

Optimization of airborne wind energy generators

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SUMMARY

This paper presents novel results related to an innovative airborne wind energy technology, named Kitenergy, for the conversion of high-altitude wind energy into electricity. The research activities carried out in the last five years, including theoretical analyses, numerical simulations, and experimental tests, indicate that Kitenergy could bring forth a revolution in wind energy generation, providing renewable energy in large quantities at a lower cost than fossil energy. This work investigates three important theoretical aspects: the evaluation of the performance achieved by the employed control law, the optimization of the generator operating cycle, and the possibility to generate continuously a constant and maximal power output. These issues are tackled through the combined use of modeling, control, and optimization methods that result to be key technologies for a significant breakthrough in renewable energy generation. Copyright © 2011 John Wiley & Sons, Ltd.

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