



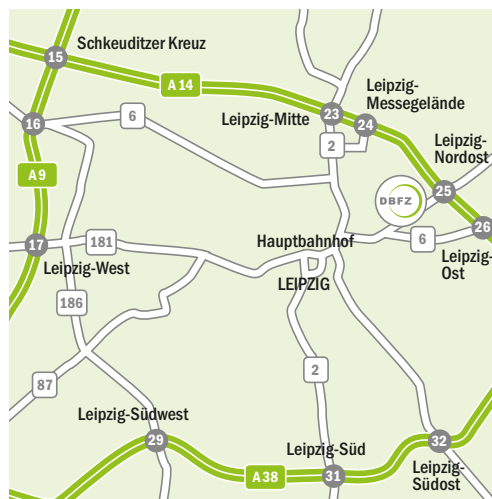
Annual Report 2025

Directions

By train: to Leipzig main station. Take tram line 3/3 E (towards Taucha/Sommerfeld) as far as the Bautzner Strasse stop. Cross the street, leave the car park on the right and use the main entrance of the DBFZ (House 1, Torgauer Str. 116). Please check in at the front office.

By car: on the A 14 motorway. Exit at Leipzig Nord-Ost; follow signs for Taucha; then follow signs for Leipzig; then follow signs for Zentrum, Innenstadt. Turn off left after the "bft" filling station (see "By train" for further directions).

By tram: line 3/3 E towards Taucha/Sommerfeld; Bautzner Strasse stop (see "By train" for further directions).



Annual Report 2025



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1 Editorial

Dear Readers,

The year 2025 was exciting but also challenging, as cuts in national funding were on the agenda in almost all departments. Against this backdrop, the DBFZ launched a strategy process to initiate a research, development and innovation concept for the years 2027–2035, which will form the essential basis for the successful further development of the DBFZ. Despite the difficult conditions, we were again able to work on around 120 R&D projects with an average total project volume of just under EUR 250,000 last year. A total of 34 new projects were launched and 41 projects were successfully completed.

A key lever for raising the profile of our research topics and acquiring new cooperation projects is the field of science communication. This year's annual report is dedicated to this topic under the title 'Making research visible'. The diversity of the projects worked on in 2025 is also reflected in the research focus areas: Whether it's a virtual city tour on the topic of waste sustainability, a project on the use of hemp fibres, a monitoring report on renewable energies in transport, the Africa project 'HeRoTogo' or the measurement project 'LangEFeld' – the spectrum in the field of biomass research remains broad and exciting. In addition to numerous national R&D projects, we were also able to provide new impetus internationally and further expand our activities, e.g. in Africa. In particular, the large-scale projects 'LabTogo', "HeRoTogo" and 'ETH-Soil' reported significant successes.

As every year, we would like to express our sincere thanks to our partners (Supervisory Board, Research Advisory Council, project sponsors and project partners) for their extensive scientific input, numerous constructive suggestions and consistently constructive cooperation!



Fig. 1: The General Management of the DBFZ

In this 2025 Annual Report, you will find a wealth of information, including details on our support for young researchers, policy advice, expert committees, finances and, last but not least, science communication. On behalf of the entire DBFZ team, we hope you enjoy reading this Annual Report and gain new insights.

Prof. Dr. Michael Nelles
Scientific Managing Director

Dr. Christoph Krukenkamp
Administrative Managing Director

2 The DBFZ at a glance

Our mission

Since its foundation in 2008, the DBFZ has been developing practical solutions along the value chains and cycles of biomass based on the 'Smart Bioenergy Approach'¹ developed by the DBFZ. Through applied research and development (R&D) of technologies for the energetic and integrated material use of biomass, the DBFZ is making a significant contribution to the realisation of a climate-neutral society, which is to become a reality by 2050 at the latest. Due to its close networking with numerous partners from science, practice and society, the DBFZ plays a special role in the development of rural areas as well as in regions in Germany affected by the coal phase-out or other structural changes. Cooperation with national and international research partners and industry promotes the global transfer of knowledge and technologies.

→ Further information:

www.dbfz.de/en/the-dbfz/mission-statement
www.dbfz.de/en/the-dbfz/scientific-assignment
www.dbfz.de/en/services/research-with-companies
www.dbfz.de/en/research/research-infrastructure

¹ www.smart-bioenergy.com

Key figures 2025

34

Newly launched projects
Market and third-party funded projects

41

Completed projects

120

Processed projects

247,946 EUR

average project volume
of the projects launched in 2025

272

Employees
as of 31/12/2025

7

Completed promotions

62

Events
(internal /external)

45

Peer reviewed publications
(including 36 open access articles)

3

Project cooperations (EU and national)

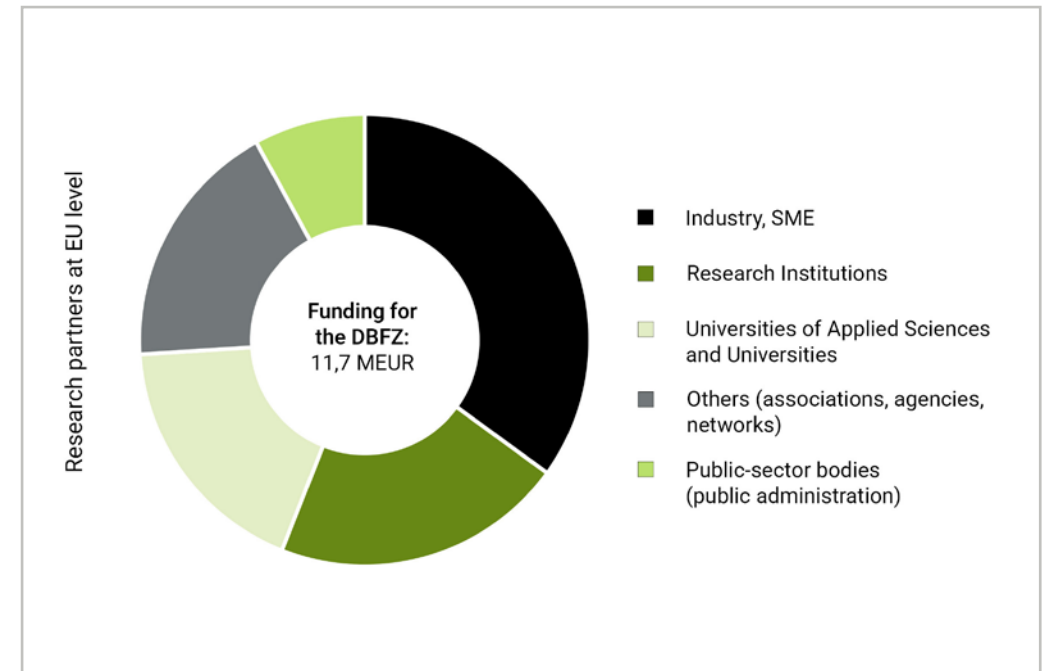


Fig. 2: Cooperation at EU level (period: 2008–2025)

Thanks to the close research cooperation with numerous partners from science, industry and society, the DBFZ was able to further expand its position as a leading national research institution in the field of energy and integrated material use of biomass in the past year. In total, more than 100 research projects were carried out in 2025 in collaboration with scientific institutions and around 120 partners from industry. An overview of all projects worked on in 2025 can be found in this annual report from page 129 onwards.

Within the framework of 35 EU project collaborations (FP7/Horizon 2020/HEU)

with almost 370 partners, or as an active member and national team leader in leading international research networks such as the IEA Energy Technology Collaboration Programme (IEA Bioenergy), the European Energy Research Alliance (EERA) or the European Technology and Innovation Platform Bioenergy (ETIP Bioenergy), the DBFZ is active in committee work and has been continuously expanding its scientific networks at national and international level for many years. An overview of the extensive committee and network activities can be found in this annual report starting on page 108.

→ Interactive overview of EU projects handled by the DBFZ:

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/org-details/998003222?isExactMatch=true&keywords=dbfz>

4 Scientific highlights and awards

Scientific highlights

ETH-Soil project managers at the Africa Climate Summit (ACS)

The impressive results of biofertilisers based on biochar in Ethiopia were the focus of an official side event organised by the Ethiopian Ministry of Agriculture at the Africa Climate Summit (ACS). The ETH-Soil project provided significant impetus and the scientific basis for this. In the 'Team Europe' pavilion, DBFZ scientist Dr. Annett Pollex joined experts from Africa and Europe to discuss the certification of carbon sinks created by

the application of biochar to soil. As part of a Clean Cooking Side Event, Dr. Kerstin Wilde (ETH-Soil project manager) presented cooker developments that were realised in the DBFZ research projects 'HeRoTogo' and 'ETH-Soil' for rural regions in Ethiopia and Togo. The Africa Climate Summit took place from 8 to 10 September 2025 in Addis Ababa and was organised by the African Union Commission and the country of Ethiopia as host. High-ranking representatives from international politics, NGOs, donors as well as the private sector were in attendance.



Fig. 3: DBFZ project managers in the Team Europe pavilion at the Africa Climate Summit 2025

Flexible substrate management with new automatic feeder

In future, biogas plants will have to be operated in line with demand in order to remain economically viable. This includes, in particular, flexible substrate management. These requirements are being tested by a new feeding machine developed by the DBFZ's 'Biochemical Conversion Department', whose hardware was upgraded in 2025 in collaboration with the 'Thermo-chemical Conversion Department'. With a total of 18 substrate cartridges, a laboratory reactor can now also be fed automatically at night. Process stability is continuously monitored by a soft sensor. This allows flexible operating scenarios for biogas plants to be investigated on a laboratory scale.



Fig. 4: New feeding machine in the DBFZ technical centre

Open access: Simulation-based optimisation of digestate recirculation in anaerobic digestion

In a simulation study conducted by DBFZ scientist Bomin Yuan (Biorefineries Department), the recirculation of the liquid fraction of digestate was investigated as an integrated process strategy for the anaerobic co-fermentation of wheat straw and cattle manure. Based on a material flow simulation model, the effects of different recirculation rates on methane yield, nutrient cycles and economic efficiency were systematically analysed. The results show that digestate recirculation can not only contribute to an increase in biogas yield, but also significantly reduces the need for fresh water, external additives and the effort required for digestate management. The optimised use of internal material flows also



Fig. 5: Policy workshop at the DBFZ (25 March 2025)

has positive effects on the overall economy of the process chain. To validate the simulation results, a long-term laboratory experiment was also carried out, which enabled a deeper understanding of the process.



