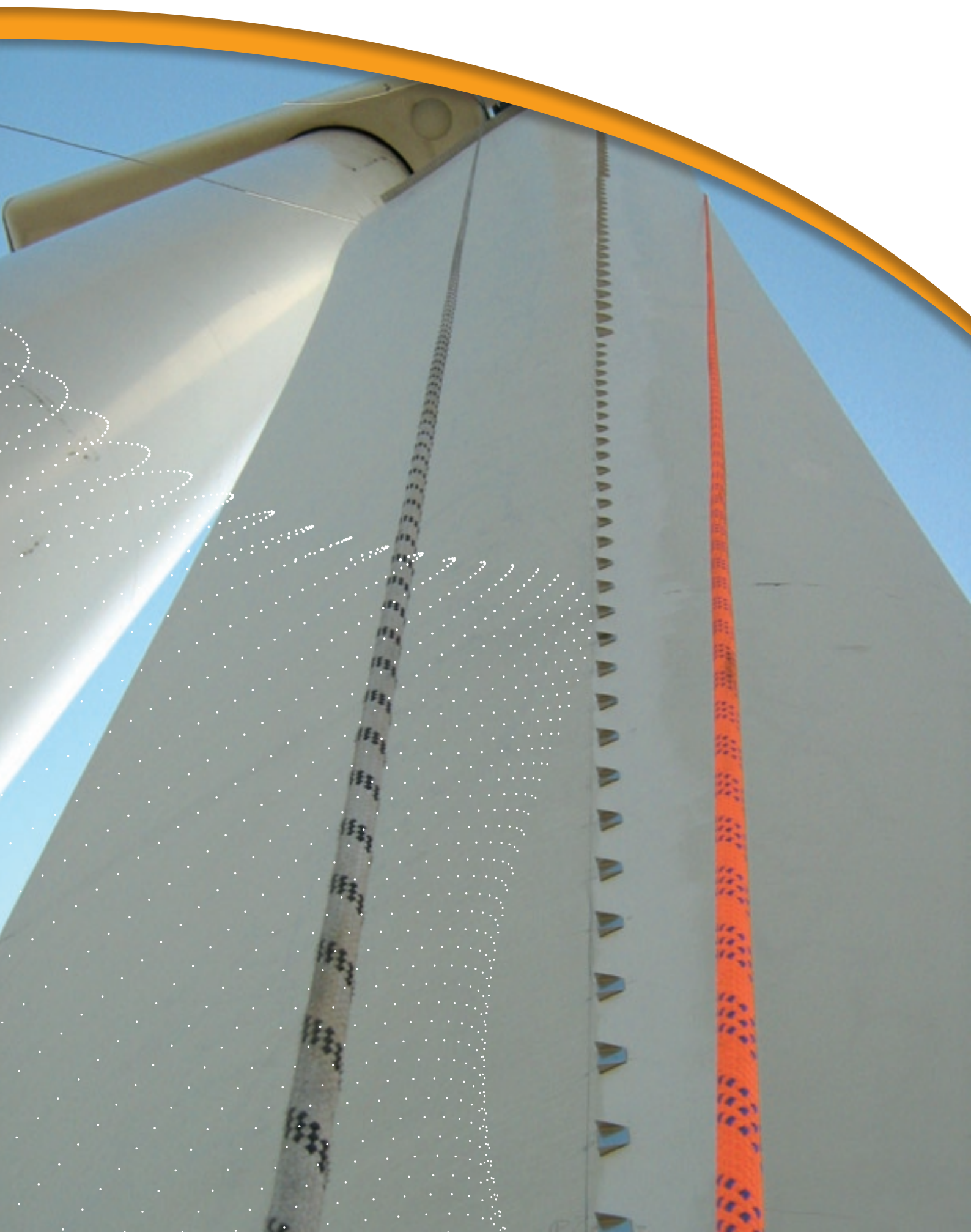




AERODYNAMIC MODIFICATION





Our power.up package helps you to increase the energy yield of your operating wind turbine

