

BAT MONITORING – State of the art

Bats form an elusive and intriguing group of species: night-active, hiding in dark places, quiet to the human ear, quick fluttering flights,.... For many years, they were feared rather than cherished. This, however, has changed the last decades, and bats are now protected all over Europe. Due to their hidden, night-time way of life, however, they are a difficult group to study, which hinders the adaptation of projects to avoid harming them.

When planning new wind farms, a reliable acquisition of bat activity at height or even better within the area covered by a wind turbines blades should be established. Only that allows to determine times, temperatures and wind speeds that include or exclude bat activity, in order to plan the correct curtailment algorithms.

Tractebel has a team of trained ecologists, specialised in the analysis of the chiropterological data. We offer – in complementarity with the remote solutions Laborelec developed – state of the art technologies, aiding the analysis and interpretation of bat activity for wind projects and formulating the appropriate mitigation measures.

WIND TURBINE IMPACT ASSESSMENT

Wind turbines pose a direct threat to many bat species, both due to the risk of a direct hit by a rotor blade as due to the fragile nature of the animals' lungs, causing barotrauma and near instant death.

Research has shown however, that the risk for bat populations can be minimised by a correct localisation of the turbines to avoid bat habitats and/or migratory routes. If this isn't possible, stopping the turbines during favourable conditions for bat activity is another way of avoiding significant bat mortality, however, this comes at the cost of (sometimes significant) production losses.

Tractebel's experts are familiar with both bat ecology and basic wind turbine management, which allows them to elaborate the right measures to protect bat populations, while avoiding unnecessary production losses.

In conceptual phase, a feasibility study can include small-scale site surveys (random checks) or long-term measurements. During operational phase, long-term measurements (monitoring) are necessary to plan curtailment algorithms.

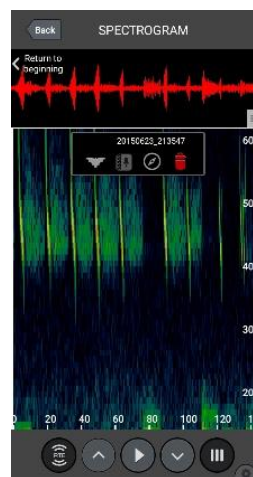


FIELD SURVEYS

Small-scale site surveys consist of 3 or 4 random site visits by a trained ecologist (6 to 12 registration hours).

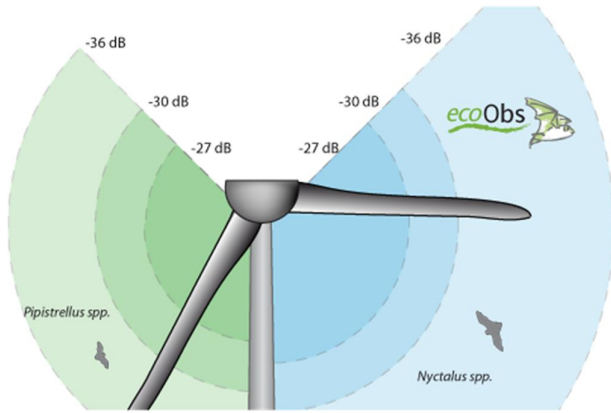
Automated recordings (at ground level) include one or more detectors placed in the field and require regular maintenance (battery and memory replacement).

Both methods are used to gather information about species and numbers and confirm (relative) absence of bats in development (pre-construction) phase.



REMOTE BAT MONITORING AND ANALYSIS

When drafting curtailment algorithms for wind turbines, be it during development or during operation of the turbine, a reliable knowledge of bat activity at height or even better within the area covered by a wind turbines blades should be established. Only that allows to determine times, temperatures and wind speeds that include or exclude bat activity. In development phase, a met mast can be used, during operational phase the microphone can be directly installed at the wind turbine nacelle.



Detecting bats through microphones registering bat calls is a commonly used and proven technology: automated detectors that record all bat calls are widely available.

