

Bioseco Bird Protection System BPS



Seminário sobre Sistemas de Shut-Down on Demand
(SDOD) em Parques Eólicos

29.10.2025

BIOSECO BPS – product development



2017

Prototype systems installed in the Pomeranian and Lublin Voivodeships. Confirmed zero mortality.

2018

PBSE research project launched First prototype installation in Germany

2019

Independent system validation conducted in Germany and Spain, Commenced commercial sales of the systems

2020

BPS Premium prototype designed BPS pilot at the Airport (PGE EO) System sales to Germany, Spain, Poland, and France

2021

PBSE implementation completed and EIC (Seal of Excellence H2020) project launched
Continued sales of Bioseco BPS in Europe (20 systems) Design of the BPS Long-Range system for the German market

2022

Commenced BPS Long-Range testing in Germany
Continued sales of Bioseco BPS in Europe (45 systems)

2023

Market entry into Belgium and South Africa (sales of 70 systems)
Further development and optimization of products and algorithms

2024

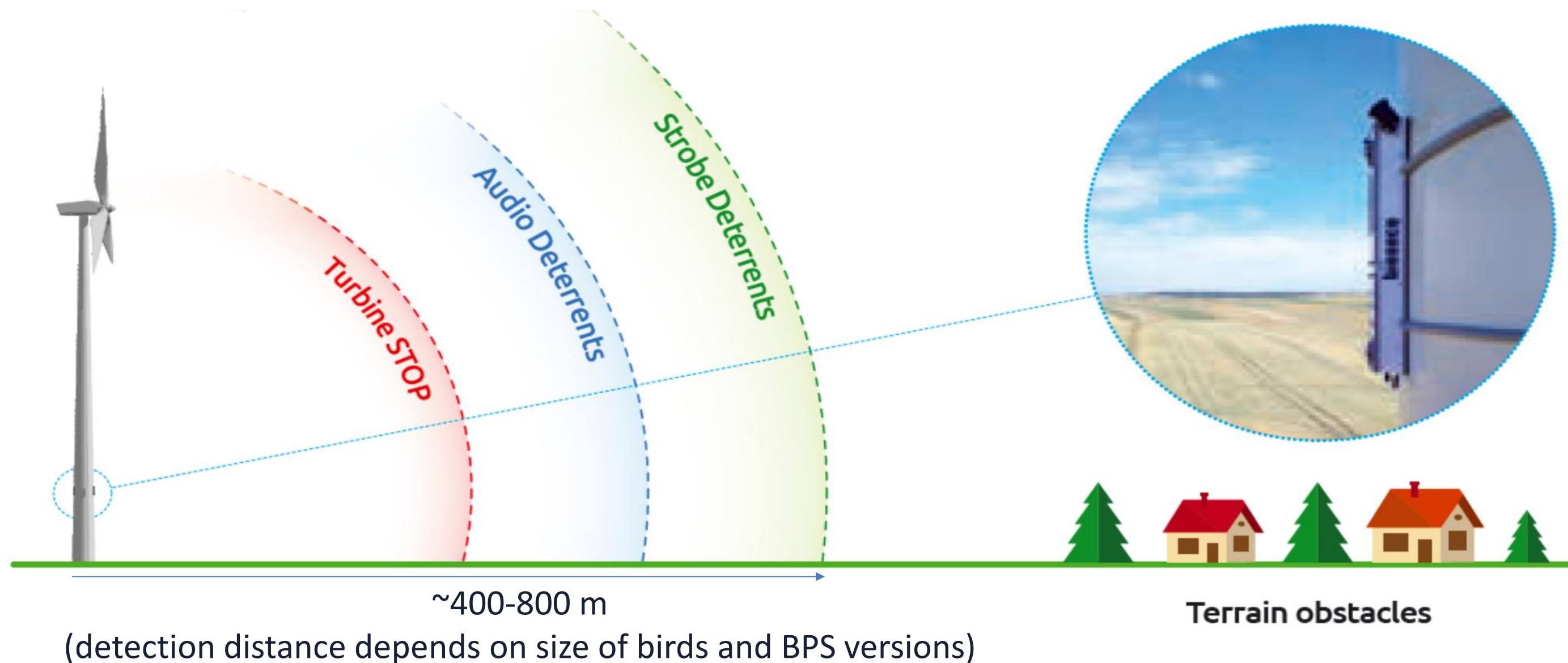
Market entry in Chile and Luxembourg
Continued sales of BPS in various versions (100 systems)
Acquired investor Spire Capital Partners



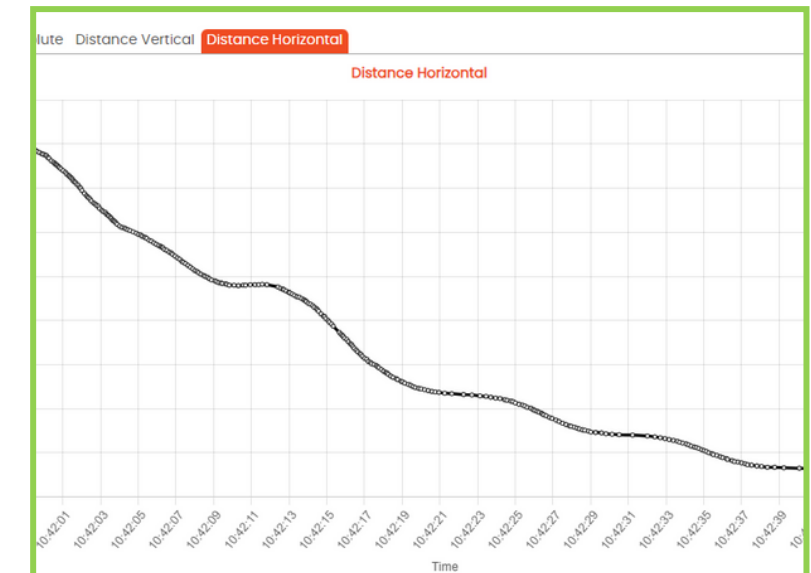
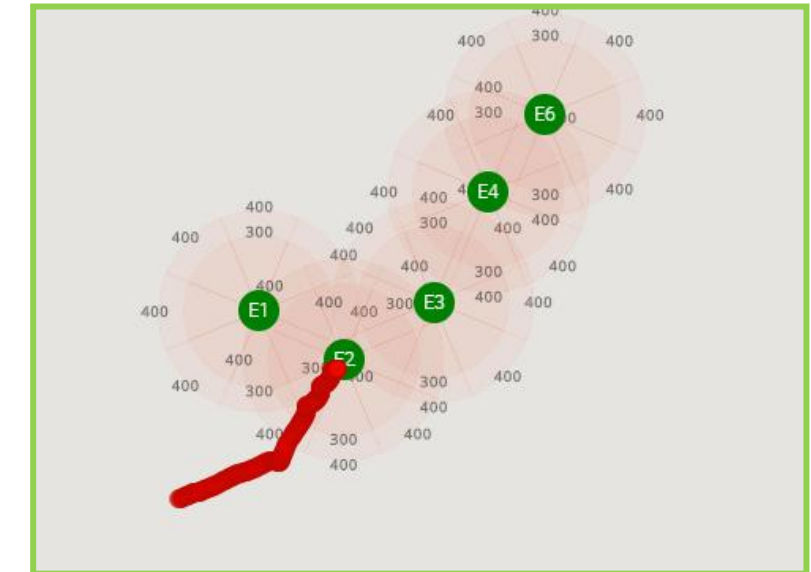
BIOSECO BPS – operating concept

