EPARADISE

ASSESSING THE EFFECT OF AERODYNAMIC INTERFERENCE ON WIND TURBINE BLADES TO IMPROVE DURABILITY AND NOISE IMPACT

The ePARADISE project aims to increase the degree of maturity of two aerodynamic sensors for use on turbine blades. These sensors can be used while operating both onshore and offshore; they are robust, simple to install and low-cost.

The project aims to use a generation site to assess the sensors' capacity to extract useful information about the effect of the turbines' structure or their environmental impact.

Full-scale and reduced-scale wind tunnel tests will demonstrate the sensors' capacity to extract the aerodynamic characteristics of a blade section in a controlled upstream flow, for example in gusts or ice. It will also test how robust the sensors are in real climatic conditions. On-site tests will establish links between these characteristics and the turbines' structural and environmental impact. Risks to the turbine blades such as breakage or accretion of ice are relevant both to the first generation of parks, now ageing, and the latest generation with blades which have increased in size in proportion to the turbines' power.

Structural sensors are currently the only means of monitoring risk on the blades of turbines during generation. ePARADISE therefore plans to improve the maturity of aerodynamic sensors as a means of anticipating structural damage as well as, in the near future, controlling localised actuators such as mechanical flaps or fluid jets.

The on-site work will be undertaken at Saint-Hilaire de Chaléons, in the Pays de la Loire, on a turbine operated by VALEMO. By the end of this project, simulations of the atmosphere at the Saint-Hilaire de Chaléons site in a controlled environment (wind tunnels) will form the basis for a suite of tools which will in turn help in the development and maturity of other sensor systems.

Partners

Companies

Mer Agitée, La Forêt-Fouesnant
Valemo, Bègles et Nantes

Research centers

École Centrale de Nantes, Laboratoire de recherche en Hydrodynamique, Energétique et en Environnement Atmosphérique (LHEEA), Nantes [Project Developer]
Centre Scientifique et Technique du Bâtiment, Nantes

Funders

- Conseil général des Pays de la Loire
- ADEME

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662 k€