Albatrozz, more energy with less wind

Publieke samenvatting / Public summary

Aanleiding

Scientific research in the Department of Biomimetics at the University of Groningen by Prof. Eize Stamhuis has led to a discovery of the effect of oscillating wing movements that large seabirds (such as Albatross) make around the longitudinal axis of their wings at low wind speeds. The wiggling of the wings during take-off and landing leads to a doubling (200%) of the upward force (=lift force). Wind tunnel tests in the RUG laboratories with a small wind turbine equipped with oscillating blades (rotor diameter = 1.0 m) indeed show that at low wind speeds the delivered power is significantly higher than without oscillations, when using the same blades. This discovery could be of great significance for the wind sector. After all, medium and larger wind turbines only deliver their nominal power at wind speeds from 12 m/s onwards, while wind speeds in the Netherlands are on average 4 - 5 m/s. This means that the effective energy yield is much lower than the nominal yield in practice.

Doelstelling

The energy yield increases of up to 200% as found in the wind tunnel is assumed not to be achieved in practice when scaling up to larger wind turbines, but a significant improvement in energy yield at low wind speeds is within reach. Although it is difficult at this time to mention hard percentages, a yield improvement of 5 - 25% seems feasible at low wind speeds. Experts, developers, energy companies and turbine manufacturers have shown a lot of interest in the Albatrozz principle. Nevertheless, there are also many questions that can only be answered by further research on a test set-up at a larger scale

Projectinformatie / Project information

Projectnummer / Project number
TEHE119025
Subsidiebedrag / Grant amount
€ 1.137.540,00

Algemene informatie / General information

Penvoerder / Secretariat
RG-Projecten (RGP) B.V.

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(TRL5). The aim of this project is to take the next step: to conduct (industrial) research into the operation of the principle on a large(r) scale (proof-of-principle). The intention is to modify an existing wind turbine Vestas V52 850kW or Vestas V47 660kW with the Albatrozz principle, and to investigate to what extent, and if so under which circumstances, a significantly increased power can be achieved.

Korte omschrijving

This project is an initiative of RG-projecten BV, EmpowerMi Albatrozz BV, the University of Groningen, and Topwind BV as subcontractor. The RUG holds the underlying patent. RG-projecten BV and EmpowerMi Albatrozz have an exclusive license of this patent and the associated (financial) obligations. The aim is to create a test and research set-up for a windmill with a capacity of 660 or 850 kW, where the tips of the turbine blades (approx. 2 - 5 meters) are equipped with the patented Albatrozz technology. The expected project lead time is approximately 24 months with the following phases: 1. Investigation design (1 - 2 months) 2. Modeling (2 - 3 months) 3. Technical design research setup (2 - 3 months) 4. Construction and installation of test and research set-up (2 - 3 months) 5. Research and test measurements (12 months) 6. Reconstruction and interpretation of research data and completion (2 - 3 months)

Resultaat

This project has to provide concrete evidence with regard to the proof of principle. The research result serves as evidence for the next step: the further development (by the industry) to relevant scale for commercial application (from 850/660 kW to 3 - 4 MW or more). The purpose of the industrial research project described in this proposal is to gain insight into the factors that determine further development of: • the cut-in-speed reduction. What minimum wind speeds are required for the principle to generate energy? • the net power increase of the wind turbine with oscillating blades compared to a conventional turbine • the (electrical) power required to oscillate • the effects (and safeguarding)

of the structural integrity of oscillating wind turbine blades. • the (optimum) cost-effectiveness • the (ideal) oscillating drive (mode, shape, frequency, drive etc.). • the safety and the extent to which the whole is fail safe • the availability, accessibility, noise and maintenance.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.
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