Stereovision is the basis of the system's operation.
Pairs of cameras detect objects, estimate their distance, and classify their size.
By estimating the distance, the system can adapt its actions to the level of collision risk.

Protection area



BIOSECO BPS – example of operation

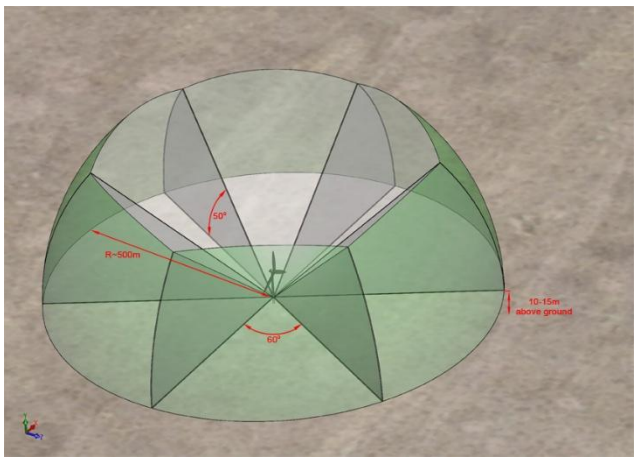


BIOSECO BPS – example of operation



BIOSECO BPS – Various versions

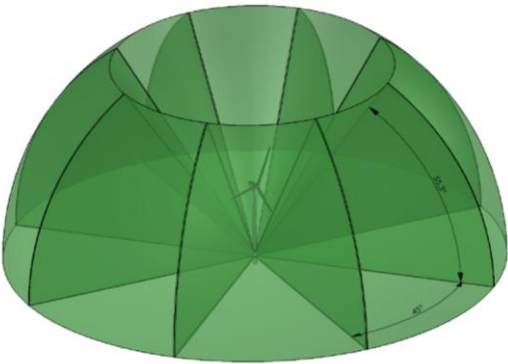
BPS STANDARD/PLUS
6/8 detection modules
(60x45 deg/deg)



x6/8



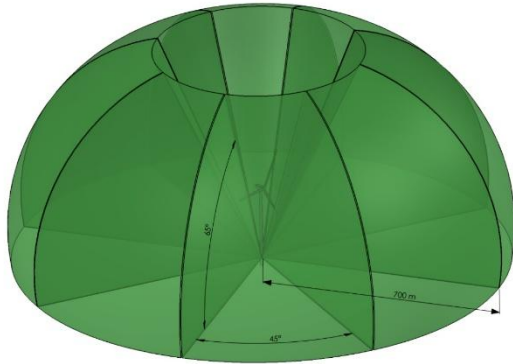
BPS PREMIUM
8x detection modules
(45x55 deg)



x8



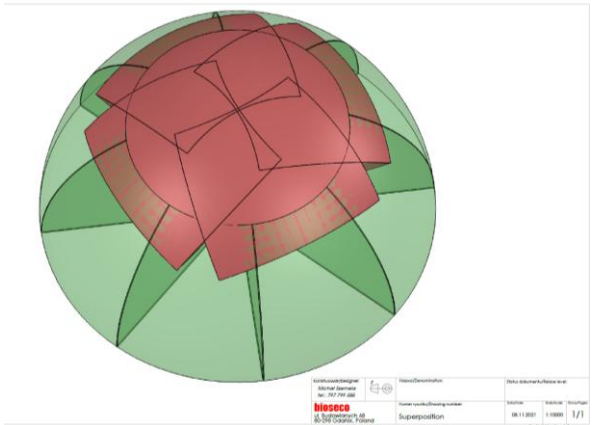
BPS LONG RANGE
8x detection modules
(45x65 stopni)



x8



Rotor Monitoring System
RMS = 4x additional cameras
(55x45 deg uplooking)



x4



What determines the effectiveness of protection?

There are at least several key factors that determine the effectiveness of a wind farm bird protection system:

- Farm location, bird species composition, and activity
- Frequency of reduced visibility
- Wind turbine and its size (e.g., distance between the blade tip and the ground)
- Wind turbine response time to a stop signal – 30 seconds or more likely >50 seconds
- Chosen bird protection system technology, in particular:
 - Monitoring area
 - Detection efficiency at various distances
 - Possibility of monitoring several objects simultaneously
 - Sophistication of algorithms to reject false detections
 - System response time (BPS 2-3 seconds, other systems 10-15 seconds)
 - Possibility of setting limit parameters (bird size/distance/height)
 - Use of warning systems
 - Regular preventive maintenance (minimum once per year)
 - System availability (failures/repair time)
 - Remote supervision and monitoring capabilities
 - Operations Settings and parameters specified by the wind farm owner or operator, as well as see a "leave it alone and play" approach

