

# THREE LINES TO WATCH



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Based in Eberswalde, Germany, EnerKite is bringing genuine movement to wind power: with aerial wind turbines. These turbines utilize strong and steady high-altitude winds to deliver double the annual yield of conventional wind turbines with the same capacity. The algorithms necessary for system control are computationally very intensive, and therefore benefit from the high performance of Bachmann CPUs.



Kites fly at high altitudes, have smaller wings, and do not require towers, leaving the landscape practically undisturbed.

Without a tower, and with minimal impact on the landscape, the system starts rotating automatically even in calm conditions, delivering maximum efficiency. According to EnerKite, this approach would allow 80% of the global land area to be developed for commercial wind energy generation – three times more than conventional systems. The system's low footprint requirements and simple, mobile installation make it ideal for island grids and decentralized power generation in countries with weak grid infrastructure. Industry and agriculture also benefit from a self-sufficient energy supply. It makes expected energy cost easier to plan, and saves costs in the long term.

## Double the wind

Another key advantage of the solution is its simultaneity factor, which is 100 percent higher than that of a conventional wind turbine. The EnerKite system can produce electricity for 5,000 to 6,000 full-load hours per year – around twice as much as a comparable wind

turbine. An interesting side effect is that the required battery storage in the grid could be significantly smaller.

## Complex system control

Complex mathematical calculations are necessary to ensure the kite's carbon rib structure is always positioned at the optimal angle and trajectory. The algorithms use powerful Kalman filters, among other elements, to estimate the system state. These algorithms were simulated in MATLAB® and can be loaded directly onto the Bachmann controller using M-Target for Simulink®. The MH230 CPU, which operates at 2.3 GHz, delivers the necessary performance level for processing this demanding application with very short cycle times.

Similar to photovoltaics, these efficient, decentralized, small-scale systems can provide a continuous electricity supply and are theoretically scalable up to the megawatt class. The prospects for this system are promising!



The ground station contains an electrical system with converters, drives, a battery, and a rotation device for takeoff and landing, including a mast, rope guide, drums, a generator, and a gearbox.

## ENERKÍTE

- Develops decentralized ground supply systems fed by kites at high-altitude wind
- Established in 2010
- Headquartered in Eberswalde (Germany)

[www.enerkite.de](http://www.enerkite.de)  
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