



PFORZHEIM UNIVERSITY (HSPF)

Hochschule Pforzheim - Gestaltung, Technik, Wirtschaft und Recht



MEET OUR PARTNERS

LEADING THROUGH PERSPECTIVE CHANGE

By Joerg Woidasky

The Institute for Industrial Ecology (INEC)

Pforzheim university cooperates with more than 100 partner universities worldwide, attaches great importance to business and corporate ethics. The close connection between theory and practice develops positive synergy effects resulting in projects and research approaches.

As an example, HSPF's Institute for Industrial Ecology (INEC) was founded in 2010. Its interdisciplinary team focuses on the analysis of energy and material flows between the technosphere and the ecosphere. The INEC research goal is the efficient use of scarce resources through the ecological and economic optimization of product life cycles and operational production processes.



With around 6,200 students, Pforzheim University - founded in 1877 - is one of the largest universities of applied sciences in the state of Baden-Württemberg in southwest Germany.

The qualifications and experience of the teaching staff and intensive cooperation with companies lay the foundation for the university's outstanding position in rankings. HSPF offers 28 bachelor's and 19 master's degree programs, with around 480 professors and lecturers.

Its interdisciplinary approach, bringing together technical, economic, and creative perspectives to address complex challenges, aligns with its vision of "leading through perspective change," emphasizing the importance of integrating multiple viewpoints to develop sustainable and future-oriented solutions.



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COMMITMENT TO PRME

Principles for Responsible
Management Education initiated
by the United Nations

ROLE IN THE REWIND PROJECT

Working on decommissioning and recover high-value secondary raw materials

WORKING ON WP1, WP2

For decommissioning a robust data and methodological foundation for material flows from end-of-life wind turbine blades is established, and forecasts on waste quality and quantity are made. For recycling, the high-voltage fragmentation process is applied for efficient separation of composite materials constituents. Pforzheim is the only German University of Applied sciences which owns a Selfrag Lab high voltage fragmentation device, focusing on circular economy applications.

**JOERG
WOIDASKY**

Professor for Sustainable
Product Development

1. WHAT IS HSPF'S EXPERIENCE IN THE WIND ENERGY SECTOR?

In the field of circular economy research, the focus lies on analysing wind turbine blades and assessing their recycling potential, particularly through high-voltage fragmentation for fiber recovery. Thus research support for and experiences in the wind energy sector can be found not only in the university's Institute for Industrial Ecology ([INEC](#)), but also in its Institute for Precious and Technology Metals ([STI](#)) as well as the Institute for Materials and Material Technologies ([IWWT](#)).

Professor Joerg Woidasky, the REWIND primary investigator at Pforzheim University, is affiliated to both institutes INEC and IWWT. He has been working on wind turbine blade recycling since 2010.

2. WHAT ATTRACTED HSPF TO JOIN THE REWIND PROJECT?

In this cooperation Pforzheim University's unique contribution – besides material flow research on wind turbine blades – is the application of the Selfrag electropulse technology to composites from wind turbine blades. Only few European research facilities have access to this technology which was initially developed for mineralogical sample processing, and even fewer apply it for recycling research in a circular economy context – amongst them Pforzheim University.

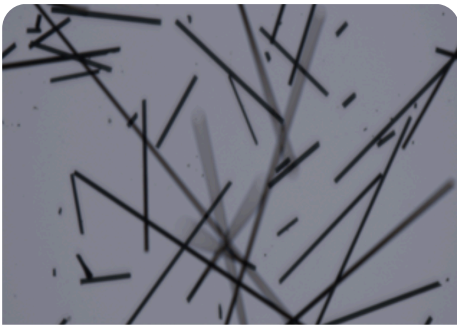
The REWIND project offers the opportunity to tailor the expertise in circular economy and sustainable product development to the wind energy sector. It provides resources to mature the university's electropulse process further, and provides additional research capabilities for the university which can be used for student involvement and qualification.



Most of the work will be carried out by the Sustainable Product Development research team allocated in the university's School of Engineering and Technology, along with the Institute for Industrial Ecology ([INEC](#)).

In parallel, technical recycling approaches have been developed and applied along with assessment methods such as life cycle (LCA) and circularity assessment. REWIND with its focus on end-of-life wind turbine blades now provides a highly relevant and very attractive research area to apply and expand the university's technical and methodological expertise.

REWIND



3. WHAT ARE THE MAIN CHALLENGES YOU ARE GOING TO ADDRESS IN THE REWIND PROJECT?

The main challenge is the high quality recycling of wind turbine blade materials. This will require reliable material flow information on turbine waste generation, with a detailed knowledge about the quantities of blade waste and information about its material composition. On this basis development for new recycling routes is possible. In addition, predicting future material flows and accurately assessing the material composition of end-of-life blades is essential to anticipate future recycling needs.

Besides, innovative processes for fiber and matrix recovery and separation for used composite materials are required: Key challenges include the efficient separation of complex composite materials without degrading fibre quality, handling large and heterogeneous blade structures, and ensuring that resulting material fractions can be used for high-quality products. A particular focus lies on tailoring fragmentation and separation to the different structural components of wind turbine blades. Achieving process scalability and consistent product material quality across varying input streams remains a central challenge here.

4. WHAT DO YOU HOPE TO HAVE ACHIEVED BY THE END OF THE PROJECT?

Our technical goal is to validate high-voltage fragmentation as an effective technology for processing wind turbine blades and to demonstrate its feasibility not only for size reduction, but also for material separation or at least for efficient preprocessing such as solvolysis treatment. In addition, the aim is to identify suitable fragmentation parameters for different structural areas of the rotor blade, enabling a more targeted and efficient processing approach. To this end, process parameter and media modification shall be tested.

Moreover, relevant educational and publication output shall be generated. This includes students' project works, bachelor and master theses, and possibly also contributions to PhD theses. In parallel, relevant scientific and general audience publications shall be produced. This requires a robust data basis on material flows and proving the technical feasibility of the developed electropulse processes.



5. HOW THE REWIND PROJECT WILL BENEFIT THE WIND ENERGY INDUSTRY?

REWIND addresses one still unsolved challenge of the wind energy industry, the high-quality recycling of composite wind turbine blades. European research funding for the REWIND consortium supports not only some highly innovative approaches, but also their combination to complete recycling routes into the final application, along with an ecological assessment. Wind energy industry will benefit from a higher maturity level of recycling routes, and robust material flow information, to achieve full circularity of wind turbine plants in future.



REWIND

MEET OUR PARTNERS: AIMPLAS

An interview conducted by Helena Abril from AEMAC, leader of WP6 in the REWIND Project.

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Contact us:
info@rewind-project.eu

www.hs-pforzheim.de

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