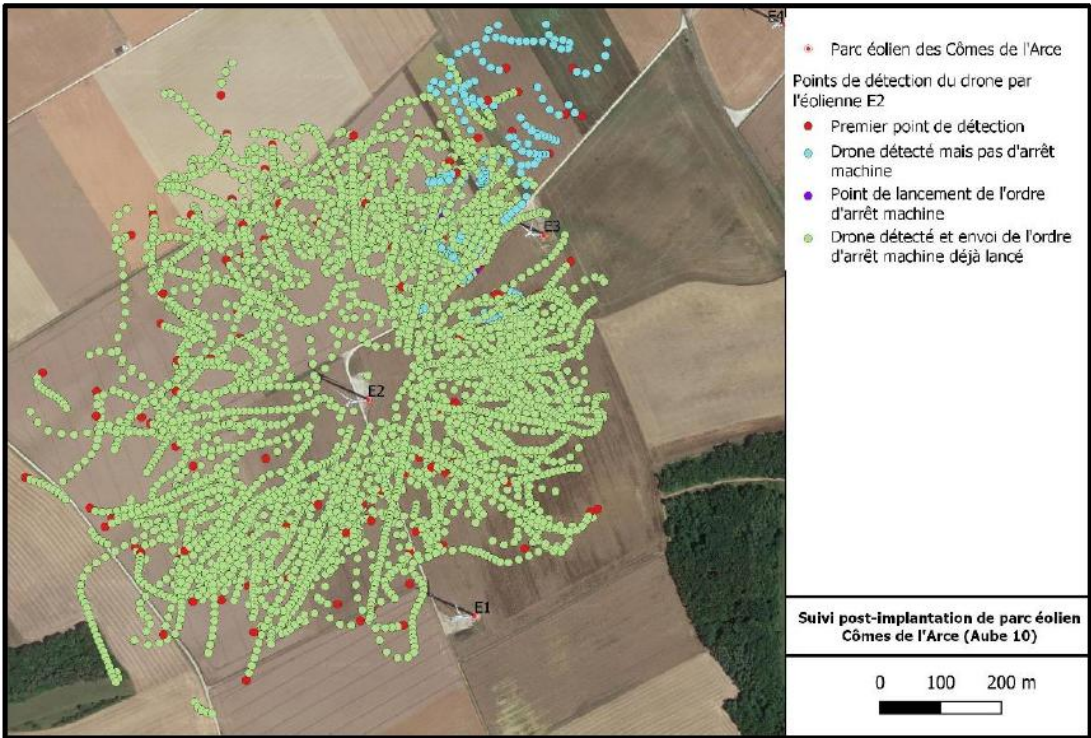
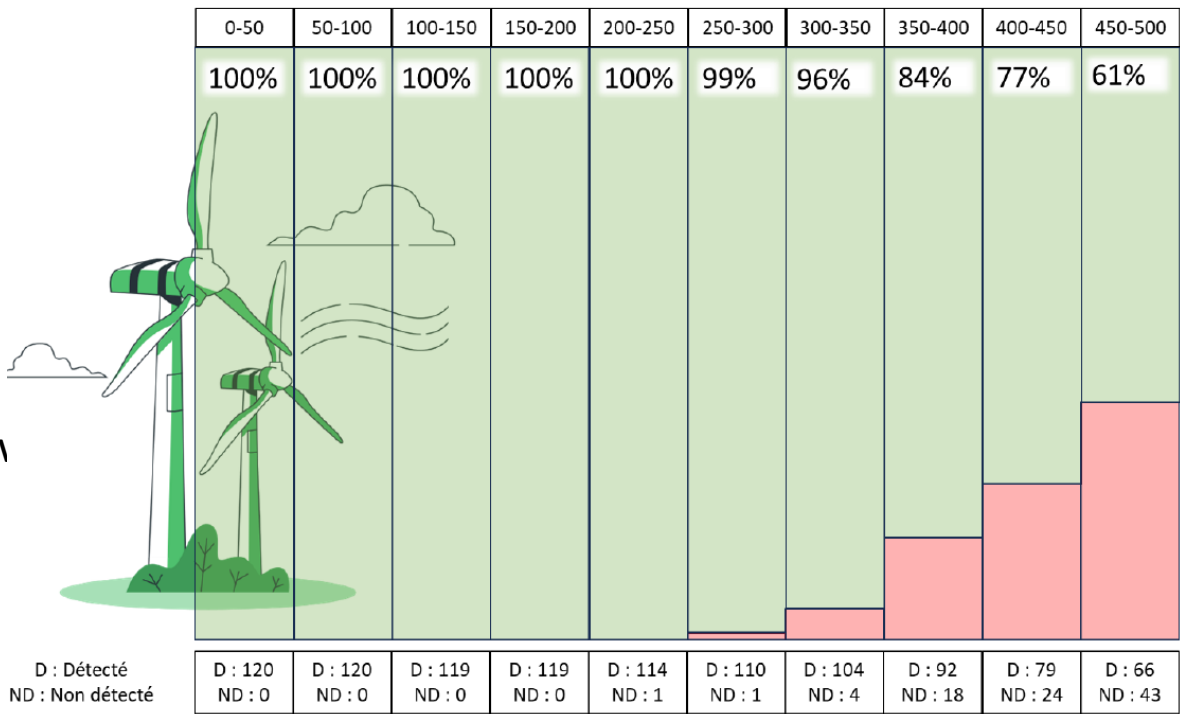


Figure 30 : Taux de détection du Milan royal à Bassigny pour des oiseaux en phase d'approche



Taux de détection > à 80%
à 400m
(Toutes hauteurs de vol confondues)

BPS – implementation examples

Spain

- Castilla La Mancha, a region with a very restrictive approach to collisions (fines + detention).
- Wind farm from 2020 – 27 WTGs.
- The first 2+2 Standard BPS were delivered in 2021 in response to collisions between the Vultures and the Royal Eagle.
- The systems shut down the turbines (no warning systems).
- Subsequent BPS were delivered successively as mortality occurred on the new turbines. Currently, there are 7 systems (4 Standard and 3 Premium). No collisions with large birds (including raptors) were recorded after the BPS was installed.



France

- The Grand Est region has a strict approach to bird collisions with turbines.
- A wind farm consisting of 5 turbines, 3 of which are located in a forest.
- The farm has been operating since 2015, and in the first two years, repeated collisions with the Red Kite, which has over 20 nesting sites in the area, were observed.
- From 2018 to 2022, the local administration ordered the wind turbines to be shut down between February and October. In 2022, the client decided to install a Premium BPS.
- Since 2023, the farm has been operating using a BPS under the strict supervision of DREAL and a local ornithologist.
- No collisions have been reported since the BPS was launched.



France

- The Occitania region has a strict approach to bird collisions with turbines. Wind farm consisting of 11 turbines.
- The farm has been operating since 2010, and collisions with birds of prey (red/black kites) have been reported. In 2021, the local administration ordered the installation of protection systems. In 2021, the client decided to install a French competitor.
- In 2022/23, the farm operates using a different supplier under the supervision of DREAL and a local ornithologist.
- Collisions continued, the system's effectiveness was low, and availability was poor. In 2023, the client decided to change the system.
- Since April 2024, 11 Premium BPSs have been installed. No collisions have been reported since the BPS was launched.



South Africa

- A new market for Bioseco from 2024
- Many protected species
- Very stringent environmental protection requirements
- Previously, HSDoD protection was typically used in South Africa (people shut down turbines).
- 9 x Premium BPS installed on 2 customer farms, Another 3 wind farms (60 BPS) planned for 2026.
- No reported bird of prey collisions to date with BPS,
- Collisions of Eagles without BPS.