GreenMeUp – Policy Workshop in Leipzig

As part of the 'GreenMeUp' project, an important policy workshop was held at the DBFZ on 25 March 2025, focusing on accelerating the expansion of the biomethane market. Entitled 'From Policy to Action: Driving Biomethane Market Growth', the event brought together stakeholders to discuss the current situation, challenges and future opportunities in the European biomethane sector.

Participants examined the current state of biomethane production in Europe, highlighted leading countries and identified areas of growth in emerging markets. Technological advances in biogas processing, such as membrane separation and facilitating feed-in to the grid, were also important topics of discussion. A significant part of the workshop focused on the need for effective policy instruments to promote market acceptance. This included discussions on financial support mechanisms such as feed-in tariffs and demand incentives, as well as non-financial measures such as policy synchronisation and efficient permitting procedures.

The event emphasised that a tailored mix of financial and non-financial incentives is crucial to optimise public investment and increase the use of biomethane. In addition, the importance of cooperation between research, industry and politics was highlighted in order to translate policy measures into practical action.

→ **Further information:**
www.greenmeup-project.eu

Appointments

TU Hamburg/University of Rostock: Dual professorship for Dr. Volker Lenz

Dr. Volker Lenz (Head of the Thermochemical Conversion Department) was officially appointed on 29 August 2024 to the position of honorary professor in the 'Renewable Energy System Integration' Department at the Hamburg University of Technology (TUHH). In addition to his work at the DBFZ, Volker Lenz has held another professorship in 'Climate-Neutral Bio-Based Heat Supply' at the Faculty for Agriculture, Civil and Environmental Engineering at the University of Rostock since 1 November 2025.

Prof. Dr. Ingo Hartmann appointed to the professorship in Environmental Technology at HTWK Leipzig

Prof. Dr. Ingo Hartmann (Head of the Research Focus Area 'Catalytic Emission Control') was appointed to the permanent position of Professor of Environmental Technology at the University of Applied Sciences (HTWK Leipzig) in October 2025. His work involves research and teaching on the scientific and engineering principles underpinning environmental engineering, as well as on environmental engineering applications in wastewater treatment, flue gas and exhaust air treatment, waste management, recycling technology, and the remediation of contaminated sites and soil.



Fig. 6: Dual professorship for Dr. Volker Lenz



Fig. 7: Official appointment of Ingo Hartmann to the professorship of environmental technology at HTWK Leipzig

Awards & honours

First prize for AR poster on science communication

DBFZ communicators Eva Siebenhühner and Matthias Werner won first prize for their AR poster 'Making biomass research visible' at the 3rd Symposium on Science Communication at the University of Leipzig on 15 May 2025. The poster deals with science communication for research projects. Using augmented reality, symposium participants were able to learn how to attract new target groups and how storytelling and video formats are produced for DBFZ science communication.



Fig. 8: Award winners Matthias Werner and Eva Siebenhühner (right)

Silver Biogas Innovation Award for Prof. Jörg Kretzschmar (Zittau/Görlitz University of Applied Sciences) and Harald Wedwitschka (DBFZ)

The German Farmers' Association (DBV) presented the Biogas Innovation Awards at the Biogas Innovation Congress in Osnabrück on 21 and 22 May 2025. The silver innovation award, worth EUR 3,000, went to scientists Prof. Dr. Jörg Kretzschmar from Zittau/Görlitz University of Applied Sciences and Harald Wedwitschka from the DBFZ for their collaborative project 'Controlled anaerobic wet retting as a biorefinery process'. The project demonstrates new ways of sustainably utilising raw materials and increasing the competitiveness of natural fibres.



Fig. 9: Prize winner Dua'a Al-Laseh

Joint 'Best Poster Award' for research projects

DBFZ scientists Andreas Schedl, Rafiandy Dwi Putra and Nikolaus Manolikakes (Thermo-chemical Conversion Department) presented the joint results of the 'BioFe' research project at the 13th International Freiberg Conference on Circular Carbon Technologies and, as co-authors together with the German Aerospace Centre (DLR) in Zittau, won the 'Best Poster Award'.

DBFZ poster among the top three entries at the FVEE Annual Conference 2025

DBFZ researcher Dua'a Al-Laseh (Thermo-chemical Conversion Department) attended the annual conference of the Renewable Energy Research Association (FVEE) in October 2025 and made it into the top three poster presentations with her contribution entitled "Optimisation of a hybrid heating

system comprising a heat pump, biogas conversion and a fuel cell for residential use". The presentation examines a hybrid system that combines biogas reforming, high-temperature PEM fuel cells and a heat pump to improve efficiency and reduce CO₂ emissions in the heating of residential buildings.

DOC2025: Best Oral Presentation Award for DBFZ Scientist Alberto Meola

Alberto Meola (Biochemical Conversion Department) received the 'Best Oral Presentation Award' for his presentation on 'Multi-step modelling of unstable anaerobic digestion processes with hybrid models for process control' at the 8th Doctoral Colloquium BIOENERGY AND BIOBASED PRODUCTS at the University of Stuttgart. The award came with prize money of EUR 450, the presentation can be found in the [conference reader](#) for the event.

Energy and Environment Foundation: Awards for bachelor's and master's theses supervised at the DBFZ

On 12 February 2025, Mourice Wölbeling from Merseburg University of Applied Sciences received the first prize of EUR 1,000 from the Leipzig Energy and Environment Foundation for his bachelor's thesis 'Manure treatment using aerobic and anaerobic processes'. Second prize went

to Goli Laleh Ahmadi Ghoucham from the Eberswalde University for Sustainable Development. On 11 February 2025, she received the EUR 500 sponsorship award in the 'Energy and Environment' category for her master's thesis on 'Value Generation and Greenhouse Gas Saving Potentials by Agroforestry Biomass Being Used in Thermo-compost System/Technology'. Both theses were supervised in the DBFZs 'Biochemical Conversion Department'.



Fig. 10: Award winner Alberto Meola (left) received the DOC2026 Best Oral Presentation Award

Active research data management supports new products: Dynamic project overview

In an ideal data ecosystem, data that has been collected once, can be reused, taking into account all legal requirements. This multiple use of data offers enormous potential for generating new knowledge. In addition, avoiding redundant data collection saves time and money and promotes the implementation of the principle of data minimisation in data collection.

The traditional approach – a specific idea leads to a specific target product – is replaced by a systemic approach. Instead of starting with the definition of an idea and then acquiring the necessary, precisely tailored data for a target product, similar tasks are researched in the data ecosystem and the data and technologies used there are examined with regard to their reusability for the next target product.

Interactive project overview

In the case study 'World Map of DBFZ Projects', the expertise of the 'Resources' working group (dynamic map creation), IT (machine-readable provision of information) and the scientific staff (data management, research coordination) was combined and existing data sets were reused. The automatic processing of all information from the source to the generation of a dynamic map also identified systematic problems in data collection and minimised various sources of error.

The provision of a map updated on a daily basis replaced the previously static, rapidly outdated graphic used to visualise the DBFZ's

international involvement outside Europe and raised the overall level of information provision to a new level. Additional synergy effects were achieved because the identical work steps also allow European projects to be visualised on the world map without additional effort and all projects to be linked to the corresponding detailed information in the publicly accessible project directory.

Research Data Management

The DBFZ's research data management covers all stages of the data life cycle. This includes technical and organisational specifications, e. g. for compliance with quality standards, guidelines and methodology for data collection and processing, as well as options for reuse for the systematic handling of data. The aim is to make research transparent and traceable from the planning of the research project to archiving, thereby enabling sustainable data use.

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Fig. 11: African project partnerships with the DBFZ

5 Science communication: Making research visible

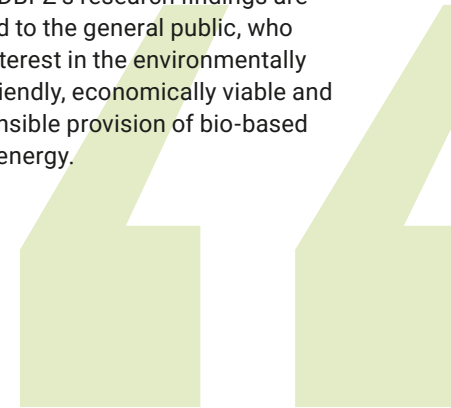


Strategic science communication forms the central link between politics, research, industry, society and the media. At a time when scientific findings are being incorporated into societal decision-making processes whilst also being subject to critical scrutiny – for instance on issues such as climate change, health, technology or sustainability – the need for ongoing communication between the scientific community and partial publics is becoming increasingly important.

Good science communication provides guidance, explains connections, but also highlights uncertainties or the limitations of scientific findings. At the same time, science communication is aimed at a wide variety of target groups and stakeholders, and the formats are correspondingly diverse: popular science articles, specialist papers, public lectures, social media, events, press releases, graphics, videos, websites, etc. The goal of all these activities is to spark interest in research, share knowledge, and foster dialogue between the scientific community and society. Whilst science communication has long been understood and practised in a one-dimensional way – from the scientific community to the public – modern communication must now also incorporate feedback, questions and perspectives from society, for example through social media, participatory workshops and public engagement. This enables research projects to better align with societal needs and strengthens trust in scientific institutions.

The DBFZ's target groups

The DBFZ's target groups comprise all stakeholders from the fields of politics, research, industry and society who have an interest in bioeconomy and bioenergy. This includes relevant scientific institutions (universities, non-university research institutions and research networks), as well as the Federal Ministry of Agriculture, Food and Regional Identity (BMLEH), other federal and state ministries, and further governmental and non-governmental national and international organisations, particularly from the agriculture and forestry sectors. The DBFZ also addresses downstream industries and economic sectors that are directly and indirectly affected by energy production and the material use from biomass. Furthermore, the DBFZ's research findings are communicated to the general public, who have a keen interest in the environmentally and climate-friendly, economically viable and socially responsible provision of bio-based products and energy.



