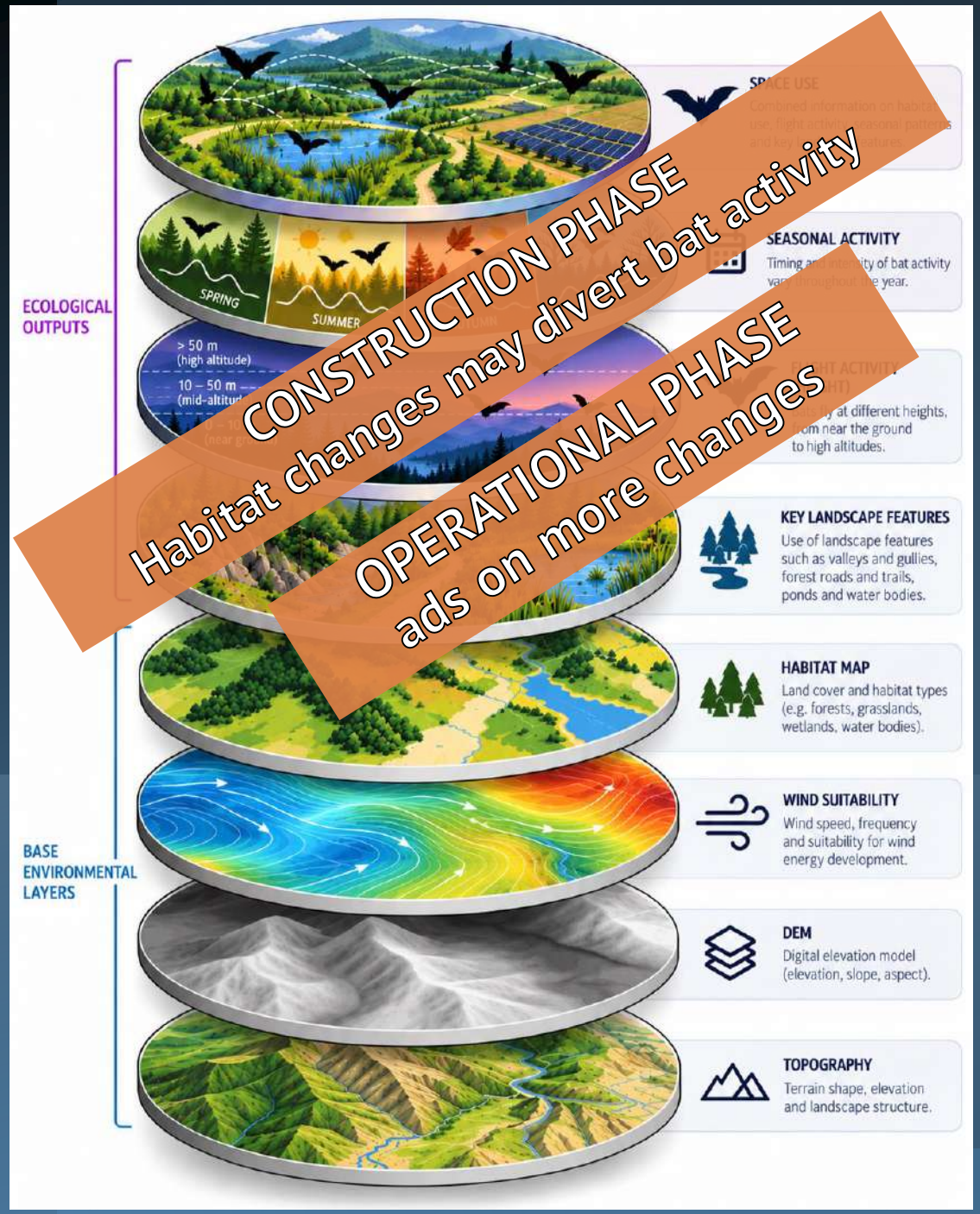


Wetlands and water bodies

PLANNING PROCESS



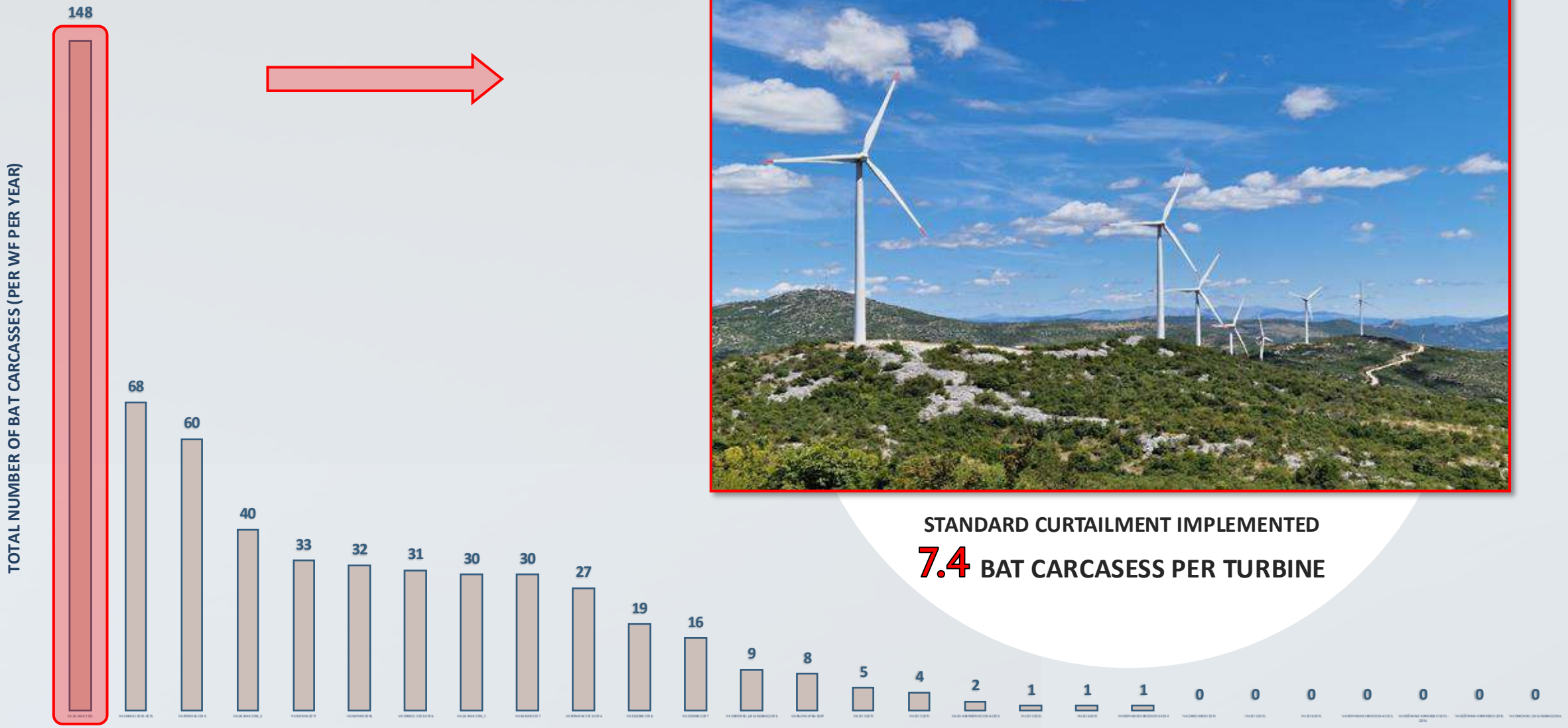




ENVIRONMENTAL IMPACT ASSESSMENT



Case from Croatia



STANDARD CURTAILMENT IMPLEMENTED

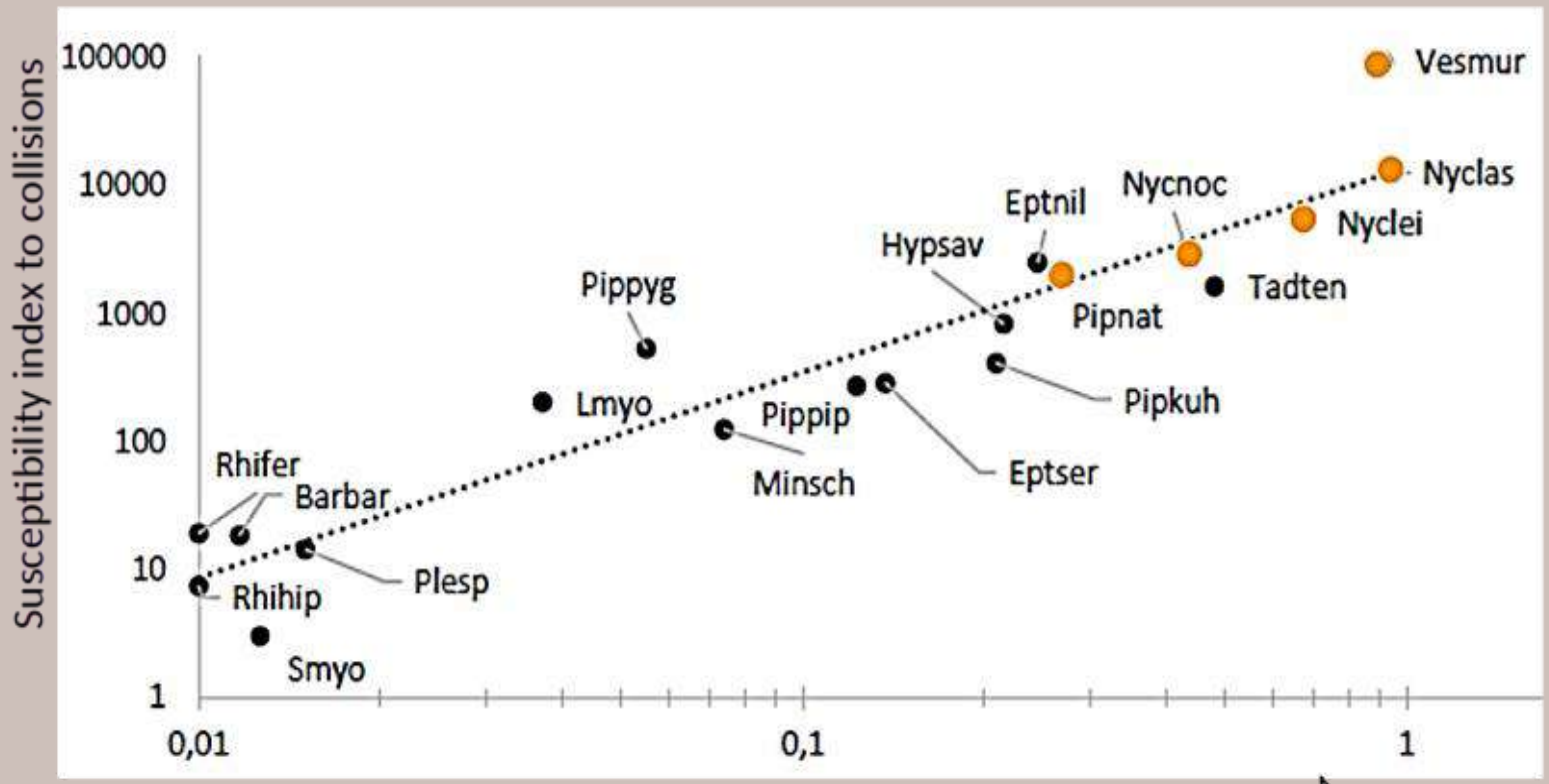
7.4 BAT CARCASESS PER TURBINE

Reports for period 2003 - 2018

M. Mazija, A. Pleić (2019): Bat mortality on wind turbines - a review of current data for Croatia

Space use patterns are predictable to a certain extent

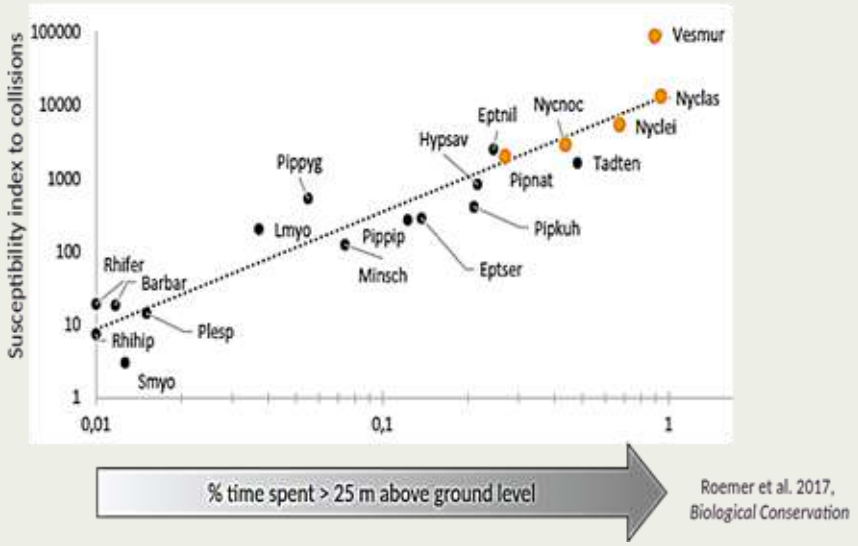
- Aerial hawkers and edge space foragers spend more time at hub hights
- Long-distance migrants use less echolocation calls while flying



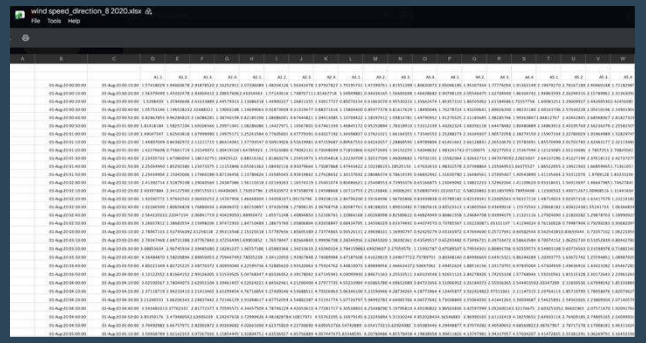
Roemer et al. 2017,
Biological Conservation

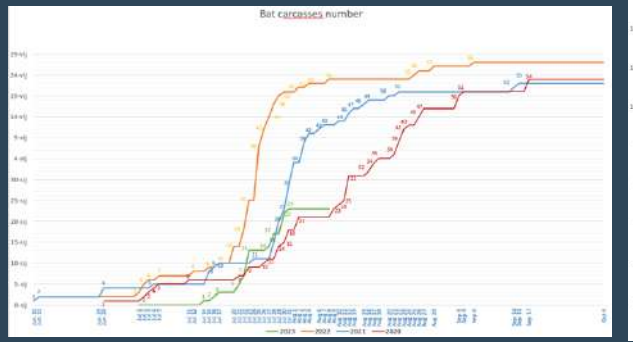
Reported cases of bat mortality

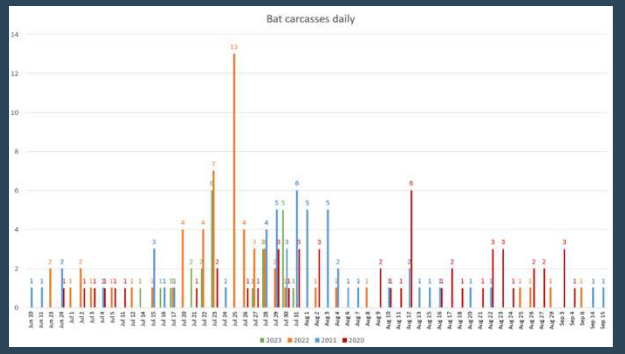
45 ->28 bat species reported

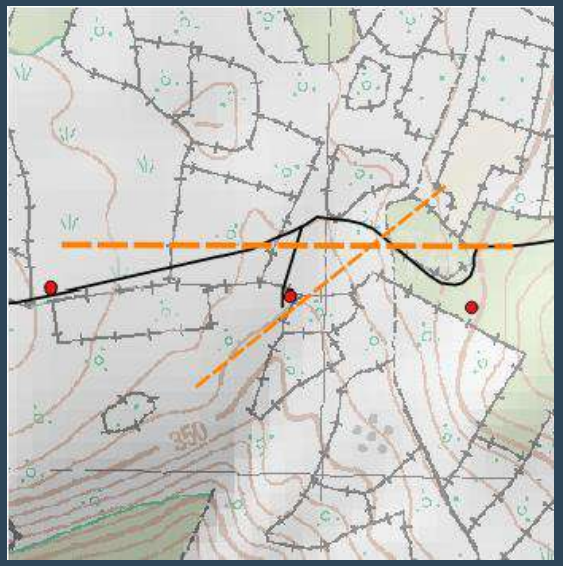


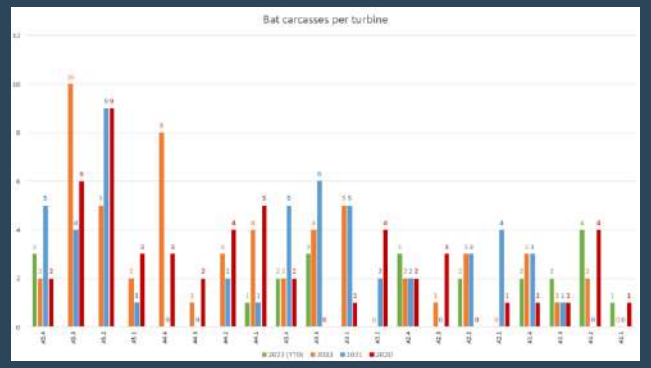
All results and relevant information gathered for fine tuning

