Demonstration of Good Practices to minimize impacts of Wind farms on Biodiversity in Greece

LIFE12 BIO/GR/000554

www.windfarms-wildlife.gr

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the project

The project started in 2013 and will end in 2017.

Coordinating Beneficiary: Center for Renewable Energy Sources & Saving

Associated Beneficiary: Nature Conservation Consultants Ltd , NCC

Total budget of the project: 894.784€

EU contribution: 430.642€

main project objectives (1)

demonstration of state-of-the-art methods and approaches that will improve the compatibility of wind farms development, with the EU biodiversity conservation targets, and

development of prescriptions and guidelines that will enable Greek state authorities and wind farm developers to effectively plan, implement and regularly evaluate the performance of the mitigation technologies.

main project objectives (2)

and in addition,
the testing of **early warning systems and mitigation technologies**

the implementation of training activities and public awareness actions

the majority of project's demonstration actions are implemented at the demonstration wind farm - Park of Energy Awareness (PENA) of CRES.

wind energy- current situation in Greece

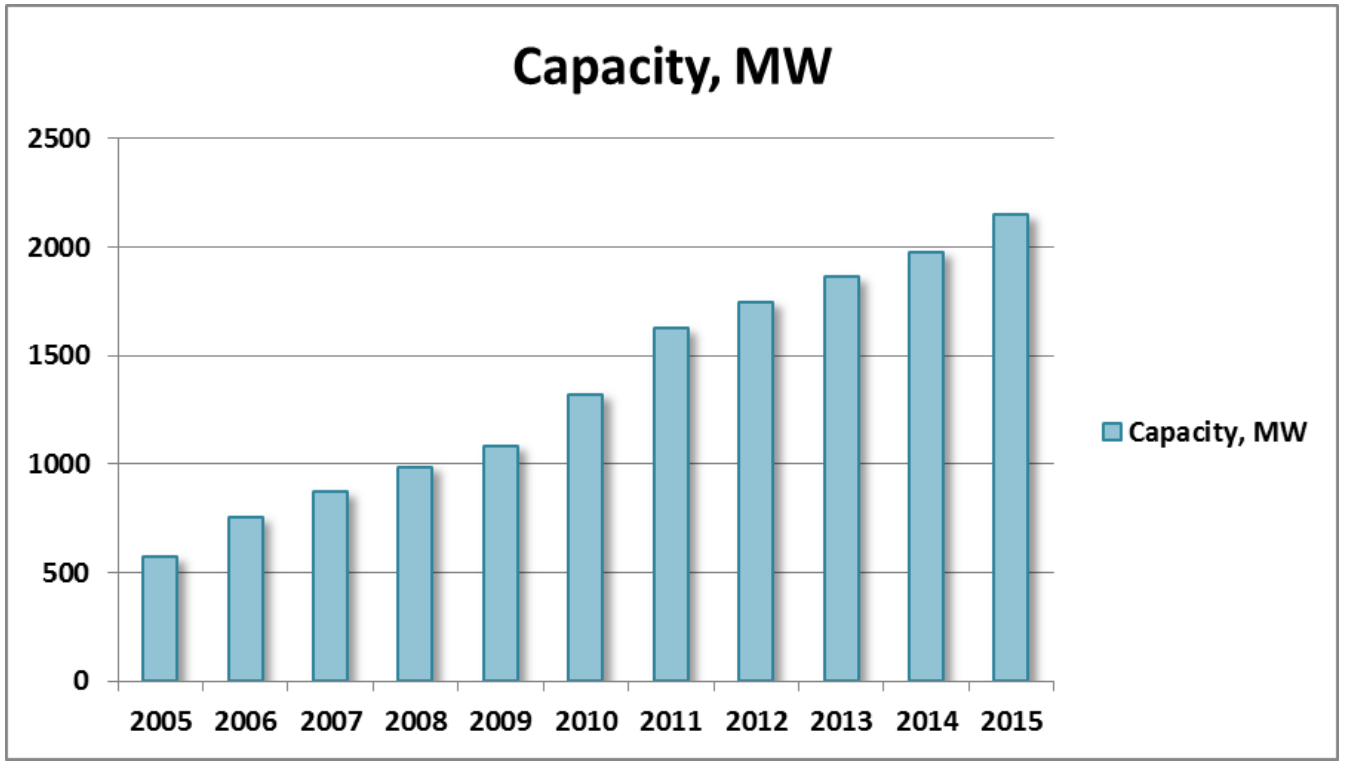
EU has adopted an ambitious plan of increasing the proportion of renewable energy to 20% of the total energy production by 2020.