Professor Nelles, why is science communication important to the DBFZ?

MICHAEL NELLES: This topic is becoming increasingly important not only within our research community but also for the DBFZ. Our funding bodies are increasingly required to assess how the funds they provide are being used and what impact they are having. As a modern research institution, we feel a responsibility in this context not only to conduct applied research but also to raise



Fig. 12: Prof. Dr. Michael Nelles, Scientific Managing Director of the DBFZ

“Our work is a dynamic process that thrives on discussion, review and further development. Making these processes transparent and understandable is the core of modern science communication.”

the profile of our relevant project outcomes. At the same time, we must engage our research topics even more actively than before in a broad societal debate on climate protection, the national energy transition and the development of a bio-based economy (bioeconomy). Good science communication is also a key success factor for our vital research collaboration with industry. And finally, we naturally wish to showcase our institution and our scientific excellence in the best possible light.

How can science communication effectively support the DBFZ’s strategic objectives?

MICHAEL NELLES: We are currently engaged in an in-depth strategic process at the DBFZ, centred on the development and establishment of five scientific research questions. These questions, and in particular the answers to be worked out, must be properly applied or implemented. Furthermore, we operate in a highly dynamic research environment in which we must position ourselves early and strategically in the right places with our research findings and scientific developments. To this end, effective, efficient and tailored science communication is a key driver.

In recent years, scepticism towards science has emerged in many quarters of society. Does research need to be communicated more effectively or in a different way?

MICHAEL NELLES: We have indeed observed for some time now that research in general, as well as specific research findings, is being called into question by certain interest groups and sections of the public. How to address this trend is a complex issue. Transparency and accountability in research are certainly key factors. In this regard, the DBFZ is already well on the way, for example in the area of open research data. In addition, trust must be continuously built up among the target groups. Ultimately, it is a matter of providing the right answers to key scientific and societal questions and presenting them in an accessible way that makes it clear how science works. Our work is a dynamic process that thrives on discussion, review and further development. Making these processes transparent and understandable is the core of modern science communication.

To what extent should research today proactively engage with public discourse or encourage action?

MICHAEL NELLES: Ever since the coronavirus pandemic, if not before, we have seen how important it is for the general public to be aware of and understand the scientific facts. Professor Drosten’s regular podcast was just one of many examples of how research topics that were previously largely unknown have now become widely known to the public. With our forward-looking topic of the circular bioeconomy, we are laying the scientific foundations for a wide range of policy decisions. Here, our policy advisory serves as the ideal interface between research and politics, which in turn is reflected in the public sphere. In addition, there are a wide range of topics on which we at the

DBFZ can and wish to contribute to the public discourse against the backdrop of the national energy transition and the development of a circular bioeconomy. Issues such as the reduction of harmful emissions, biofuels, biogas, greenhouse gas reduction, smart heat supply, waste and circular economy, etc., are just a few examples from the wide range of research projects we undertake that are of societal relevance.

What is science communication like at the DBFZ?

MICHAEL NELLES: We have a strong and highly dedicated team drawn from a wide range of disciplines. The colleagues involved have many years of experience in the press and media sector, are event specialists, trained media designers and professionals in the field of audiovisual storytelling. In my view, together we are excellently positioned to master the diverse challenges in this area, to professionalise the DBFZ’s public image and to further increase the organisation’s visibility. However, the primary responsibility for providing comprehensive information on renewable raw materials and the material and energy utilisation of biomass in general lies with the Agency for Renewable Resources (Fachagentur Nachwachsende Rohstoffe e. V.) and does not fall within the primary remit of the DBFZ’s science communication department.

Thank you very much for the interview.



Fig. 13: The DBFZ's Science Communication Team

Departments of science communication

Communication and Event Management

Since its foundation, the DBFZ has used events to raise the profile of its scientific activities, promote professional exchange and connect different stakeholders. The Communication and Events Management Department has been coordinating and organising these tasks centrally for several years. This is achieved through a wide range of event formats – from national and international specialist events such as the DBFZ Annual Conference, the Doctoral Colloquium BIO-ENERGY AND BIOBASED PRODUCTS, expert discussions and workshops, to public-facing formats such as the 'Long Night of Science', the 'Leipzig Night of Education' or 'Girls' Day/Boys' Day'. Visitor management also plays a part in conveying science in a clear and direct manner and providing insights into the DBFZ's research activities and research infrastructure.

→ Further information:
www.dbfz.de/en/events

Science communication in projects

The aim of project-based science communication is to present the content, results and significance of individual research projects to different target groups (e. g. the scientific community, industry, policymakers, the general public) and to communicate these throughout the entire course of the project. To this end, project communication utilises

a wide variety of science communication formats to achieve the communication objectives of the research projects. Project communication relies on traditional storytelling and journalistic presentation in the form of videos, illustrations, brochures or social media campaigns. If science communication is planned as an integral part of the project, it can effectively promote the project's success and facilitate dialogue with stakeholders.

Press and media

The aim of science communication within the 'Press and Media' department is to connect applied biomass research with the public and other relevant target groups via journalistic media. The overarching objective is to make complex scientific findings understandable, accurate and suitable for use in journalistic formats, news reports and digital media. This includes not only the drafting and distribution of press releases, but also responding to and coordinating journalistic enquiries and interviews, maintaining contacts with journalists, actively researching topics, preparing content for various media channels (e. g. the website and social media), and evaluating the press activities (campaigns) carried out. In addition, the 'Press and Media' department is responsible, among other things, for the content and formatting of various publications in the DBFZ series 'DBFZ Report', 'Conference Reader', 'Annual Reports' and special brochures.

→ **Further information:**
www.dbfz.de/en/press-media-library



"Events bring people together, make research accessible and facilitate genuine dialogue. At the DBFZ, we don't just present our findings; we also offer an insight into our work and our approach. In future, events will play an even greater role in sharing knowledge, building trust and working together to advance sustainable solutions."

Katja Lucke,
 Head of the "Communication and Event Management" department



"The demands placed on science communication in day-to-day research have expanded significantly: today, science communication increasingly supports research and researchers throughout the entire course of a project, thereby making a significant contribution to the clarity, accessibility and impact of scientific work, as well as to its reputation. As an integral part of modern research institutions, it simultaneously enhances the visibility of project outcomes and the strategic positioning of the institution."

Eva Siebenhühner,
 Project Manager for Science Communication in projects



"Press and media relations have long been an indispensable part of science communication, even before the digital age. At the DBFZ, we use a wide variety of channels and networks to showcase our diverse research topics in the media landscape and engage in scientific dialogue with our defined target groups."

Paul Trainer,
 Press and Media Coordinator

6

References from the research focus areas

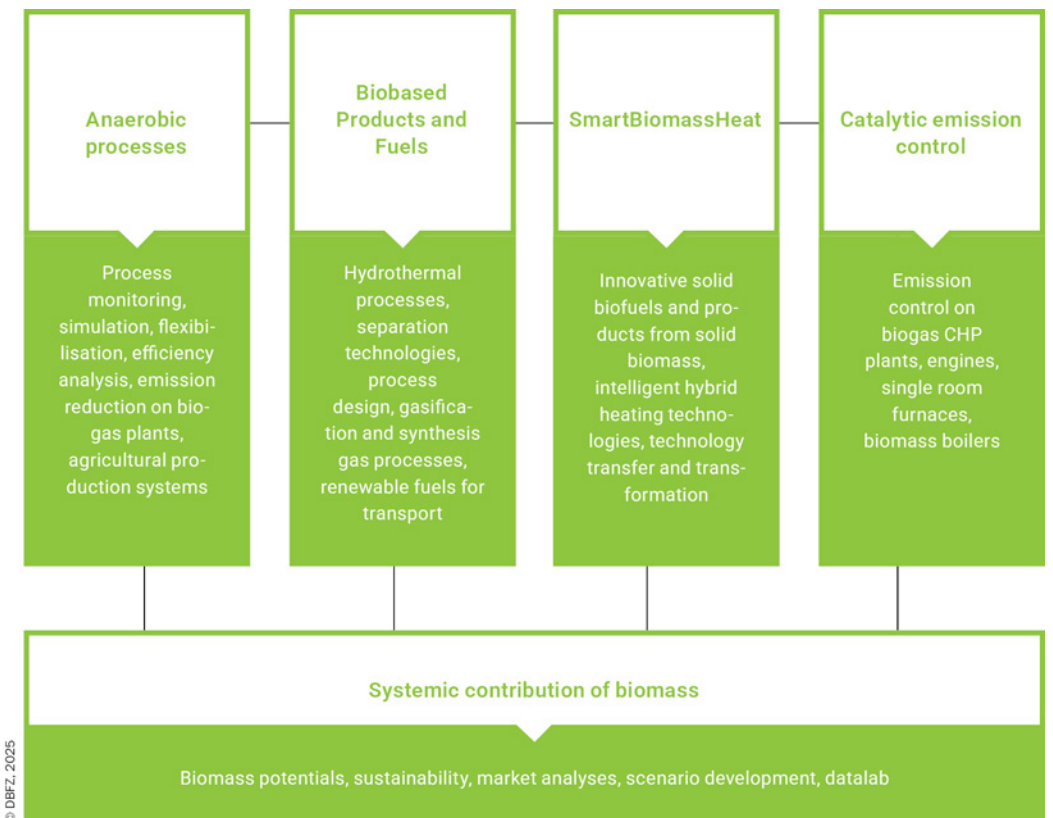


Fig. 14: The five key research focus areas of the DBFZ (as of February 2026)

Key research topics at the DBFZ are addressed through five research focus areas. These ensure that important aspects of bioenergy and the bioeconomy can be explored in the depth required for excellent research. The DBFZ's research focus areas are aligned with current and future research policy challenges and framework conditions

(e. g. the High-Tech Strategy for Germany, the National Bioeconomy Strategy, the Mobility and Fuel Strategy, and the EU Green Deal). Key factors shaping the scientific focus of these research focus areas also include the funding policy framework, the unique selling points within the research landscape, and the DBFZ's excellent research infrastructure.

