

## AIRBORNE WIND ENERGY AT THE TECHNICAL UNIVERSITY MUNICH

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The team of Windward Energy, located at TU Munich, is working on high altitude wind energy since 2009. It has developed and tested small-scale prototypes of kite steering units, as well as a ground station for kite-pumping.

The team consists of two engineering students (Aerospace & Product Development) and one student of economics (Technology and Management oriented). All three are graduates from the scholarship 'Manage&More' from the Center for Innovation and Business Creation at TU Munich.

The thesis of Michael Schölkopf, that will be presented, deals with the conception of a ground station for a 1 MW Kite wind power plant. A comparison of possible mechanical components, like generators, energy storage and gearing, for fulfilling the needed functions are in the focus. Furthermore an estimation is given about development, investment and operation costs to derive the total costs for electricity and make a prediction about the cost-effectiveness of such a system.

The steering unit that will be presented by Patrick J. Lauffs offers the ability to control the steering lines, as well as to change the angle of attack. It is designed to be manually controlled from the ground station, but also offers the possibility to run closed loop control algorithms based on the states of flight. The current development focuses on optimizing weight and maneuverability in addition to the implementation of automatic control.



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