In Greece, during the last decade, there is a significant increase of wind farms installations and obviously in wind power capacity.

total installed wind power at the end of 2015 = **2.152 GW**,
a contribution to the national electric demand of 7.1%

the total installed wind power at the first half of 2016 = **2.248 GW**

wind energy- current situation in Greece



wind farms development / biodiversity

the drastic increase of wind farms may cause, in certain cases, negative impacts to biodiversity on local, regional and potentially on national level

the extend and severity of the possible impacts on the biodiversity greatly depends on the:

- proper wind farm siting,
- relevant environmental permits,
- mitigation measures adopted, and in extreme cases on the effectiveness of compensation measures applied.

potential impacts of wind farms

in general there are five main types of potential impacts of wind farms on wildlife and habitats. These impacts vary greatly among different wind farms and are as follows:

- collision risk, leading to direct mortality
- disturbance and/or displacement of sensitive species
- habitat loss or degradation
- barrier effects, causing changes in flight patterns
- indirect effects on species habitats and prey species

Modern mitigation technologies

within the last years more than 20 new wind farm projects have been approved in Greece, under the strict provision of involving **modern mitigation technologies.**

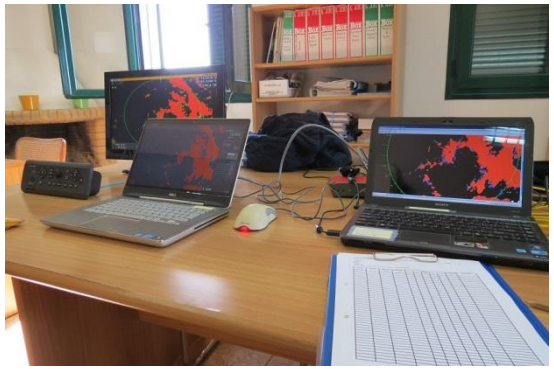
the modern mitigation technologies includes "**Early warning/monitoring systems**", such as:

- ✓ ornithological radars,
- ✓ thermal imaging cameras,
- ✓ bio-acoustic monitoring systems (bat detectors and sound recorders)
- ✓ video surveillance systems

Demonstration of early warning systems

Within the project several Early warning/monitoring systems have been demonstrated at CRES demonstration wind farm at Keratea Attikis, as well as, in private wind farms.

use of radar



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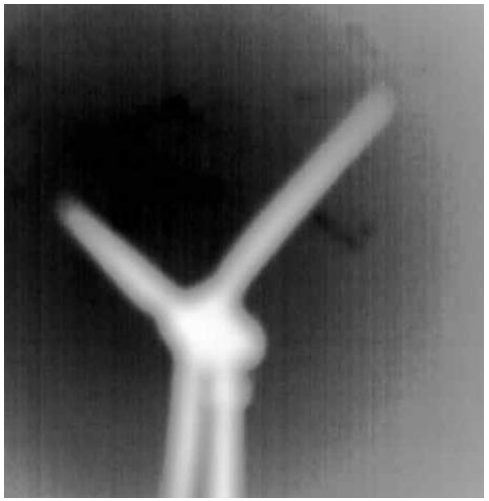
Demonstration of early warning systems

field surveys with thermal imaging camera



Demonstration of early warning systems

Ultrasound bat detectors

Bat detectors are used to detect the presence of bats by converting their echolocation ultrasound signals, as they are emitted by the bats, to audible frequencies, usually about 300 Hz to 5 kHz

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Demonstration of early warning systems-