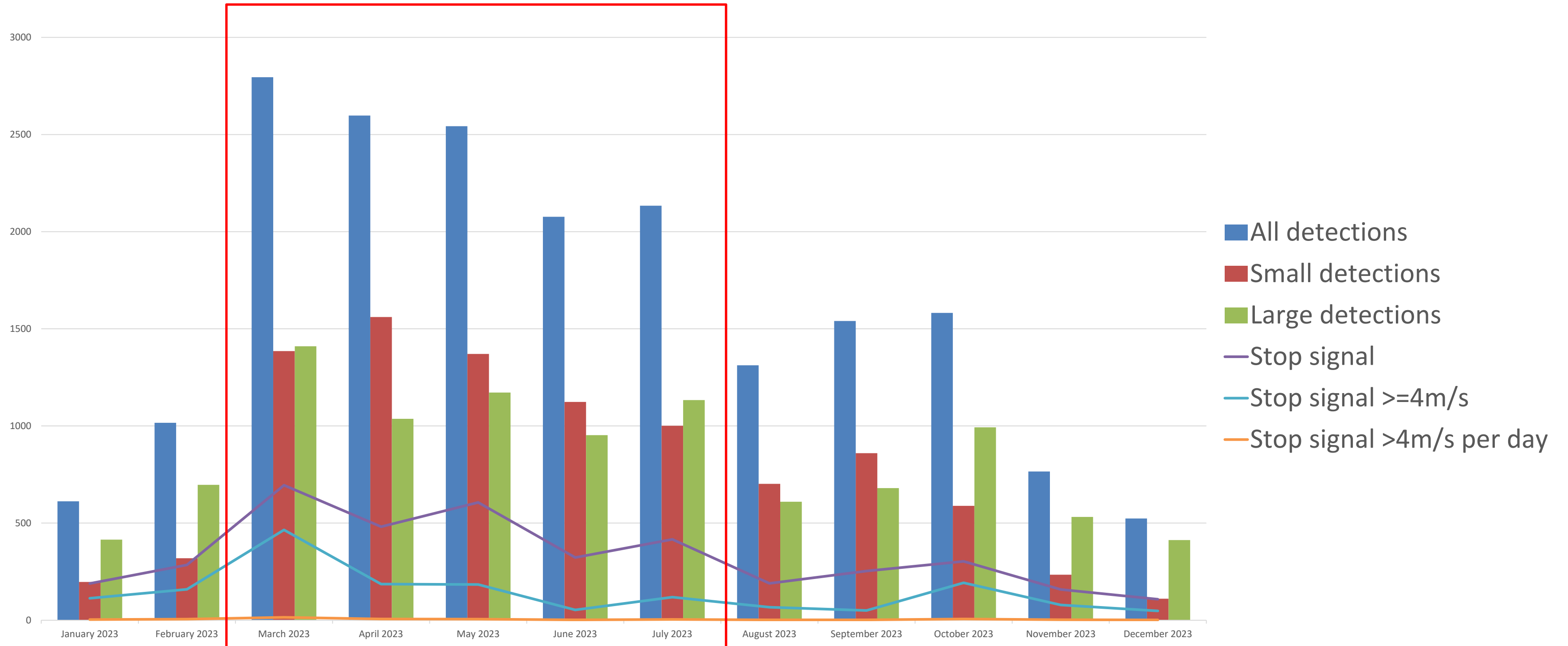


Different countries, the same problem. Administrative decisions mandate shutdowns (sometimes with financial penalties) and implement mitigation measures.

After installing the BPS, farms can continue to operate, and bird mortality during turbine shutdowns is reduced to a minimum.

Loss of energy production

Central Poland (Stop for Large & <150m) March 1st to July 31st



Year-round: 5 stops/day <1% AEP loss During active stops: 3 stops/day <0.4% AEP loss

