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Seminar

Airborne Wind Energy

An innovative renewable energy technology

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Airborne wind energy (AWE) is the conversion of wind energy into electricity using tethered flying devices. Some concepts combine onboard wind turbines with a conducting tether, while others convert the pulling power of the flying devices on the ground. Replacing the tower of conventional wind turbines by a lightweight tether substantially reduces the material consumption and allows for continuous adjustment of the harvesting altitude to the available wind resource. The decrease in installation cost and increase in capacity factor can potentially lead to a substantial reduction of the cost of wind energy. Wind at higher altitudes is also considered to be an energy resource that has not been exploited so far. In a first part, this talk will outline the fundamental working principles and a basic theory to describe the energy harvesting performance, using this to explore some of the technology demonstrators of leading industrial players. In a second part, the widely adopted pumping AWE concept will be analyzed in more detail, both theoretically as well as experimentally, with the final goal to describe the performance of AWE systems arranged in wind parks. In a last part, current research challenges are outlined, with a focus on the activities at TU Delft.

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