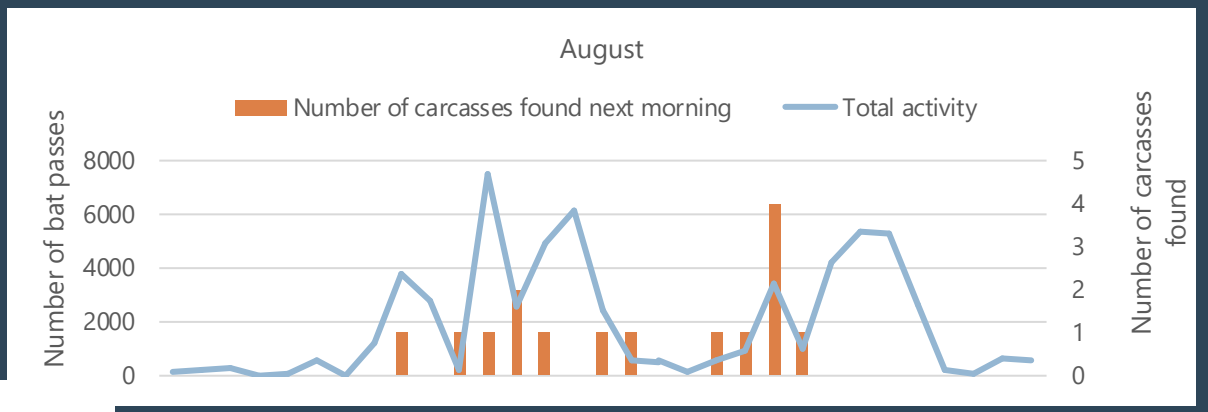


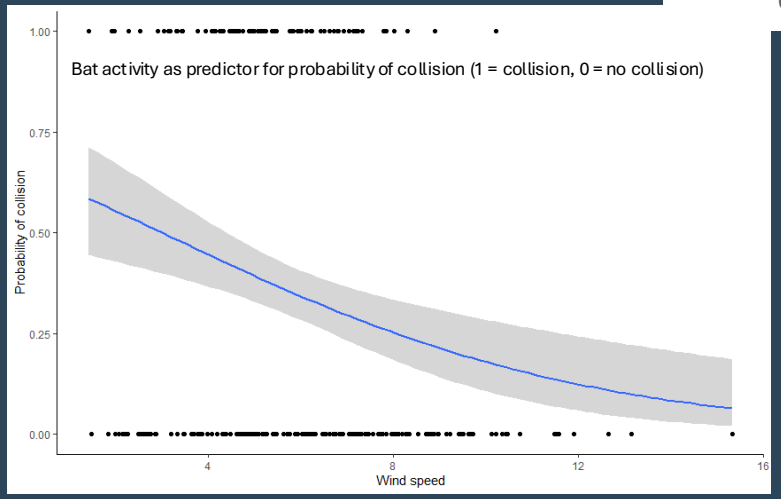


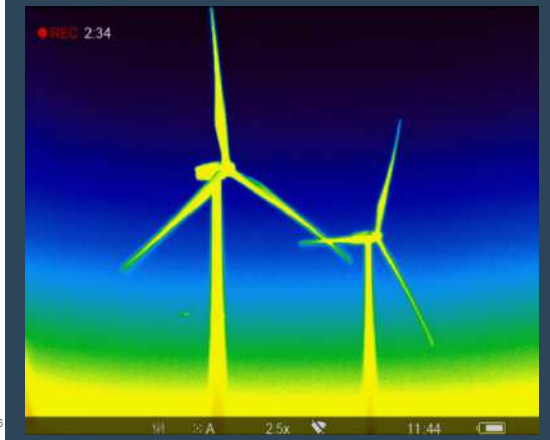


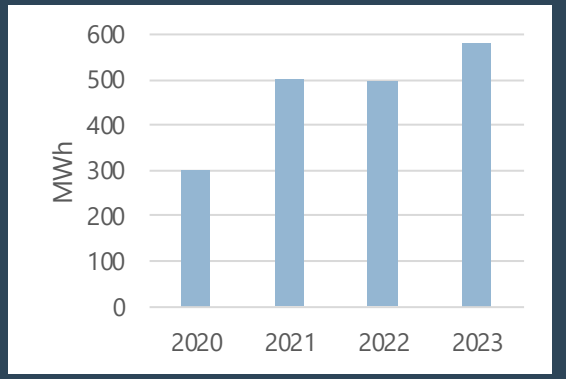




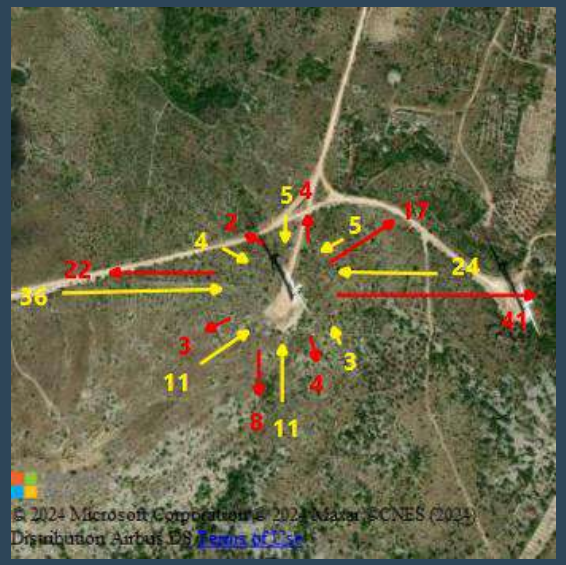








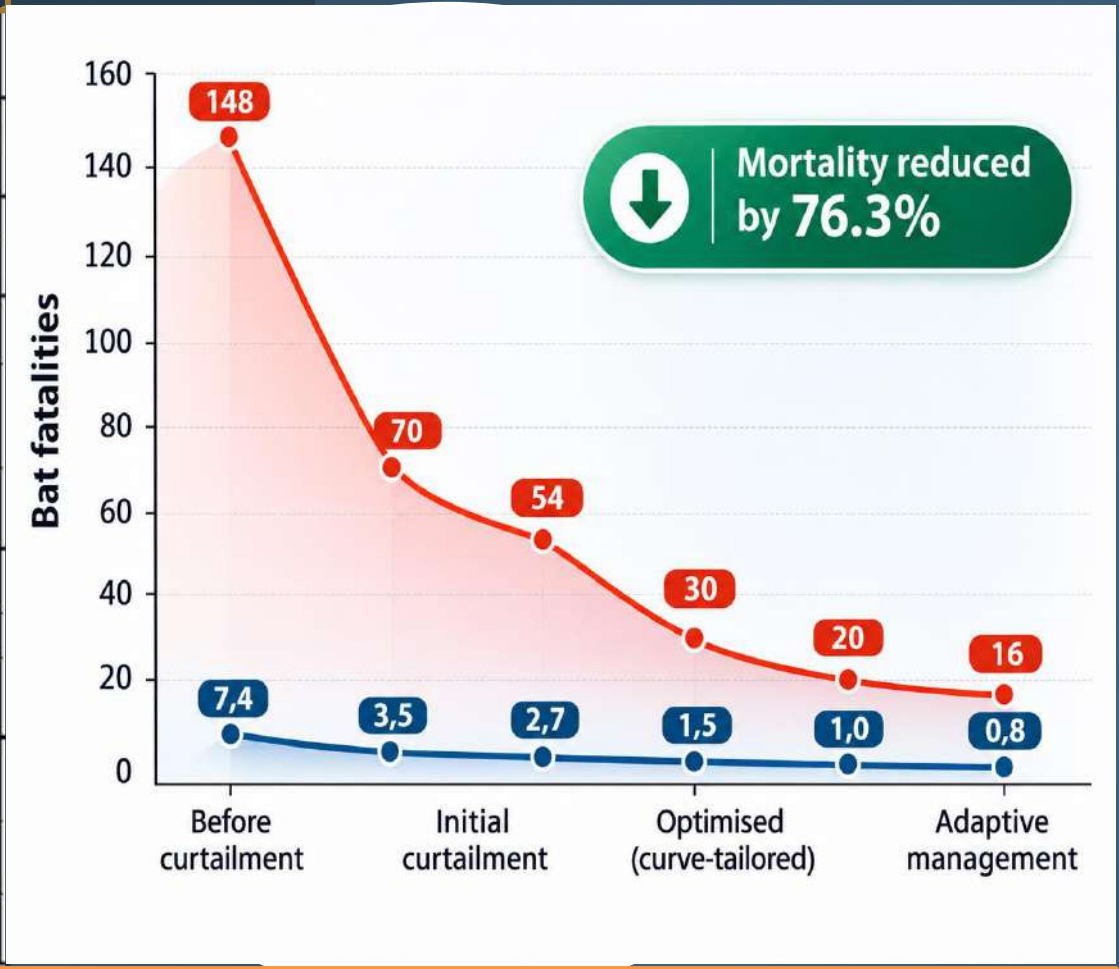
Total energy loss due to curtailment



Case from Croatia

ADAPPTIVE MANAGEMENT THROUGH SITE SPECIFIC CURTAILMENT PROGRAM

Year	Months	Cut-in speed	Turbines	Turbines with mitigation measures	Hours per day
2014	1st July-30th September	5m/s	6	T2, T6, T7, T10, T17 and T18.	4 hours (one hour before sunset and three hours after sunset)
2015	1st July-31st August	5m/s	8	T2, T6, T7, T10, T17, T18 T1, T3.	6 hours (from 9 pm to 3 am next morning).
2016	1st July -15th July	5m/s	14	T1, T2, T3, T4, T5, T6, T7, T10, T13, T14, T16, T17, T18, T20	6 hours (from 9 pm to 3 am next morning)
	16th July -15th August	5m/s	14	T1, T2, T3, T4, T5, T6, T7, T10, T13, T14, T16, T17, T18, T20	the whole night (from half an hour before sunset to half an hour after sunrise)
	16th August -31st August	5m/s	14	T1, T2, T3, T4, T5, T6, T7, T10, T13, T14, T16, T17, T18, T20	6 hours (from 9 pm to 3 am next morning)
2017	1st July -15th July	5m/s	14	T1, T2, T3, T4, T5, T6, T7, T10, T13, T14, T16, T17, T18, T20	6 hours (from 9 pm to 3 am next morning)
	16th July -15th August	5m/s	19	all excep T19	the whole night (from half an hour before sunset to half an
	16th August -31st August	5m/s	14	T1, T2, T3, T4, T5, T6, T7, T10, T13, T14, T16, T17, T18, T20	6 hours (from 9 pm to 3 am next morning)
2018	1st July -15th July	5m/s	14	T1, T2, T3, T4, T5, T6, T7, T10, T13, T14, T16, T17, T18, T20	6 hours (from 9 pm to 3 am next morning)
	16th July -15th August	5m/s	19	all excep T19	the whole night (from half an hour before sunset to half an hour after sunrise)
	16th August -31st August	5m/s	14	T1, T2, T3, T4, T5, T6, T7, T10, T13, T14, T16, T17, T18, T20	6 hours (from 9 pm to 3 am next morning)

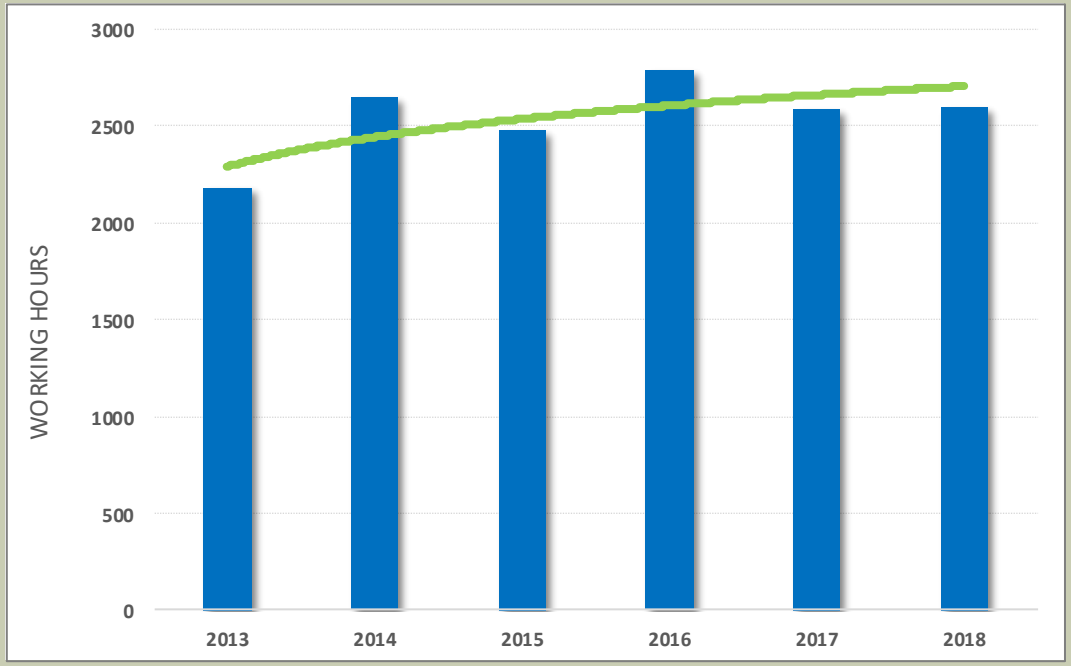


CURTAILMENT PROVEN TO BE EFFICIENT BUT THE WRONG SITING STILL CAUSES MORTALITY

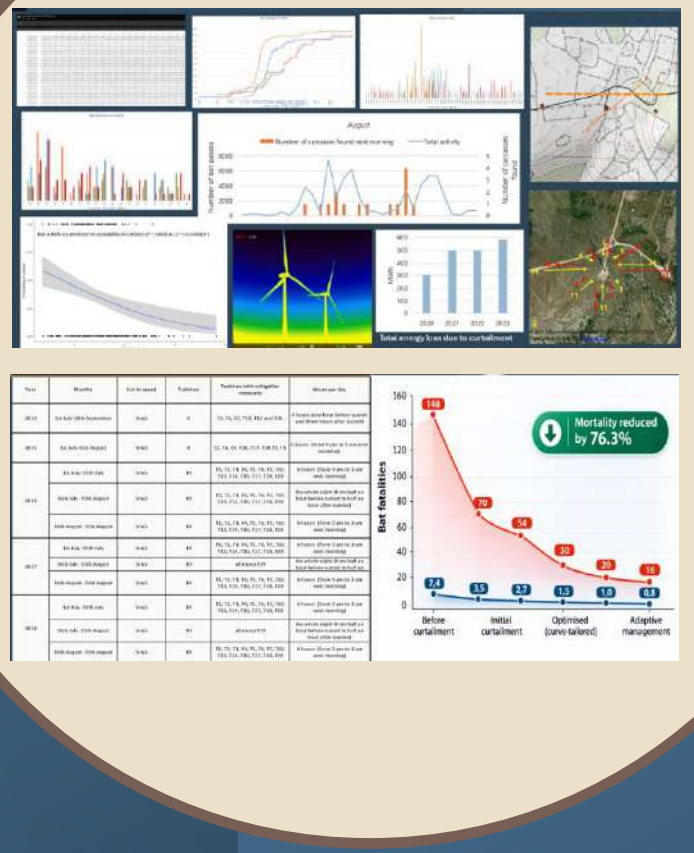
M. Mazija, A. Pleić (2019): Bat mortality on wind turbines - a review of current data for Croatia

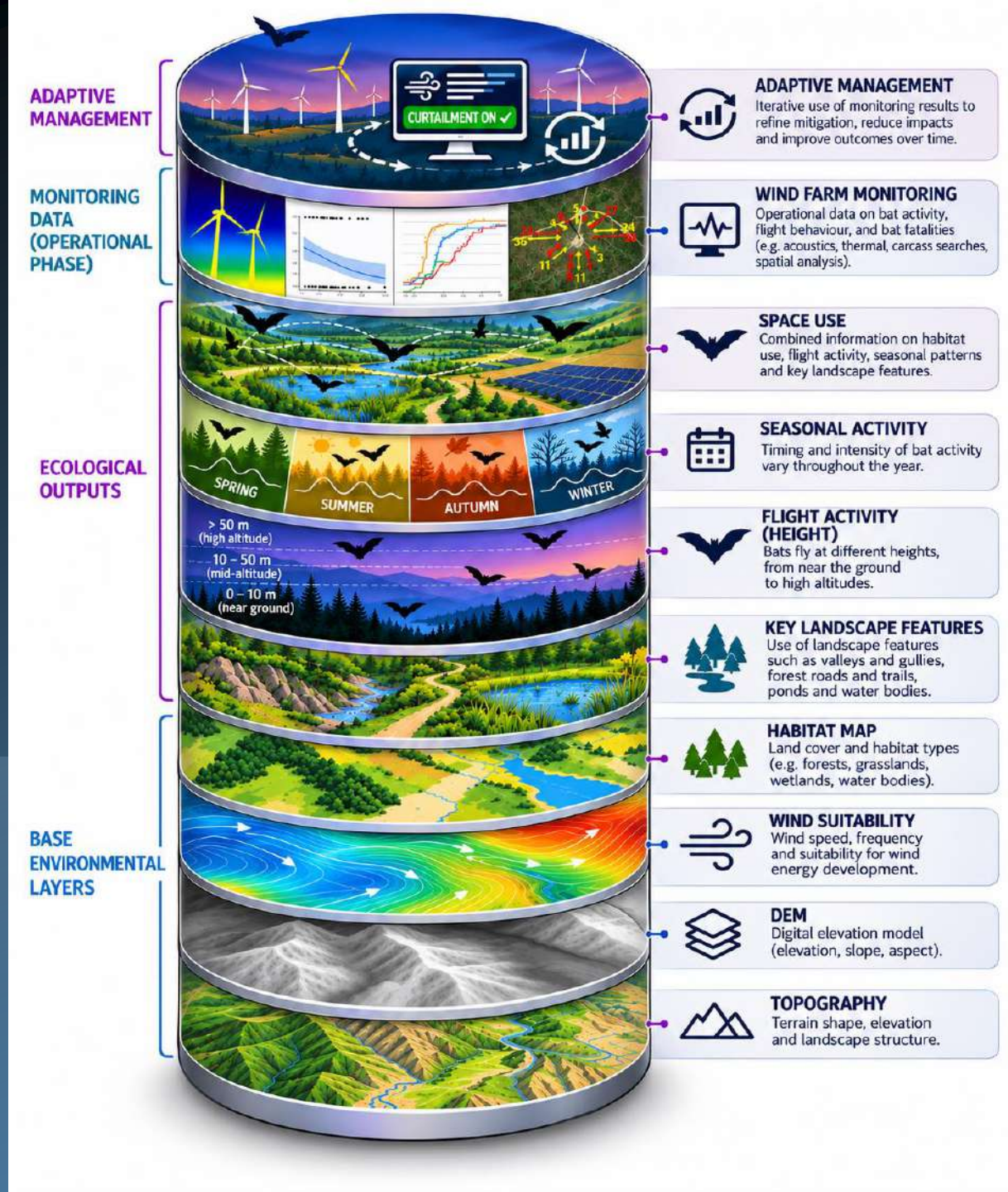
Case from Croatia

ENERGY PRODUCTION DID NOT DROP!









SILOS demonstrates how a single structure keeps loose components together, making the entire system make sense.

Thank you for your attention



Mirna Mazija

Association for Bat Conservation Tragus

From Data Silos to Shared Solutions: Collaboration for Bat-Smart Wind Energy

WINGSPAN 2026

Presentations

Bridging the Gap: Leveraging Data Sharing as a Win-Win for Wildlife and Energy Projects



Joana Bernardino
Researcher
CIBIO/BIOPOLIS



José Tavares
Director
Vulture Conservation Foundation



Dr. Mirna Mazija
President
Association For Bat Conservation Tragus



Rainhard Raab
Deputy CEO
TB Raab GmbH



Larissa Biasotto
Senior Science Officer - Birds & Energy
BirdLife International



Margarida Almeida
Conservation Biologist
REN

WINGSPAN 2026 · BERLIN · 3–5 NOVEMBER 2026

THE RKR MODEL

From the spatial use of breeding birds to wind turbine-specific collision probability

A transparent, empirically grounded probabilistic framework

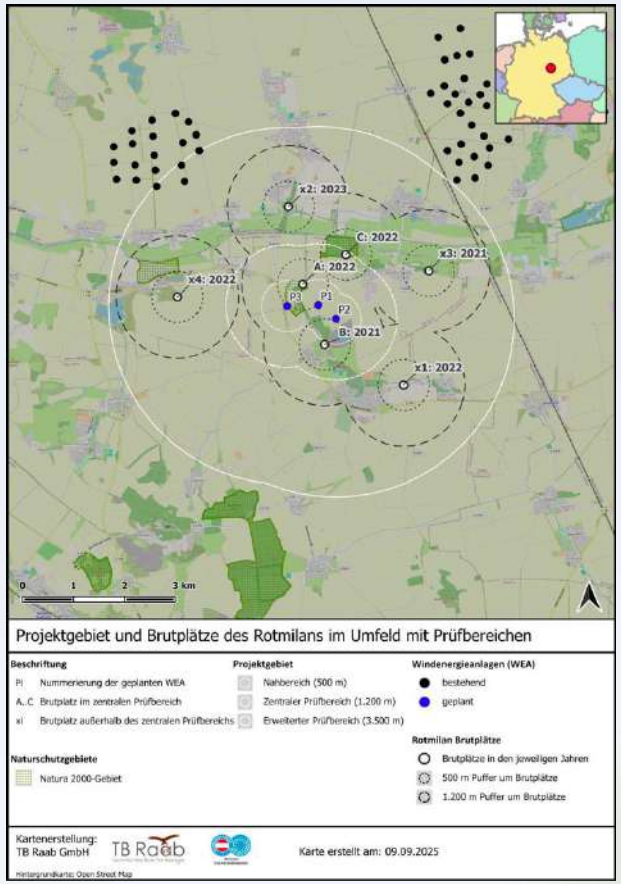
Rainhard Raab, BSc | TB Raab GmbH

Wingspan 2026 · From Partnerships to Practice: Accelerating Nature-Positive Energy Infrastructure



Cover photograph © W. Unkrig · supplied Smart Flying presentation, slide 1

Breeding sites and planned turbines



THE PROJECT CONSTELLATION

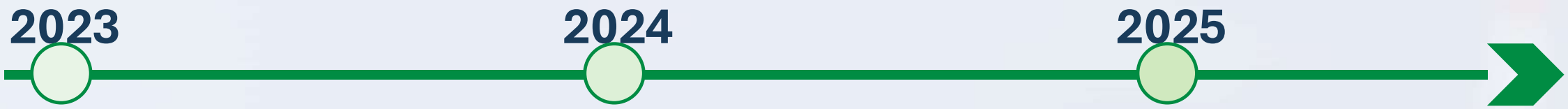
The RKR model assesses defined combinations of breeding sites and wind turbines.

The calculation combines habitat, flight behaviour and turbine parameters instead of relying only on breeding-site distance.

Figure: supplied Mercker, KNE Conference 2026, slide 2; map attribution retained in the image.

RKR development: 2023–2025

From probabilistic collision-risk modelling to a framework for six species.



PILOT STUDY

Probabilistic pilot study

Hybrid collision-risk approach

First Red Kite application

Telemetry, habitat and flight data

FOLLOW-UP STUDY

RKR model established

Enhanced data foundation and validation

Collision and telemetry evidence

Transparent model implementation

RKR-PRO PROJECT

Extension to six species

Expanded species-specific framework

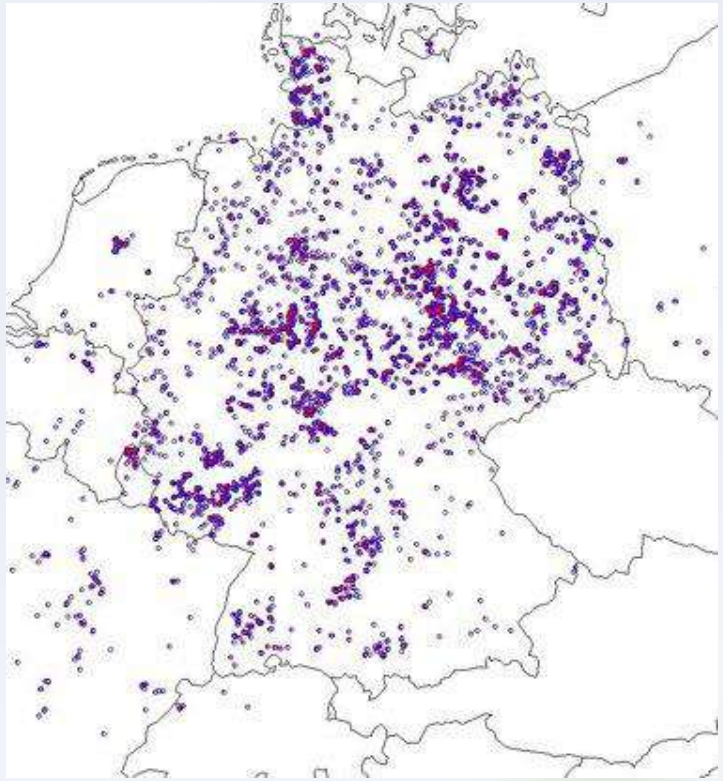
White-tailed Eagle and other species

Separate Eastern Imperial Eagle model

Three research milestones — one transparent, species-specific approach to collision-risk estimation.

Timeline design: supplied Smart Flying 2026, slide 6; development: RKR studies 2023–2025.

Telemetry and field observations provide model inputs



GPS TELEMETRY · FIELD MEASUREMENTS

GPS telemetry provides movement observations used to model habitat selection and flight behaviour.

The RKR abstract also identifies camera, laser-rangefinder, breeding-place, land-use and turbine data.

Figure: telemetry locations, supplied Raab et al., RRF 2025 presentation, slide 9.

Where birds fly is shaped by habitat

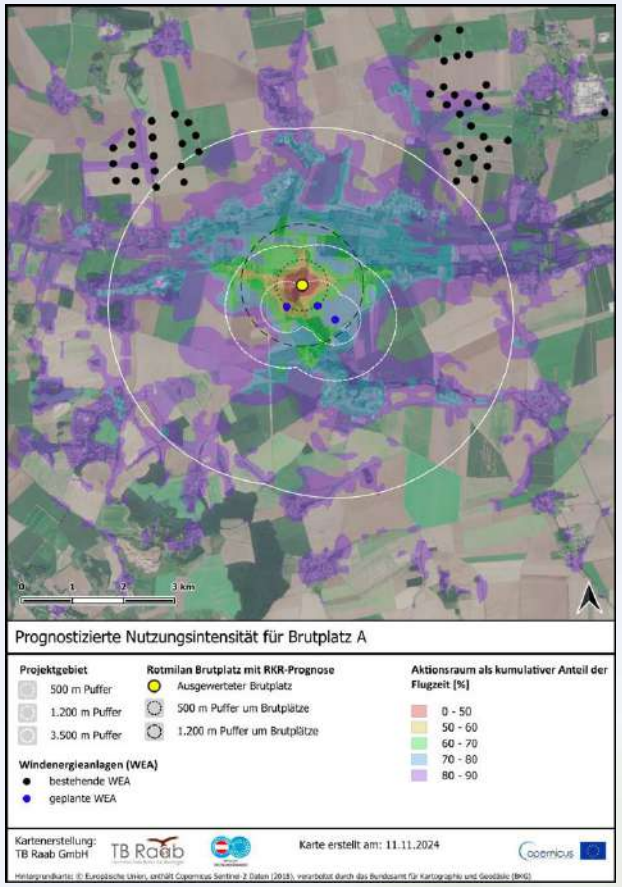


Figure: supplied Raab et al., RRF 2025 presentation, slide 17.

SPATIAL USE IS HETEROGENEOUS

Habitat preferences and breeding-site context generate a local use-of-space prediction.

The model expresses spatial variation in expected flight activity before the physical collision step.

Flight height and avoidance add the third dimension

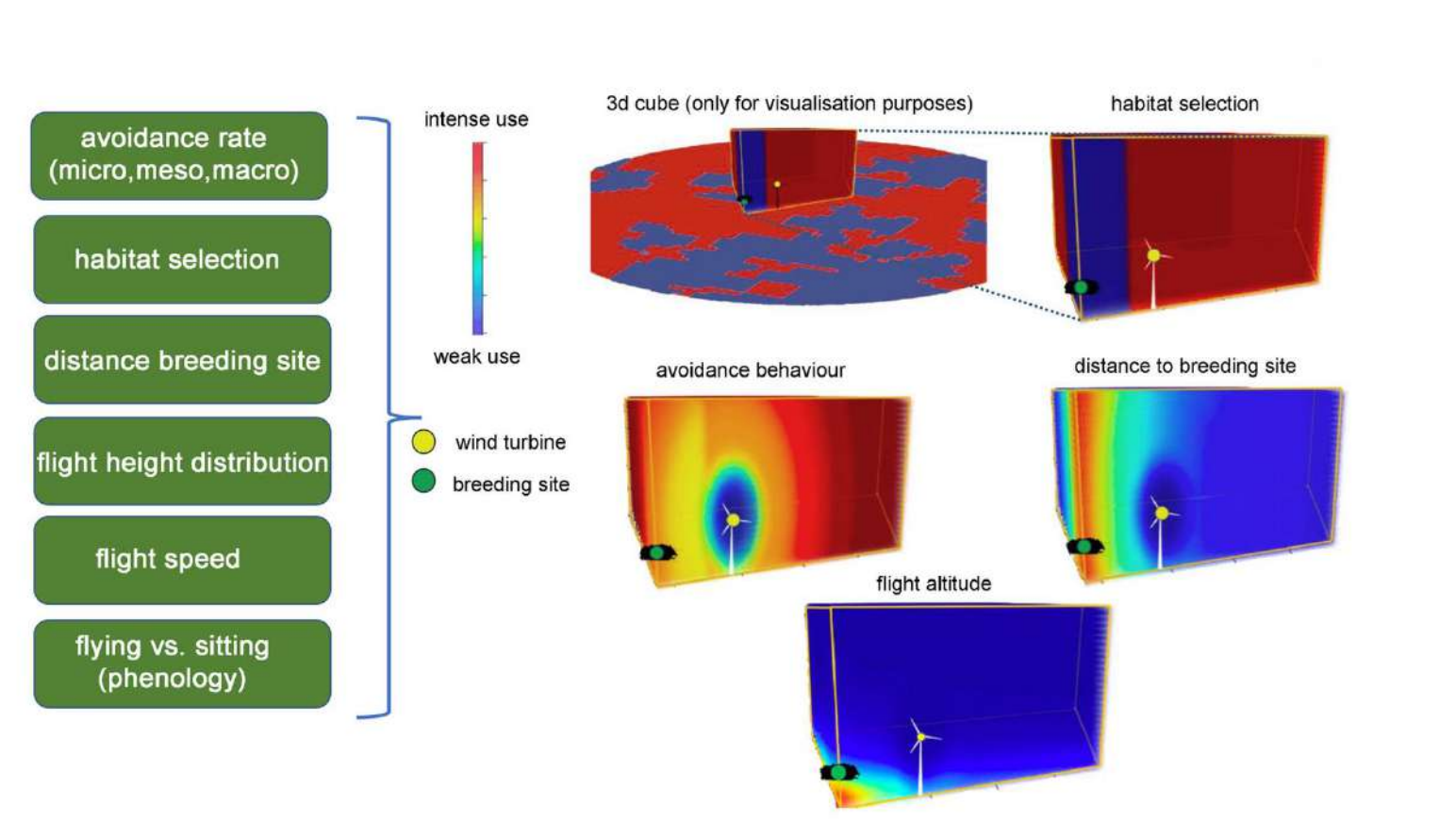


Figure: supplied Raab et al., RRF 2025 presentation, slide 12.