40% < 4m/s; 40% 4-8m/s; 13% 8-10m/s; only 7% >10m/s

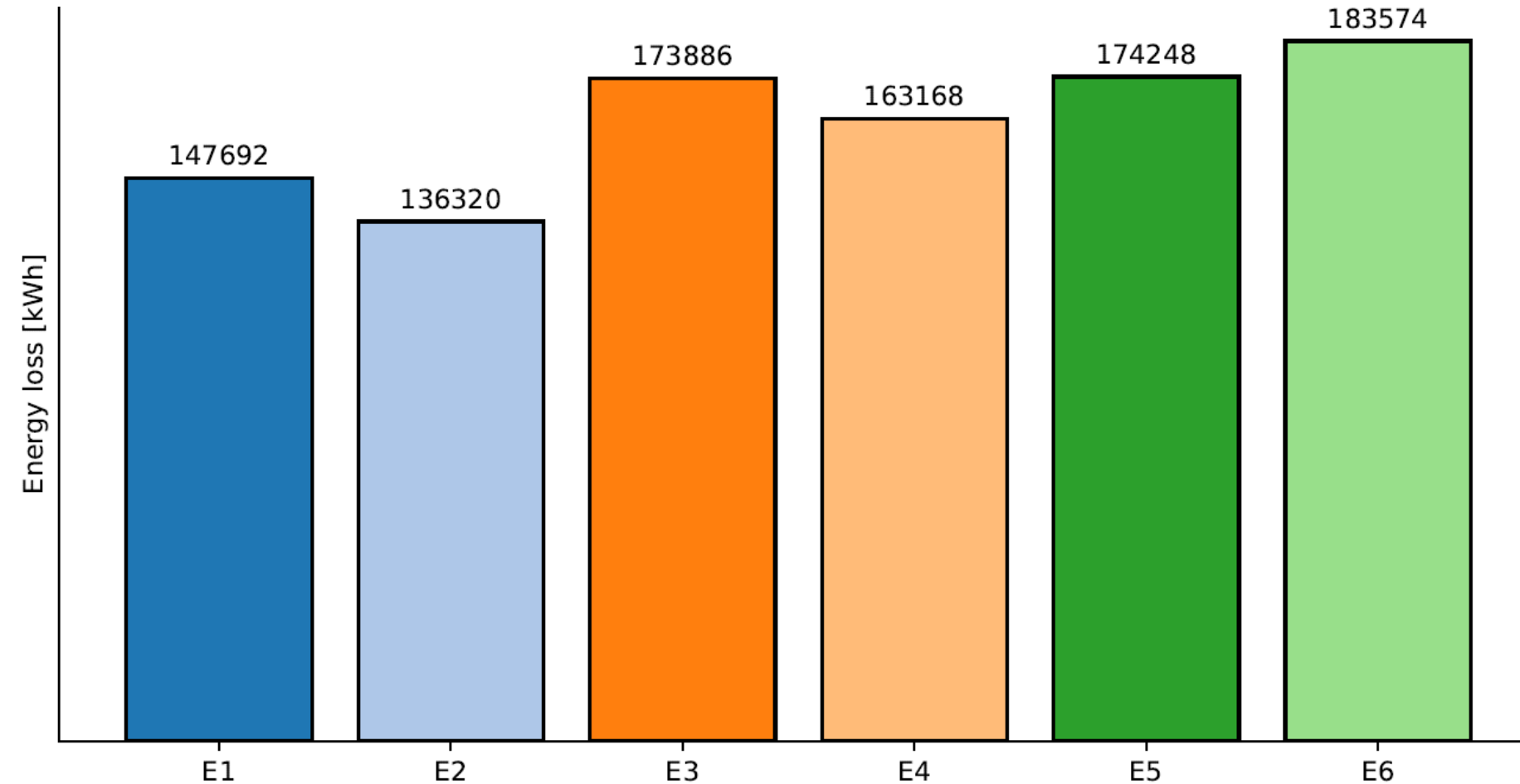
Loss of energy production

Systems installed in 2023 on six 2 MW turbines.

Large shutdown at 300 m.

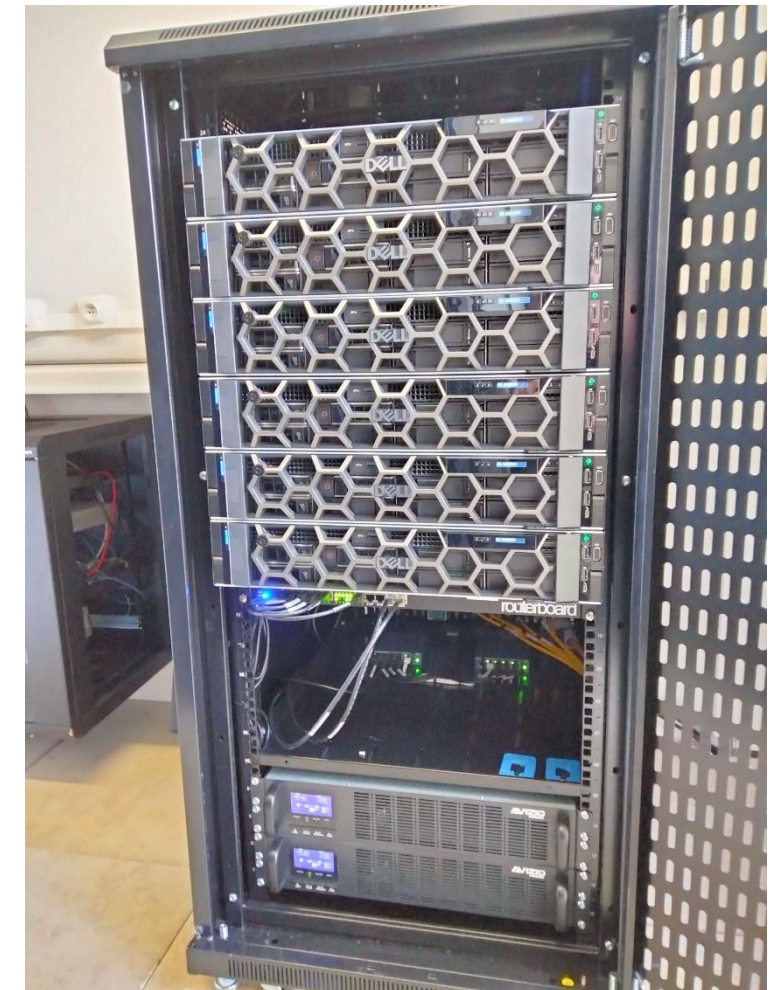
Losses calculated for 2024 based on SCADA.

Active shutdowns February–October each year. Losses estimated at approximately 977 MWh, which equates to approximately 3.5% of annual production.