→ **Further information:**
www.dbfz.de/en/research/research-focus-areas

6.1 KreisLauf: a new city tour demonstrates the potential of biogenic waste



“At the DBFZ, we investigate material flows, utilisation pathways and processing technologies for biogenic resources. These are mostly complex research questions, the details of which are as yet little known to the general public. This is precisely where the KreisLauf project comes in: as an accessible form of science communication, it aims to bridge this gap. Through this project, we are stepping out of the laboratory and bringing our research on the circular economy into people’s everyday lives.”

Dr. Romy Brödner,
Project manager

Kreis-Le (KreisLauf)

With *KreisLauf*, the DBFZ is breaking new ground in science communication, as there has never been a dedicated project of this kind at the institute before. The overall aim is to make research findings and scientific perspectives on the topics of the bioeconomy and circularity accessible to a wider public, and in particular to reach young adults in their immediate living environment. In doing so, *KreisLauf* aims to illustrate in a clear and accessible way how circularity can be achieved in everyday life. Knowledge transfer is combined with an urban experience, thereby opening up new perspectives. This goes beyond traditional sustainability concepts such as ‘Repair, Reuse, Recycle’. Visitors to the tour learn in a playful way how industrial waste materials are incorporated into new production processes, what potential lies hidden in green waste, and how human excrement can be transformed back into valuable raw materials.

The *KreisLauf* Leipzig is a joint project between the DBFZ, the Stadtreinigung Leipzig (Leipzig City Cleaning Authority) and Games XR Mitteldeutschland e. V. The tour takes in five marked stops across the city of Leipzig, showing where organic waste and residual materials are typically generated and how they can be recycled. The tour therefore passes through parks where green waste biomass is generated and past a university canteen that recycles its food waste daily. The route is marked by five wooden posts erected throughout the city. These posts indicate the route and also point to multimedia content on the topics mentioned. The *KreisLauf* will be a feature of Leipzig’s cityscape until the



Fig. 15: Participants at the ‘What’s in the green waste?’ station

end of 2026. During this period, the DBFZ and Stadtreinigung Leipzig will be responsible for maintaining the posts and operating the website. The project was funded by the Volkswagen Foundation as part of the ‘Circularity in Everyday Life – Ideas Competition’ funding programme.

Methods/Measures

The concept developed in 2025 focuses on the value creation from biological waste and residual materials, as well as their potential for the urban circular economy. The overarching question in each case is how the limited biomass resources available can be utilised sustainably and with maximum efficiency for the bioeconomy, both in terms of materials and energy. The project is based on the DBFZ resource database² on biogenic waste and

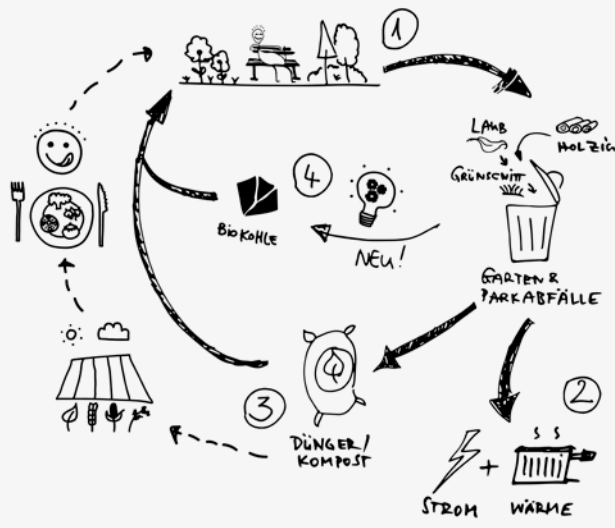
residues. The focus is on materials of organic origin that are generated in everyday urban life and have value-creation potential. Five stations illustrate different aspects of urban material flows:

1. Industrial waste in the vicinity of a busy shopping and dining area
2. Kitchen waste near a university canteen
3. Green waste in a public park
4. Human excrement near a public toilet
5. Biomass generated by traffic along a major transport route

Wooden posts bearing QR codes have been installed at these locations. Scanning them opens up multimedia content that provides further information. In this way, *KreisLauf* combines elements of geocaching, multimedia storytelling, knowledge sharing and traditional route tracking.

Feedback from participants shows that this connection highlights the relevance of the

² www.dbfz.de/en/resource-database



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Fig. 16: Infographic on the value created by green waste (see: www.dbfz.de/kreislauf-gruen)

topics. It also became clear that complex scientific content can be communicated in an accessible way through interactive and multimedia formats. The *KreisLauf* also strengthens the DBFZ's presence within the local community and demonstrates how scientific expertise can have a tangible impact on everyday life.

Milestones/Recommendations for action

The project began its substantive and organisational work in January 2025, culminating in its first public presentation in October 2025 as part of the launch event featuring *LiveWalk*. During a *LiveWalk* through Leipzig city centre, experts from the DBFZ and Stadtreinigung Leipzig presented the tour to interested members of the public. The tour took participants past various stations where it was explained how biogenic residues and waste materials can be kept in the *KreisLauf* for longer. In the same month, the team presented the project as part of the SAS Frühschicht Mitteldeutschland (SAS Early Shift, Central Germany). During the event, 100 young peo-

ple aged 13 and over spent a morning shift working to support the environment and the scientific community in the Central German Mining Region. As part of a *KreisLauf* workshop, the pupils learnt about the circular economy and then developed their own ideas on the topic, which were presented in a pitch to a high-profile jury – including Saxon Science Minister Sebastian Gemkow.

In December 2025, the project was presented at the Saxony Bioeconomy Forum and the Volkswagen Foundation's Circularity Forum. The latter was a meeting of grant recipients organised by the project sponsor. Here, a total of ten exciting projects clearly demonstrated how scientific findings on the topic of circularity can be communicated in a way that is both easy to understand and tailored to the target audience. All these experiences made it clear that a holistic approach is needed when it comes to funding:

- Projects such as *KreisLauf* demonstrate that effective science communication is only possible through a holistic campaign. It requires an interdisciplinary team comprising: scientists (for subject-mat-

ter expertise), communicators, graphic designers, video journalists (for visual presentation) and PR managers (for reach and impact). Only through the coordinated collaboration of these experts can broad impact and lasting learning outcomes be achieved.

- Funding in the field of science communication enables the implementation of comprehensive, professional campaigns in which all disciplines work together seamlessly. Without targeted funding, such projects would not be feasible in terms of scope and quality.
- Visually appealing, multimedia content evokes emotions, facilitates the understanding of complex topics and enhances participants' retention.
- The content is not merely conveyed; it remains in the public consciousness.
- By linking science with everyday life, the campaign helps to strengthen trust in science. This has a direct impact on the regional education and innovation landscape, promotes informed decision-making and raises public awareness of sustainable action.

Perspectives

The *KreisLauf* project has already achieved a great deal in Leipzig. The aim of the partners involved is to make the concept available to other cities and local authorities as well. The existing tour is also set to be expanded in terms of both technology and content. This includes translating the website into English and developing an audio guide. Ongoing marketing and communication for the project are also planned. To contribute to greater circularity in everyday life, an application to continue the project is planned for the coming months.

PROJECT SUMMARY

Duration:
01/01/2025–30/06/2026

Status:
Ongoing

Contact:
Dr. Romy Brödner, Eva Siebenhühner

Project number:
9E265

Project partner:
Stadtreinigung Leipzig,
Games XR Mitteldeutschland e. V.

Funding body:
VolkswagenStiftung



→ Find the *KreisLauf* and take part:
dbfz.de/kreislauf (german language)





Research focus area “Systemic Contribution of Biomass”

The research focus area “Systemic Contribution of Biomass” is intended to contribute to the development of sustainable bioenergy strategies at national and international level. To this end, regionally and globally available biomass potentials are determined and the diverse options of different biomass utilisation concepts are considered and evaluated. The overarching goal of this research focus is to answer methodological and system-related questions regarding the efficiency and sustainability of biomass use from an economic, ecological and technical point of

view, taking into account both the land resources used and the energy source-specific processing and conversion technologies. The combination of these topics provides the basis for deriving strategies and recommendations for decision-makers in politics and business.

→ Further information:

www.dbfz.de/en/research/research-focus-areas/systemic-contribution-of-biomass

Important reference projects and publications

Project: BCLOOKUP – Pyrolyse sekundärer landwirtschaftlicher Biomassen: Datenbank zu Pflanzkohle-Eigenschaften und agronomische Bewertung, Federal Ministry of Agriculture, Food and Regional Identity, 01.09.2023–31.08.2029 (FKZ: 2823HUM005)

Project: BeForce – Begleitforschung Bioenergie, Federal Ministry for Economic Affairs and Energy, 01.04.2021–31.03.2026 (FKZ: 03EI5400)

Project: BK-BiT – Stoffstroeme-BK: Analyse zum Rohstoff-, Technologie- und Nachhaltigkeitspotenzial biobasierter Kunststoffe in Deutschland; TV 2 – BK-BiT: Potenzialanalysen und Technologiebewertung für Biopolymere aus biogenen Rest-, Abfallstoffen und Nebenprodukten, Federal Ministry of Agriculture, Food and Regional Identity, 01.09.2024–31.08.2026 (FKZ: 2223NR075B)

Project: BOOST4BI – BOOST4BIOEAST, European Commission, 01.01.2024–31.12.2026 (GA 101133398)

Project: TRANSBIB – Nationales Transfer- und Beschleunigungsnetzwerk Industrielle Bioökonomie, Federal Ministry for Economic Affairs and Energy, 01.10.2023–30.09.2026 (FKZ: 13BDI10019)

Publication: Meisel, K.; Röder, L. S.; Dögnitz, N.; Götz, I. K.; Cyffka, K.-F. (2025). Marktrelevante Biopolymere: Technologie, Ökonomie & Nachhaltigkeit im Fokus. Mit Steckbriefen zu Biopolymertechnologien, Bewertungsergebnissen und Biomasseverfügbarkeiten. Fokusheft. Leipzig: DBFZ. 34 S. ISBN: 978-3-949807-18-3. DOI: 10.48480/1s3d-k833.