The location of a flight matters.
So does its height.

Vertical use, timing and meso-/micro-avoidance are combined with the rotor-risk volume.

Documented RKR modelling for additional species



RKR-PRO REPORT · DECEMBER 2025

The report describes the RKR model for four additional breeding-bird species.

The submitted abstract lists the Eastern Imperial Eagle as an additional separately developed species model.

Document cover: supplied Mercker, KNE Conference 2026, slide 6.

A shared framework — six different species

Red Kite

Milvus milvus

Black Kite

Milvus migrans

White-tailed Eagle

Haliaeetus albicilla

White Stork

Ciconia ciconia

European Honey-buzzard

Pernis apivorus

Eastern Imperial Eagle

Aquila heliaca

The Eastern Imperial Eagle is presented as a separately developed species-specific adaptation.

Source: submitted RKR abstract; RKR-PRO study (Mercker et al., 2025).

Two complementary routes to reducing collision risk

Reduce rotor interaction

Detection-based shutdowns, agricultural-event shutdowns and phenological operating windows can reduce risk during relevant exposure periods.

Reduce exposure in space

Alternative feeding habitat, micro-siting and rotor-clearance choices can change the expected bird–rotor overlap.

The RKR model enables comparable scenarios under explicit assumptions.

Source: Mercker, KNE Conference 2026 presentation, slides 15–17.

Flight behaviour informs temporal risk modelling

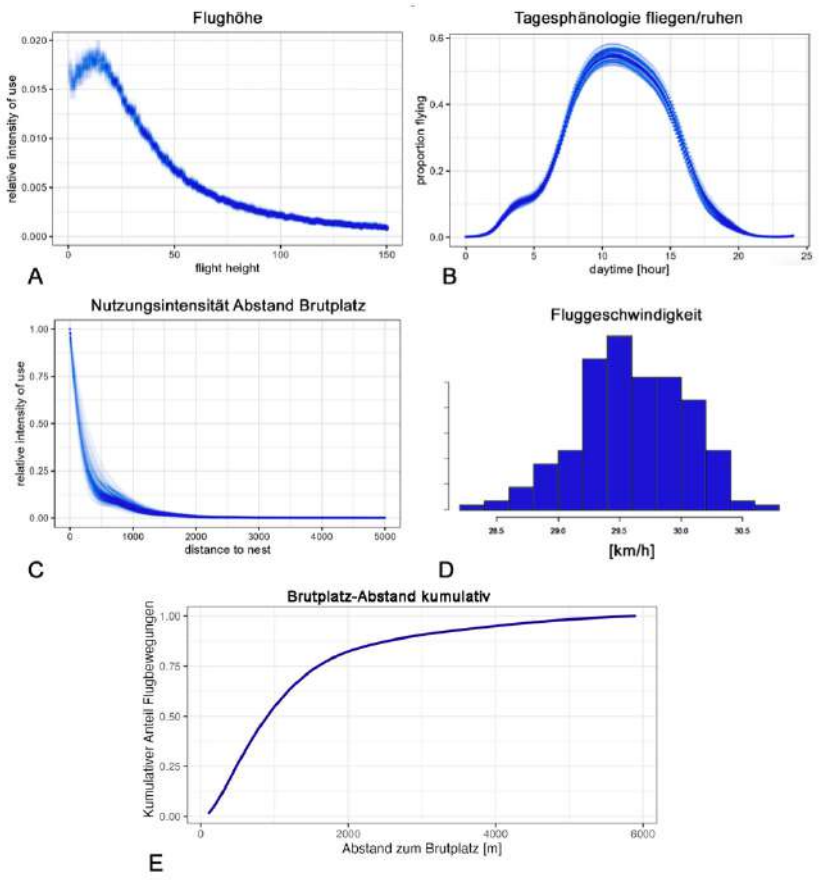
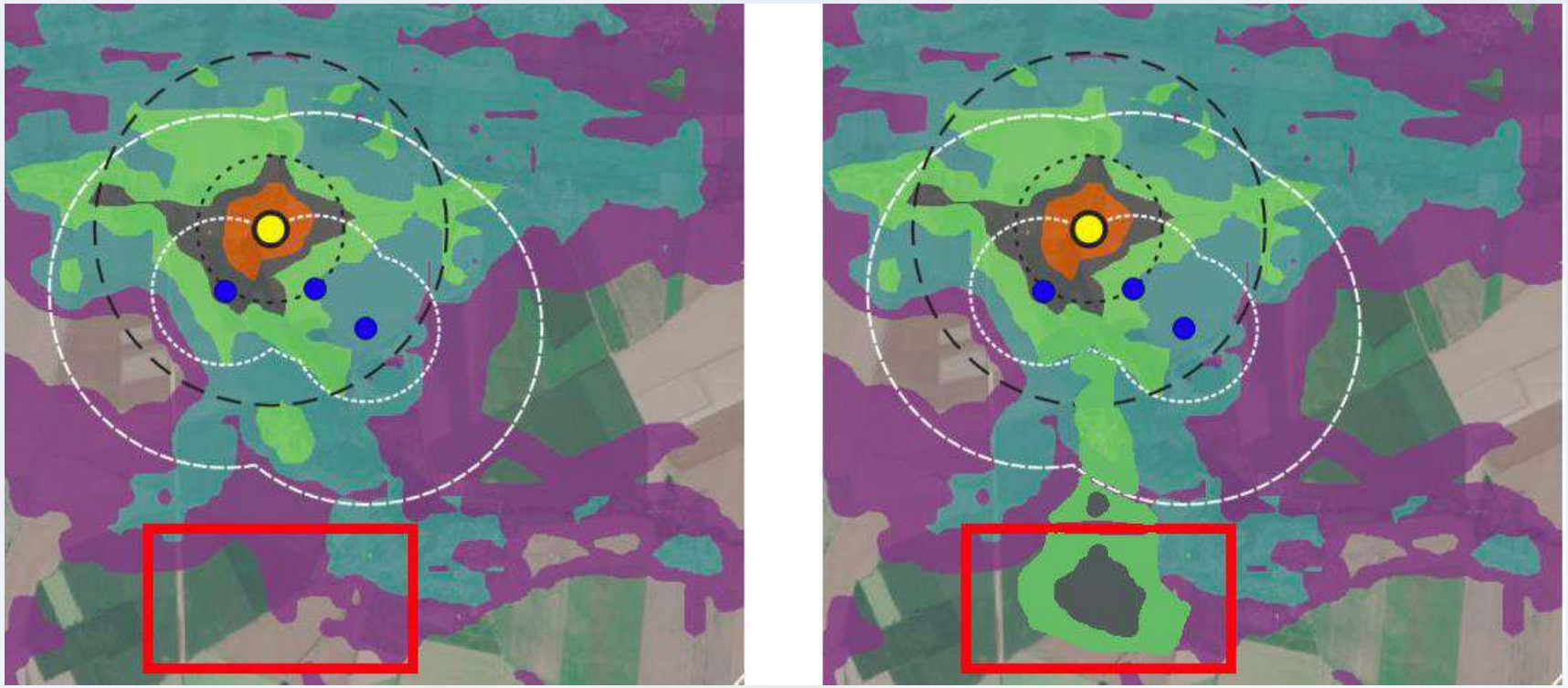


Figure: supplied Mercker, KNE Conference 2026 presentation, slide 29.

The figure shows flight height, daytime activity, breeding-site distance and flight speed.

These model inputs are relevant to exposure estimates. The figure does not quantify the effectiveness of a shutdown measure.

Compare scenarios with alternative feeding habitats



The RKR example compares existing land use with a virtual feeding-habitat scenario.

Figure: supplied Mercker, KNE Conference 2026 presentation, slide 33.

Spatial RKR risk maps support micro-siting

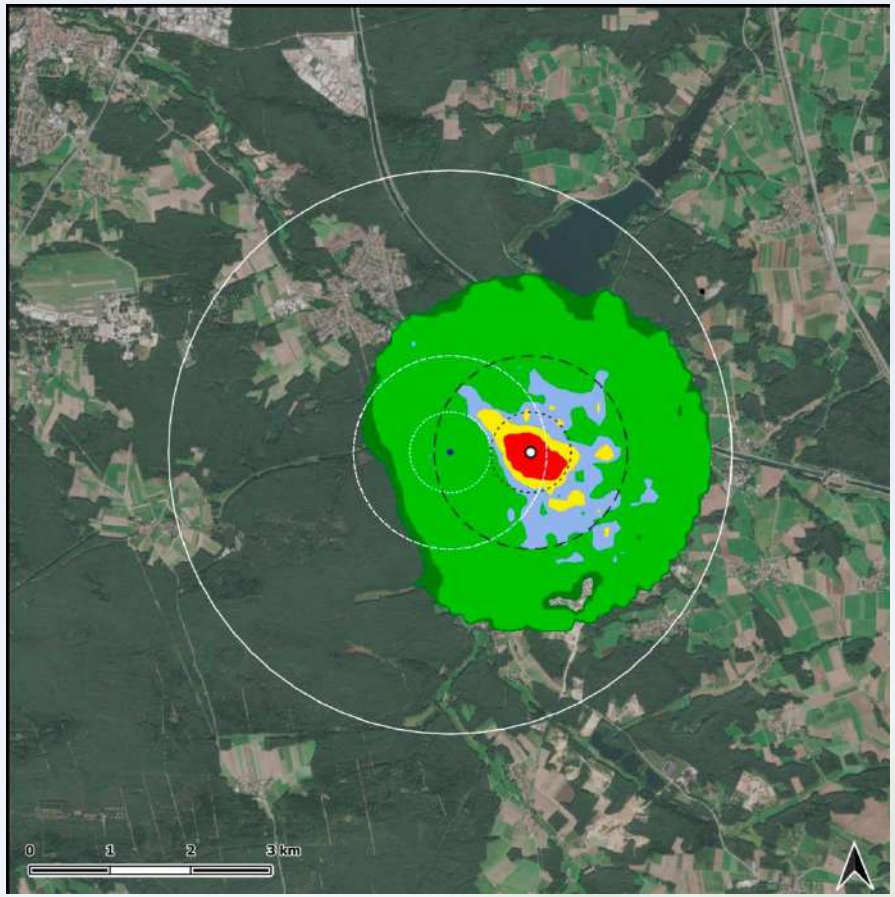


Figure: supplied Mercker, KNE Conference 2026 presentation, slide 34.

The KNE example visualises spatial collision risk as a basis for comparing turbine positions.

Different candidate locations can be assessed with the same documented RKR methodology.

Compare turbine-specific model scenarios

Planning

Compare turbine positions and rotor geometry.

Repowering

Evaluate redesigned turbine configurations.

Mitigation

Compare defined mitigation scenarios.

Model uncertainty is reported alongside turbine-specific estimates.

Source: submitted RKR abstract; Mercker, KNE Conference 2026 presentation.

Components of the probabilistic RKR model

01	**Space use**	Species and habitat information
02	**3D exposure**	Flight height and temporal activity
03	**Collision mechanics**	Turbine and rotor configuration
04	**Avoidance**	Species-specific behaviour
05	**Prediction**	Risk over a defined period

Conceptual components: submitted RKR abstract; Mercker et al. (2024).

Collision risk by turbine and breeding site



Brutplatz	Jahr	P1	P2	P3	Gesamt (gepl.)
A	2022	0,00601	0,00175	0,04857	**0,05594**
B	2021	0,00214	0,00477	0,01012	**0,01695**
C	2022	0,00157	0,00131	0,00733	**0,01019**
x1	2022	0,00035	0,00056	0,00158	**0,00249**
x2	2023	0,00036	0,00025	0,00310	**0,00370**
x3	2021	0,00027	0,00036	0,00144	**0,00207**
x4	2022	0,00022	0,00017	0,00311	**0,00349**
x5	2024	0,00006	0,00006	0,00054	**0,00066**

Calculated collision risk for each breeding-site and turbine combination.

A project-specific calculation example — not a universal risk percentage.

Figure: example RKR results, supplied Raab et al., RRF 2025 presentation, slide 18.

Agricultural-event shutdowns as a mitigation measure

Agricultural-event shutdowns

The KNE presentation identifies shutdowns during agricultural operations as a protection measure. Its assessment depends on the specified event, timing and operating conditions.

The effect of a shutdown must be assessed for the defined scenario.

Source: Mercker, KNE Conference 2026 presentation, slides 15, 18 and 28.

Anticollision systems act through timely rotor control

Detection → **Reaction** → **Operating state**

Effectiveness depends on a chain of events: recognising the relevant bird, responding in time, and reducing rotor collision exposure during the event.

A detection rate alone is not a total protection rate.

Source: Mercker, KNE Conference 2026 presentation, slides 26–27.

Estimates remain linked to their scientific assumptions

Habitat representation	How breeding birds use the landscape
Flight behaviour	Height, timing and avoidance assumptions
Scenario configuration	Location, rotor geometry and operations
Model reporting	Model inputs, validation and uncertainty

Source: submitted RKR abstract; Mercker et al. (2024–2025).

Meso- and micro-avoidance are distinct components

MESO

Use of space around the turbine

MICRO

Use of the immediate rotor-risk zone

Behavioural estimates are supported by telemetry evidence, and their applicability depends on the species and study design.

Source: submitted RKR abstract; RKR model studies (2024–2025).

A scientific estimate informs — but is not — a legal decision

RKR calculation

Predicted collision probability under transparent data, model and turbine assumptions.

Legal assessment

Determination of significance under the applicable regulatory framework.

Source: submitted RKR abstract.

The people behind the RKR model



Rainhard Raab



Moritz Mercker



Jannis Liedtke



Thilo Liesenjohann



Jan Blew



Maximilian Raab

Pilot study and RKR follow-up

2023

Pilotstudie „Erprobung Probabilistik“

Mercker, Liedtke, Liesenjohann & Blew (2023)

Report commissioned by HMUKLV · probabilistic hybrid-model development

OPEN SOURCE ↗

2024

Fortsetzungsstudie Probabilistik – RKR-Modell

Mercker, Raab, Liesenjohann, Liedtke & Blew (2024)

BfN-commissioned report · Red Kite RKR methodology and validation

OPEN SOURCE ↗

Extension to six species and calculation rules

2025

RKR-PRO: Additional breeding-bird species

Mercker, Raab, Liesenjohann & Blew (2025)

Four German species in the main report; Eastern Imperial Eagle in appendix A.4

OPEN SOURCE ↗

2024

RKR calculation and algorithm documentation

Mercker et al. (2024), official model documentation

Source download page with calculation procedure, inputs and validation materials

OPEN SOURCE ↗

Behavioral evidence and RKR information

2026

Smart flying in challenging skies

Mercker et al. (2026), Scientific Reports, 16, article 12939

Micro- and meso-avoidance of Red Kites, DOI 10.1038/s41598-026-45894-3

OPEN SOURCE ↗

WEB

RKR model information and implementation

PredictBird · RKR model website

Project overview, RKR model context and implementation

OPEN SOURCE ↗

Thank you for your attention.

Questions & discussion

PRESENTER

Rainhard Raab, BSc

TB Raab GmbH | Austria

rainhard.raab@tbraab.at



Photo © Hansreudi Weyrich

WINGSPAN 2026

Presentations

Bridging the Gap: Leveraging Data Sharing as a Win-Win for Wildlife and Energy Projects



Joana Bernardino
Researcher
CIBIO/BIOPOLIS



José Tavares
Director
Vulture Conservation Foundation



Dr. Mirna Mazija
President
Association For Bat Conservation Tragus



Rainhard Raab
Deputy CEO
TB Raab GmbH



Larissa Biasotto
Senior Science Officer - Birds & Energy
BirdLife International



Margarida Almeida
Conservation Biologist
REN



AVISTEP: Turning the Tool into Lessons and Practical Applications

Bridging the gap: Leveraging data sharing for Wildlife and Energy projects

Presented by:
Dr. Larissa Biasotto - Senior Science Officer
BirdLife International

Date:
03/11/26

Energy infrastructure and impacts on birds



- Birds are one of the groups most directly impacted by energy infrastructure

→ **Direct mortality:** collisions with turbines and power lines; electrocution on pylons

→ **Displacement**: pushed out of preferred habitats

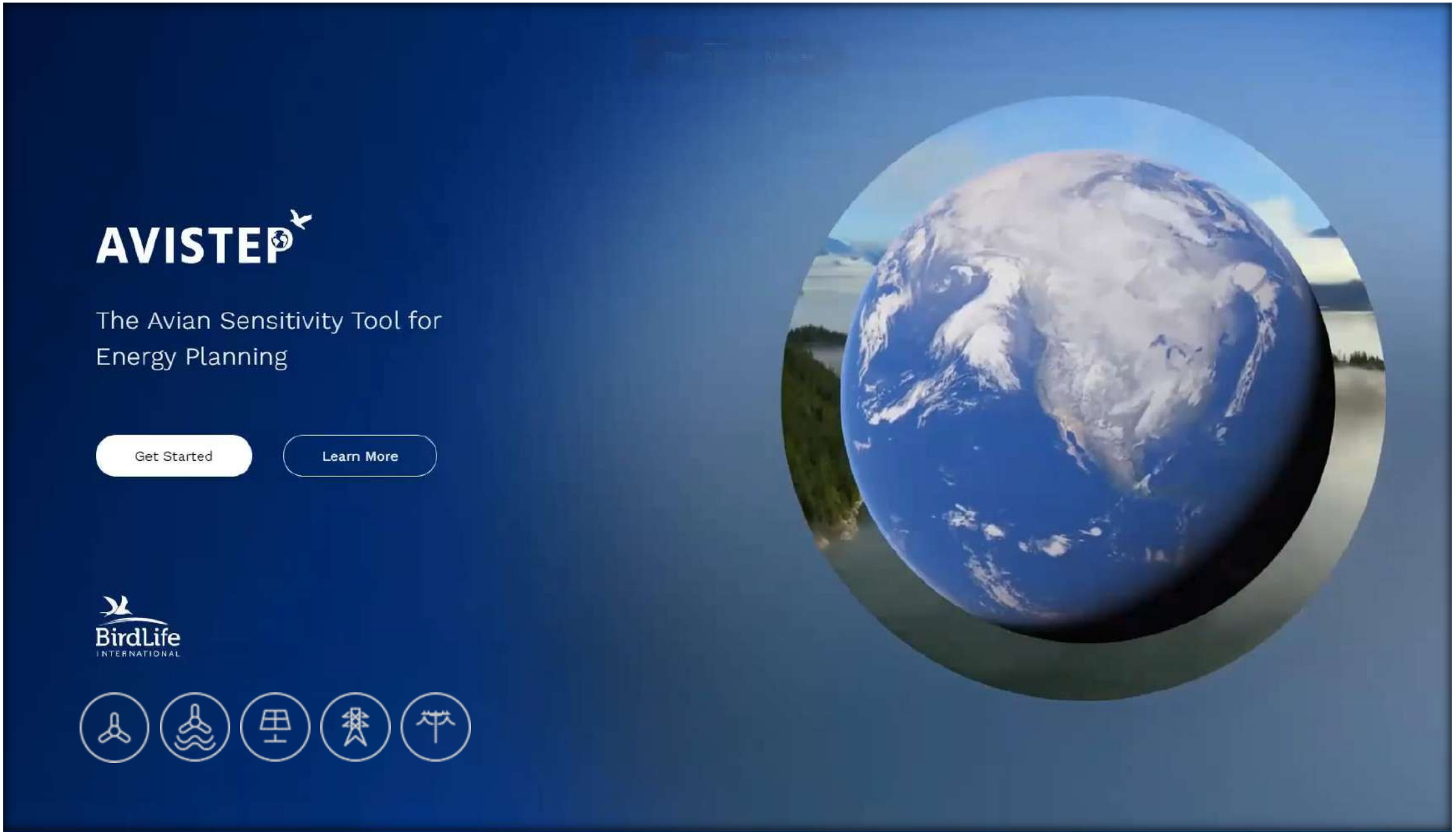
→ **Habitat loss**: degradation or removal of key areas

Sensitivity mapping and energy planning



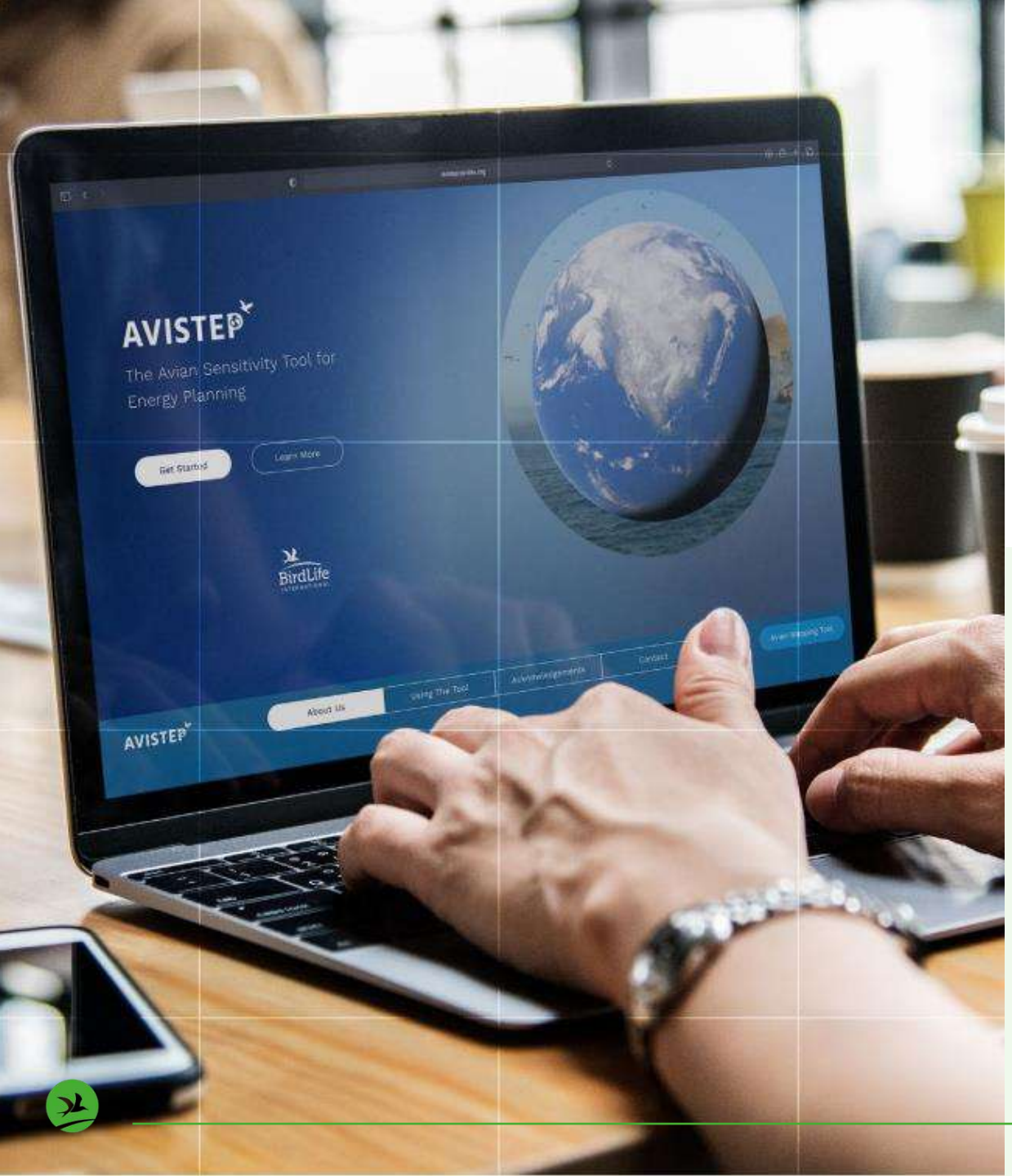
- Identify areas where energy infrastructure should be avoided
- Use spatial biodiversity data to predict and assess sensitivity and produce spatially explicit information across regions
- Highlight sensitive ecological areas early in planning
- Support strategic decisions during site selection
- Widely recommended in best practice guidance

Sensitivity mapping is not simply a technical tool, it is a governance tool


AVISTEP
The Avian Sensitivity Tool for Energy Planning
Get Started
Learn More
BirdLife INTERNATIONAL


AVISTEP
The Avian Sensitivity Tool for Energy Planning
Get Started
Learn More
BirdLife INTERNATIONAL
India
Nepal
Thailand
Vietnam
Kenya
Lao PDR
Uzbekistan
Egypt
Australia
Argentina
Philippines
Bangladesh
2027