These long-term (months, years rather than weeks) studies, combined with a knowledge of bat ecology, also allow a finetuning of the criteria to stop the turbines during peaks of bat activity, thus reducing both bat mortality and production losses.

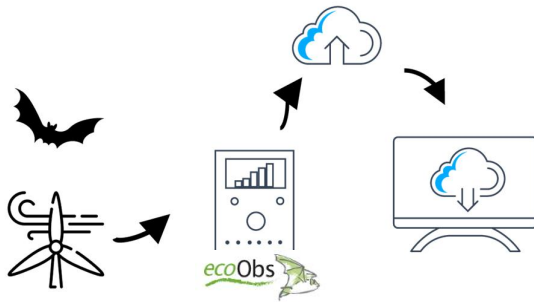
Together with Laborelec, Tractebel is developing a remote bat monitoring and analysis system, avoiding time-consuming trips to the (planned) turbine locations for data gathering:

- ENGIE Laborelec developed a data transfer solution (gateway to server) which enables an automatic data retrieval from and remote monitoring of the EcoObs GSM Batcorder 1.0 (acoustic monitoring)
- Tractebel analyses the acoustic data of the batcorders installed, using the EcoObs bcAdmin 4.0 software

This monitoring results in:

- A summary analysis of the bat activity for the measuring year being studied
- A comparison of the activity with meteorological data recorded on site

Being able to plan specific curtailment algorithms.



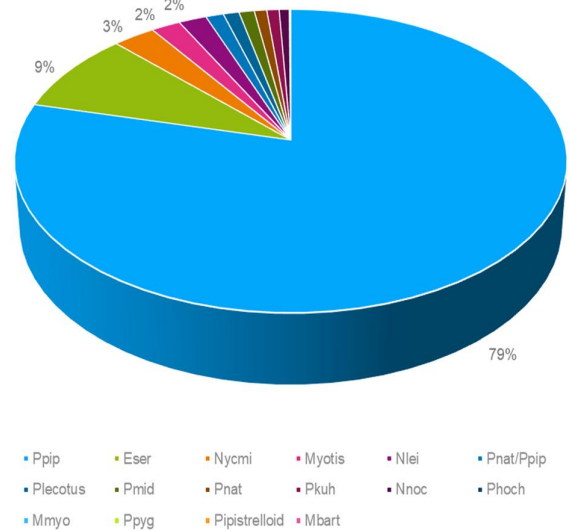
PILOT 2019

A test case was set up in a wind park during the summer of 2019.

To monitor the activity of bats both at height and close to the ground, two GSM Batcorder type ultrasonic detectors / recorders were used simultaneously. A first batcorder was placed at nacelle height, a second was placed at the bottom of the wind turbine tower.

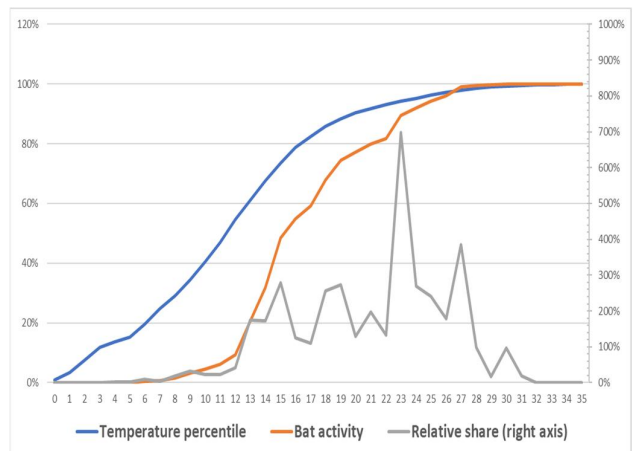
The GSM Batcorders were installed on 11 July and were operational until 30 November. Bats were registered throughout the entire study period.

Automated species determination was combined with manual controls to assure maximum accuracy, resulting in a robust data set.



Bat occurrence could then be coupled with calendar, solar, wind, and temperature data for more detailed analysis.