Publication: Nelles, M.; Backes, R.; Brödner, R.; Hartmann, I.; Knötig, P.; König, M.; Kornatz, P.; Lenz, V.;

Naegeli de Torres, F.; Naumann, K.; Radtke, K. S.; Schmidt, K.; Schmieder, U. (2026). “Verwertung biogener Abfälle und Reststoffe: Kohlenstoffquelle, Bioenergie & negative Emissionen”. Österreichische Wasser- und Abfallwirtschaft (ISSN: 0945-358X), Vol. 78, Nr. 1–2. S. 74–86. DOI: 10.1007/s00506-025-01183-3.

Publication: Siol, C.; Majer, S.; Thrän, D. (2025). “Integrating soil- and agro-ecosystem models into life cycle assessments of sustainable management of agricultural residues: A review in the context of Sustainable Development Goals and planetary boundaries”. The International Journal of Life Cycle Assessment (ISSN: 0948-3349), Vol. 30, Nr. 12. S. 2908–2924. DOI: 10.1007/s11367-025-02550-8.

Publication: Wollnik, R.; Szarka, N.; Matzner, N.; Otto, D.; Sadr, M.; Esmaeili Aliabadi, D.; Tremmel, R.; Röbbisch, J.; Thrän, D. (2025). “Scenario Storylines for Carbon Dioxide Removal in Germany: Drawing From Regional Perspectives”. GCB Bioenergy (ISSN: 1757-1693), Vol. 17, Nr. 9. DOI: 10.1111/gcbb.70075.

Publication: Wilske, B.; Cyffka, K.-F.; Kalcher, J.; Karras, T.; Selig, M.; Radke, K.-S.; Naegeli de Torres, Friederike Elisa; Brödner, R. (Mitarbeiter: Technische Informationsbibliothek (TIB); Deutsches Biomasseforschungszentrum) (2025). Aufbau eines systematischen Monitorings der Bioökonomie – Konsolidierungsphase: Teilvorhaben 2: Aktualisierung Reststoffmonitoring. Schlussbericht zum Projekt MoBi II : Konsolidierung und Aktualisierung Reststoffmonitoring (MoBi II); Berichtszeitraum: 01.11.2021-31.01.2025. Leipzig: DBFZ. 71 S. DOI: 10.2314/KXP:192896544X.



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6.2 HanfNRG: Project for the energetic use of residues from hemp processing



“The aim of the ‘HanfNRG’ project is to utilise waste materials from the hemp processing industry as cost-effective raw materials for bioenergy production and to identify economically and environmentally beneficial process chains for subsequent implementation in practical applications.”

Harald Wedwitschka,
Project Manager

Studies into the energy-related uses of hemp fibre waste materials with a view to their integration into the energy strategy of a processing site

In recent years, the hemp industry has developed into a growing sector of the economy, driven by new policy frameworks and innovative product areas. Hemp products are used in a range of industries, including food, pharmaceuticals, automotive, construction, textiles and paper. The area under industrial hemp cultivation has increased since 2017, and the hemp industry is forecast to continue growing. In 2025, 496 farms in Germany were growing industrial hemp across an area of 5,274 hectares [1]. The strongest growth in the hemp industry is occurring in the production of food and food additives made from hemp seeds, hemp oil and cannabidiol (CBD) oil. These sectors generate extraction residues as by-products, for which there are currently only limited opportunities for utilisation.

In industrial hemp fibre production, high-quality natural fibres are extracted from dried hemp straw; these are used, for example, in lightweight vehicle construction for the manufacture of vehicle dashboards and trim. Hemp fibres are also an established eco-friendly insulation material. Hemp insulation materials are characterised by a better carbon footprint and recyclability compared to conventional insulation materials such as mineral wool or polystyrene, and offer the possibility of sequestering carbon dioxide

within the insulation material for several decades.

In the production of natural fibre insulation materials from hemp, cellulose-containing residues are produced in roughly the same quantity as hemp fibres, which are the main product. There are currently few viable commercial applications for these residues. In view of the growing reliance on renewable energy supplies, dwindling resources and the critical debate surrounding the use of renewable raw materials for energy generation, the development of biogenic residues and waste materials for the production of efficient, storable, flexible and decentralised bioenergy sources is becoming increasingly important. The HanfNRG project aims to investigate energy utilisation options for hemp fibre residues with a view to their exemplary integration into the energy concept of a hemp fibre factory. The aim is to thereby increase the

competitiveness of ecological hemp insulation materials and further improve the carbon footprint.

The overall aim of the project was to expand the feedstock base for bioenergy production. The focus was on low-cost biomass residues from industrial hemp processing, and their suitability for use in biogas production and in thermal conversion processes – namely combustion, gasification, and pyrolysis – was investigated. In collaboration with the Hanffaser Uckermark eG cooperative, approaches were developed for implementing the processes in a hemp fibre factory.

Methods/Measures

Residual materials from the production of hemp fibre insulation can be irregular in nature and vary in quality. For this reason,



Fig. 17: Hemp fibres for industrial use



Fig. 18: Test beds for biogas digestion tests, biomass gasification tests and combustion trials

the collection, storage and pre-treatment of these residual materials were investigated in collaboration with the industry partner, with the aim of ensuring a year-round supply of residual biomass with optimal material properties for energy use. In a second step, the residual materials from hemp processing that were significant in terms of quantity were identified and sample material was procured. The chemical properties of hemp shives, filter dust and short fibres from hemp fibre extraction, as well as harvest residues from hemp straw harvesting and extraction residues from hemp food production, were subsequently analysed in the biogas laboratory and the analytical laboratory at the DBFZ.

The biogas potential and digestibility of selected waste materials and mixtures were determined in long-term digestion trials. The aim was to gain initial insights into the biogas potential and potential biological and technical challenges associated with the digestion of waste materials. The pelletisation and addition of additives to the waste materials were also investigated, and comprehensive combustion and gasification tests were carried out. The objective was to derive recommendations regarding fuel and plant technology for the combustion and gasification of the waste materials in pellet form, including a classification for regulatory approval purposes.

Milestones/Challenges

Various challenges have arisen during the course of the project. In addition to irregular waste generation and fluctuating input quality, the current practice of storing waste outdoors results in storage losses. The project has enabled the necessary adjustments to internal operational processes to be implemented, allowing for improved waste

collection and storage, as well as optimisation of mechanical pre-treatment. Thanks to these individual measures, a consistent input quality of the waste is now ensured throughout the year.

Material analyses have revealed that the residual materials have a very low bulk density of approximately 100–140 kg/m³, which has a negative impact on transportability and storage space requirements. This makes it difficult to utilise the residual materials for energy purposes at a location other than in the immediate vicinity of the point of generation. Even if a pellet press is already available at the processing site, compacting the residual materials can only be considered a viable solution if the necessary energy input and additional labour costs are justified by the outcome.

Practical fuel trials demonstrated that conventional screw conveyors presented a higher risk of failure when feeding loose waste material, which is why a modified feeding system is recommended. Nevertheless, through a careful processing procedure, it was possible to produce homogeneous pellet fuels from the mixed waste materials, which can be classified as fuel class B. The quality of the hemp pellets was assessed through chemical and fuel-specific analyses. Compared to wood pellets, the hemp pellet batches exhibited higher ash content and comply with fuel class B according to ISO 17225-6 [2].

When burning hemp pellets, significantly higher emission levels and increased ash formation were observed compared to the ENPlus wood pellet reference fuel. In the combustion chamber, the high ash formation impaired air-fuel contact. Consequently, incomplete combustion occurred, leading to increased CO concentrations of approximately 500 mg/Nm³ (based on 13 vol. % O₂

in the flue gas). The addition of kaolin to the pellets did not result in a significant reduction in CO emissions. However, a reduction in NO_x emissions and in the dust concentration in the flue gas was observed. The combustion tests carried out showed that, under the operating conditions investigated, hemp pellets do not comply with the requirements of the 1st BImSchV regarding CO emissions and dust content.

The results of the waste gasification tests were comparatively better. In the four preliminary tests carried out, the pyrolysis and CO₂ gasification behaviour of the hemp pellets was comparable to that of DIN+ wood pellets. The gas composition, coke formation and reaction stability were unremarkable and stable in all tests.

Biogas potential tests have demonstrated that the material is generally suitable as a biogas substrate. However, the residues require pre-treatment by pre-shredding to protect the pump and agitator systems from long plant fibres. It has been observed that fibres that are difficult to break down can promote the formation of a floating layer during the fermentation process. In long-term fermentation trials, a liquid co-substrate had to be used to ensure long-term mixing within the fermenter. In practical operation, the use of suitable paddle agitators is also recommended when working with challenging substrates. Methane production from the waste material samples investigated ranged from approximately 130–202 ml CH₄/g DM in batch tests and long-term fermentation trials. By comparison, other fibre-rich biogas substrates, such as wheat straw, can exhibit a 15 % higher methane potential. The fermentation tests demonstrated that a 10 % increase in gas potential can be achieved through mechanical substrate pretreatment. However, given the necessary material conditioning and the low energy yield, the utiliza-

tion of fibre-containing residues from hemp processing via the biogas process appears challenging. Due to the higher demands placed on the digestion of residues, an expanded concept was developed that aims at the fermentative extraction of long fibres for technical textile applications and includes the digestion of the resulting by-products [3]. High-quality utilisation of the digestate could further enhance the prospects for the biogas process.

Perspectives

Based on the results of the trials, the industry partner is now aiming to utilise waste materials thermally with the aim of generating process heat. Hanffaser Uckermark eG is currently in discussions with boiler and gasifier manufacturers to plan the first pilot-scale trials. Scientific support for the practical trials by the DBFZ is being sought, as the results would be applicable to a wide variety of fibre-rich residues. Research is needed, among other things, to adapt boiler and gasifier technology to the loose and ash-rich feedstock. Improving the emission behaviour of the fuels is also a priority. Optimising ash removal in the combustion boiler to improve the combustion process could be a promising approach. The laboratory trials on fermentative fibre refinement were promising, which is why the further development and practical implementation of the process are being pursued.