Optimization – Aerodynamic Modification

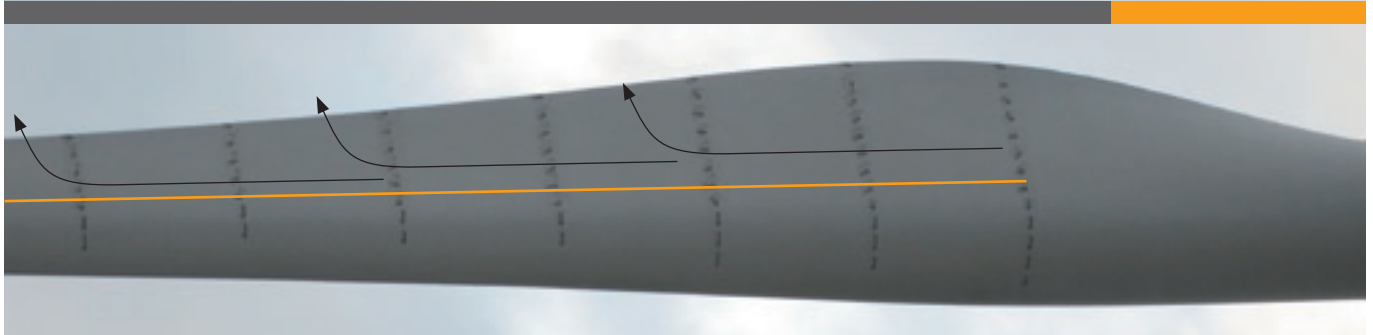


Figure 1 Suction side of the rotor blade mounted at a 1.5 MW wind turbine while operation. Flow indicators orientated in the direction of the blade tip visualize massive flow separation. Without optimization measures much energy yield is lost.

Problem – Loss of energy yield caused by flow separation at rotor blades

Due to structural needs most rotor blades of wind turbines are characterised by a suboptimal aerodynamic shape in the root area. Here massive flow separation and cross flow appear (see fig. 1). These flow phenomena act like an aerodynamic brake and lead to a loss of energy yield. **If you do not want to loose any energy we help you to use the full potential of your rotor blades!**

Solution – Our power.up package

» Clever – Specific measures

Flow separation can be reduced by specific modification of rotor blades with individually adapted flow elements. A significant improvement of the energy yield is achievable. Our power.up package includes an analysis of the original flow conditions at rotor blades. Based on this an individual modification is developed and installed. Reliable information about the realized improvements will be obtained by a detailed power analysis. This is performed by comparing the energy yield of the modified wind turbine with a not modified reference turbine.

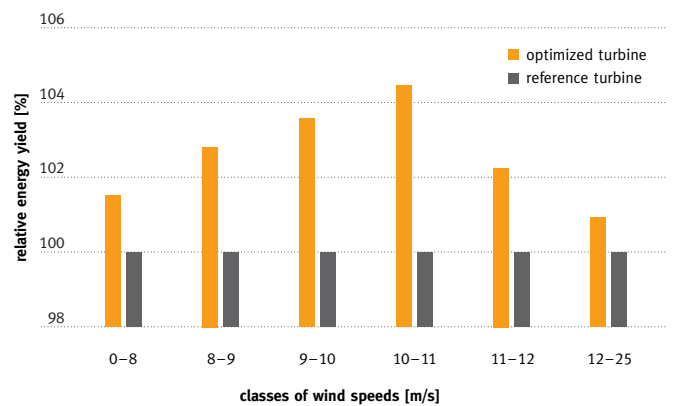
» Strong – Long-term experiences, energy improvements up to 5 %

Since 2003 we realize projects including flow analysis and optimization. A lot of wind turbines have been modified with our power.up package and the influence on energy yield was analysed over several years. Our long-term experiences show that an increase of energy yield up to 5 % can be realized.

» Cost efficient – Very short pay off periode

Depending on the wind conditions on site the costs of our power.up package will pay for itself within one or two years of operation.

Improvement of energy yield caused by optimization measures at different wind speeds (example, 1.5-MW-wind-turbine)



Improvement of energy yield caused by optimization measures over several years (example, 1.5-MW-wind-turbine)