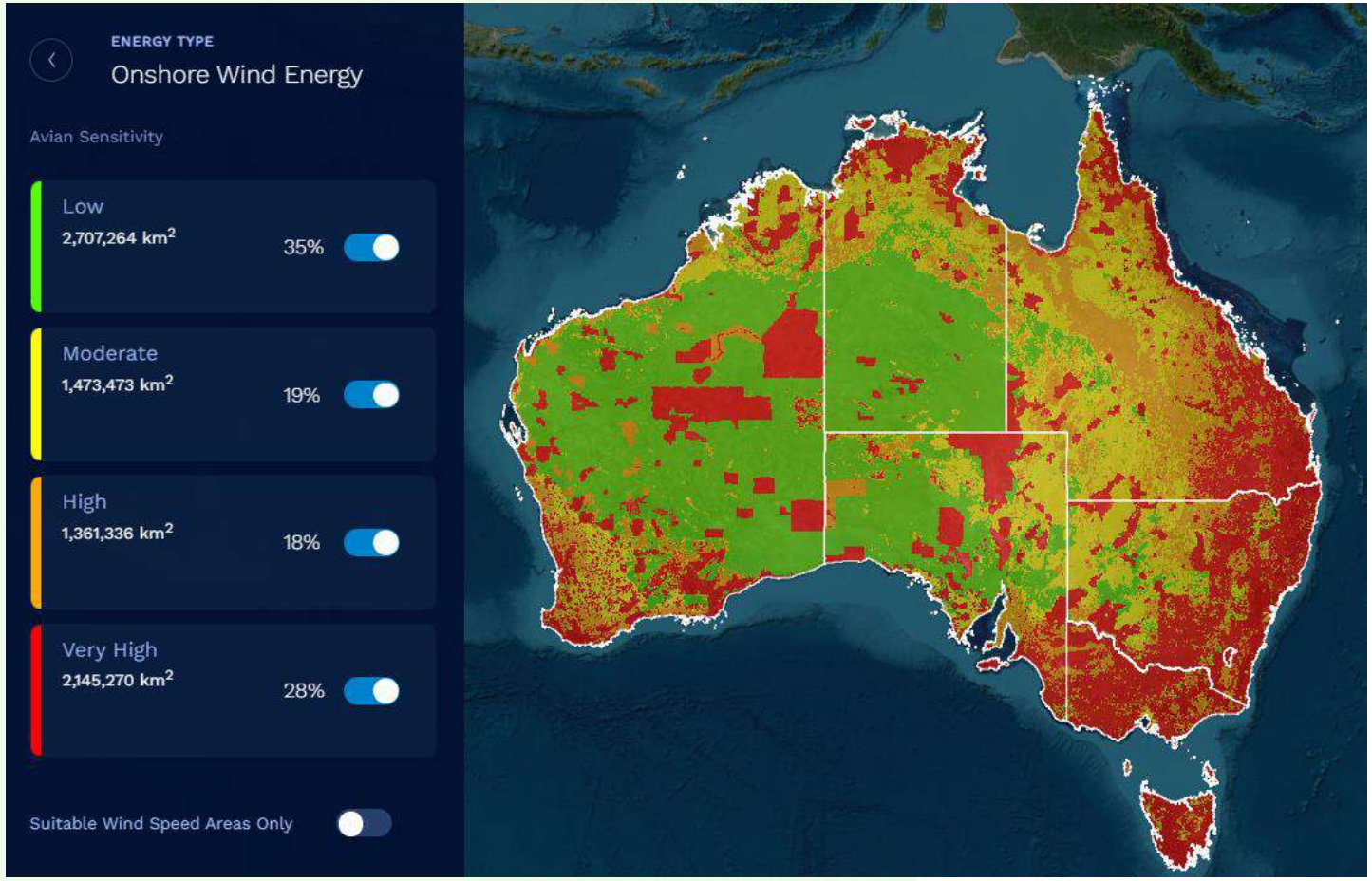

AVISTEP
AUSTRALIA
ENERGY TYPE
Onshore Wind Energy
Avian Sensitivity
Low
2,707,264 km²
35%
Moderate
1,473,473 km²
19%
High
1,361,336 km²
18%
Very High
2,145,270 km²
28%
Suitable Wind Speed Areas Only
Sensitivity Layer Transparency
WHERE TO NEXT?
Zoom in to view a spatial assessment of avian sensitivity at a local level, provided at a resolution of 5km x 5km.
BirdLife
Earthstar Geographics



Common questions on bridging the gap and leveraging data sharing

1. How to use, interpret, and translate the tool into meaningful insights for decision-making?
2. How to apply the maps in renewable energy planning?

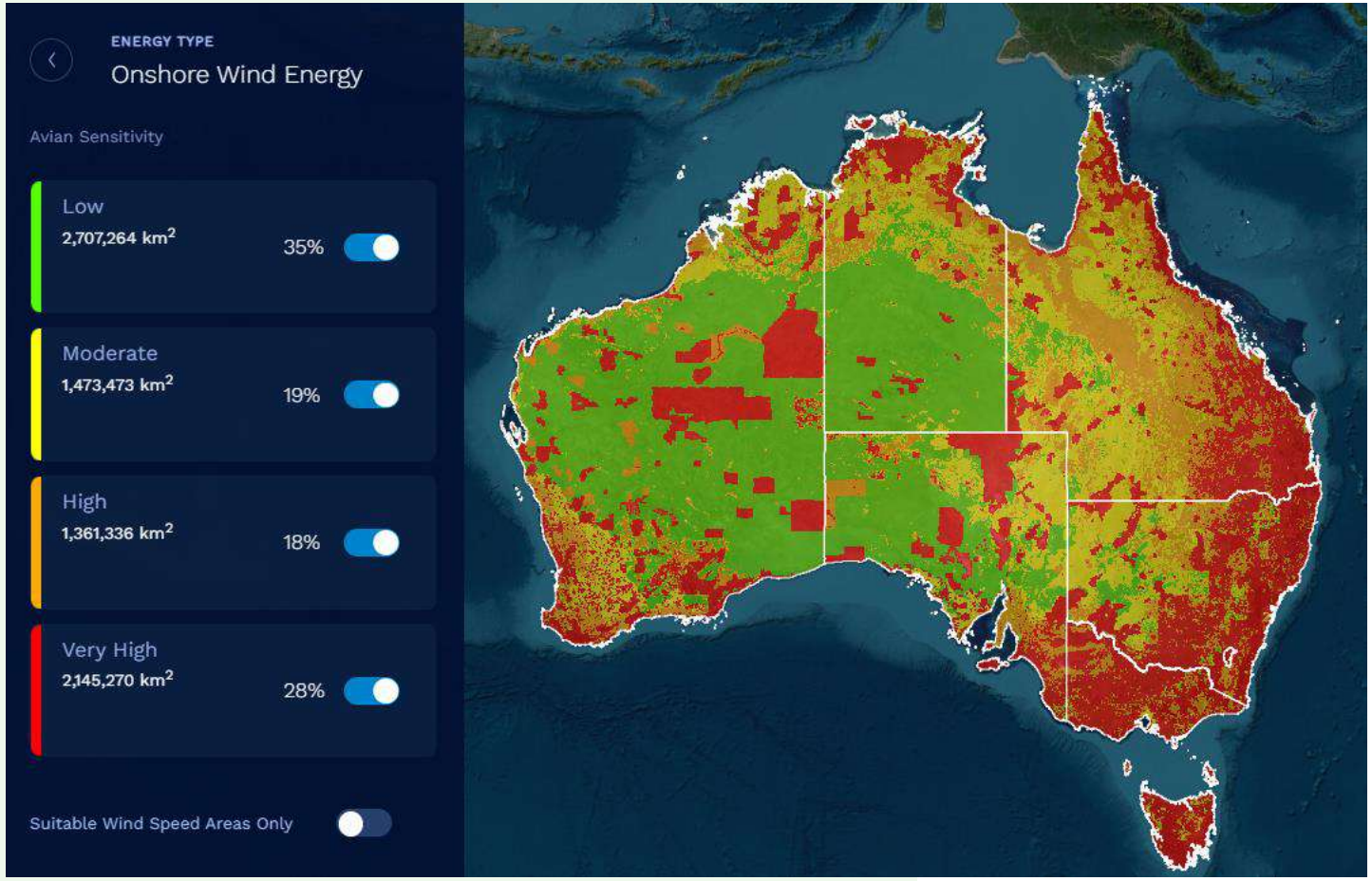
How to use and interpret the results?



Factors determining cell-level sensitivity

- Number of priority species
- Presence of more sensitive species
- Confidence in the presence of sensitive species
- Overlap with Important Bird and Biodiversity Areas (IBAs) and protected areas
- Greater availability of suitable habitat for sensitive species
- A higher proportion of natural and preserved land-use classes

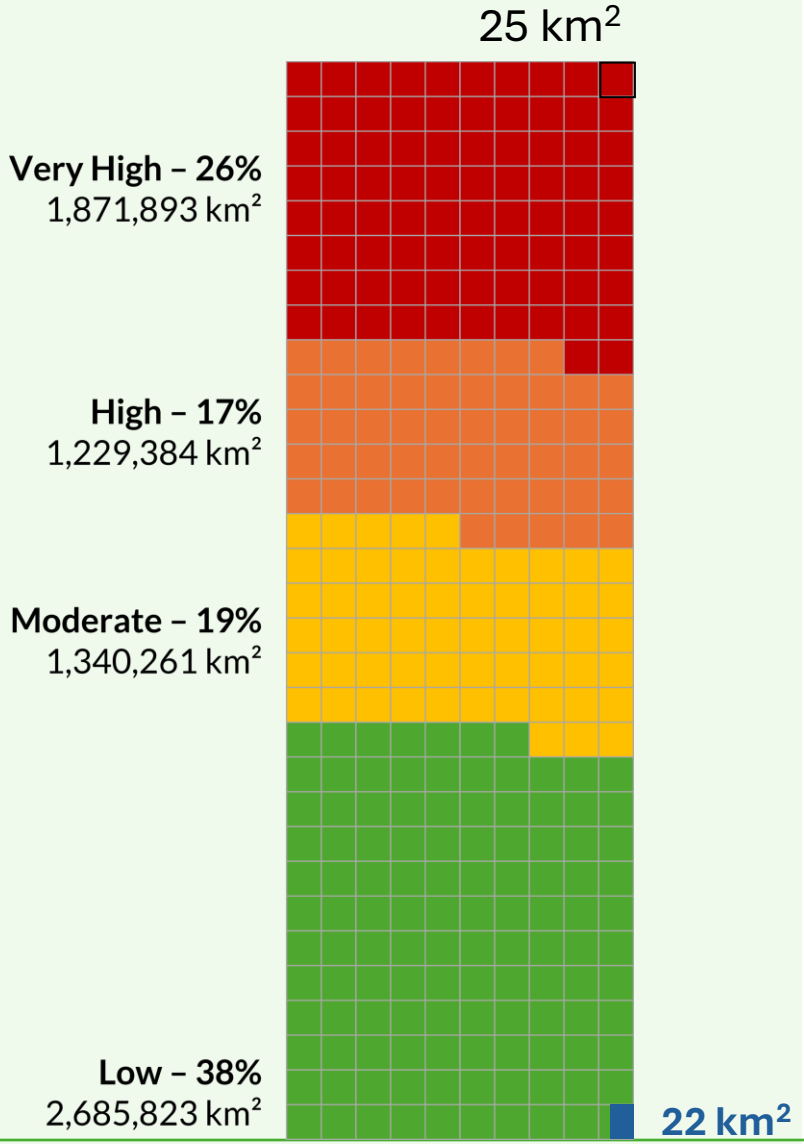
How to use and interpret the results?



- Prioritise impact **avoidance**, followed by minimisation, restoration and offsetting.
- Areas of **low sensitivity** should be the **starting point** for wind energy site prospecting and should not be considered "go-to zones".
- Areas of medium sensitivity should only be considered once lower-sensitivity alternatives have been exhausted.
- Protected areas and areas of high or very high sensitivity are generally unsuitable for development due to their importance for birds and biodiversity.

How to use and interpret the results?

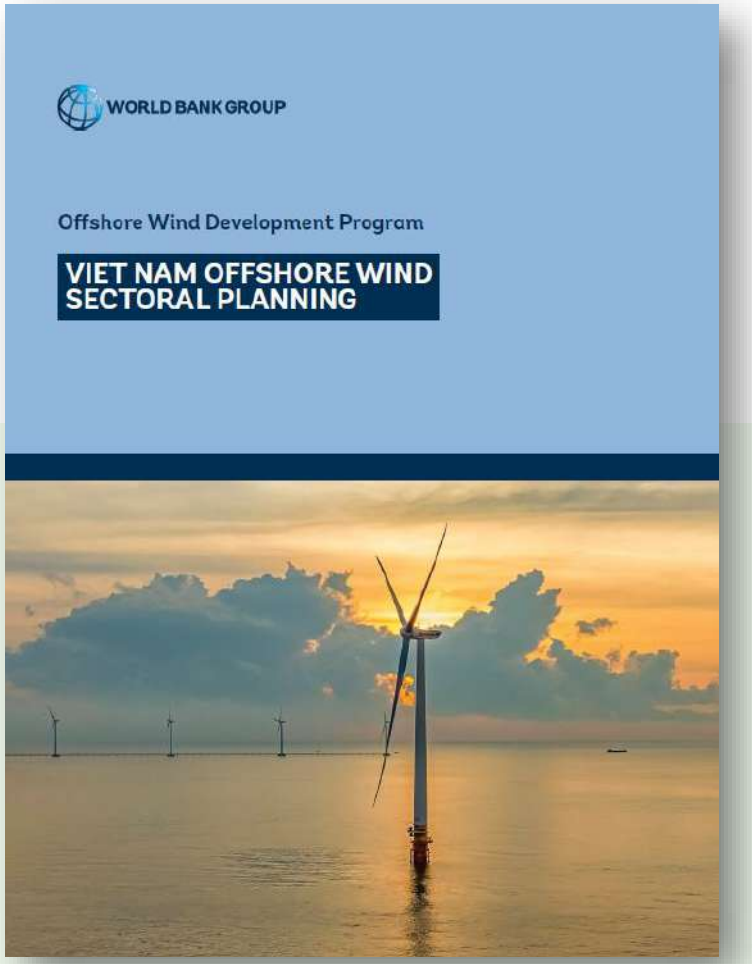
Australia
Onshore
Wind
Sensitivity

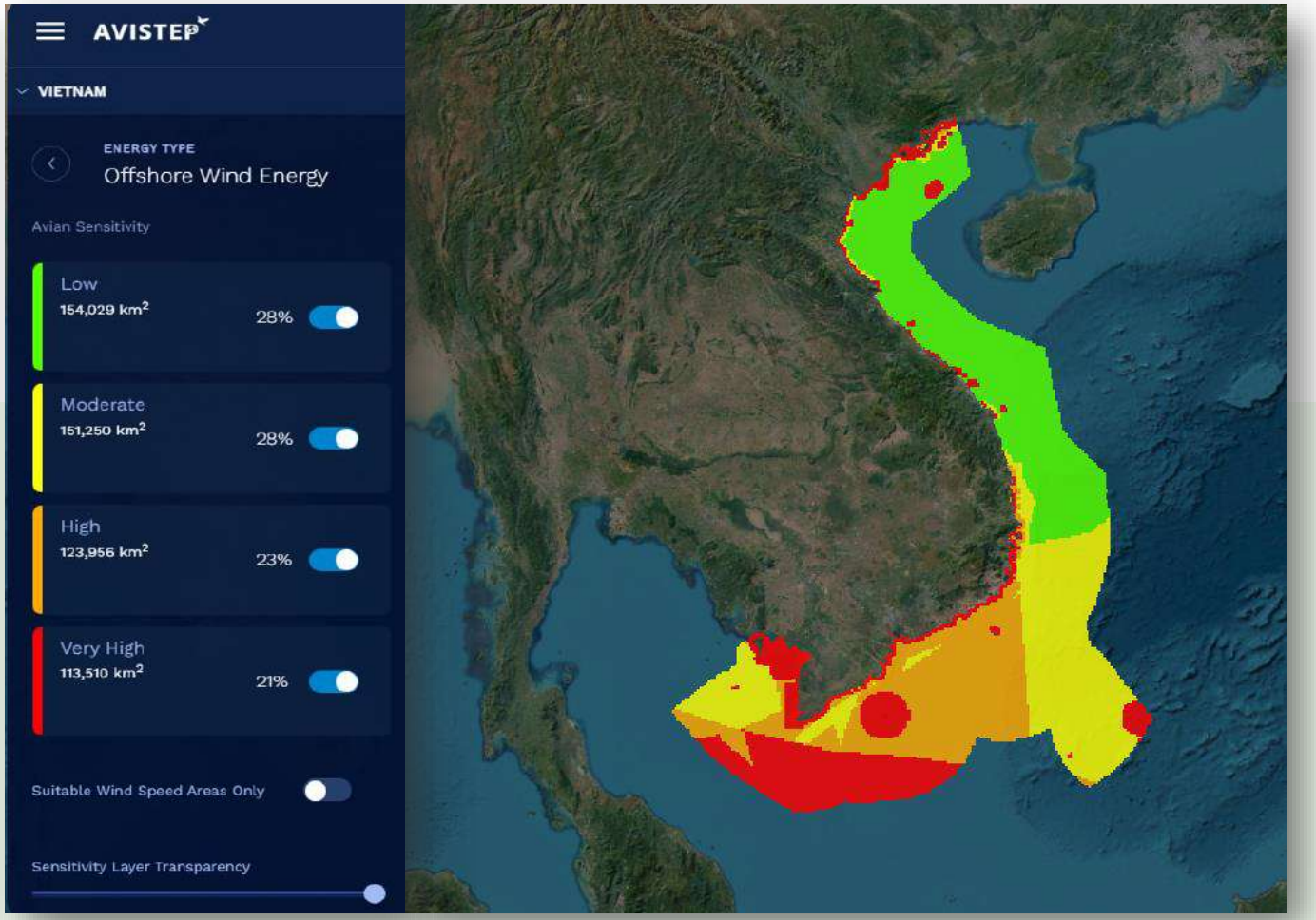


- Over 7 million km² of Australia has wind speeds suitable for commercial wind generation. Of this, 38% is classified as low sensitivity.
- Powering Australia with 100% renewables will require just about **22 km²,**
- The available low-sensitivity land area is approximately 142 times the estimated land area required in this scenario.

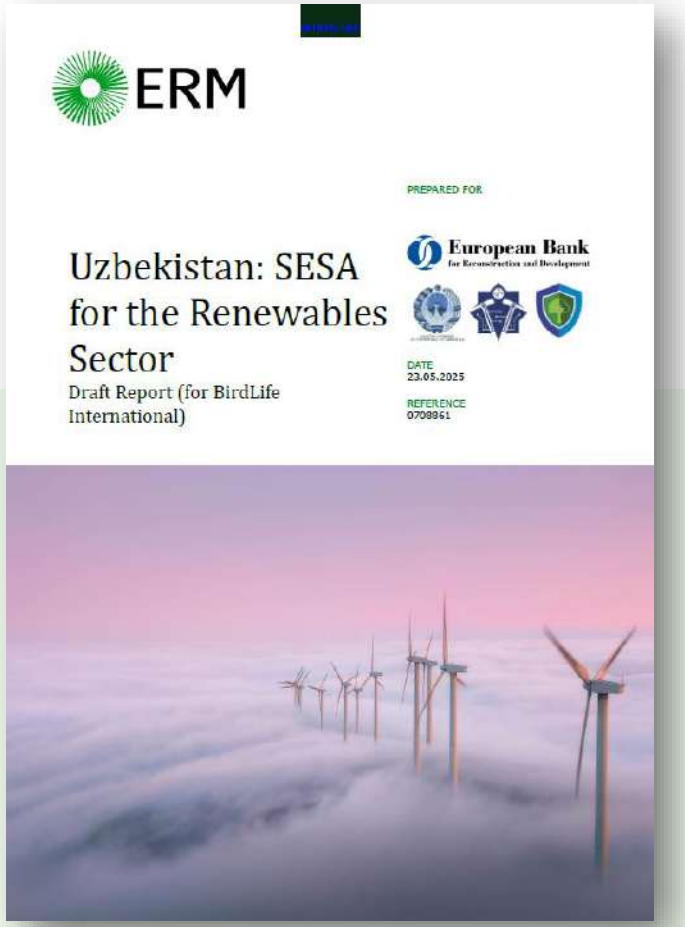
Area of land needed for onshore wind farms to power Australia entirely from renewables

How to apply AVISTEP maps in renewable energy planning?

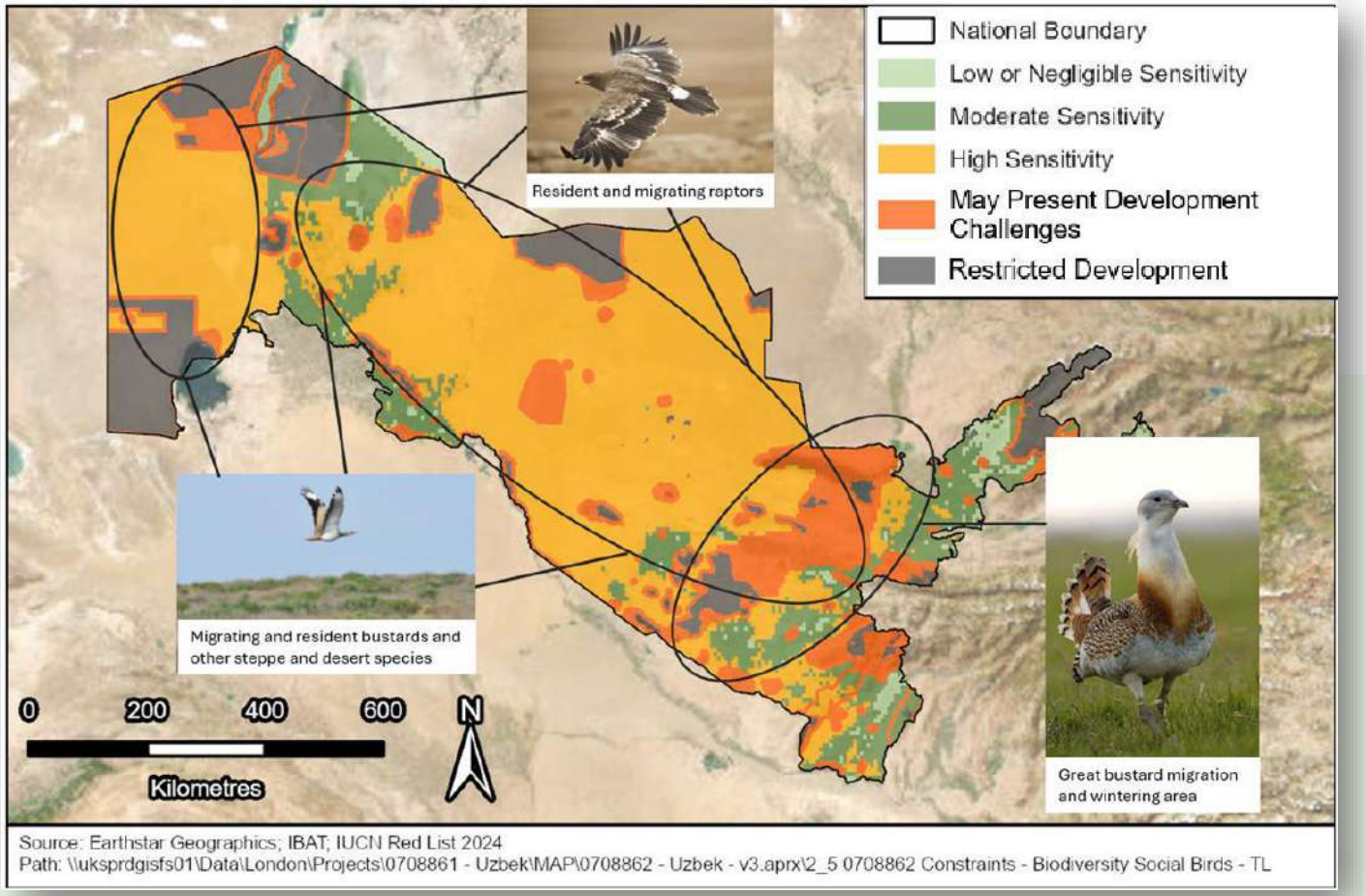




How to apply AVISTEP maps in renewable energy planning?