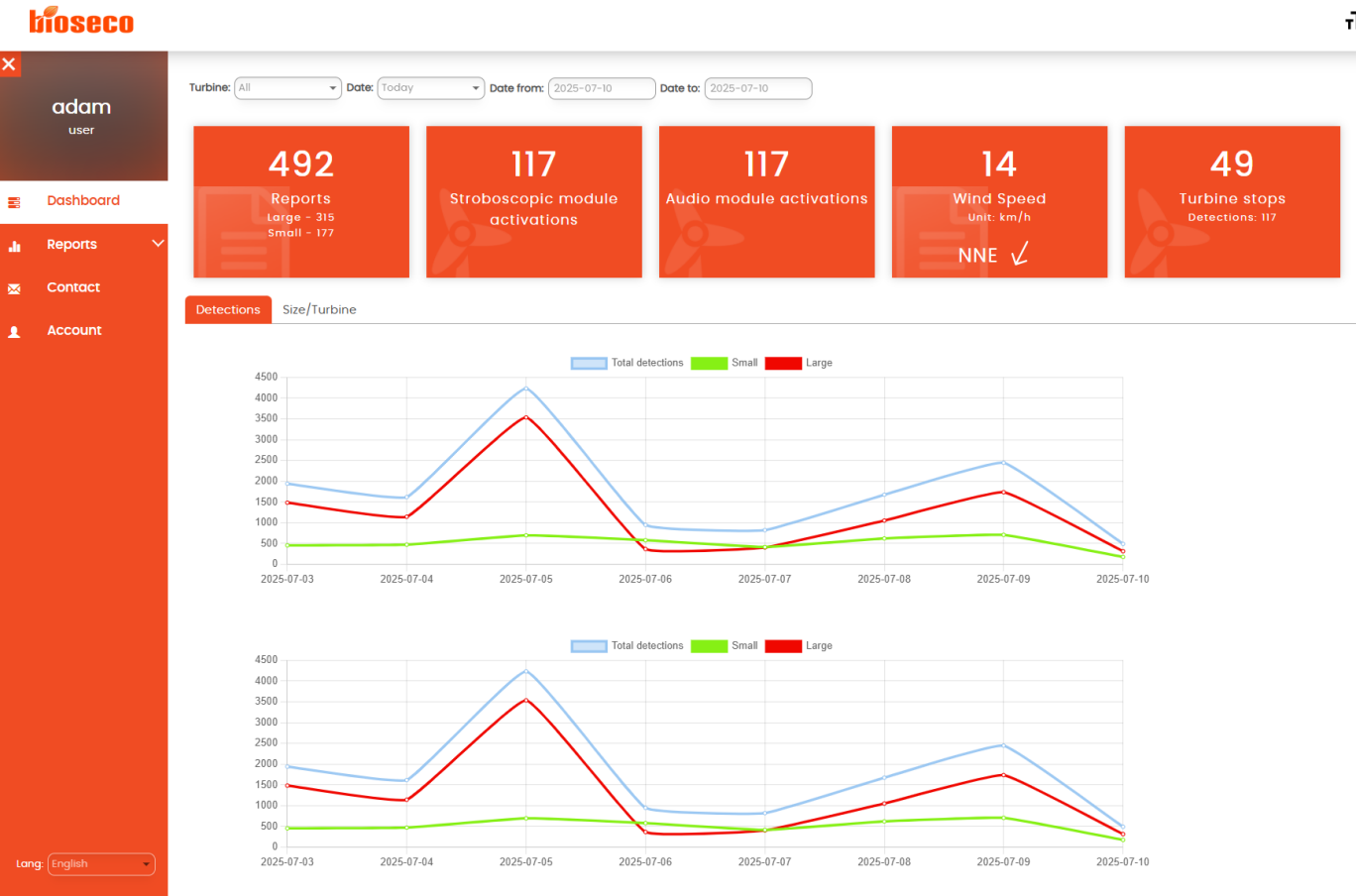


Requirement from the Environmental Protection Agency.

Estimated production: 27,000 MWh



BPS Web application for data review



bioseco

adam user

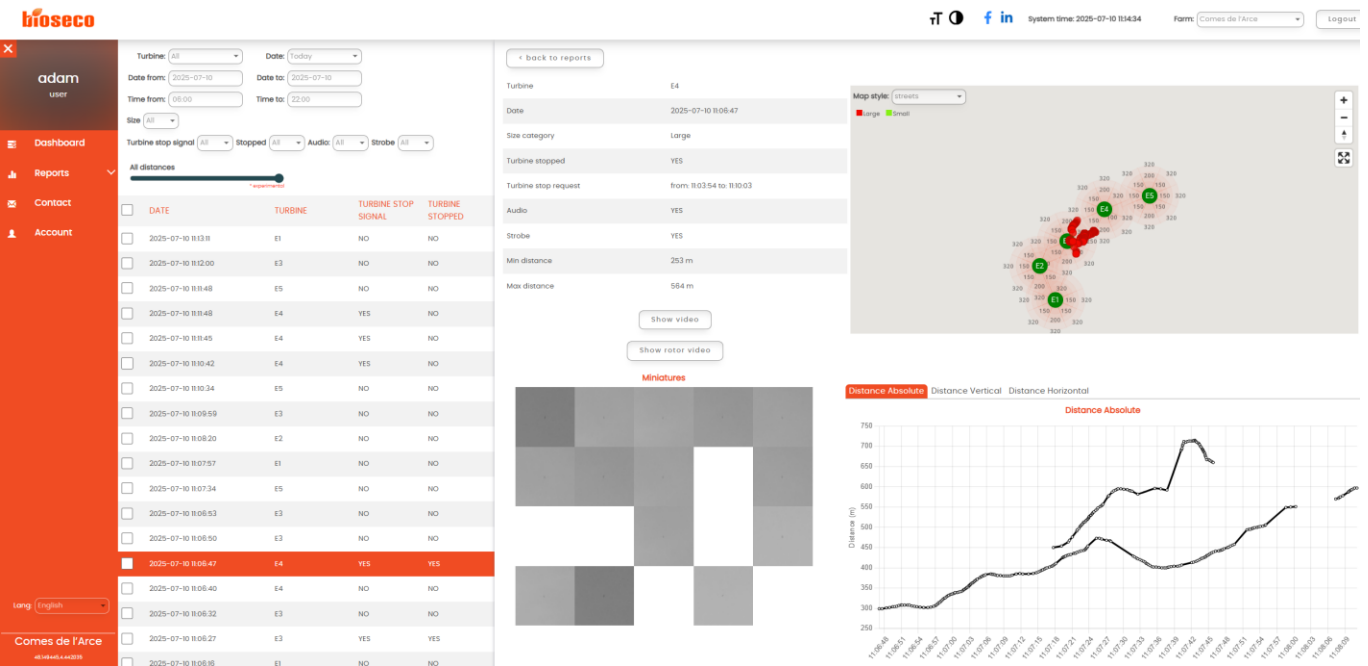
Turbine: All Date: Today Date from: 2025-07-10 Date to: 2025-07-10 Time from: 06:00 Time to: 22:00