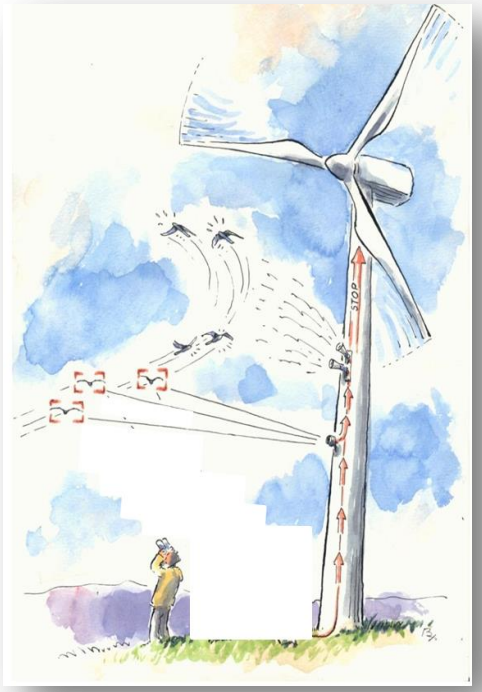
video surveillance systems **- DtBird system**

DTBird is a self-working system that monitors bird activity in real-time, and detects any bird species in daylight all year round.

Surveillance area 360° around the WTG.

Detection distance:

BIRD WINGSPAN	SET UP RANGE
> 150 cm	200 - 600 m
75 - 150 cm	100 - 350 m
< 75 cm	25 - 175 m



Demonstration of early warning systems-

video surveillance systems **- DtBird system**

DTBird has **4** modules available for birds:

Detection - Automatic and real-time detection of birds by high resolution image analysis

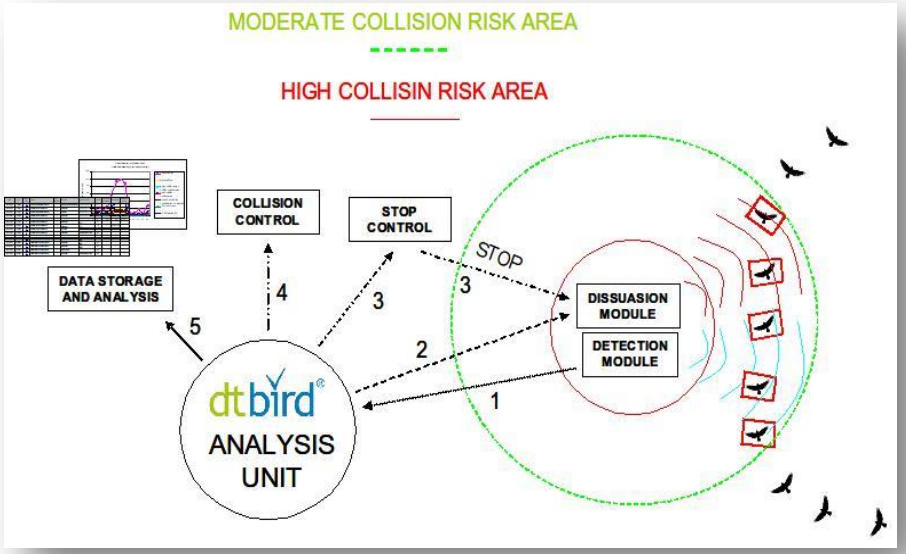
Collision Avoidance - Emission of Warning and Discouraging Sounds adjusted to bird collision risk and legal requirements

Collision Control: Video and audio recording of high collision risk flights, including bird collisions (with the blades, tower and nacelle), and injured birds that fly away

Stop Control: Automatic wind turbine stop trigger and restart, according to real-time collision risk of bird flights detected.

Demonstration of early warning systems-

DtBird system



Demonstration of early warning systems

installation of the dtBird system at CRES wind farm

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Demonstration of early warning systems

dtBird system

Based on the data from the operation of the DTBird system at NEG MICON wind turbine at CRES wind farm the total duration of automatic stops of the wind turbine was around 4 hours at a period of 8 months.

The energy loss corresponds to 0,24% of the total energy production from the wind turbine during the specific period.

windfarms & wildlife, conclusions

The use of the early warning/monitoring systems along with traditional methods of data collection (e.g optical observations), and information on the responses of birds to wind turbines, can help to reduce the impact on birds and biodiversity during the operation stage, and significantly improve the biodiversity data on the space use within a planned wind farm site during the planning stage, allowing for a better siting and design of the wind farm, as well as an improved design of the potential mitigation measures to be applied.

Thank you for your attention

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