



# Mobile machine tool and the giant wind turbines

Researchers and companies have come up with an idea that could have far-reaching implications for the wind turbine industry. They will design a portable machine tool that can process the giant components on site. If successful, it could save billions in transportation costs and thereby significantly reduce energy consumption in the production chain.

As components grow in size, the production of giant wind turbines is facing major challenges. In a few years, cast iron structures such as the hubs that are part of large-scale offshore wind turbines will increase from 3x3x3 metres and a weight of 15 tons to at least double these figures. This will make it near impossible to transport the components to the machines that process them, yet alone to make these processing machines that generate the accurate surfaces necessary for assembly.

## On site processing improves logistics

Researchers working on this project are developing a flexible machining system for processing the giant wind turbine components of the future. The challenge is to make the mobile machining system so accurate that the components can be processed on site while maintaining the same level of accuracy and productivity currently possible using stationary machining systems.

"One of the greatest challenges in the project is to gain constant knowledge of the current stiffness and vibration level in the overall processing system. It involves controlling the cutting forces that arise when we're working with the components. We're trying to solve this

by combining mathematical models of the material's mechanical properties and dynamics of the flexible structure with continuous process monitoring of forces and vibrations to detect and correct possible deviations of machining performance in real time," says Professor (Docent) Ole Balling.

The approach followed by the project consortium encompasses an innovative design of the machining system in smaller, mobile units.

*Transporting giant wind turbine components many kilometres between factories in different countries could soon be a thing of the past.*

*A new mobile machine tool will be able to process so accurately that it can replace some if not all of the work done today in stationary machinery.*