Size: All Turbine stop signal: All Stopped: All Audio: All Strobe: All

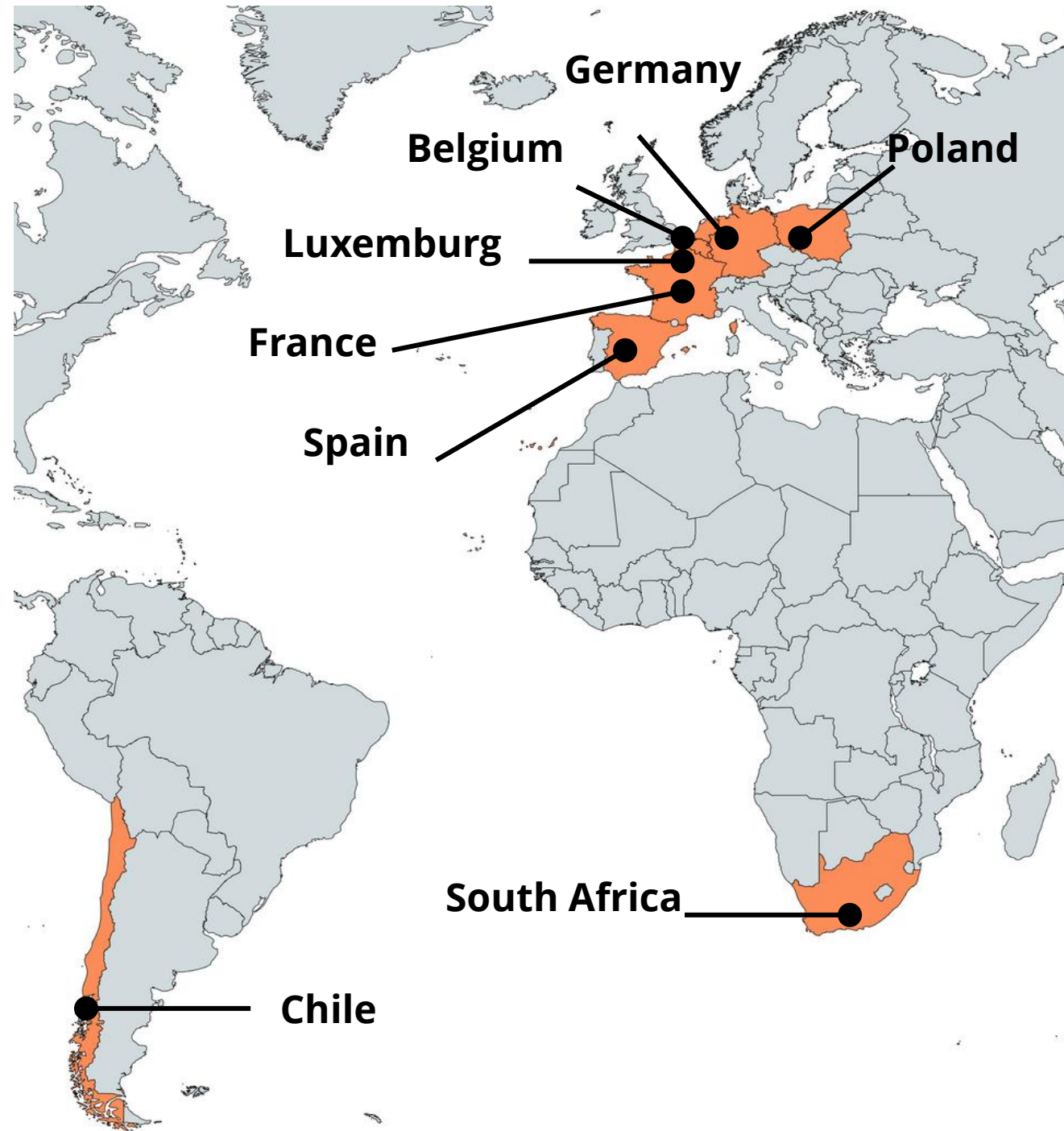
All distances

☐	ID	DATE	TURBINE	SIZE	TURBINE STOP SIGNAL	TURBINE STOPPED
☐	95425e	2025-07-10 11:13:11	E1	Small	NO	NO
☐	5f2b76	2025-07-10 11:12:00	E3	Large	NO	NO
☐	b5438e	2025-07-10 11:11:48	E4	Large	YES	NO
☐	e4a5a	2025-07-10 11:11:48	E5	Small	NO	NO
☐	8b5eac	2025-07-10 11:11:45	E4	Large	YES	NO
☐	a8kda1	2025-07-10 11:10:42	E4	Large	YES	NO
☐	130df4	2025-07-10 11:10:34	E5	Large	NO	NO
☐	f0e811	2025-07-10 11:09:59	E3	Large	NO	NO
☐	e8e7c7	2025-07-10 11:08:20	E2	Large	NO	NO
☐	7becf3	2025-07-10 11:07:57	E1	Large	NO	NO
☐	b55df2	2025-07-10 11:07:34	E5	Small	NO	NO
☐	26da8e	2025-07-10 11:06:53	E3	Large	NO	NO
☐	aa01b9	2025-07-10 11:06:50	E3	Large	NO	NO
☐	237690	2025-07-10 11:06:47	E4	Large	YES	YES
☐	c12de3	2025-07-10 11:06:40	E4	Large	NO	NO
☐	41f4cf	2025-07-10 11:06:32	E3	Large	NO	NO
☐	1c9081	2025-07-10 11:06:27	E3	Large	YES	YES
☐	989c4a	2025-07-10 11:06:16	E1	Large	NO	NO
☐	fa995b	2025-07-10 11:06:06	E5	Small	NO	NO

Lang: English



BPS Track record



- 430 systems deployed so far since 2020
- 200 systems deployed only in 2025
- 300 systems expected in 2026
- 10 countries, 3 continents

Equipped for:



Installed on:



BPS SMART – next step in BPS development

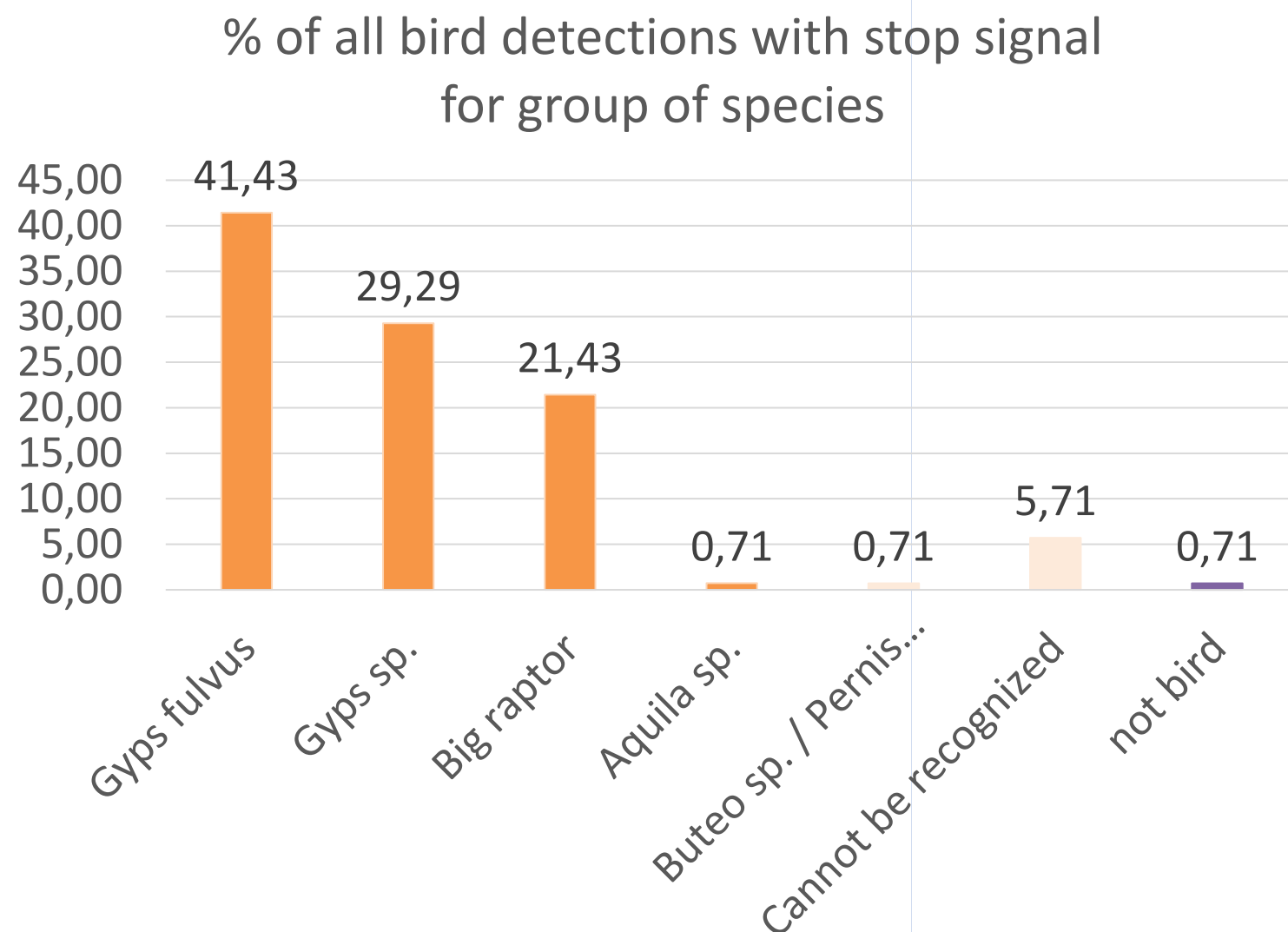
Multi-criteria collision risk assessment model (during R&D):

