Respecting the ecosystem helps wind energy investments take flight

Wind is an important source of renewable energy, but it is crucial to minimize its impact on the ecosystem and especially on birds, through effective bird protection measures. nvisionist is committed to helping society transition away from fossil fuels and reach global zero-emission goals, while maximizing energy production of Wind Turbine Generators.

Tassos Alefantos

Wind power is one of the fastest-growing sources of renewable energy worldwide, and it has the potential to play a significant role in reducing greenhouse gas emissions and helping to reverse climate change.

Wind parks are often installed in locations where wildlife flourishes. Thousands of birds, both domestic and migrating, fly through the wind parks. Many of them are endangered and each one of them is valuable to the ecosystem. EU legislation has enacted environmental protection rules that all energy providers are required to adopt.

When installing wind parks in areas designated as Natura 2000, energy providers are obliged to install systems that monitor the skies around the parks for birds and deter them when they are on a collision course with the blades.

To protect investments in wind parks, it is essential to ensure that bird protection measures are integrated into the planning and design of wind farms. This can include, among other things, developing a monitoring and deterrence system to prevent bird mortality and adjust the mitigation measures accordingly.

Investing in bird protection measures not only helps to protect bird populations, but also safeguards the long-term viability of wind energy projects. Failure to address the issue of bird collisions can lead to regulatory and legal challenges, project delays, and negative publicity that can ultimately impact the financial performance of wind farms.

Protecting the environment while increasing profitability

Nvisionist is committed to continuously improving its products and services. The recent partnership with the Greek Power Corporation (DEI) provides a strong opportunity and a financial boost to invest more and more in its vision. Some of its solutions include nvbird®, an innovative idea for wind energy, with eco-benefits and global awards. Specialized algorithms detect/identify birds, analyze paths and use loudspeakers to deter them. If the birds don't move away, the turbine shuts down.

nvbird® has won 18 first class awards in Greece and internationally, including First Global ICT Award Winner at the WITSA 2021 & 2022 Global ICT Global Innovation & Tech Excellence Awards in the category 'Emerging Digital Solutions Award', from the World Innovation Technology and Services Alliance (WITSA). Nvbird® stands out as the only recipient of the "WITSA Global ICT Excellence Award" for two different products in two consecutive years,

How the system works

Firstly, the system is installed on each wind turbine generator and covers its surrounding area for long distances. During the detection

phase, through HD cameras, birds were recorded. For offshore solutions, 3D radars are installed on the perimeter of the wind park, covering the surrounding area for distances up to 10km.

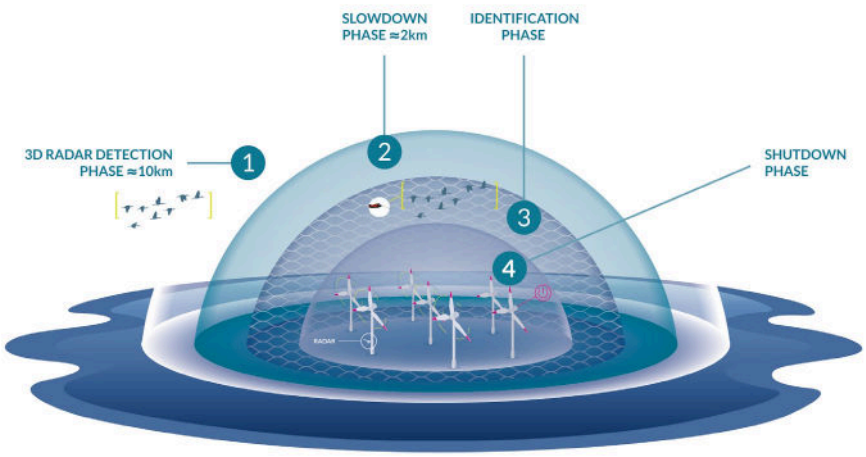
In the slow down phase, in case the flock is on a collision route with the wind turbines, the system sends an automatic command via the OPC on Wind Turbine to slow down the rotor speed of those wind turbines in the route of the flock.

Identification phase: onshore, offshore

The cameras then record the birds as they approach further, during the identification phase, Edge AI and machine learning algorithms are applied to categorize them in critical or non-critical species according to the environmental impact assessment of the wind park.

During the collision avoidance and deterrence phase, when the identified bird belongs to the critical species and enters the critical zone, an Acoustic Startle Response (ASR) sound is enabled to deter it.