Based on these results, tailor-made curtailment algorithms can be developed, aiming at maximum electricity production while minimising bat victims. Where this is necessary, a species-specific analysis is possible.



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Our Experts

Jean-Pierre De Roo

Jean-Pierre is a landscape architect by training (since 1990), but also a highly experienced and passionate nature guide with Natuurpunt, the main Flemish nature conservation organization.

In his professional life with Tractebel, he has an extensive expertise in designing both infrastructure projects, vegetation plans and recreational infrastructure in natural areas. His designs have been awarded, both in 2008 (Nationaal Park Hoge Kempen) and in 2014 (RivierPark Maasvallei).

Within the team, he is highly valued as an ecologist with a broad knowledge of both fauna and flora, which he has enlarged over the years during his activities within Natuurpunt. He has almost thirty years of experience as a nature guide, specialising in birds and bats. Organising the yearly 'Night of the bat' is an important part of his tasks. This encompasses not only guiding the participants, but also, and most importantly, finding the bats' roosts of that year, to allow the public an easy view of the animals. For these endeavours, he mainly uses a manual Petterson batdetector. Bat call characteristics, both heterodyne and full-spectrum recordings on computer, have no secrets for him.

Using these utensils, he has inventoried, among others, the valleys of the Zwarte Beek and the Mangelbeek, and Domein Bovie (Polderberg). He recently also conducted some quick-scan inventories for wind projects in Landen, Gingelom, Lichtervelde and Nevele.



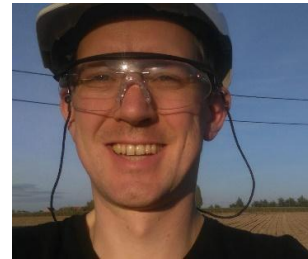
Peter Corens

Peter is a Bioscience Engineer in Forest, Nature and Landscape management. During his education (2000-2005), many days were spent in the field where he developed a keen interest in the practical side of ecology surveys.

Since joining Tractebel's policy team in 2012, he was active in a broad range of ecological projects, both practical and more theoretical: appropriate assessment and EIA of infrastructure projects and masterplans, policy studies, consulting for green area masterplans,... many of those comprising in part of fieldwork and the analysis thereof.

During recent years, an important part of his time has been devoted to ecological assessments of wind farm projects in Flanders, with large parts devoted to impacts on birds and bats. To assess the latter, Peter has performed ample fieldwork to assess bat activity in the vicinity of the planned turbines, becoming an expert in the matter. Working mostly with a hand-held bat recorder, he also gained thorough insight in the computer-assisted semi-automatic determination.

His latest projects in this matter include bat assessments (quick-scans) for wind projects in Passendale, Nevele, Wielsbeke, Landen, Gingelom, Ghent, Zwevegem and Eeklo.



Nele Aerts

Nele Aerts, bio-engineer in Forest, Nature and Landscape management (KULeuven), is specialised in forest ecology and management, plant ecology, nature conservation and urban green, complemented by a specialisation in landscape analysis and land use. She is project manager in the department 'Urban and Regional Development' (specialty Policy) and is –with regard to the environmental impact assessment studies in the Flemish Region– an accredited expert on the topics 'Faune & Flore' and 'Landscape, architectural heritage and archaeology'.

Nele has a wide experience on ecological consultancy and assists clients in diverse projects that are related to ecology and biodiversity (nature development plans, urban greening plans,...). Bat surveys are one of the inputs she uses to form a comprehensive overview of the situation at hand. Recently, she conducted quick-scan bat inventories in Mechelen, Landen-Gingelom, Nevele, Lichtervelde, Passendale and others.



Our References

The last few years, we have performed several bat surveys for wind projects, requiring both in-the-field detection and determination and desktop analysis of recordings.

Nevele
Wachtebeke
Landen
Gingelom
Wielsbeke
Geluwe
Passendale
Zwevegem
Eeklo
Lichtervelde