- Distance, Height
- Size
- Wind speed
- Nominal flight speed
- Cruise speed relative to the rotor
- Flight direction and blade orientation
- New turbine management capabilities, e.g.,
rotor speed reduction without stopping
- Species recognition



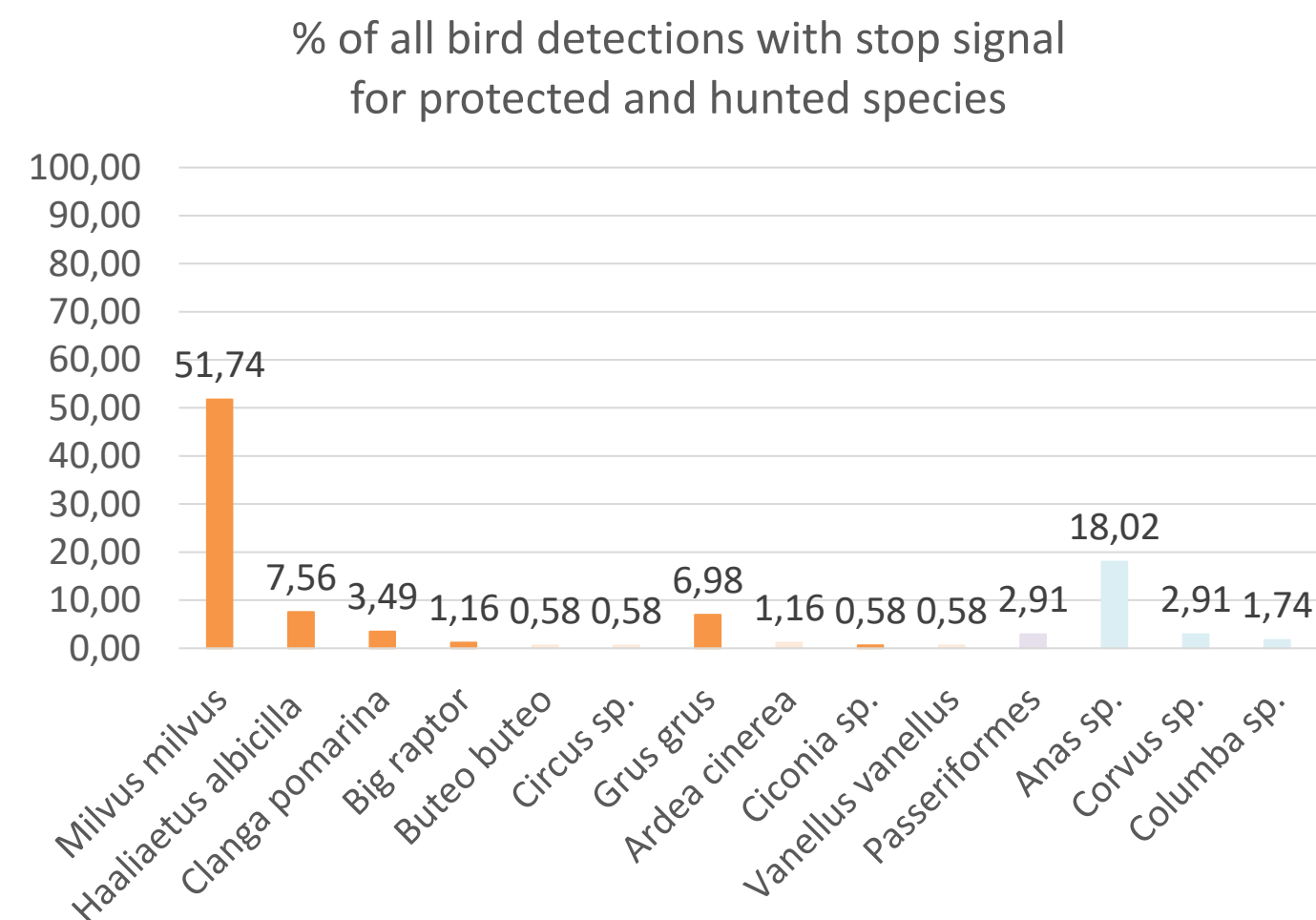
Species recognition

➤ Species recognition – great feature, but not always needed



Spain – BPS Premium –

- data tagged for 2 weeks (peak).
- 140 stops (Large and 300m), ca. 10/day (ca. 1h)
- Ca. 94% of stops for raptor or Gyps Sp.
- Species recognition would reduce stops by <1/day



Poland – BPS Standard –

- data tagged for 2 weeks (peak).
- 172 stops (Large and 300m), ca. 12/day
- Ca. 75% of stops for protected species
- Species recognition would reduce stops by 3/day,
- but BPS Premium would do better also (less Anas).

Contact details

Interested in investing in biodiversity solutions?

contact me:



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Let's protect birds together

Something new, bats..



SMART

Song Meter with Analysis and Remote Transfer



- System aktywnej detekcji nietoperzy oparty o mikrofony ultradźwiękowe, na rynku od 2 lat
- Pierwsze wyniki walidacji z Francji pokazują podobny stopień ochrony jak nocne wyłączenia, przy redukcji strat o kilkadziesiąt %
- System umożliwia zdalną zmianę ustawień, więc jeśli monitoring wykáže śmiertelność można zaostrzyć kryteria
- Dla turbin małej mocy <3 MW wyłączenia w sezonie, w nocy i przy wietrze <6 m/s dawały straty rzędu 1-2% produkcji, co było akceptowalne ale przy 6-7MW to jest 5-10% w zależności od turbiny i lokalizacji, stąd pojawiła się technologia, która może zredukować straty
- Bioseco jest na etapie nawiązywania bezpośredniej relacji z Wildlife Acoustic jako dystrybutor systemu BAT SMART