Sources

- [1] Nutzhanfanbau 2025, Bundesinformationszentrum Landwirtschaft, Federal Office for Agriculture and Food (www.ble.de/nutzhanf)
- [2] DIN EN ISO 17225-6:2021-11 Biogene Festbrennstoffe - Brennstoffspezifikationen und -klassen – Teil 6: Klassifizierung von nicht-holzartigen Pellets (ISO 17225-6:2021); German version EN ISO 17225-6:2021
- [3] Harsányi, J., Poraj-Kobielska, M., Wedwitschka, H. et al. Controlled anaerobic water retting of flax as part of an innovative biorefinery process. *Biomass Conv. Bioref.* 15, 16499–16510 (2025). <https://doi.org/10.1007/s13399-024-06452-x>

→ Further information:
www.dbfz.de/en/hanfng

PROJECT SUMMARY

Duration:

01/10/2022–31/12/2025

Status:

Finished

Project partner:

Hanffaser Uckermark eG

Contact:

Harald Wedwitschka,
Rafiandy Dwi Putra,
André Herrmann

Project number:

03E15448

Funding body:

Federal Ministry for Economic
Affairs and Energy,
7th Energy Research Programme
“Innovations for the Energy
Transition” – Biomass to Energy/
Project Management Jülich



Supported by:



on the basis of a decision
by the German Bundestag



Research focus area “Anaerobic Processes”

Microbial processes of biomass conversion under anaerobic conditions are the basis for a multitude of biotechnological processes for the provision of energy sources and materials used as raw materials. In the research area “Anaerobic Processes”, efficient and flexible processes for the production of biogas are developed with priority for the requirements of the future energy system. A higher added value is achieved by coupling to processes for material utilisation. In the research focus, tools for process monitoring

and control, concepts for flexible, low-emission plants and operating regimes, methods for evaluating and optimising efficiency, and processes for maximising material conversion, particularly for difficult substrates, are being developed.

→ Further information:

www.dbfz.de/en/research/research-focus-areas/anaerobic-processes

Important reference projects and publications:

Project: BIOMETHA – Demonstration und Vernetzung von Produktionsinnovationen im Biomethan-Universum (BIOMETHAVERSE), European Commission, 01.10.2022–31.03.2027 (FKZ: 101084200)

Project: BiTop – BiToP Prozessoptimierung eines Bioraffinationsverfahrens zur Gärrestaufbereitung mit dem Ziel der Gewinnung von Torfersatzstoffen unter Praxisbedingungen an Biogasanlagen; TV 2 DBFZ: Prozesskettenoptimierung, Ökonomische Bewertung und regionale Übertragbarkeit dezentraler Strategien, Federal Ministry of Agriculture, Food and Regional Identity, 01.12.2024–31.12.2026 (FKZ: 2224MT005B)

Project: EEGMon – Vorbereitung und Begleitung bei der Erstellung eines Erfahrungsberichtes gemäß § 99 Erneuerbare-Energien-Gesetz (EEG 2023) zum spartenspezifischen Vorhaben “Stromerzeugung aus Biomasse, Gülle, Biomethan sowie Klär-, Deponie- und Grubengas”, Federal Ministry for Economic Affairs and Energy, 15.11.2023–14.11.2027

Project: EmmiLa – Verbundvorhaben: Biogaserzeugung aus Wirtschaftsdünger: Emissionsminimierte Wirtschaftsdüngerlagerung TV 1: “Gesamtkonzeption, Koordination, Entwicklung, wissenschaftliche Begleitung und Wissenstransfer”, Federal Ministry of Agriculture, Food and Regional Identity, 01.10.2024–30.09.2027 (FKZ: 2224NR031A)

Project: SynCon – Quantifizierung einer Gruppe von syntrophen Bakterien als neuer Biomarker zur besseren Steuerung von Biogasfermentern, Project Management Jülich (PTJ), 01.09.2024–28.02.2027 (FKZ: 03EI5476C)

Publication: d’Espiney, A.; Pinheiro, H. M.; Marques, I. P.; Kretzschmar, J.; Cyffka, K.-F.; Thrän, D. (2025). “Biomass and bioenergy potentials of bioreidues: assessment methodology development and application to the region of Lafões”. *Biomass Conversion and Biorefinery* (ISSN: 2190-6815), Vol. 15, Nr. 1. S. 359–373. DOI: 10.1007/s13399-023-05168-8.

Publication: Matlach, J.; Knoll, L.; Reinelt, T.; Cuhls, C.; Stinner, W.; Daniel-Gromke, J. (2025). “Greenhouse gas emissions from anaerobic and aerobic treatment of biowaste and green waste”. *Waste Management* (ISSN: 0956-053X), Nr. 207. DOI: 10.1016/j.wasman.2025.115097.

Publication: Meola, A.; Wolf, K.; Weinrich, S. (2025). “Meta-tuning and fast optimization of machine learning models for dynamic methane prediction in anaerobic digestion”. *Bioresource Technology* (ISSN: 0960-8524), Nr. 432. DOI: 10.1016/j.biortech.2025.132654.

Publication: Pouresmaeil, S.; Schliermann, T.; Schmidt, M.; Harnisch, F.; Kretzschmar, J. (2025). “Biochar Cathodes for Bioelectrochemical Systems: Understanding the Effect of Material Heterogeneity on Performance for Abiotic Hydrogen Evolution Reaction”. *ChemElectroChem* (ISSN: 2196-0216), Vol. 12, Nr. 20. DOI: 10.1002/celec.202500008.

Publication: Weber, S. N.; Ulrich, N.; Mühlenberg, J.; Engler, N.; Nelles, M. (2025). “Determination of veterinary antibiotics in German poultry manure by ultrasonic assisted extraction and QuEChERS coupled with LC-MS/MS”. *Talanta Open* (ISSN: 2666-8319), Nr. 12. S. 100592. DOI: 10.1016/j.talo.2025.100592.



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6.3 MoVeE: Monitoring report on renewable energies in transport



MoVeE – Renewable energies in transport

There are only a few decades left to achieve the climate neutrality targets set for Germany (by 2045) and globally (by 2050). The transport sector plays a key role, accounting for around 20 % of greenhouse gas emissions. Analyses show that these targets can only be met if all available measures are implemented in a sensible and coordinated manner. These include: reducing traffic, shifting to climate-friendly modes of transport, electrifying vehicle propulsion systems, and using renewable fuels. Without an integrated energy transition, the climate targets for transport cannot be achieved.

The monitoring report on renewable energies in transport describes the current status of the energy transition in the transport sector and assesses developments at national, European and global levels. In addition to a detailed analysis of the current state of the transport sector and its energy requirements, the new monitoring report [1] also outlines the legal framework and policy objectives. In addition, technologies for the production of renewable fuels, resource potentials, market indicators and environmental and economic assessments are presented. A new chapter, 'The Challenge of the Energy Transition in Transport', has been included, which contextualises the status quo against climate targets and describes key success factors for a successful energy transition.

The aim of the monitoring programme is to provide reliable data for policymakers, researchers and industry. The information

“The use of renewable electricity and renewable fuels is central for the energy transition in the transport sector. However, they currently account for just under 5 % of global energy demand; mineral oil remains the most important resource for fuels. Establishing a competitive renewable energy sector requires an integrated approach: long-term, binding targets and measures must be linked to the transformation of existing refineries into green refineries and the early mobilisation of renewable resources. MoVeE contextualises these requirements within the framework of current developments and challenges in the transport sector.”

Dr. Kati Görsch/Jörg Schröder
Project Management



Fig. 19: Monitoring Report: 'Renewable Energies in Transport'

is intended to highlight the urgent need to build production capacity, adapt existing infrastructure and promote technologies. At the same time, the findings should raise open research questions, such as those concerning the design of green refineries and the infrastructure required to mobilise previously unused or underutilised resources for innovative production facilities.

Methods

The report is based on a comprehensive review, analysis and contextualisation of existing data on the topics covered. In particular, the analyses were based on national and international statistical data, regulatory information, climate scenarios, scientific publications and existing DBFZ publications. The contents of the individual chapters are listed below:

1. **The challenge of the energy transition in transport:** Current and future energy

requirements and energy supply, sensitivities of selected assumptions, and factors for the success of the energy transition (see also the information in the next section)

2. **Transport and its infrastructure:** Current situation regarding transport performance, vehicle fleet, refuelling and charging infrastructure, final energy consumption, and greenhouse gas emissions in transport
3. **Political and legal framework:** regulatory framework for fuel production, fuel trade, transport infrastructure and vehicles
4. **Fuel supply technologies:** process description, technological readiness level, relevant stakeholders and research needs for 36 different technologies for converting renewable resources into renewable liquid and gaseous energy carriers or intermediate products
5. **Resources:** Overview of suitable resources, current status of resource use, resource potential and fuel potential

6. **Market indicators:** Established and planned capacities, production volumes, trade and use of various renewable energy carriers
7. **Application:** Fuel standards and labelling, fuel quality parameters, safety aspects and handling, requirements for refuelling infrastructure, fuel distribution, and the use of renewable energy carriers in engines
8. **Ecology:** Sustainability requirements and GHG emissions from energy carriers, exhaust emissions and GHG emissions throughout the vehicle lifecycle
9. **Economics:** Costs and prices of energy carriers

In addition, ten side notes and three articles written by guest authors addressed cross-cutting issues such as the technical challenges of the energy transition in aviation (article) or the need for a comprehensive biomass strategy (side note).

The challenge of the energy transition in transport

In 2023, global energy demand for transport stood at over 120 EJ. Around 800 oil refineries met 90 % of this demand. The remaining demand was met by natural gas (5 EJ), electricity (2 EJ) and biofuels (5 EJ). In 2023, there were approximately 2,100 production facilities available for the production of biofuels such as bioethanol, biodiesel (FAME) and HVO/HEFA. A comparison of the volumes of fuel produced by oil refineries and biofuel plants highlights the immense challenges involved in the energy transition towards climate-neutral transport.