OVERALL BIODIVERSITY AND SOCIAL SENSITIVITY MAPPING – OVERHEAD TRANSMISSION LINES





Thank you!

www.avistep.birdlife.org

larissa.biasotto@birdlife.org

Presented by:
Dr. Larissa Biasotto

WINGSPAN 2026

Presentations

Bridging the Gap: Leveraging Data Sharing as a Win-Win for Wildlife and Energy Projects



Joana Bernardino
Researcher
CIBIO/BIOPOLIS



José Tavares
Director
Vulture Conservation Foundation



Dr. Mirna Mazija
President
Association For Bat Conservation Tragus



Rainhard Raab
Deputy CEO
TB Raab GmbH



Larissa Biasotto
Senior Science Officer - Birds & Energy
BirdLife International



Margarida Almeida
Conservation Biologist
REN

A JOINT TSO-ACADEMIA PERSPECTIVE FROM A DECADE OF APPLIED RESEARCH AND KNOWLEDGE TRANSFER ON BIRD-POWER LINE INTERACTIONS

Ricardo Martins

Joana Bernardino

BIOPOLIS cibio

Infrastructure Ecology

Margarida Almeida

João Lopes

REN

Department of Quality, Environment and Safety



CONTEXT



NATIONAL ELECTRICITY TRANSMISSION NETWORK



NATIONAL GAS TRANSMISSION AND STORAGE NETWORK

REN

PORTUGUESE TSO

Electricity Transmission

150 - 400 kV

Natural Gas Transport

ENVIRONMENTAL AND OPERATIONAL CHALLENGES

CONTEXT

ELECTRICITY TRANSMISSION

KEY CHALLENGES INCLUDED



INFRASTRUCTURE RELATED IMPACTS

IMPACT ASSESSMENT AND MITIGATION WITHIN EIA PROCESSES

LACK OF DETAILED METHODOLOGICAL GUIDANCE



WHITE STORK NESTING ON TRANSMISSION TOWERS

CONTEXT

10 YEARS AGO



+ 15 Years of Data Collected Through EIA



Uncertainty Regarding The Effectiveness of Approaches



Limited in-house Expertise in Highly Specialised Fields

REN-BIOPOLIS Partnership

- **REN Chair in Biodiversity** 2015-2020
- **Protocol 2020 - 2023**
- **Protocol 2024 - 2027**

Two main working areas

- ✓ **Applied Research on the interactions between Transmission PL and Biodiversity (strong focus on birds)**
- ✓ **Scientific advisory and Knowledge Transfer to REN and other stakeholders**

Applied Research

Impacts of Power Lines on Bird Populations and Mitigation

Main questions to be addressed

- Main types of impacts
- Main drivers of collision risk?
- Most vulnerable species and populations?
- Effectiveness of wire-marking devices?

Impacts of PL on bird populations and mitigation

- 9 papers published. Examples:

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Bird collisions with power lines: State of the art and priority areas for research

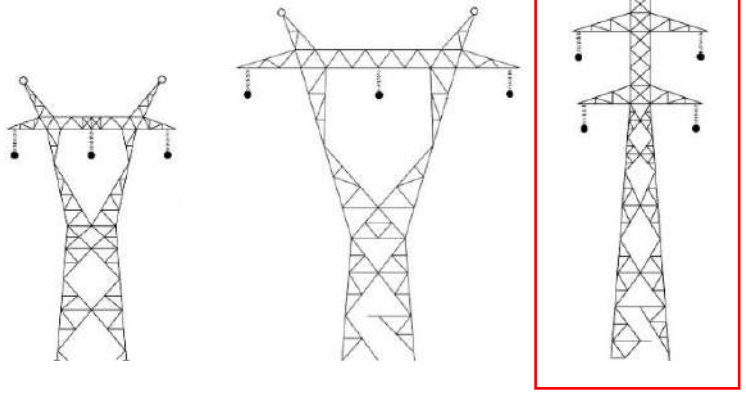
J. Bernardino[a,*], K. Bevanger[b], R. Barrientos[c,d], J.F. Dwyer[e], A.T. Marques[a,d,f], R.C. Martins[a,d], J.M. Shaw[g,h], J.P. Silva[a,d,f], F. Moreira[a,d]



Oryx

Power line routing and configuration as major drivers of collision risk in two bustard species

Ana Teresa Marques, Ricardo C. Martins, João Paulo Silva
Jorge M. Palmeirim and Francisco Moreira



Impacts of PL on bird populations and mitigation

Ecology and Evolution
Open Access

Species-Specific Responses of Farmland Birds to Overhead Powerlines

Ana Teresa Marques[1,2,3] | João Paulo Silva[1,2,3,4] | Francisco Moreira[1,2,3]





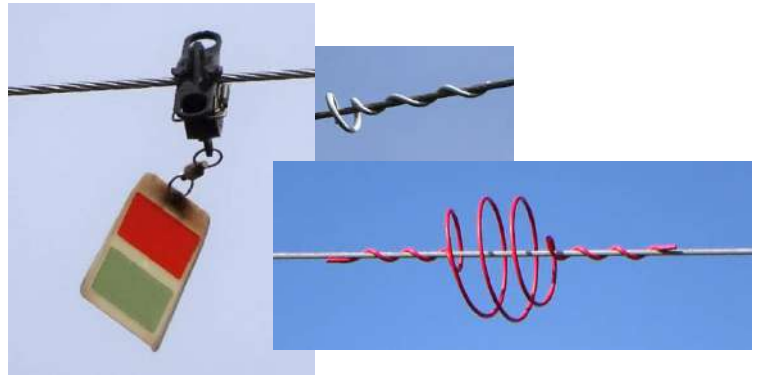
- Displacement on 2 grassland species

ELSEVIER
Contents lists available at ScienceDirect
Journal of Environmental Management
journal homepage: http://www.elsevier.com/locate/jenvman



Re-assessing the effectiveness of wire-marking to mitigate bird collisions with power lines: A meta-analysis and guidelines for field studies

Joana Bernardino[a,b,*], Ricardo C. Martins[a,b], Regina Bispo[c], Francisco Moreira[a,b]



- Overall reduction: ~ 50%

Applied Research

Monitoring Methods

Main questions to be addressed

Current monitoring practices adequate?

How can bird mortality biases be reduced?

Monitoring methods

- 4 papers published. Examples:

Contents lists available at ScienceDirect

Environmental Impact Assessment Review

journal homepage: www.elsevier.com/locate/eiar

A review of post-construction monitoring practices used in the evaluation of transmission power line impacts on birds and mitigation effectiveness, with proposals for guideline improvement

Ricardo C. Martins[a,b,c,*], Joana Bernardino[a,b,c], Francisco Moreira[a,b,c]





SCIENTIFIC REPORTS
nature research

Response of vertebrate scavengers to power line and road rights-of-way and its implications for bird fatality estimates

Joana Bernardino[1,2✉], Regina Bispo[3], Ricardo C. Martins[1,2], Sara Santos[4] & Francisco Moreira[1,2]



Birds Nesting on Pylons: Opportunities and Risks

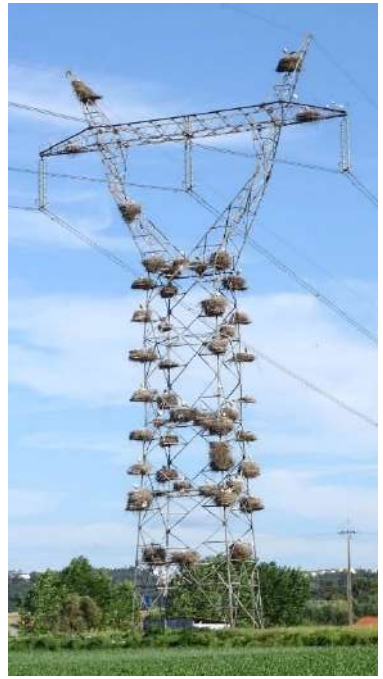
Main questions to be addressed

- Effectiveness of nest management programme?
- Effectiveness of specific mitigation measures?
- Which other species use towers for nesting?
- How to enhance biodiversity while ensuring network reliability?

Applied Research

Birds nesting on pylons: the white stork

- 5 papers / reports. Examples:





Environmental Research Letters

Wired: impacts of increasing power line use by a growing bird population

Francisco Moreira[1,2,8], Vitor Encarnação[3], Gonçalo Rosa[4], Nathalie Gilbert[5], Samuel Infante[6], Julieta Costa[7], Marcello D'Amico[1,2], Ricardo C Martins[1,2] and Inês Catry[1,2,5]

Contents lists available at ScienceDirect

Journal of Environmental Management

journal homepage: www.elsevier.com/locate/jenvman

Long-term management practices successfully reduce bird-related electrical faults in a transmission grid increasingly used by white storks for nesting

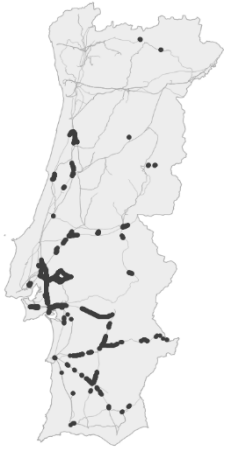
Francisco Moreira[a,b,c,*], Ricardo C. Martins[a,b,c], Francisco F. Aguilar[a,b], António Canhoto[d], Jorge Martins[d], José Moreira[d], Joana Bernardino[a,b,c]



A joint TSO-Academia perspective from a decade of applied research and knowledge transfer on bird-power line interactions

Applied Research

Birds nesting on pylons: Other species





First national survey for all species

- 14 species besides the white stork
  - 9 with high dependence on cavities of stork nests
- 5 threatened species
  - 3 inside stork nests
- Recommendations to protect and promote this value
  - compatible with electricity transmission



Knowledge Transfer

Effective Application of Scientific Knowledge on REN Activity

Main topics deserving improvement

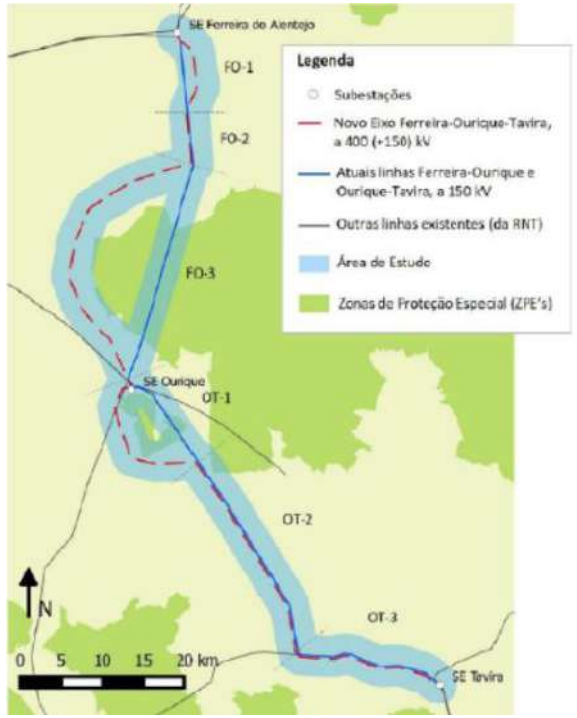
- Quality of submissions to EIA authorities
- National methodological guidelines
- Incorporation of biodiversity on strategic issues
- Relationship with stakeholders and outreaching

Knowledge Transfer

Scientific advice in specific projects (mainly EIA context)

- Analyse EIA Reports, proposals of EI Statements from the EIA authority, proposals or reports of post-construction monitoring programs

- Define methodology of Ecological Monitoring programs at the pre- or post-construction phase



Improvement of documents delivered to EIA authority based on existing guidelines and updated scientific knowledge

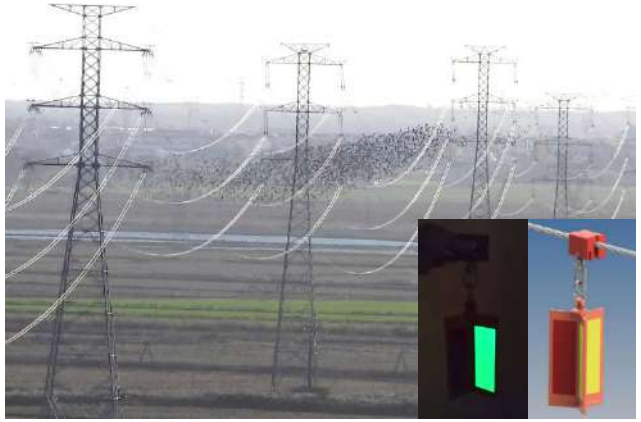
Knowledge Transfer

Other activities

- Update (in 2020) of **Best practice guidelines** for monitoring impacts of Transmission Lines on Birds and evaluate wire-marking effectiveness
  - Collaboration and approval by the national authority for nature conservation



- Contribution to proposal of **LIFE project calls**



- Support the definition of **REN's Strategy for Biodiversity**



- Co-organization of Seminars and training sessions



- Participation in Conferences



Take home messages

Main advantages of this TSO – Academia collaboration

- Support evidence-based decision-making;
- Promote effective knowledge transfer;
- Build internal capacity and expertise on biodiversity-related issues;
- Better understand, manage, and enhance the natural capital associated with REN's infrastructures;
- Increase visibility and recognition as a company committed to biodiversity.

- Develop research aligned with real operational challenges in this area of activity;
- Access to large amount of existing data;
- International positioning as a well-recognized research centre on infrastructure ecology;
- Promotion of collaborations with other stakeholders;
- Attraction of additional funding and human resources (e.g. students).

REN

BIOPOLIS

cibio

ACKNOWLEDGMENTS

- Organisers of WINGSPAN Conference 2026
- Other BIOPOLIS Researchers
- REN team (QAS and Other departments)
- Field work collaborators
- Property owners providing access to field work areas

THANK YOU!

Ricardo Martins: rcmartins@cibio.up.pt

Margarida Almeida: margarida.Almeida@ren.pt



FUNDING

REN FCT Fundação para a Ciência e a Tecnologia · República Portuguesa Ciência, Tecnologia e Ensino Superior · NORTE2020 · PORTUGAL 2020 · União Europeia Fundo Social Europeu

Projeto: NORTE-01-0246-FEDER-000063

WINGSPAN 2026

Presentations

Bridging the Gap: Leveraging Data Sharing as a Win-Win for Wildlife and Energy Projects



Joana Bernardino
Researcher
CIBIO/BIOPOLIS



José Tavares
Director
Vulture Conservation Foundation



Dr. Mirna Mazija
President
Association For Bat Conservation Tragus



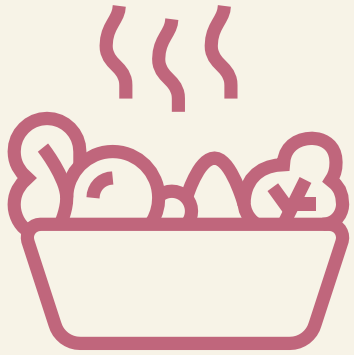
Rainhard Raab
Deputy CEO
TB Raab GmbH



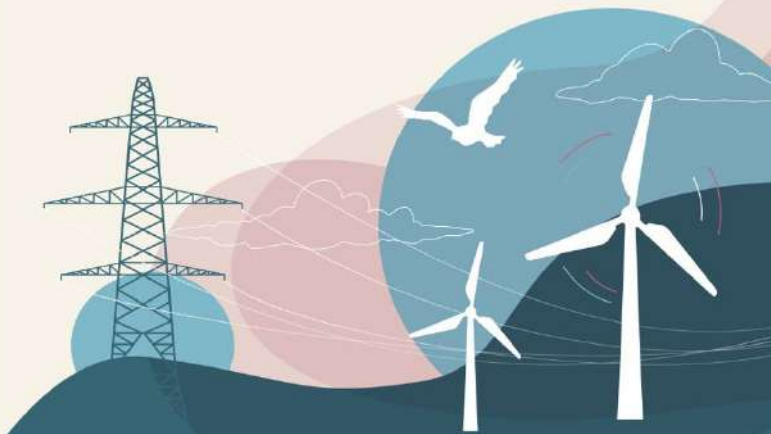
Larissa Biasotto
Senior Science Officer - Birds & Energy
BirdLife International



Margarida Almeida
Conservation Biologist
REN



LUNCH BREAK



WINGSPAN 2026

From Partnerships to Practice

Accelerating Nature-Positive Energy Infrastructure

3 – 5 November 2026
Berlin



Renewables Grid Initiative · TB Raab Technisches Büro für Biologie · SafeLines4Birds · EUROKITE · LIFE EURO BUSTARD · 50hertz | Elia Group · elia group · NATURA 2000 · Co-funded by the European Union

WINGSPAN 2026

From Partnerships to Practice

3 – 5 November 2026 | Berlin



Spotlight

Annika Lilliestam

Coordinator - GINGR

Renewables Grid Initiative



GINGR

Global Initiative for Nature, Grids and Renewables

Spotlight Presentation

Annika Lilliestam

GINGR Coordinator

An initiative by

IUCN

Renewables Grid Initiative

Introducing



GINGR

Global Initiative for Nature,
Grids and Renewables

Global Initiative for Nature, Grids, & Renewables

We envision a rapid energy transition enabled by wind, solar and electricity grids that embraces Nature- and People-Positive goals.

gingr.org

Our Mission

GINGR aims to support the just and sustainable energy transition by providing assessment tools to quantify contributions to Nature- and People-Positive goals.

To facilitate this, we intend to develop monitoring and reporting systems that are globally aligned and standardised.

an initiative by

GINGR
Global Initiative for Nature, Grids and Renewables

IUCN Renewables Grid Initiative

Challenges for a Nature-Positive energy transition

- Long and complex permitting procedures
- Balancing energy infrastructure needs with biodiversity protection
- Addressing community concerns and maintaining social acceptance
- Limited ecological & socio-economic data for informed decision-making
- Managing competing land-use interests
- Demonstrating measurable environmental and social benefits



How do we move from individual solutions to measurable Nature-Positive outcomes?

Bridging the gap between ambition & implementation

Global Ambitions



Climate and biodiversity goals

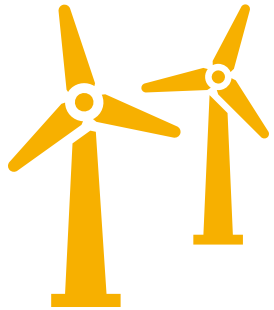
Global Frameworks and Commitments

GINGR



Co-developing and testing practical approaches, tools and guidance

Implementation & Outcomes



Measurable outcomes for Nature and People

From ambition to action: Practical resources from GINGR

GUIDE



Strategic recommendations & guidance

MEASURE



Measuring biodiversity contributions and demonstrating progress

NAVIGATE & ACT



Navigating existing frameworks and translating them into practical action

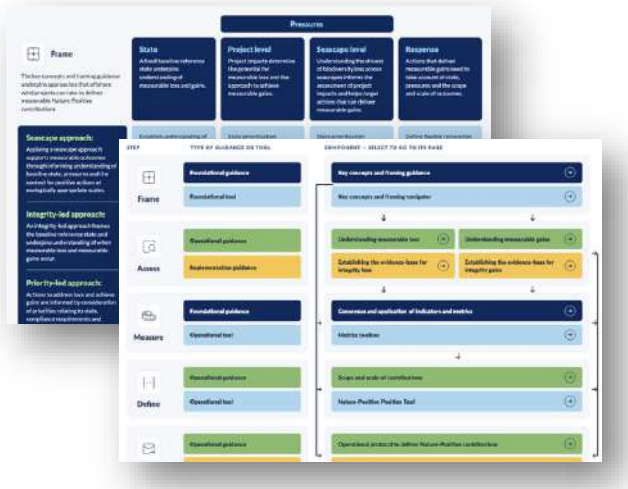
From ambition to action: Practical resources from GINGR

GUIDE



Strategic recommendations & guidance

MEASURE



Measuring biodiversity contributions and demonstrating progress

NAVIGATE & ACT



Navigating existing frameworks and translating them into practical action

From ambition to action: Practical resources from GINGR

GUIDE



Strategic recommendations & guidance

MEASURE



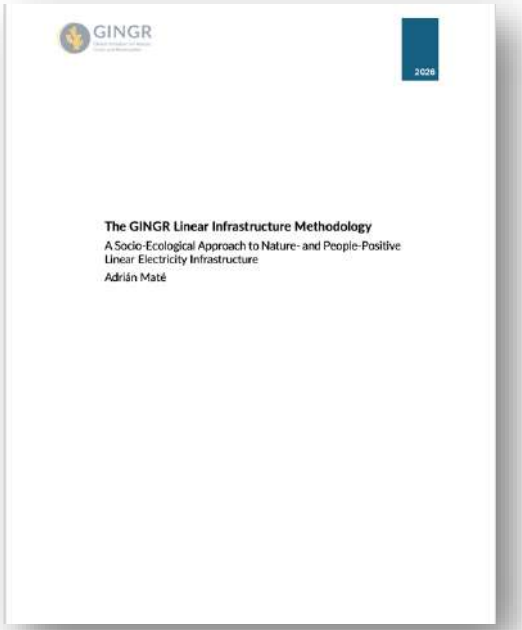
Measuring biodiversity contributions and demonstrating progress

NAVIGATE & ACT



Navigating existing frameworks and translating them into practical action

Nature- and People-Positive Grids: From Methodology to Practice



A holistic approach to grid planning:
Bringing together landscape, biodiversity, cultural and social information to support Nature- and People-Positive decision-making.

GINGR linear infrastructure methodology

A practical, step-by-step methodology to apply the Framework to electricity transmission and distribution lines (overhead and underground) .

0 Stakeholder engagement and scoping

1 Socio-ecological system baseline (State)

2 Integrated assessment (Pressures)

3 Cost and opportunity surfaces

4 Scenario comparison

5 Implementation and adaptive management (Responses)

6 Reporting and learning (Benefits)

4 Knowledge Layers
Ecology, field, biodiversity, ecosystem services and equity fairness.

Metrics system
Selection and use of relevant indicators from the science base.

Applied throughout the infrastructure lifecycle
Planning → Construction → Operation → Decommissioning.

- Layer 1: Landscape and territorial context
- Layer 2: Field Biodiversity and monitoring
- Layer 3: Cultural Ecosystem Services and human-nature relationship
- Layer 4: Ecosystem service fairness

Explore the four knowledge layers through our Connecting Energy, Nature & People Webinar Series

Putting GINGR to the Test: Piloting with Partners



TEST

Apply the methodology in real-world projects



LEARN

Bring together grid operators, conservation experts and researchers



REFINE

Improve the methodology for wider application

Interested in helping us put the GINGR Methodology into practice?
We welcome opportunities to explore piloting and collaboration.

Learn more about GINGR and stay tuned…





Thank You!

