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Growing Intelligent Control Technology for wind turbines

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Scientists at the Otto-von-Guericke University of Magdeburg are working on fundamentally revolutionising the control and regulation technology for wind turbines. On the one hand, the newly developed operational management allows future turbines to be built higher and their efficiency to be increased. On the other hand, plants that have already been in operation for many years can be retrofitted with the new system and thus adapted to the power requirements of modern and efficient energy generation.

"The new control concepts lead to a safe operation of the plants under changing wind conditions and are better able to meet the strongly changing performance requirements of the electrical supply network", says Prof. Rolf Findeisen, project manager of the Chair of Systems Theory and Control Engineering at the Otto von Guericke University Magdeburg.

His team works together with national and international partners from industry and science in the research project *eco4wind* to replace conventional automation concepts with a so-called real-time operation control. This real-time operation control is based on a continuous optimisation of the plant behaviour by using mathematical models. Thus, the control and regulation of the wind turbines can be continuously adapted to changing wind currents and requirements on the electrical grid.

Current plants are based on two separately operating control loops: the power control adapted to the wind and the speed control responsible, among other things, for the control of the rotor blades. These two control loops, which have so far operated independently, are to be replaced by real-time operation control.

"This is tantamount to a technical revolution, as it makes the use of wind turbines more flexible and at the same time easier," says automation engineer Prof. Dr.-Ing. Rolf Findeisen. "The increased energy yield combined with lower material costs will reduce electricity generation costs by at least two percent. In addition, the reliability of the energy supply from wind power stations increases.

The Magdeburg scientists from the Faculty of Electrical Engineering and Information Technology are cooperating with the Albert Ludwigs University of Freiburg, the Ruhr University of Bochum and Servion GmbH under the consortium leadership of IAV GmbH Ingenieurgesellschaft Auto und Verkehr in the research project funded by the Federal Ministry of Economics and Energy with three million euros.

More information on the research project can be found at the German webpage > <https://www.enargus.de> (<https://www.enargus.de/>).

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