In future, depending on the climate neutrality scenario analysed, less energy will be required for transport than today (80–110 EJ). This is due to the growing global importance

of electrification. Nevertheless, fuel demand will remain immense in future, at 32–85 EJ. Ideally, the available plant capacity for renewable fuels will almost double by 2030. Nevertheless, a large number of additional plants must be planned and commissioned within a very short timeframe. This demand is met with a series of technical challenges that must be resolved to ensure success:

- The demand for fuel infrastructure depends to a large extent on current trends in mobility. In the EU, it is assumed that the widespread electrification of road transport is achievable. Should this electrification fail to materialise to the extent planned, the pressure to act will increase to expand suitable fuel capacities and mobilise suitable renewable resources. In the case of biogenic resources, this involves, amongst other things, their systematic collection, quality assurance and conversion into suitable intermediates. When using non-biogenic resources, an extremely ambitious expansion of capacity for electrolysis and CO₂ capture is required.
- The provision of renewable (liquid) energy carriers requires adjustments to the established infrastructure in almost all areas. Resilient infrastructure measures are required to supply green refineries with hydrogen and CO₂, as well as for grid connections. Sufficient storage capacity is required at the respective plant or refinery sites for the use of biogenic resources.
- A significant proportion of the potential technologies are not yet market-ready due to their level of technological readiness. These technologies go through various stages of development – from the initial idea through scaling up to market establishment. As a rule, these stages cannot be bypassed. In particular, the construction of a first-of-a-kind plant on a commercial scale involves high risks.

- The time and financial costs involved in building refineries and their infrastructure must be assessed realistically. The duration of such large-scale projects is influenced by factors such as approval procedures, the availability of specialist equipment or a shortage of skilled workers.

There are numerous political and social measures available to address these challenges. In the context of renewable energy carriers, the following points are of greater importance and are regularly highlighted by industry and the research community:

- Creating a secure investment environment is crucial for building additional capacity for renewable fuels. This involves developing consistent and harmonised regulations, as well as binding, long-term targets to promote a competitive renewable economy.
- Existing oil refinery infrastructure must be gradually converted into renewable multi-product refineries.
- The widespread mobilisation of suitable biomass and non-biogenic renewable resources must take place in parallel with the development of plant capacity and associated infrastructure.

Perspectives for renewable energy sources in transport

There are over 60 million vehicles on the road in Germany, the majority of which are powered by internal combustion engines and fossil fuels, with only a small proportion of renewable fuels. With a view to achieving climate neutrality, electrification should be prioritised in all relevant transport sectors due to the significant potential for energy savings. Nevertheless, the outlook suggests that some forms of transport will continue to rely on fossil fuels. For these sectors, it

makes sense to use targeted, pure renewable fuels instead of fossil fuel blends, alongside at least partial electrification of the powertrains. However, the challenges involved in producing renewable fuels will increase massively as demand rises, as the potential of the biofuels currently in widespread use is severely limited depending on the resources employed. Expanding the available technologies and usable resources to include options not yet established on the market is essential for both biomass- and electricity-based concepts. However, the type of energy carrier depends heavily on the specific mode of transport and the performance requirements of the powertrain. Figure 20 interprets the fuel data collected in the report using various evaluation criteria to suggest a possible classification by area of application for Germany in 2045:

- Passenger cars, motorcycles, rail vehicles, buses and commercial vehicles can be powered almost entirely by battery-electric systems. Other propulsion options will only be marginally competitive in these segments in the future.
- The remaining fleet of vehicles with internal combustion engines in 2045 will, in these segments, be powered predominantly by renewable fuels such as HVO diesel derived from hydroprocessed vegetable oils and methanol-to-gasoline (MTG) blended with bioethanol.
- In long-distance heavy-duty transport and for buses, additional alternative propulsion concepts such as fuel cells are conceivable.
- For agricultural and forestry machinery, vegetable oil fuel from regional production is also an attractive option.
- Due to high performance requirements and the international regulatory framework, shipping and aviation are considered to be the most difficult transport systems to electrify. Apart from smaller electric inland



Fig. 20: Use of selected renewable energy sources in 2045

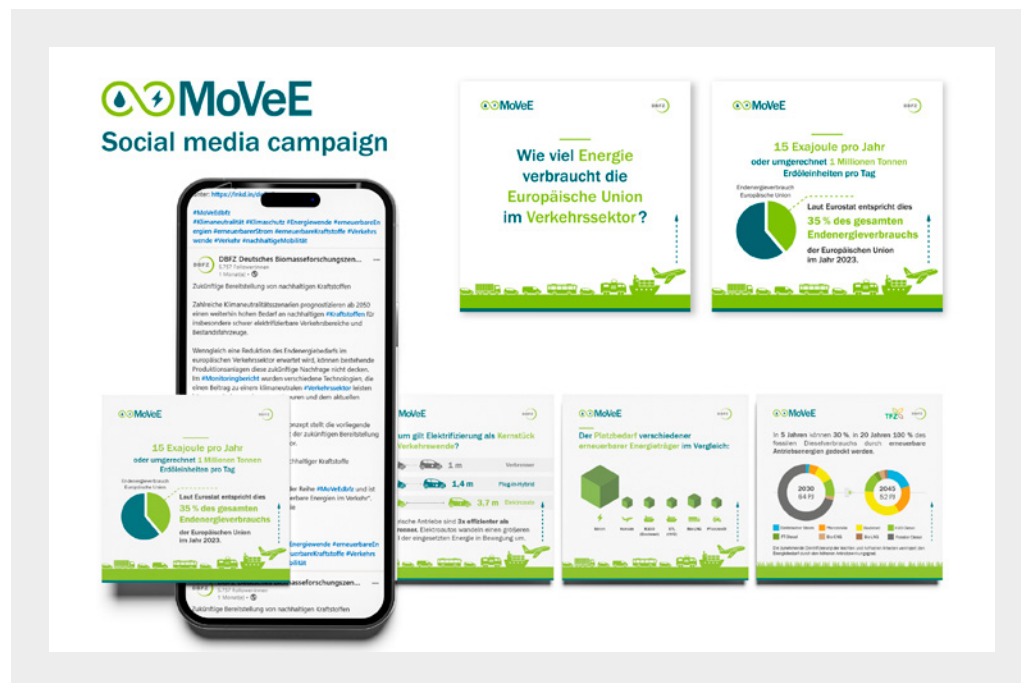


Fig. 21: "MoveE" social media campaign on LinkedIn

vessels and light aircraft, the majority will continue to require liquid fuels, which will become fully renewable in the long term (possibly not until well after 2045). The main options here are paraffinic aviation fuels derived from hydroprocessed esters and fatty acids (HEFA-SPK), Alcohol-to-Jet (ATJ), Methanol-to-Jet (MTJ) or Fischer-Tropsch-SPK, as well as marine fuels such as biodiesel (FAME), LNG and methanol.

Looking ahead to 2045, it is conceivable that established renewable options such as FAME or bioethanol will lose significance in their current applications in land transport. For example, in future, the resources currently used for FAME – vegetable oils and used cooking fats – could also be used in HVO/HEFA plants, whilst the resources currently used for bioethanol could be deployed for the production of ATJ, with the aviation sector as the target market.

This report is a continuation and expansion of the previous DBFZ Reports No. 11 (Monitoring the Biofuel Sector) and No. 44 (Monitoring Renewable Energies in Transport): To improve the digital readability, a new desktop-optimised layout in 16 : 9 format has been used. The monitoring report is published digitally in German and English. Individual figures can also be downloaded from the download section of the relevant website. To ensure targeted scientific communication, the results were made available to specialist audiences and the interested public through a Leipzig biofuel expert talk, various scientific presentations and a LinkedIn communication series (#MoVeEdbfz). In the future, a web-based information tool (in fact-sheet format) on the technologies and products covered in the report will be made available on the website.

Source

[1] Schröder, J.; Görsch, K. (Eds.) (Contributors: Schröder, J.; Görsch, K.; Dögnitz, N.; Hauschild, S.; Naumann, K.; Götz, I. K.; Klüpfel, C.; Cyffka, K.-F.; Nieß, S.; Meisel, K.; Etzold, H.; Lenz, C. N.; Paiva, G. C. de; Thuneke, K.; Remmele, E.; Emberger, P.; Tuschewitzki, W.; Prieß, T.; Mendler, F.; Neuling, U.; Zitscher, T.; Bauer, C.; Sacchi, R.; Köchermann, J.) (2026). Renewable Energies in Transport: Monitoring Report. Leipzig: DBFZ. 204 pages. ISBN:978-3-949807-36-7. DOI: 10.48480/45hp-x131

PROJECT SUMMARY

Duration:
Ongoing

Status:
In progress

Contact:
Jörg Schröder, Dr. Kati Görsch

Funding body:
Own funds and, to a lesser extent, the Federal Ministry of Transport through relevant funding projects.

➔ **Further information:**
www.dbfz.de/en/monitoring-renewables-transport



Research focus area “Biobased Products and Fuels”

The research focus area “Biobased Products and Fuels” investigates the entire process chains of biorefineries. In addition to developing processes and concepts for the bioeconomy, the work also includes implementation on a laboratory and pilot plant scale, as well as technology assessment. The overarching goal is to contribute to flexible, highly efficient and sustainable biorefinery concepts using innovative technological approaches. To this end, chemical refining processes are being researched with a focus on hydrothermal processes (HTP) and hydro-treatment. The development of fractionation processes for solid-liquid and liquid-liquid separation plays an important role as a link between the individual research topics (e. g. in connection with anaerobic processes and HTP intermediate products).

Another building block is the development of synthesis gas processes for the production

of high-quality products, with biomethane being the main focus. Synergies between the topics are addressed in joint projects. To this end, the work in the research focus area concentrates on (i) the analysis of relevant individual processes and necessary system components, (ii) preliminary experiments for selected individual processes (e. g. HTP, gasification, methanation, separation technology) and (iii) the preparation of an accompanying technology assessment (focus: material and energy balancing, costs and economic efficiency, environmental effects).

→ **Further information:**
www.dbfz.de/en/research/research-focus-areas/biobased-products-and-fuels

Important reference projects and publications

- Project:** AltCell2 – Alternative Cellulosequellen für künstliche Cellulosefasern 2, Federal Ministry of Research, Technology and Space, 01.08.2025–31.01.2028 (FKZ: 03WIR3810C)
- Project:** HemiCoat – Konversion von Hemicellulose zu Beschichtungen, Federal Ministry for Economic Affairs and Energy, 01.09.2024–31.08.2026 (FKZ: 01IF00399C)
- Project:** NEXTSTEP – Next-gen of sustainable bio-based chemical platforms and polymers: enhancing sustainability in European industry, European Commission, 01.06.2024–31.05.2028 (FKZ: Project 101157081)
- Project:** P-SBG1b – Pilot-SBG | Bioressourcen und Wasserstoff zu Methan als Kraftstoff – Forschungsbetrieb und Konzeptoptimierung einer Anlage im Pilotmaßstab, Federal Ministry of Transport, 01.01.2023–30.06.2027
- Project:** REF4FU – Erneuerbare Kraftstoffe in grünen Raffinerien der Zukunft, Federal Ministry of Transport, 01.12.2022–30.09.2026 (FKZ: 16RK24001C)
- Publication:** Dietrich, S.; Etzold, H.; Oehmichen, K.; Naumann, K. (2025). *Wasserstoffbereitstellung: Erzeugung und Logistik von grünem Wasserstoff. Fokusheft im Projekt Pilot-SBG*. Leipzig: DBFZ. 51 S. ISBN: 978-3-949807-34-3. DOI: 10.48480/AQDQ-GR59.