Finally, in the slowdown-shutdown phase, in case the bird remains in the critical zone or further approaches the Rotor Swept Area (RSA) the system sends a direct signal to the SCADA to stop the wind turbine generator.



Unique and innovative

What makes nvbird® unique and innovative versus other similar systems? The answer is five innovations that were developed and applied by its R&D team. Firstly, the solution uses state-of-the-art Artificial Intelligence algorithms to detect birds in risk zones.

Furthermore, high-definition cameras, in combination with thermal vision technology cameras, achieve 24-hour all-weather detection and operation.

Bird classification depends on dataset quality and the system collects incidents' photos/videos, which are uploaded to the cloud. Ornithologists then classify unclassified birds, and the system is retrained, improving recognition.

The nvbird® system has been designed and manufactured using high quality materials. Wire ropes tensioned up to 1000kg (certified) and hold back base plates on WTG tower. A rubber mat protects the

tower, and increases friction to prevent damage from ice impact, alongside with a certified ice protector, while a stainless steel cover protects the cameras, speakers, and wiring attached to the backplate. Installation and removal is straightforward, without the need for deinstallation of the external system.

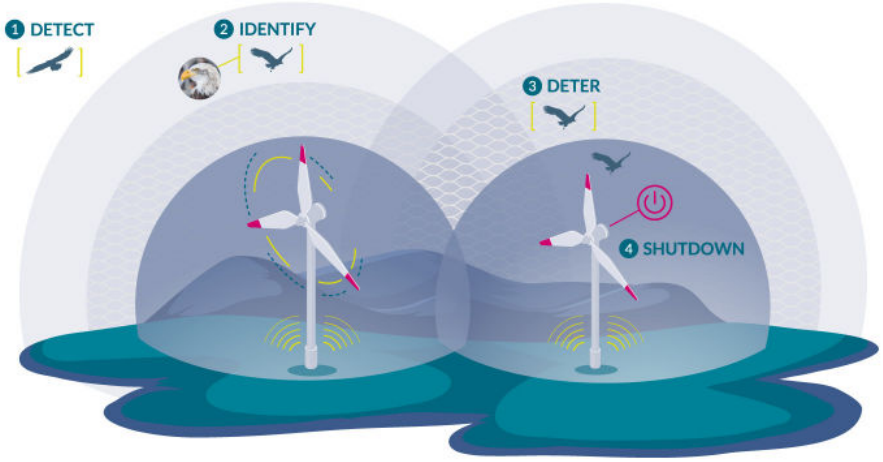
For wind turbine generators with long pylon height, there is no need for a second or third row of speakers, as a special omnidirectional 360° speaker is installed on the top of the nacelle.

The nacelle speaker is very effective as it is placed in the middle of the Rotor Swept Area and provides easier installation and maintenance.

Nvisionist has invested and created its own OPC client, for the systems to communicate with the SCADA system. This can send commands to any wind turbine generators in the park and receive useful data for the functionality of the system and the reporting.

The nvbird® OPC client can acquire measurements about the environmental conditions and submit interrupting signals. This has been utilized by many manufacturers including Vestas, Enercon, GE, Siemens Gamesa, Nordex, Goldwind etc.

https://nvisionist.com/nvbird-wtg/



nvbird® PaaS

Nvisionist's strong financial position enables it to prioritize innovation and adaptation to changing market conditions. In an industry first, it is offering the nvbird® system Platform As A Service. With the nvbird® PaaS is a comprehensive service package that includes all the equipment necessary for a wind farm, as well as installation, maintenance, Data Analysis & Reporting Platform (DARP), and SLA support. Nvbird® PaaS is unique in the industry, and its minimum term of five years can be extended to suit individual requirements. At the end of the contract period, ownership of all systems transfers to the customer. The advantages include lower upfront costs, maintenance and upgrades and predictable costs. Overall, selling a system based on both hardware and software as a service can provide customers with a more cost-effective, flexible, and scalable solution that is easier to manage and maintain.

nvisionist's people

Our employees have advanced educational degrees, such as PhDs, Masters, and other postgraduate qualifications like environmental studies. A valuable key factor for the company is that they share the common vision of our company and can ensure our high value products and services. Our installation team members have the relative GWO and first aid certifications for health & safety standards.

In conclusion, wind energy is an important source of renewable energy, but it is crucial to minimize its impact on ecosystem and especially on birds through effective bird protection measures. nvbird® is here to minimize impact to ecosystem and maximize energy production.