Annika Lilliestam
Coordinator – GINGR

Get in touch:
annika@renewables-grid.eu
info@gingr.org

Sign up for the GINGR newsletter: https://bit.ly/GINGR_Newsletter

Follow GINGR on LinkedIn: https://bit.ly/GINGR-on-LinkedIn

WINGSPAN 2026

From Partnerships to Practice

3 – 5 November 2026 | Berlin



Spotlight

Annika Lilliestam

Coordinator - GINGR

Renewables Grid Initiative



WINGSPAN 2026

From Partnerships to Practice

Accelerating Nature-Positive Energy Infrastructure

3 – 5 November 2026
Berlin



Renewables Grid Initiative · TB Raab Technisches Büro für Biologie · SafeLines4Birds · EUROKITE · LIFE EURO BUSTARD · 50hertz | Elia Group · elia group · NATURA 2000 · Co-funded by the European Union

WINGSPAN 2026

Panel Discussion

Nature-Positive for Renewables and Grids: Pathways to Success



Peter Jones
Sustainability Manager
RWE



Jean-François Godeau
Research & Development Scientist
Ecofirst



Tris Allinson
Senior Conservation Scientist
BirdLife International

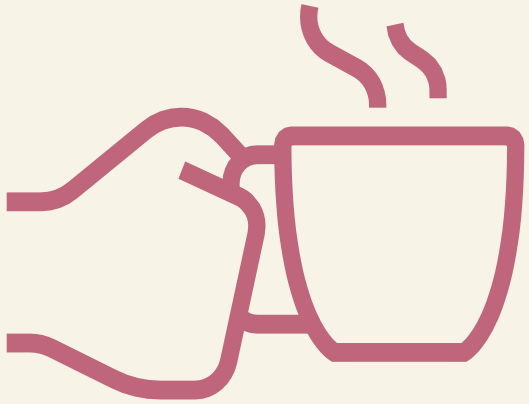


Robert Fennelly
Lead Senior Ecologist
EirGrid Group

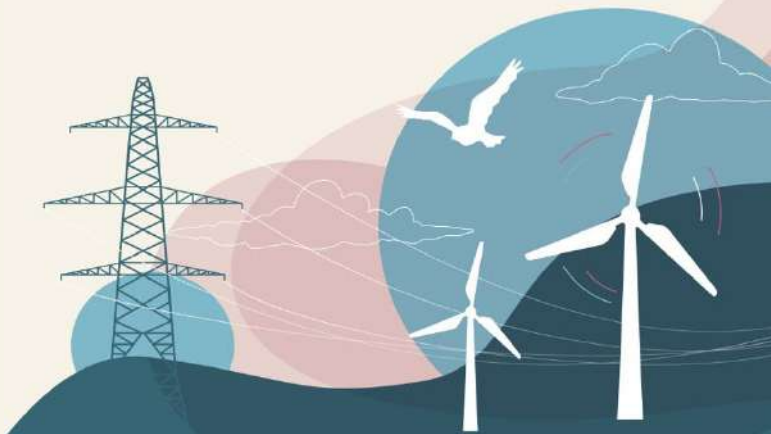


Moderator

Gus Schellekens
Director - GINGR
Renewables Grid Initiative



COFFEE BREAK



WINGSPAN 2026

Presentations

From Vision to Action: Pathways for Nature-Positive Energy Infrastructure



Karin Gögelburger
Team Permits & Habitat Management
Austrian Power Grid



Lucia Deutschová
Project Manager
Raptor Protection of Slovakia



Wingspan Conference 2026

From Voluntary Action to Lasting Impact - APG's Challenges in Nature-Positive Habitat Management

Karin Göglburger, Austrian Power Grid AG



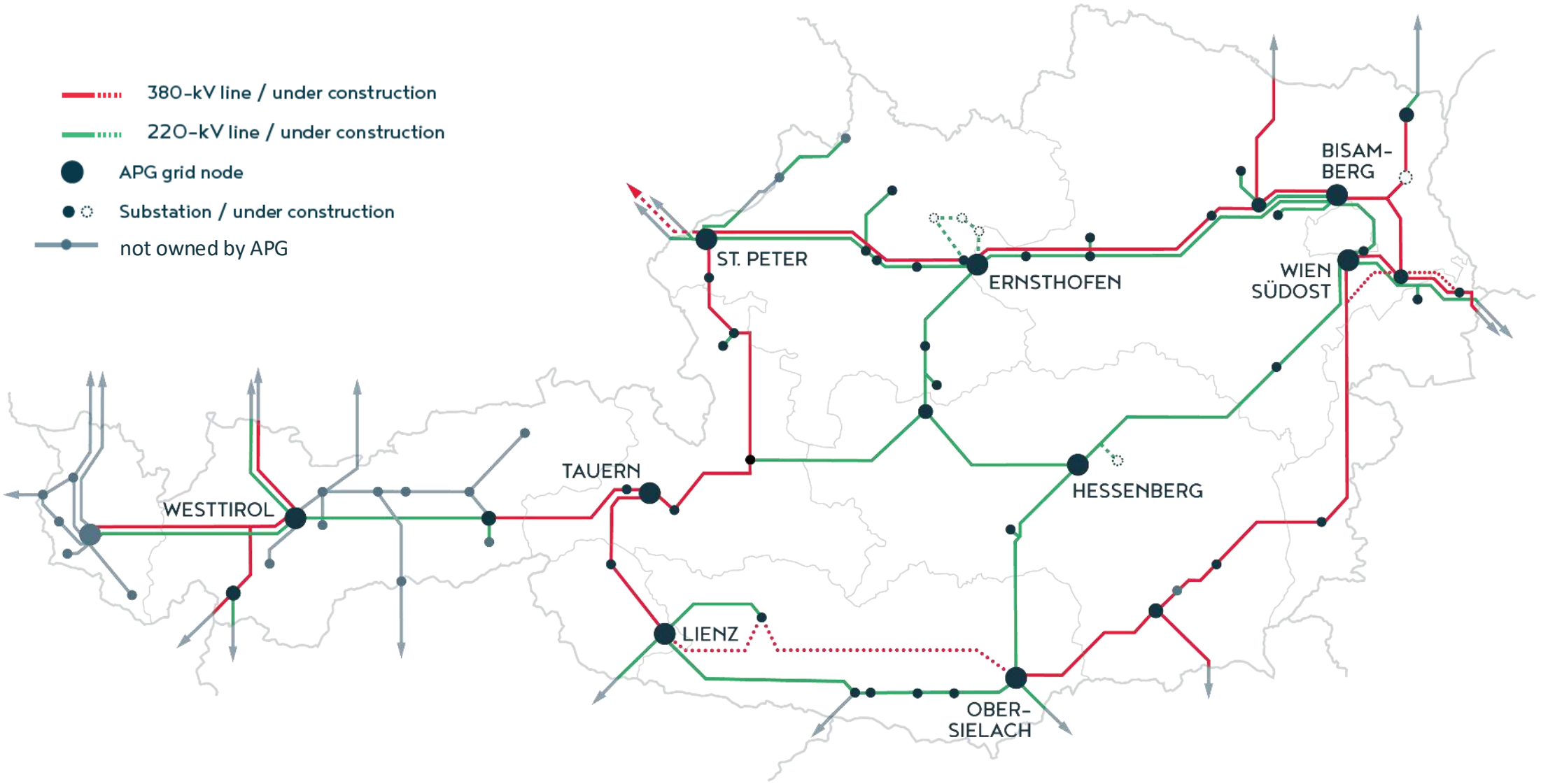
Who we are

Austrian Power Grid (APG) is Austria's transmission system operator (TSO) and operates as a certified Independent Transmission Operator (ITO).

- **APG** is responsible for providing **secure transmission of electricity for Austria**, its **economy** and **society**.
- Our **responsibilities** include the operation and development of high voltage grid, maintaining system stability, balancing electricity generation and demand, and enabling the integration of renewable energy.
- We connect power generation, industry and distribution networks across Austria. As a key partner in the energy transition, **APG is helping to build a resilient and future-ready electricity system**.

© Austrian Power Grid | Klassifizierung: INTERN

APG - Grid map


380-kV line / under construction
220-kV line / under construction
APG grid node
Substation / under construction
not owned by APG
ST. PETER
ERNSTHOFEN
BISAM-
BERG
WIEN
SÜDOST
TAUERN
WESTTIROL
HESSENBERG
LIENZ
OBER-
SIELACH

APG – Facts and Figures

approx. **7,000 km** of lines



approx. **12,000** towers

67 substations/ switching stations

63 research & innovation projects



9 billion euros
investment volume until 2034

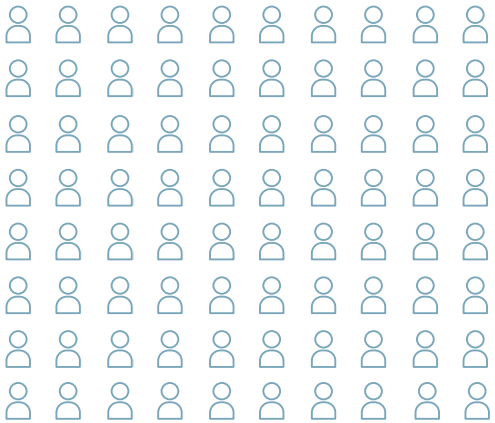
volume of activated redispatch energy from power plants in APG's control area:
609 GWh



transport of
46,082 GWh
via the APG grid

1.28 billion euros
business volume in 2025

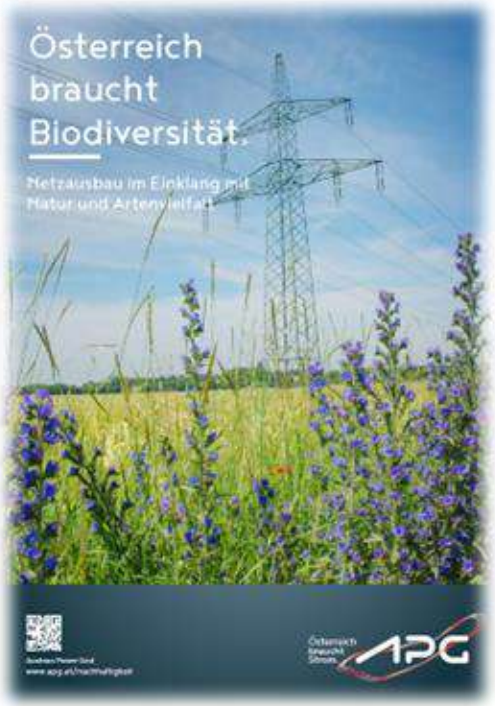
approx. **1.000** employees

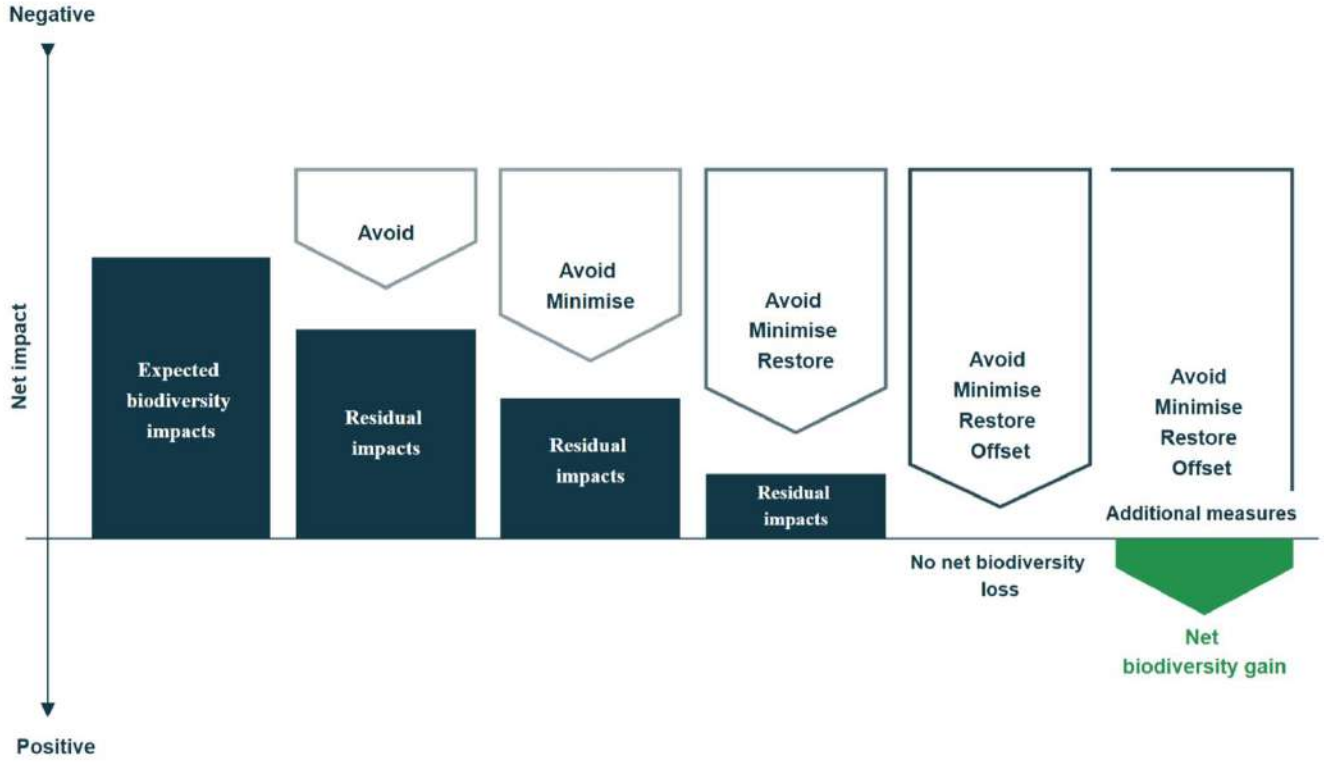


99.9 percent
security of operation

© Austrian Power Grid | Klassifizierung: INTERN

APG‘s Strategy on Sustainability and Biodiversity





	Avoid	Minimise	Restore	Offset
Substations & High-voltage lines	• Avoidance of particularly species-rich and valuable ecosystems when selecting sites for substations • Avoidance of crossing important Bird Transition Areas (if possible)	• Sensitive land management with longer mowing intervals • Montage of Birdmarkers in bird-sensitive Areas (if technically possible)	• Planting native shrubs and trees suited to the local conditions	• Invasive non-native species management • Creating natural habitats such as flowering meadows

A brief look at the history:

APG has been practicing nature conservation above legal requirements **since 1989**

Im Umspannwerk summen nicht nur Stromkabel, sondern auch Bienen

Unter dem Mastenwald des Umspannwerkes in Ernsthofen, das die APG derzeit generalsanieren, wird nebenher die größte Magerwiese des Landes angelegt

VON HANNES FEHRINGER

ERNSTHOFEN. Beim Umspannwerk Sarasdorf der Austria Power Grid (APG) hat Imker Dirk Kroner bereits Kästen von zehn Bienenvölkern aufgestellt. Die fleißigen Honigsammlerinnen finden unter den Starkstromschiebern und Transformatoren ein üppiges Nahrungsangebot an Wildblumen, aus deren Blütenkelche sie Nektar saugen. Den Honig, den Kroner schleudert, verschenkt die APG in Gläschen als Giveaway.

14 Hektar große Fläche

Nach Abschluss der 140 Millionen Euro teuren Generalsanierung, bei der derzeit die 220-kV-Schaltanlagen erneuert werden, werden im Jahr 2029 auch Bienenvölker beim Umspannwerk Ernsthofen ausschwärmen. Hier, an den Fundamenten des Mastenwaldes, entsteht nebenher nämlich aus zweiter Hand ein riesiges Biotop, die größte zusammenhängende Magerwiese in ganz Oberösterreich, wie Projektleiter Jürgen Pilgerstorfer neben den vielen Kennzahlen über Stromstärke, Traforegler und Netzleistung erwähnt: „Immerhin misst unser Werksareal 14 Hektar Fläche."

Die wird nicht einfach den Erfordernissen der Stromisolation und Erdung gemäß zubetoniert. Die elektrotechnischen Erfordernisse des Unterbaus schaffen die APG beim Ernsthofener Umspannwerk nämlich ganz ohne Zement und Asphalt mit jeder Menge Sand, der die Basis für die Beschaffenheit eines Trockengebietes und einer Magerwiese ist. Wildkräuter und eine Unmenge an Wildblumen lieben gerade diese Bodenverhältnisse, sodass sie sich nach Aussaat und Samenflug rasch ausbreiten.

Die APG haben für die Ökologisierung ihrer Betriebsflächen eine eigene Tochtergesellschaft, die sich VUM nennt, Verfahren Umwelt Management GmbH. Dabei überlässt man die Flächen hinter den Werkszäunen nicht bloß dem Wildwuchs. „Die Vegetation wird standortangepasst und besteht aus niederwüchsigen, trockenheitsresistenten Arten", sagt APG-Pressesprecherin Elisabeth Fazekas.



Auch das Ernsthofener Umspannwerk erhält eine Magerwiese. Foto: APG

Monitoring bei dem Projekt

Die VUM will dabei die Selbstverpflichtung zum Artenschutz nicht einfach nach erfüllten Bauauflagen abhaken, sondern überprüft mit genauen Kartierungen und Dokumentationen, ob die gesetzten Naturierungsmaßnahmen auch gewirkt haben, erklärt Fazekas.

Die auf dem Gelände des Ernsthofener Umspannwerkes entstehende Magerwiese ragt schon aufgrund ihrer Größe von rund 20 Fußballfeldern hervor. Natur aus zweiter Hand soll dabei auch das Image der Nachhaltigkeit bei der APG bekräftigen.



„Es ist technisch machbar, den Boden unter den Schaltanlagen nicht mit Beton zu versiegeln. Wir bekommen die größte Magerwiese des Landes."

Jürgen Pilgerstorfer, Projektleiter

Seltener Greifvogel ist zurück in Österreich

Sakerfalken nisten auf NÖ-Strommasten



Der Sakerfalke - auch „Würgfalke" - ist fast ausgestorben.

Gänserndorf. Dank gezielter Schutzmaßnahmen ist die Zahl der Sakerfalken in Österreich von zwei bis vier Brutpaaren um 1970 auf aktuell 59 (2025) gestiegen. Rund zwei Drittel der heimischen Population brüten im Leitungsnetz der Austrian Power Grid (APG), wo in 60 Meter Höhe speziell konstruierte Nisthilfen montiert wurden.

Schutz. In mittlerweile über 100 davon sind bisher rund 850 Jungfalken flügge geworden. Fünf von ihnen wurden nun in Deutsch-Wagram entnommen, untersucht und beringt. Dieser Schritt ist Teil eines langfristigen Artenschutzprojekts für Europas seltenste Greifvögel, bei dem die Jungtiere eben individuelle Aluminiumringe erhalten.



From Strategy to Practice I

What we do in SHM



IVM

*Biodiversity-promoting land management along the routes on more than **5,000 ha** in forests and meadows*



Habitat restoration and improvement

*Biodiversity-promoting land management of gravel grasslands in **10 substations***



Bird protection

*Bird Markers on approx. **560 km Overhead line** and **244 nesting aids** on pylons*



Cooperation with NGO‘s

BirdLife, Umweltdachverband, Österreichische Vogelwarte



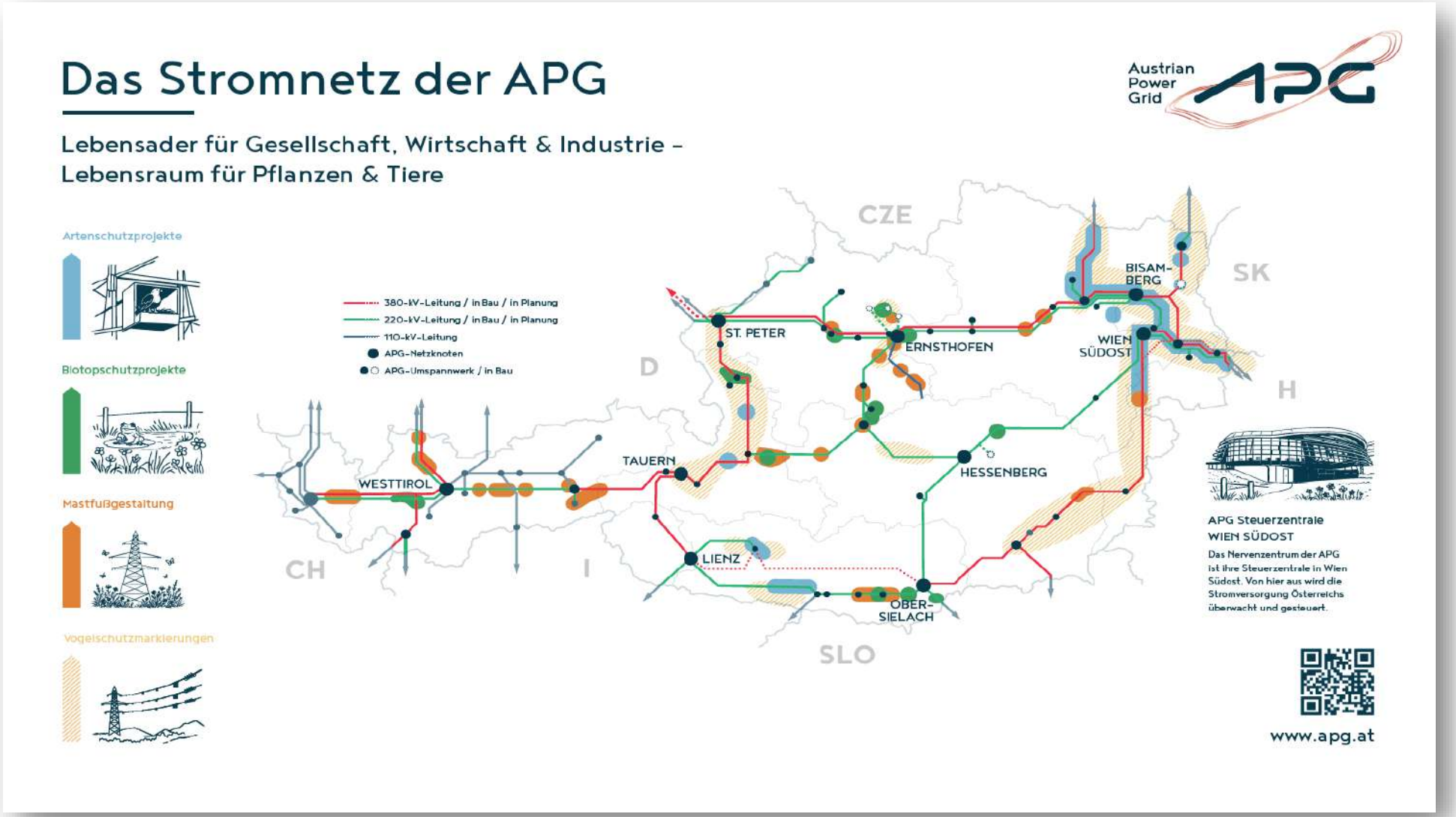
Integration of biodiversity into corporate strategy

KPI’s are directly linked to our measures in SHM

© Austrian Power Grid | Klassifizierung: INTERN

From Strategy to Practice II

Where we do it



From Strategy to Practise III

Measures for Birds

Nesting Aid
Little Owl



Nesting Aid
Ural Owl





Life Eurobustard



Life Eurokite

Spiral - 1989



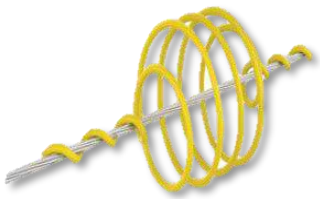
Balls - 2011



Zebra - 2013



Spiral - 2023



Nesting boxes and platforms for Saker Falcons

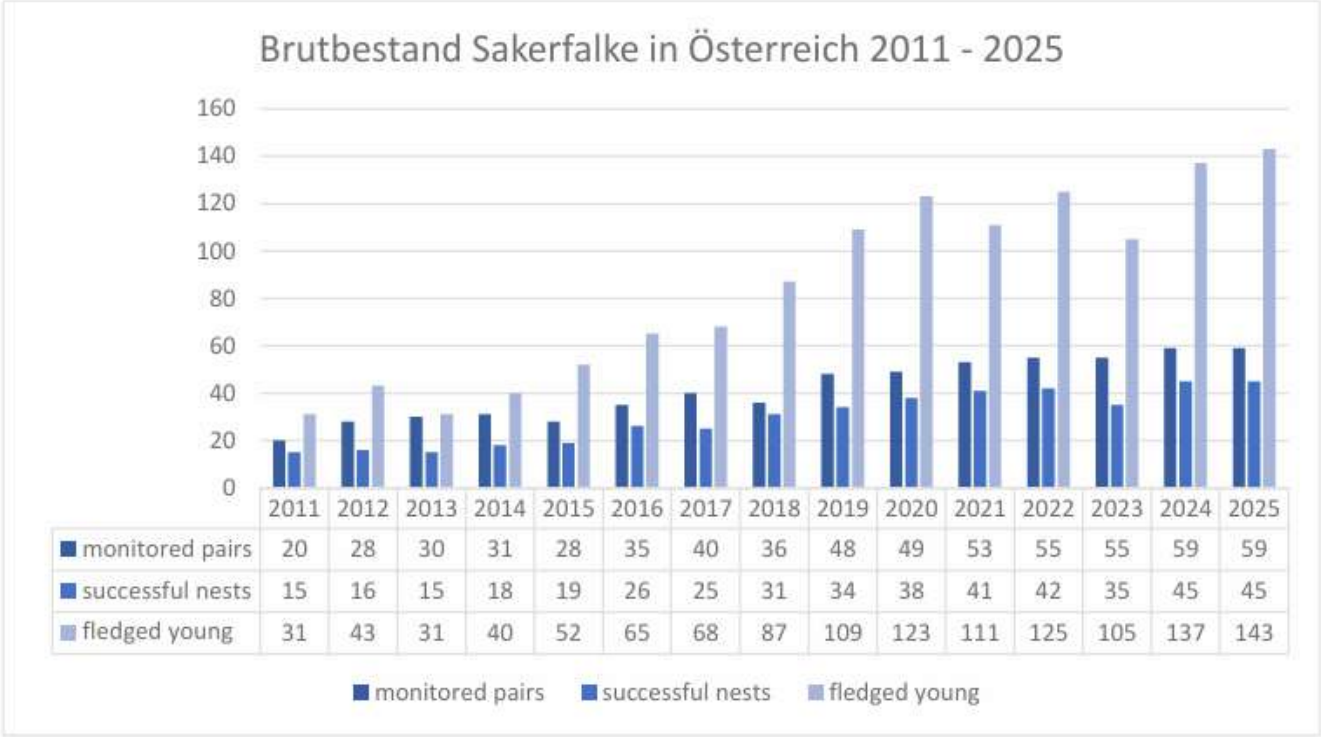


149 nesting aids are installed

High-voltage power line pylons from:

- APG (117 on 380kV and 220kV; Mounting height 115 – 150ft)
- DSO (12 on 110kV; Mounting height 80 – 110ft)
- Railway Company (20 on 110kV; Mounting height 80 – 110ft)

Current population status and trend



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
monitored pairs	20	28	30	31	28	35	40	36	48	49	53	55	55	59	59
successful nests	15	16	15	18	19	26	25	31	34	38	41	42	35	45	45
fledged young	31	43	31	40	52	65	68	87	109	123	111	125	105	137	143

approx. 95% of the population are breeding in artificial nests on pylons

© Austrian Power Grid | Klassifizierung: INTERN

Current Project: conductor replacement

- Increasing the Transmission capacity by replacing the existing conductors with carbon-fibre conductors, including fittings and insulators.
- The project covers approximately 109 km of power line, comprising 351 pylons (structure remais unchanged).
- This overhead line also supplies the city of Vienna.
- Construction work must be carried out quickly to keep the shutdowns as short as possible

- Along the power line there are 41 artificial nesting aids for the Saker falcon
- In 2026, 15 artificial nesting aids were occupied
- Successful breeding was found in 13 artificial nesting aids



Projekt on an existing overhead power line in Natura 2000 Site “Traun-Donau-Auen”

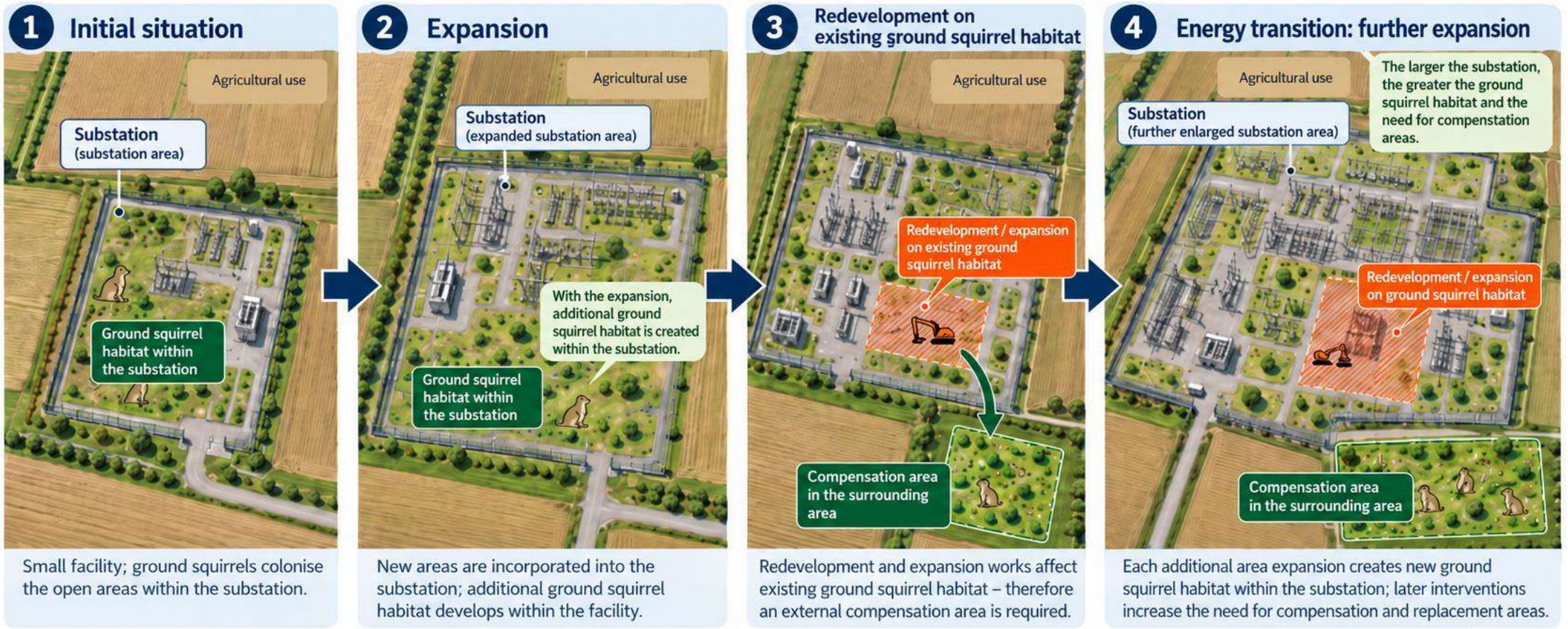
Appropriate Assessment of Impacts on the Natura 2000 Site during the Approval procedure of a APG project

- Temporary land use affects more than 1% of the total area of the European protected area in habitat types **LRT 6212 and 6510**.
- Based on previous experience in this area, the restoration period for the characteristic semi-dry grasslands and lowland hay meadows is expected to be only three to five years. - No significant effects are expected.
- Opponents of the project argued that the affected habitat types could not be restored within a reasonable period of time. In their view, the temporary interventions therefore had to be classified as permanent and would consequently have had significant impacts on the protected area.
- These **objections delayed the proceedings before the Federal Administrative Court by several months** and consequently **affected the progress of a project of key importance** to Austria’s energy transition.
- **The site was part of our measures in IVM!**





Substation and ground squirrel share the space – How do we coexist?



Note: Symbolic images created with the support of AI.

The “Temporary nature” approach needs a legally secure return option

01

Area is temporarily unused

Operating or reserve areas are available for several years

02

Nature is allowed to develop

Voluntary upgrading: flowering areas, succession, wetlands, woody plants

03

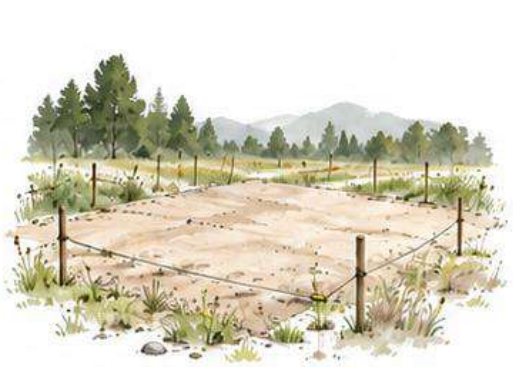
Later use remains possible

Predefined rules (enshrined in law) for operational reuse

04

Legally compliant Return option

Ecological construction supervision, construction time restrictions, minimum standards and protective measures









WITHOUT MODEL

Avoidance care – voluntary nature becomes unattractive

WITH “TEMPORARY NATURE“ APPROACH

Temporary areas become additional biodiversity spots

Legal certainty creates voluntary action for biodiversity.

Note: Symbolic images created with the support of AI.


AVOIDANCE
CARE


LEGAL CERTAINTY
for our Dedication and Efforts
in Biodiversity

WINGSPAN 2026

Presentations

From Vision to Action: Pathways for Nature-Positive Energy Infrastructure



Karin Gögelburger
Team Permits & Habitat Management
Austrian Power Grid



Lucia Deutschová
Project Manager
Raptor Protection of Slovakia



Nest Boxes on Electricity Pylons – A Conservation Success Story for the Saker Falcon in Slovakia

We do not take it for granted

With thanks to grid operators who care.

Slovenská elektrizačná prenosová sústava

ZÁPADOSLOVENSKÁ DISTRIBUČNÁ

Stredoslovenská distribučná

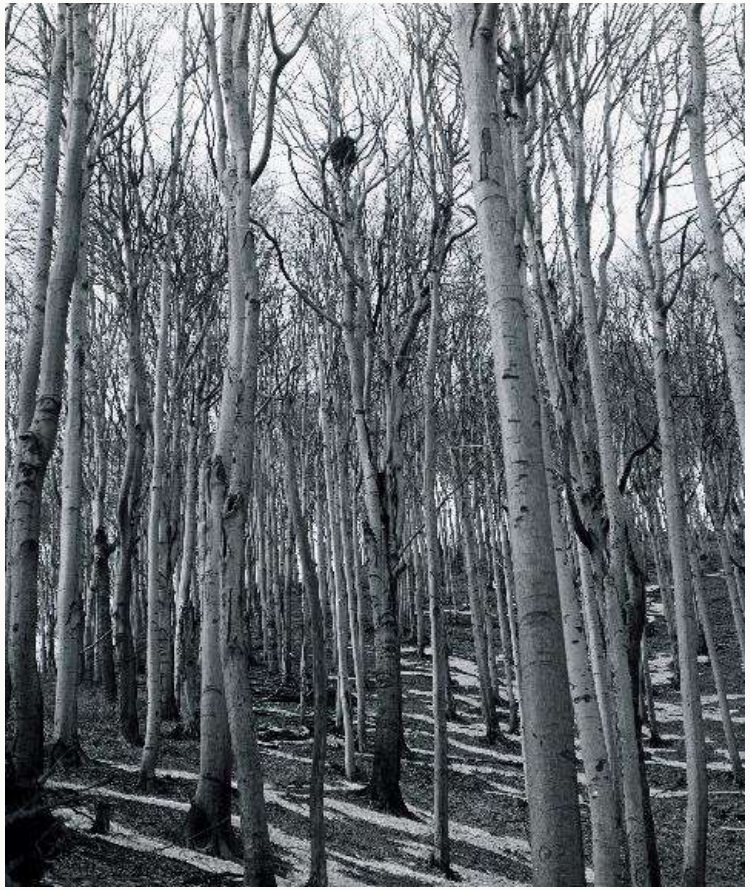
Co-funded by the European Union

NATURA 2000



1970s–1980s: On the brink of extinction





The last few tree-nesting pairs were guarded 24/7

Loss of breeding/foraging habitats – from pastures to agricultural land







Nest boxes on transmission pylons since 1995 were a GAME CHANGER





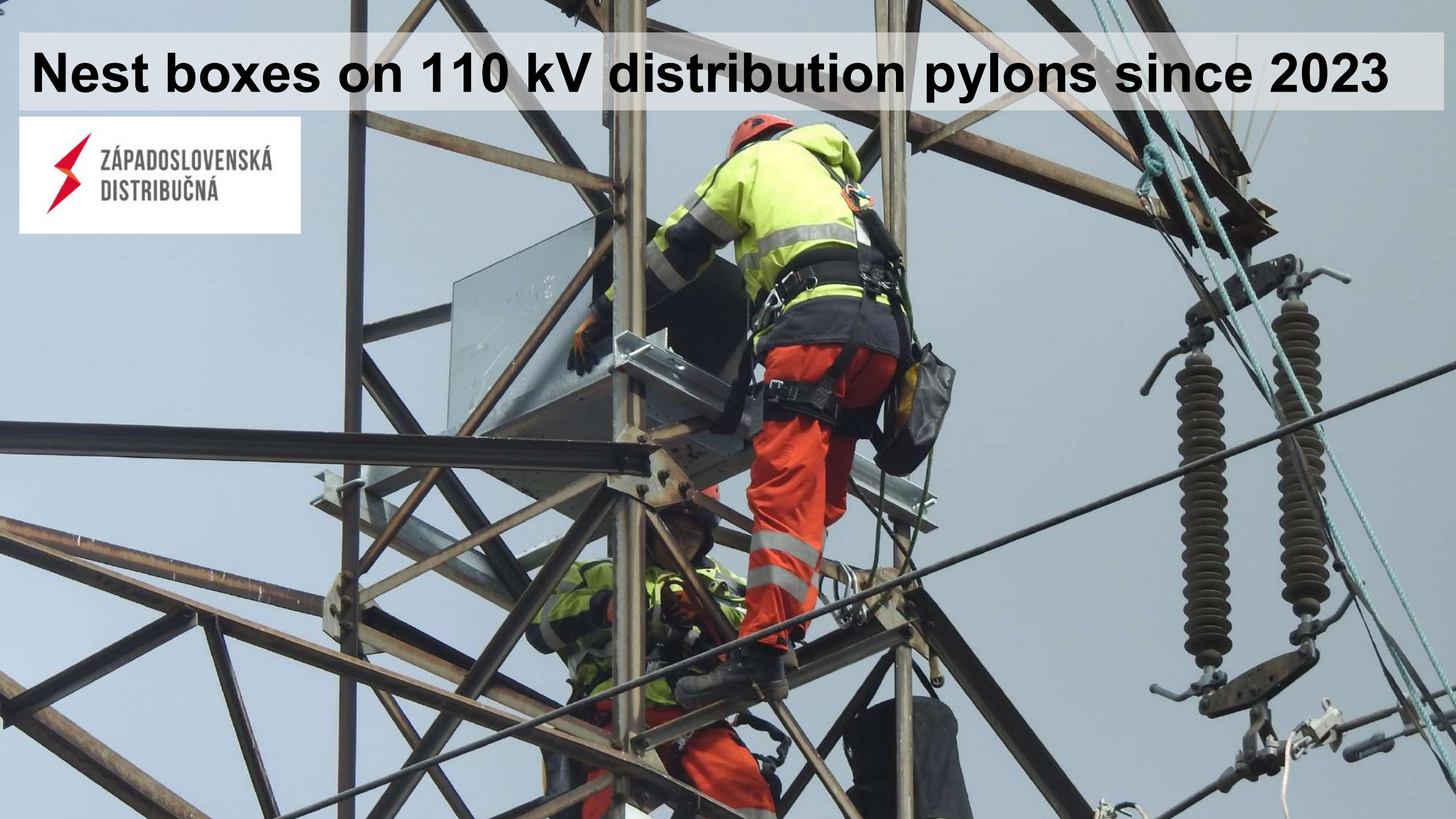
The Saker Falcon might not have survived in Slovakia without help.

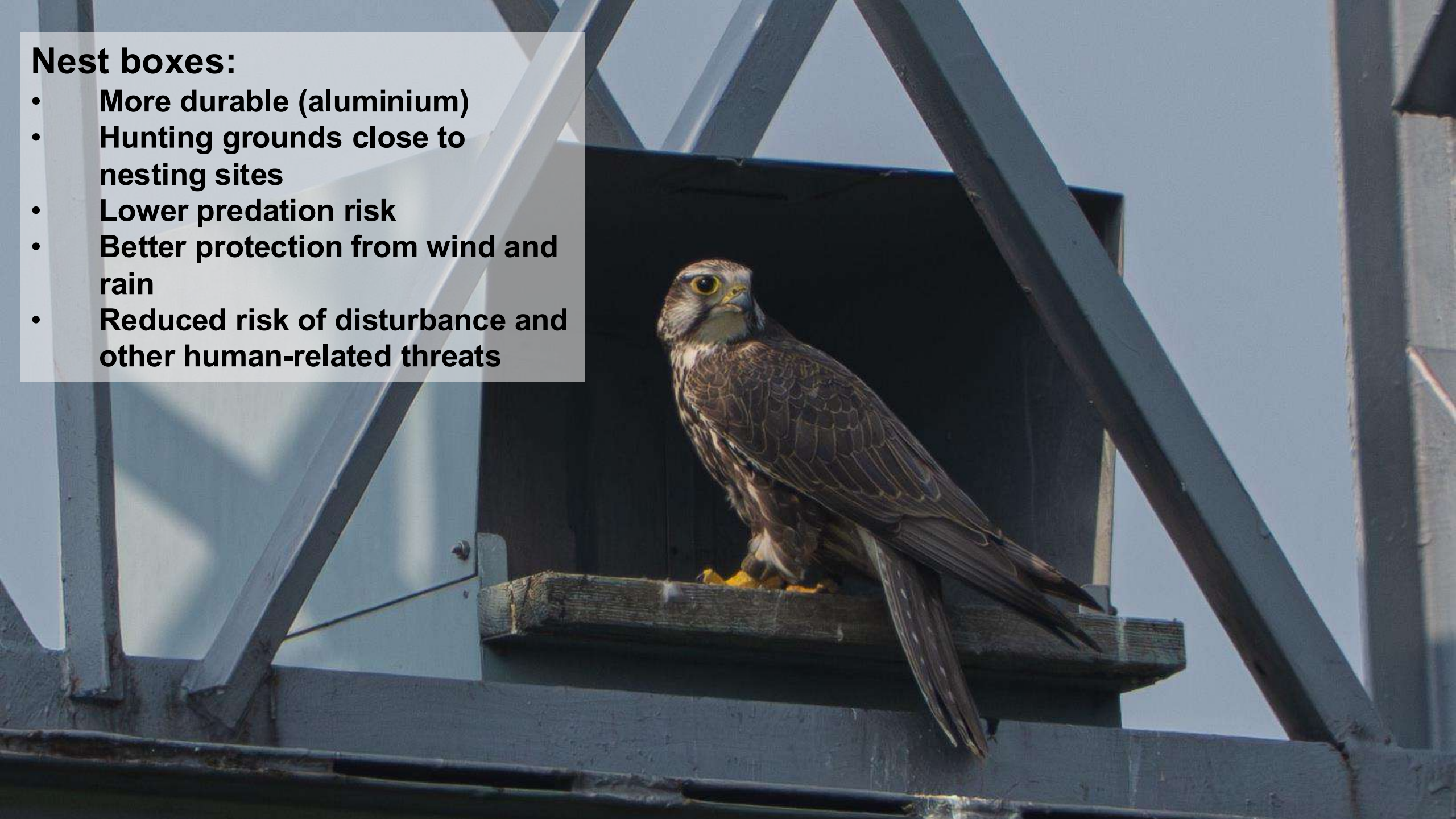


Slovenská elektrizačná prenosová sústava

Nest boxes on 110 kV distribution pylons since 2023

ZÁPADOSLOVENSKÁ DISTRIBUČNÁ

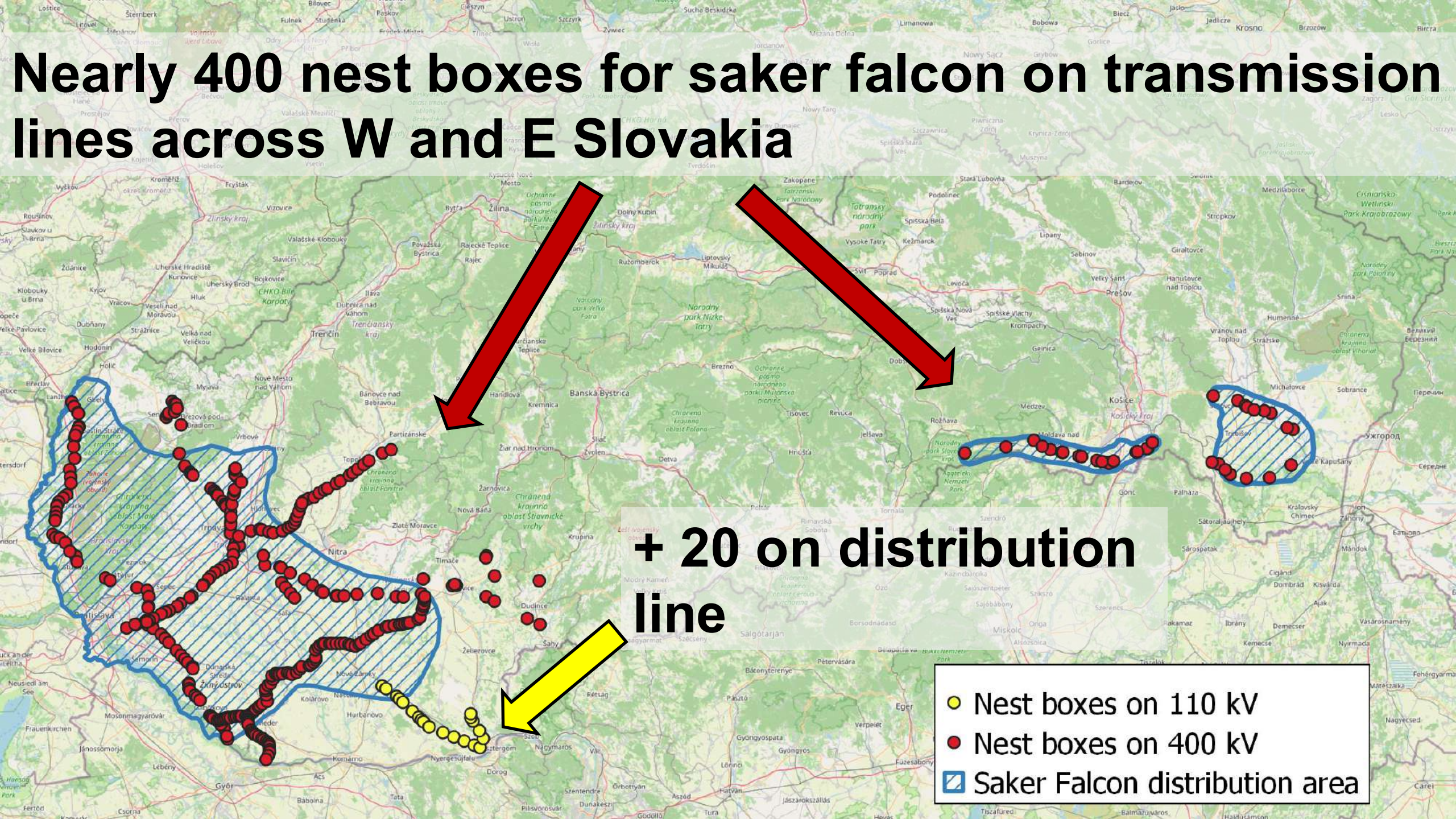




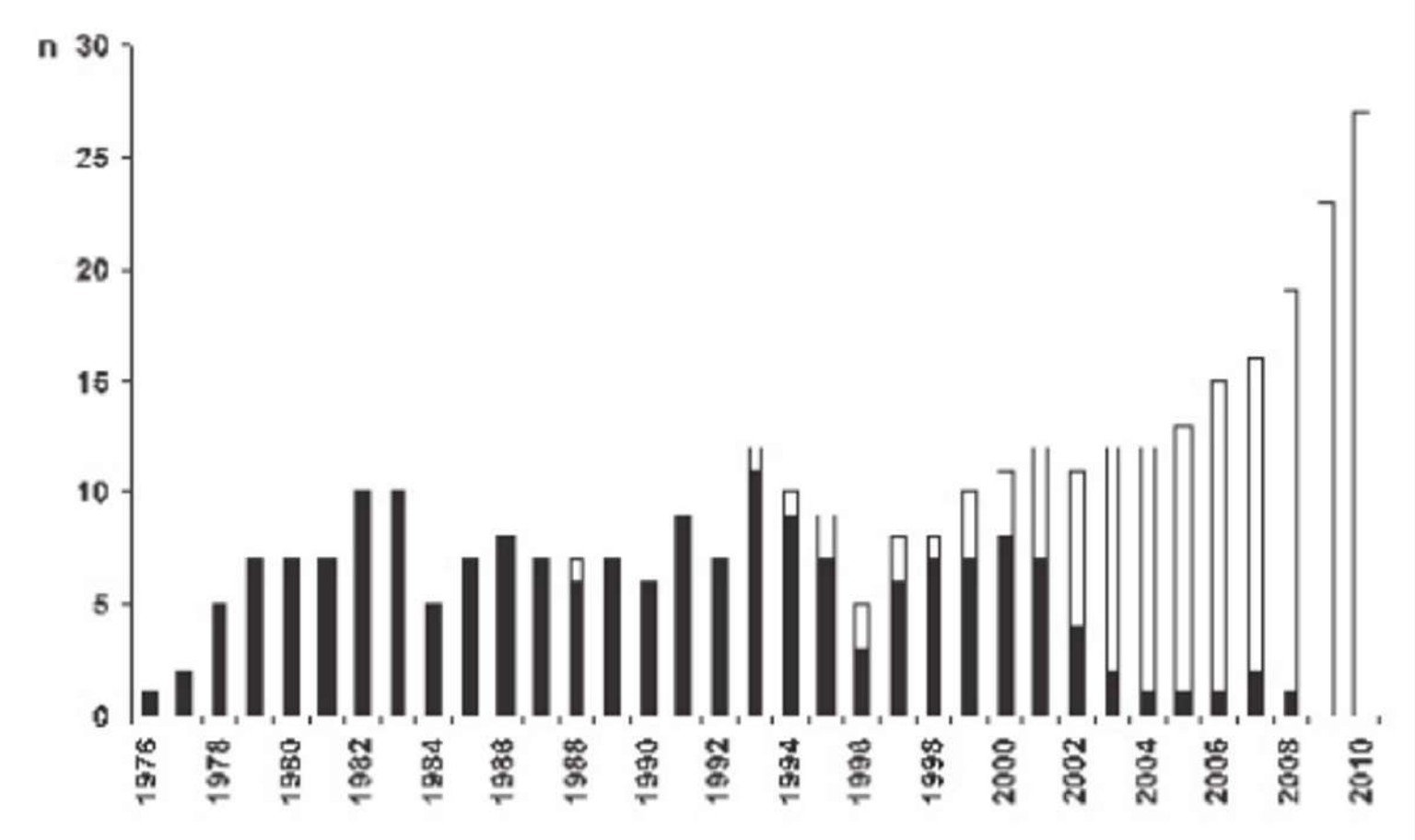
Nest boxes:

