

Joint research project SkyPower100



PRESS RELEASE

Research project successfully completed: Airborne wind energy system proves the technology potential

Gefördert durch:



aufgrund eines Beschlusses
des Deutschen Bundestages

The project partners SkySails Power, EnBW, Omexom and Leibniz Universität Hannover have successfully completed the SkyPower100 project for energy generation from high-altitude wind, which was funded by the German Federal Ministry of Economics and Technology.

Hamburg, Karlsruhe, Hanover, Oldenburg, Sept. 28, 2022.

SkyPower100 is the world's most comprehensive project to demonstrate an automated airborne wind energy system. Since 2019, an airborne wind energy system with kites of up to 120 m² has been operated within the project in Klixbuell/Schleswig-Holstein. This makes Klixbuell the site with by far the longest operating experience of airborne wind energy systems worldwide. The comprehensive permits for the site in North Friesland enable the plant to be operated under ideal conditions and now serve as a model for the planning of airborne wind energy projects all over the world. Following the successful completion of the project, all necessary permits have been obtained to continue the operation of the plant.

Over the course of the project, great progress was made, especially in automation and flight control. As part of the project, it was possible to extensively validate the airborne wind energy system and to gain knowledge about the durability of central components such as kites and tethers. Various materials and production techniques were investigated in the laboratory for future series production.

The airborne wind energy system was developed and built by SkySails Power GmbH. The Institute for drive systems and power electronics at Leibniz Universität Hannover was in charge of developing the sophisticated drive train. The testing of the drive train in the laboratory and its field application served as basic research for the scaling of airborne wind energy systems into the MW class. The project partner Omexom Renewable Energies Offshore GmbH (formerly EWE Offshore Service & Solutions GmbH) led the topics of site search, permitting and infrastructure. Within this framework, the environmental impact of airborne wind energy systems was also investigated.

Joint research project SkyPower100



EnBW Energie Baden-Württemberg AG investigated licensing requirements, environmental impact and safety aspects of airborne wind energy systems. The focus was on a generic investigation of international conditions.

Advantages and operation of airborne wind energy systems:

For the first time ever, airborne wind energy systems allow to tap the energy resources of the wind at several hundred meters. Since the wind is more powerful and steady in higher altitudes, airborne wind energy systems offer a very constant production of green electricity. The impact on the landscape for the construction of airborne wind energy systems is comparatively small. The light as well as compact design also allows the installation in areas that are difficult to access. At the same time, thanks to their material-saving design, airborne wind energy systems conserve valuable resources and are particularly environmentally friendly in operation.

Overall, airborne wind energy systems represent a forward-looking addition to existing technologies for sustainable power generation and can further accelerate the expansion of a decentralized renewable energy supply in Germany as well as internationally.

For energy production, the automatically controlled power kite rises in figures of eight, driven by the wind. As it gains altitude, it unwinds a tether from a winch on the ground. The tractive force drives a generator inside the winch that produces electricity. Once the tether has reached its maximum extension of 800 meters, the autopilot steers the kite into a neutral position with minimal drag and lift. While consuming only a fraction of the energy generated before, the generator now acts as a motor and reels-in the tether. The system continuously repeats this process, flying the kite at an altitude of 200 to 400 meters. Energy generated by the Airborne Wind Energy System can be fed into the grid, stored in batteries, or directly consumed.

For more information on the "SkyPower100" project, please visit: www.skypower100.de

Joint research project SkyPower100



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About SkySails Power GmbH

SkySails Power GmbH develops and markets systems for electricity generation from high-altitude wind - so-called airborne wind energy systems. With this technology, SkySails enables the harnessing of the so far untapped powerful resource of high-altitude wind for the first time ever.

SkySails Power GmbH is part of SkySails Group GmbH. SkySails Group GmbH and its subsidiaries are based in Hamburg/Germany. The group counts about 100 employees and operates a production facility in Seevetal, Lower Saxony as well as an airborne wind energy pilot unit in Klixbüll, Schleswig Holstein.

For more information, please visit: www.skysails-power.de

About EnBW Energie Baden-Württemberg AG

With over 26,000 employees, EnBW is one of the largest energy companies in Germany and Europe. It supplies around 5.5 million customers with electricity, gas, water as well as energy solutions and energy-related services. By 2025, EnBW plans to invest more than five billion euros in the further expansion of renewable energies. In the field of wind power, the company offers planning, construction, operation, maintenance and repair from a single source. The aim is to operate onshore and offshore wind turbines with a total capacity of at least 4,000 megawatts by 2025.

For more information, please visit: www.enbw.com

Joint research project SkyPower100



About Omexom Renewable Energies Offshore GmbH

As a service company, Omexom advises, accompanies and supports its customers in offshore wind farm projects and offers solutions with proven 360° experience. The planning and realization as well as the operation of an offshore plant are complex tasks that require sound expertise and many years of experience.

In the meantime, the company founded in 2012 has grown from a pioneer to an experienced player in the offshore industry at home and abroad. Currently, the interdisciplinary team of around 170 offshore specialists is working for the projects alpha ventus, Riffgat, Gemini and Trianel Windpark Borkum I & II, among others. Omexom Offshore is a subsidiary of Vinci Energies Deutschland Industry & Infrastructure GmbH.

More on the Internet at www.omexom-offshore.de

About Leibniz Universität Hannover - Institute of Drive Systems and Power Electronics

At the Institute for Drive Systems and Power Electronics, under the direction of Prof. Dr.-Ing. Axel Mertens and Prof. Dr.-Ing. Bernd Ponick, approximately 45 scientific staff members conduct research in the entire field of electrical power train engineering from the microwatt to the multi-megawatt range in the work areas of electrical machines and drive systems, power electronics and drive control.

The main areas of work include the development of analytical and numerical calculation methods for electrical machines, the simulation of transient processes in electrical drives, the electrical, electromagnetic and thermal design of drive systems and their control.

For more information, please visit: www.ial.uni-hannover.de