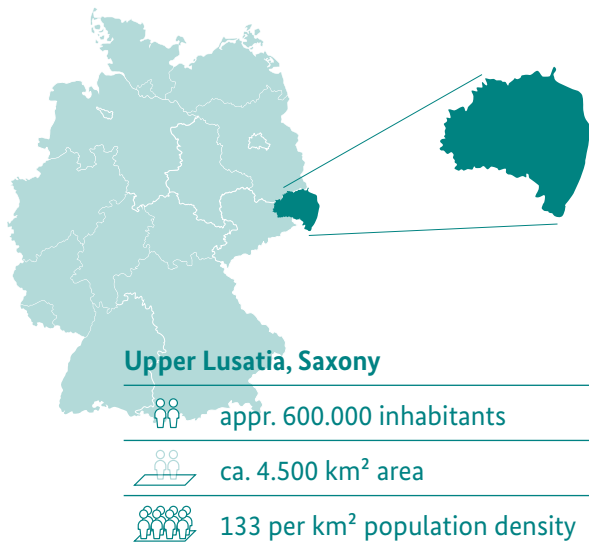


LaNDER³ in Upper Lusatia, Saxony



Innovation network around the circular value chains of natural fibres and plastics



Characteristics of the region

- Rural character and affected by structural change as a former coal mining region
- Many small and medium-sized enterprises (SMEs)
- Population decline of appr. 1 %/year
- Key sectors of the regional economy: agriculture and forestry, mechanical engineering, metalworking, textile, paper and pulp, plastic processing industry

Baseline situation and objectives

„With LaNDER³, we are taking up a topic that has historical background: 200 years ago, natural fibers were already being processed into textiles in the region.“

Dr. Matthias Kinne, Clustermanager LaNDER³

LaNDER³ was initiated in 2017 by the Zittau/Görlitz University of Applied Sciences (HSZG) as a project funded by the German Federal Ministry for Research and has since been implemented with the collaboration of 20 to 25 regional companies and other scientific institutions. The aim of the partnership is to establish a regional network focused around the holistic technology development for the production and recycling of natural fiberreinforced plastics (NFRPs).

The project picks up the specialization of the regional university in the field of plastic manu-

facturing processes. The local cell and plastic processing businesses, as well as the regional availability of natural fibers as agricultural residues, serve as crucial points of reference. Regional actors from the fields of science and industry are being interconnected and enabled to engage in collaborative innovation. By integrating multiple subprocesses, the aim is to close regional material cycles.



Processing of NFRPs © Philipp Herfort Photography

Stakeholders involved

- **Zittau/Görlitz University of Applied Sciences** Initiator and driving force, project management and central network management
- **Regional companies** in raw materials supply and plastics processing (20 to 25 in total), particularly SMEs and science-driven start-ups, supplemented by supraregional research institutions and companies as a target group and network
- **Advisory board** consisting of representatives from politics (e.g. State Ministry of Economics), science (e.g. German Biomass Research Center, Technical University of Chemnitz), as well as companies and regional chambers of commerce (e.g. Dresden Chamber of Commerce and Industry) for consulting and knowledge transfer

Financing

The bulk of the project funding is provided within the framework of the BMBF program FH-Impuls ‘Strong Universities of Applied Sciences – Impulse for the Region’ (100% funding for network management), which is coupled by partial self-financing in the form of contributions from the participating companies (SMEs can submit applications in a project format through a one-stage, simple procedure); Upon market entry, state funding is available to support spin-off initiatives originating from the network (LaNDER³ provides a reference framework and assists member companies in securing funding)

Biodegradable bowls © Zittau/Görlitz University of Applied Science



Focus of the initiative

Natural fibers accumulate as residues or by-products in agriculture, e.g. as chaff and straw. They are not merely waste but rather valuable resources, e.g. for the regional textile and pulp industries. Another emerging application field for natural fibers, which is a focal point in LaNDER³, is the development of **natural fiber-reinforced plastics (NFRP)**. NFRP are composite materials that combine advantageous properties of both natural fibers and plastics. While conventional plastics are derived solely from fossil resources, in NFRPs some of the fossil resources are replaced by natural fibers. This mostly results in a more favorable resource and climate footprint for NFRPs, as well as potentially improved mechanical properties. NFRP products are utilized in various sectors, such as construction, lightweight design, or consumer goods, and they can be effectively recycled when separated by type.