- More durable (aluminium)
- Hunting grounds close to nesting sites
- Lower predation risk
- Better protection from wind and rain
- Reduced risk of disturbance and other human-related threats

Nearly 400 nest boxes for saker falcon on transmission lines across W and E Slovakia

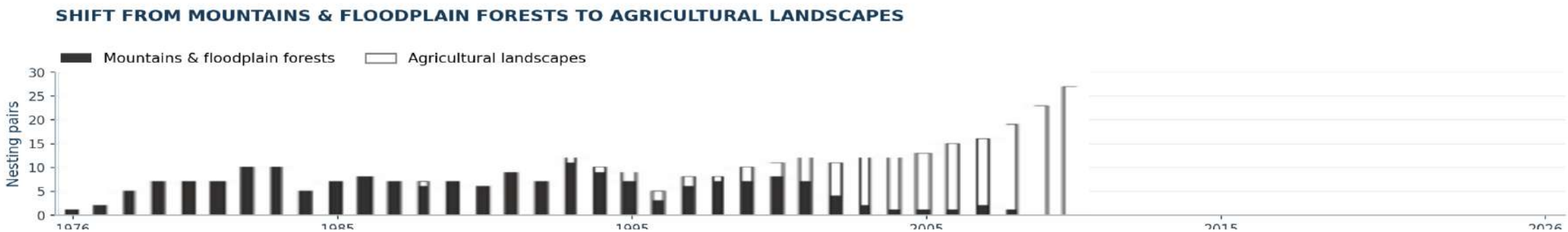


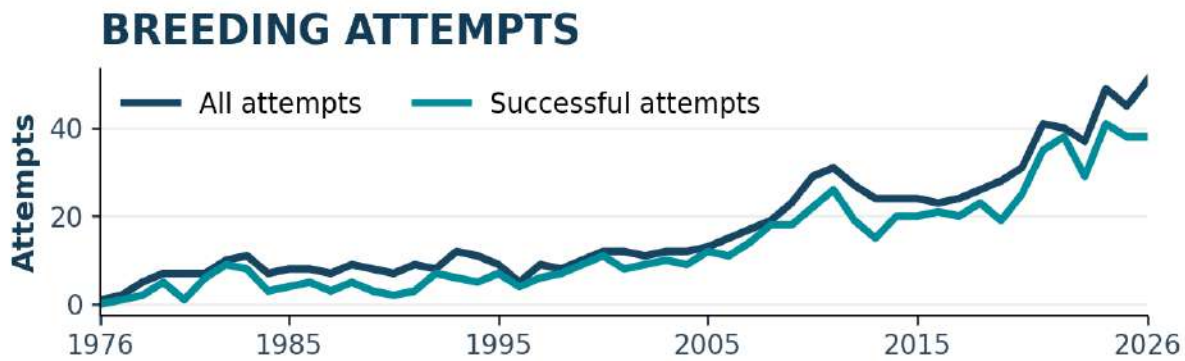
From forests to farmland — a dramatic shift

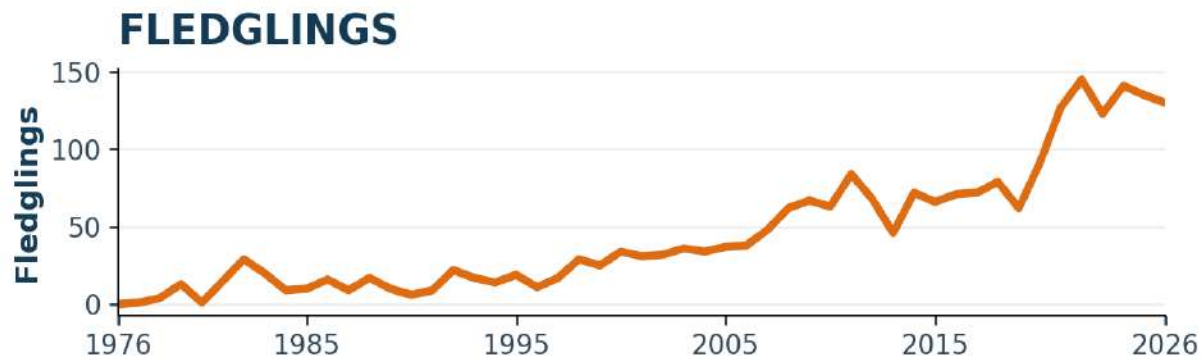


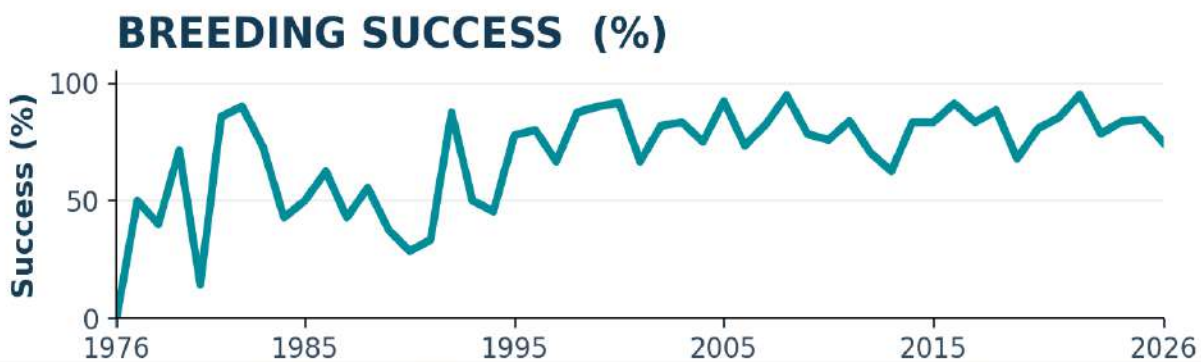
BLACK Mountains & floodplain forests WHITE Agricultural landscapes

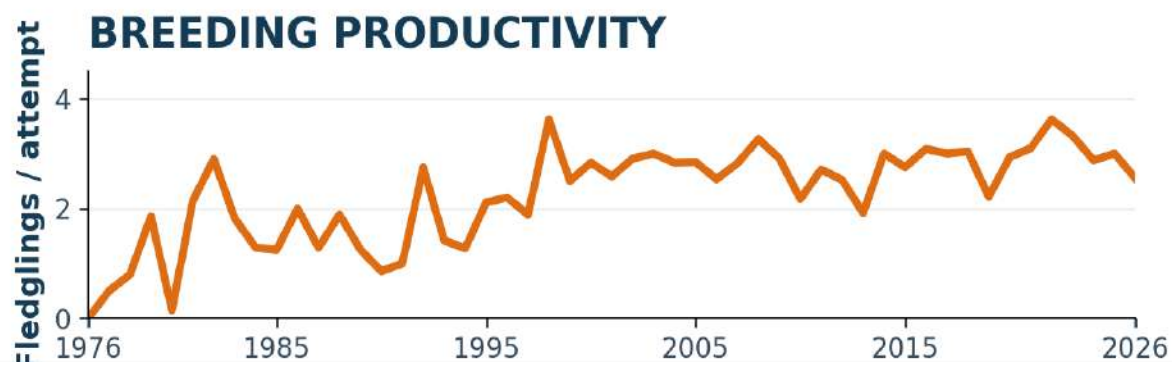
WESTERN SLOVAKIA | HISTORICAL TRENDS







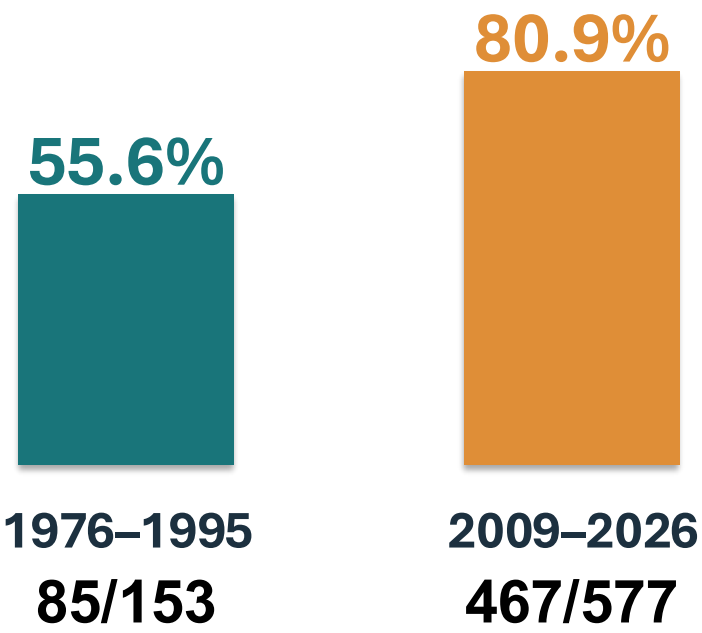




Before and after

Breeding success

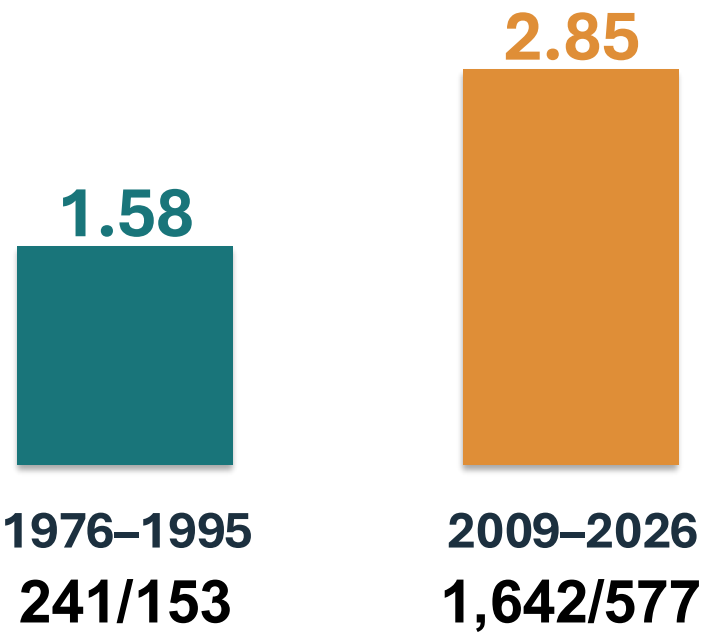
(%, successful attempts/all attempts)



Relative increase: +45.5%

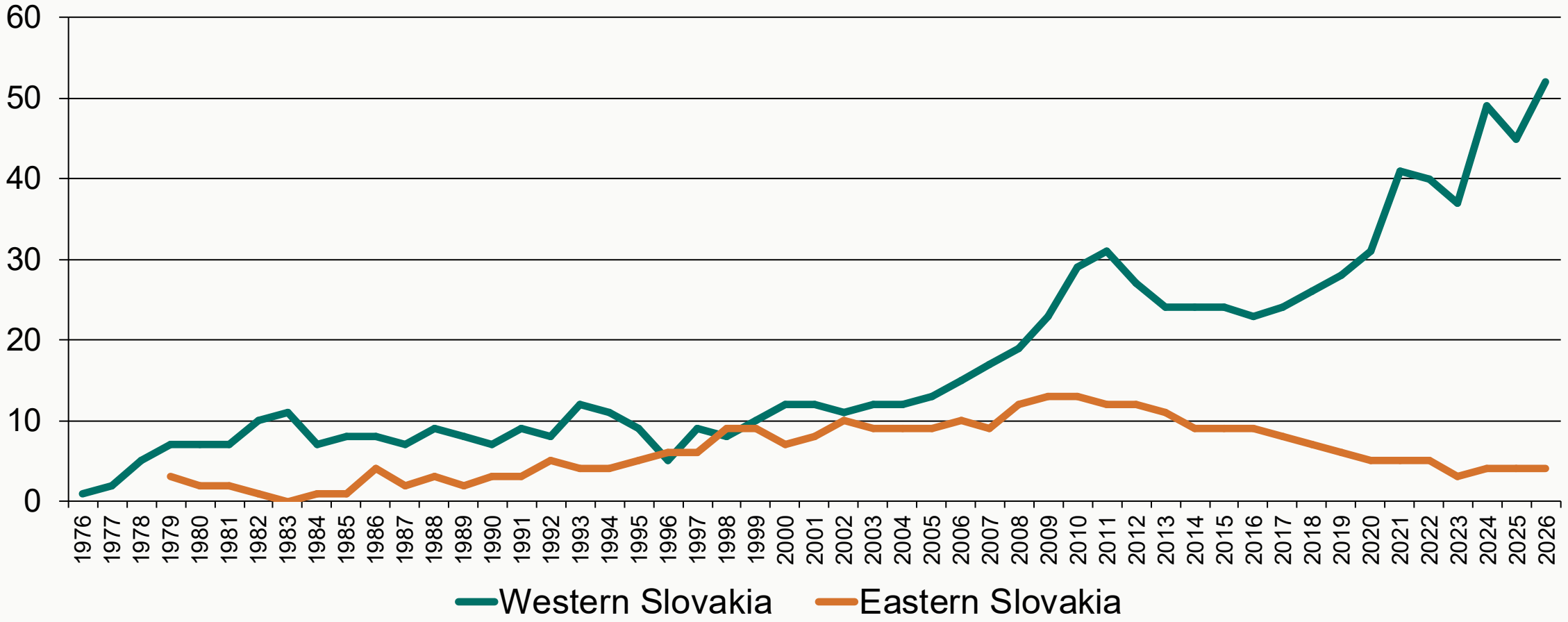
Breeding productivity

(fledglings/all breeding attempts)



Relative increase: +80.7% (1.81×)

Breeding attempts in Western and Eastern Slovakia (1976–2026)



Saker Falcon breeding results in Slovakia in 2026



	Western Slovakia	Eastern Slovakia
Total breeding attempts	52	4
Successful breeding attempts	38	4
Unsuccessful breeding attempts	14	0
Total fledglings	130	13

Before a nest box can be installed

A power pylon is a regulated structure – every attachment must be safe, technically designed and approved.

01 SITE SELECTION

- Suitable site
- Tower type and suitability
- Ecological assessment

02 TECHNICAL DESIGN

- Nest box design
- Mounting adapter
- Site-specific plans

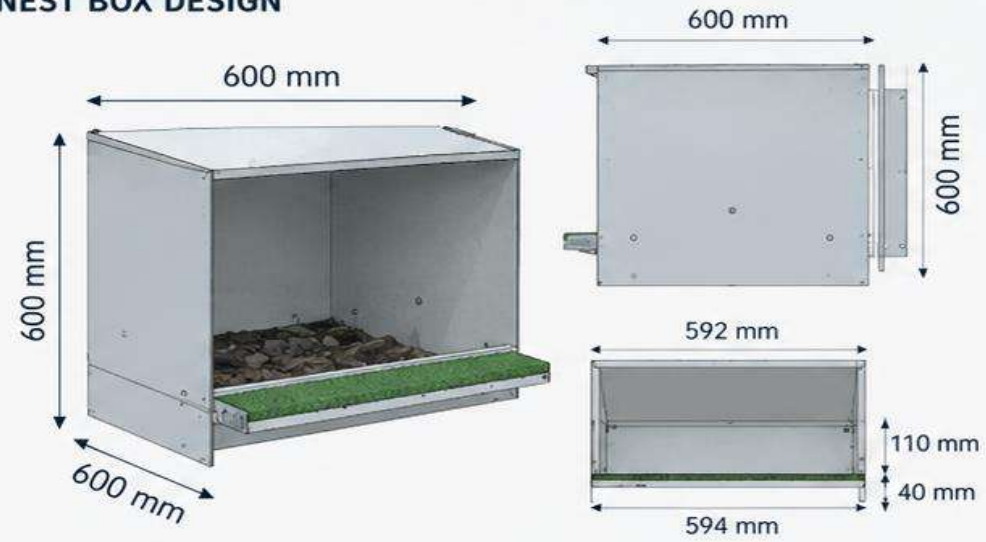
03 APPROVAL & COMPLIANCE

- Technical documentation
- Approval by Technical Inspection (e.g. Žilina)
- Compliance with safety and grid regulations

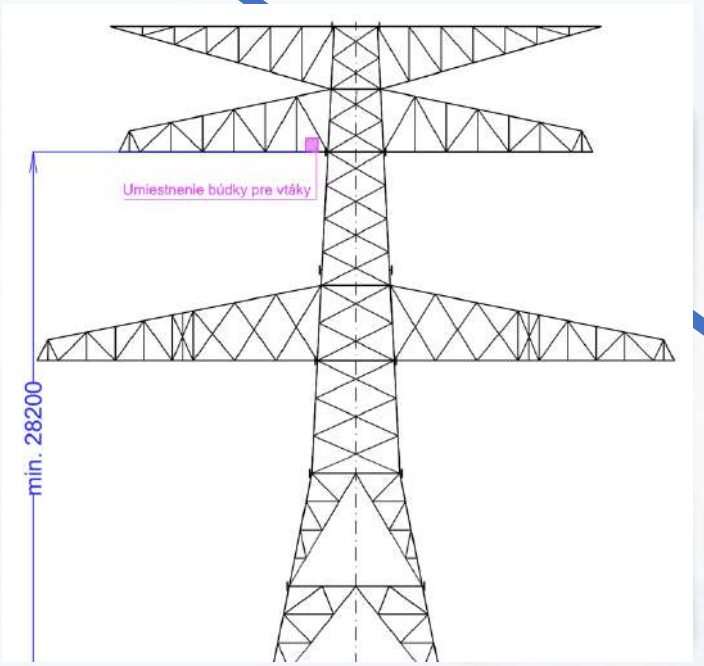
04 INSTALLATION

- Carried out by authorised utility team
- Line must be switched off
- Coordinated via dispatching

NEST BOX DESIGN



- Aluminium sheet 2 mm (box), 2.5 mm (joints)
- Wooden perch for raptors (59.5 × 11 × 4 cm) with cover (59.5 × 11 cm)
- Two-layer surface treatment (anti-corrosion)



INSTALLED NEST BOX



110 kV distribution line • Saker Falcon

Nest boxes are increasingly integrated into new and reconstructed power lines.

They are also increasingly required by environmental authorities as part of the Environmental Impact Assessment (EIA).

One nest box. Shared responsibility. Long-term cooperation.

Conservation and power-grid operations require coordination.

RPS TEAM

Monitoring the occupancy and box condition (drones)

Ringing and other research*

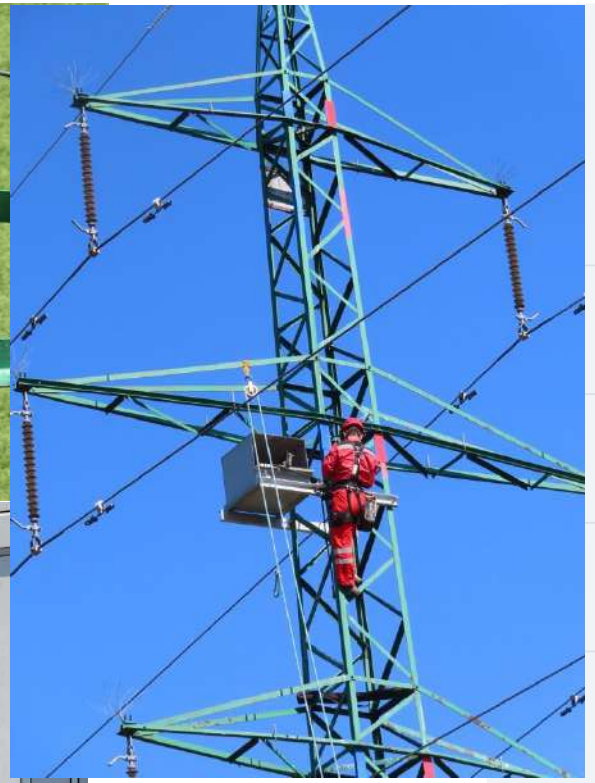
Clean old nest material – important for prey analyses

Update nest-box inventory









GRID OPERATOR

Authorised pylon access

Installation of nest boxes

Outages + dispatch coordination

Only essential work on pylons with occupied nest box – exchange of information

Nest-box repairs


AI
masterpiece

It’s all about people





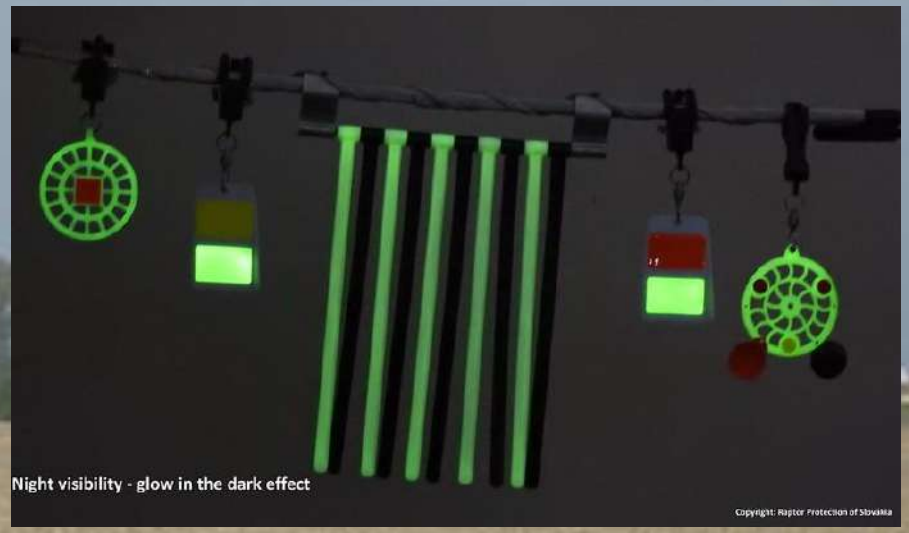
„We started installing nest boxes as a voluntary measure to compensate for the environmental impact of our power distribution infrastructure and contribute to biodiversity conservation.“










Night visibility - glow in the dark effect
Copyright: Raptor Protection of Slovakia



Thank you
for your attention.

Lucia Deutschová

deutschova@dravce.sk

Data, pictures, maps: Jozef Chavko, Marek Gális, Zuzana Lančaričová

Co-funded by the European Union

WINGSPAN 2026

Presentations

From Vision to Action: Pathways for Nature-Positive Energy Infrastructure



Karin Gögelburger
Team Permits & Habitat Management
Austrian Power Grid



Lucia Deutschová
Project Manager
Raptor Protection of Slovakia

WINGSPAN 2026

From Partnerships to Practice

3 – 5 November 2026 | Berlin



Closing Words

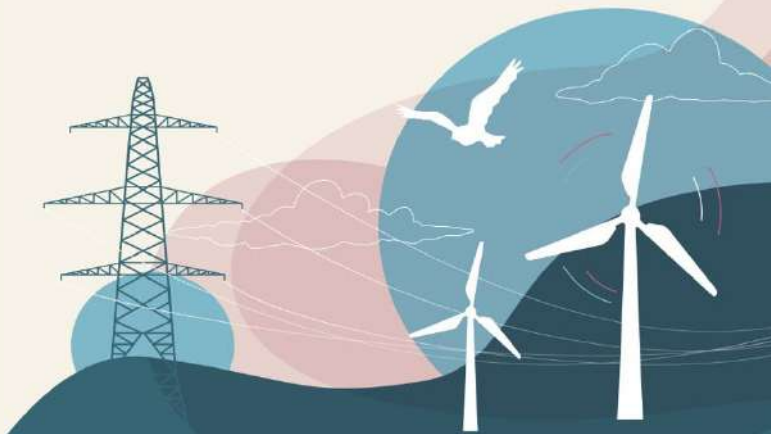
Manon Thiel

Manager - Energy & Nature

Renewables Grid Initiative



GROUP PHOTO



WINGSPAN 2026

From Partnerships to Practice

3 – 5 November 2026 | Berlin

See you tomorrow!