LaNDER³ incorporates the entire value chain of NRP in its **innovation and technology development**. It investigates and advances various aspects, including raw material preparation, processing, recycling or utilization in biogas plants, product innovation, as well as methodologies in data analysis, such as in the component forming process and testing techniques.

A regional **network structure was established** as the foundation for the project. Initially, the network was formed through existing contacts in the vicinity of the Zittau/Görlitz University. Network building and management are implemented through personal exchanges, events, and collaborative research activities.

★ Spotlight: Shared Factory

An interdisciplinary laboratory hall, a so called share factory, was established in Zittau in 2019, serving as the LaNDER³ Center for natural fiber technologies. The shared factory provides various research and development infrastructures for the partnership stakeholders to support their project work. In addition to physical infrastructure, such as tools and machinery, this also includes methodological and technological expertise from Zittau/Görlitz University.

The technical equipment covers the entire value chain of natural fibre reinforced plastics (NFRP): from raw material preparation to production processes and recycling. This holistic approach ensures that processes can be coordinated and researched in parallel from the development stage onwards. As a result, the closure of material cycles can be achieved, initially in the laboratory and subsequently on a larger scale.



Preparation of natural fibres © tobiasritz-photography

This offering can be particularly attractive to smaller companies: larger machinery is required for the processing and along the value chain of NFRP, which can entail prohibitive costs. In the Shared Factory, processes and products can be jointly developed and tested before investment decisions are made. The same applies to specialized knowledge, which may be difficult for companies with a small workforce to develop internally. Through the network, such knowledge becomes accessible.

In the future, companies can continue to use the LaNDER³ Center for natural fiber technologies in collaboration with Zittau/Görlitz University for bilateral R&D projects or larger collaborative projects. The Shared Factory thus promotes long-term collaborations.



Plastic shredder © Marcel/schroeder Fotograf

🧩 Challenges and barriers

- The **shortage and outflow** of qualified workers is a significant issue in the region.
- The **energy crisis** presents an obstacle on the path to competitiveness and poses an existential threat to SMEs with energy-intensive production.
- **Availability of raw materials** – continuous quantity in sufficient quality: Natural fibers are organic and must therefore be tested individually.

🔭 Outlook

The stated goal of LaNDER³ is to further develop the structures that have already emerged from the project into competitive business models, including several companies that were founded as spinoffs from the university research initiatives. The partnership aims to continue as an innovation network beyond the funding period and is currently working on the appropriate organizational form.

Key learnings and replicability

- The input from the academic field and the possibilities of a collaborative R&D process have enabled regional companies to progress. Additionally, new companies have been established as a result of the project.
- The existing contacts of individual professors were crucial in establishing a network at the beginning of the project.
- Proximity to industry and the existing networks of the university were important factors in gaining the trust of companies for the project.
- The effort and personnel required for network management were initially underestimated. In the second phase of funding, the available budget for this purpose was increased by the BMBF.
- The trust of companies was primarily established through bilateral, personal conversations.
- Network managers must possess both substantive knowledge (in business and strategy) and social skills to initiate processes.

„When building a network, you start with a core, and then threads start forming, like in a spider’s web. The companies collaborate, and a self-sustaining dynamic emerges. Our goal is to support and channel this dynamic.“

Dr. Matthias Kinne, Clustermanager
LaNDER³

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The example demonstrates how an applied sciences university can provide impulses for the region and local companies. The specialization of the university aligns well with the orientation and knowledge needs of the regional businesses in this case. This fit may not be the case in every region. Strategic selection of the location for universities and competence centers can help take influence in this regard. In this context, it is advisable to consider knowledge as a resource and thereby make regional needs as well as potentials visible.

With the production of natural fiber (NFRP) products, the network serves a growing market. This growth is driven by an increasing environmental awareness among consumers, as well as by legal frameworks such as the ban on single-use plastic at EU level. Such factors and trends can only be influenced to a limited extent by regional stakeholders. Nevertheless, LaNDER³ demonstrates the value of proactively embracing supra-regional developments.

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