- Publication:** Etzold, H.; Dögnitz, N.; Naumann, K. (2025). “Modellierung der deutschen Treibhausgas-minderungsquote im Verkehrssektor mittels Merit-Order-Ansatz auf Basis von Treibhausgas-vermeidungskosten”. *Zeitschrift für Energiewirtschaft* (ISSN: 0343-5377), Vol. 49, Nr. 1. S. 38–57. DOI: 10.1007/s12398-025-1301-0.
- Publication:** Klüpfel, C.; Yuan, B.; Biller, P.; Herklotz, B. (2025). “Hydrothermal liquefaction as a treatment technology for anaerobic digestate: A review”. *Renewable and Sustainable Energy Reviews* (ISSN: 1364-0321), Nr. 210. DOI: 10.1016/j.rser.2024.115156.
- Publication:** Köchermann, J. (2025). *Hydrothermal Conversion of Hemicellulose Sugars for the Production of Furfural: Doctoral thesis*. Leipzig: DBFZ. XXIV, 99 S. (DBFZ-Report, 53). ISBN: 978-3-949807-26-8. DOI: 10.48480/ecn9-4k74.
- Publication:** Röder, L. S. (2025). *Strategies for Demand Side Management in Biorefineries: Exploring New Frontiers in Enhancing Load Flexibility and Optimization. Doctoral thesis*. Leipzig: DBFZ. XVI, 11–159 S. (DBFZ-Report, 52). ISBN: 978-3-949807-25-1. DOI: 10.48480/b5h4-wf36



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6.4 HeRoTogo: Development of a roadmap for the transition to biomass-based heat generation in Togo



“The project ‘HeRoTogo’ is developing a roadmap for sustainable, biomass-based heat generation in Togo. The focus is on efficient technologies and the responsible use of resources in order to reduce pressure on forests. Selected solutions will be tested under real-world conditions to assess their environmental and climate benefits.”

Dr. Dennis Krüger,
Project Manager

HeroTogo – Development of a roadmap for sustainable heat generation using biomass in Togo and demonstration of selected technologies across the entire value chain

Billions of people worldwide still rely on firewood and charcoal to meet their daily energy needs. Across Africa, limited access to efficient and affordable fuels and technologies means that biomass remains the primary source of energy for cooking and heating, not only in households but also in small local businesses [1]. As energy demand grows, this widespread use of firewood and charcoal increases the pressure on forests and is one of the main causes of deforestation. Togo is one of the countries where these challenges are particularly acute. Biomass accounts for around 80 per cent of household energy consumption, primarily for cooking and small-scale heating [2]. Consequently, pressure on forest resources has increased significantly in recent decades, with deforestation and forest degradation reaching alarming levels. These developments threaten biodiversity, soil stability, water regulation and the livelihoods of the rural population. At the same time, inefficient technologies cause high levels of pollutant emissions, exacerbate indoor air pollution and the associated health risks, whilst also increasing greenhouse gas emissions.



Fig. 22: The APELI cooker developed at the DBFZ

Against this backdrop, earlier work carried out as part of the ‘LabTogo’ project laid the foundations for the development of innovative solutions for clean cooking that are adapted to local conditions in Togo [3]. Funded by the Federal Ministry of Research, Technology and Space (BMFTR), the project focused, among other things, on developing a cost-effective, efficient, low-emission and fuel-flexible biomass cooker made from locally available materials and waste products. In close collaboration with local partners, the APELI cooker was developed and successfully tested in the field by users over several years [4]. Building on these experiences, the ‘HeRoTogo’ project was launched in 2024 to further address the environmental and energy challenges associated with Togo’s heavy reliance on traditional biomass [5]. Recognising that biomass will continue to play a central role in heat supply for the foreseeable

future, the project focuses on improving existing practices. The overarching objective is to develop a practical roadmap for sustainable, biomass-based heat generation that identifies more efficient technologies and resource utilisation pathways, reduces pressure on forest resources and ensures access to basic energy services.

Methods/Measures

HeRoTogo takes an integrated, practice-oriented approach to technology development, combining local production with field trials under real-world conditions. The project examines the entire biomass heating chain, thereby enabling a systematic comparison of environmental, climate and health impacts with existing practices. Locally adapted solutions, including improved stoves, the

sustainable production of fuels from residues, low-emission heat generation and alternatives to conventional charcoal, are investigated as interconnected elements of an overarching system. The findings will be consolidated into a comprehensive roadmap that supports policymakers and other stakeholders in making informed decisions and contributes to reduced deforestation, better health outcomes and more sustainable biomass-based heating systems in Togo.

A key element of the project is the demonstration and evaluation of locally producible technologies under practical conditions. At selected sites such as Lomé and Kpalimé, manufacturing processes for advanced biomass cookers will be established to assess

technical feasibility, production quality, maintenance requirements and scalability. These activities enable the identification of potential for optimisation, as well as economic and institutional barriers relating to local production, distribution and market launch. On this basis, viable business and implementation models will be developed to support long-term sustainability. In parallel, the project is implementing measures to improve the availability and sustainability of biomass fuels. Locally available biomass residues are being used to produce standardised fuels suitable for efficient and low-emission heating technologies. Different production pathways are being tested to take account of local resource availability and organisational structures.

Abb. 23: Field test of the new cooking stove in Togo



To address biomass consumption in high-temperature and commercial heating applications, the project is developing and testing low-emission heat generation systems that can be fuelled by biomass residues. These systems are integrated into local production processes and complemented by the development of cost-effective insulation materials made from locally available raw materials. This approach reduces fuel requirements whilst expanding the potential applications of sustainable biomass-based heat beyond cooking. A further key measure aims to replace unsustainably produced charcoal with biochar-based fuels made from biomass residues. Combined systems for biochar production and briquetting are being implemented and tested to increase conversion efficiency and reduce emissions. User feedback on fuel performance and price plays a central role in optimising these systems and assessing their market potential.

All findings will be consolidated into a practical, evidence-based roadmap, and the technical insights will be translated into actionable recommendations for a more efficient, low-emission and forest-friendly biomass-based heating sector.

Milestones/Challenges

Several key milestones marked the launch of the project and the early implementation phase of HeRoTogo. The project officially began with a kick-off meeting in Togo in April 2024, at which all project partners came together to agree on objectives, roles and the overarching implementation strategy. A further important milestone followed with the appointment and induction of the local project coordinators. One project coordinator was appointed for Lomé and another for Kpalimé, both of whom officially took up their posts in December 2024. This significantly

strengthened the project's local presence and ensured continuous coordination with partners, producers and local users. This step was crucial for translating the project objectives into concrete activities and enabling day-to-day implementation under local conditions.

Project leader Dr. Dennis Krüger, together with DBFZ scientist Wiebke Wedekind, carried out several on-site visits to Togo to support implementation and strengthen cooperation with local stakeholders. An initial project visit took place in May 2024. During this visit, in-depth discussions were held with Togolese partners to discuss the first practical steps and assess the local conditions. Key project sites in Lomé, Dèvéme and Kpalimé were visited. A second visit followed in 2025 and focused in particular on identifying potential local production sites for the APELI stove developed at the DBFZ, as well as on assessing locally available waste materials or fast-growing biomass for fuel production. During this visit, sample productions of individual stove components were assessed; these had been manufactured on a trial basis by specialised local producers in accordance with the instructions as part of a comparative evaluation. In Kpalimé, the project team also met with Mr. Yawo Dogbatse, Mayor of Kpalimé and Chair of the Covenant of Mayors in Sub-Saharan Africa, to present the objectives and activities of the HeRoTogo project and discuss current local developments. In addition, APELI cookers that have been in operation at the field test site since 2022 were serviced. Discussions were also held with users regarding performance, handling and possible further adjustments.

In addition to these milestones, the project also faces a number of challenges. Logistical constraints remain a significant issue, particularly when it comes to sourcing specific technical components such as electric fans,



Fig. 24: DBFZ researchers Dr. Dennis Krüger (centre) and Wiebke Wedekind (bottom row, second from the right) during a field visit to Togo

which have to be procured from outside Togo. This results in longer delivery times and higher costs. Furthermore, the fluctuating availability and quality of local biomass residues require flexible adjustments to fuel production processes. Overcoming these challenges is an integral part of the ongoing project work. There is a strong focus on strengthening local supply chains, reducing external dependencies and ensuring the long-term robustness of the solutions developed.

Perspectives

In the next phase of the project, HeRoTogo will further intensify the local implementation and evaluation of the tested technologies. The focus will be on optimising production processes, fuel supply chains and busi-

ness models. Findings from field tests and feedback from users will inform further technical adjustments, whilst cooperation with local stakeholders and decision-makers will be strengthened to support future scaling and replication. All results will be consolidated into a practical roadmap for potentially sustainable biomass-based heat generation in Togo, providing a robust basis for policy-making, investment decisions and follow-up initiatives.

The project highlights the potential of efficient biomass-based heating solutions to reduce deforestation, cut emissions and improve health and living conditions. In doing so, HeRoTogo contributes to the Sustainable Development Goals, in particular SDG 7, SDG 13 and SDG 15. The strong commitment of local partners and users demonstrates that visible improvements in efficiency and

usability can trigger more comprehensive transformation processes.

Beyond its local impact, HeRoTogo strengthens the DBFZ's role as a partner for scientifically sound transformation processes in the Global South. By combining expertise in bioenergy systems, thermo-chemical conversion and sustainability assessment with close collaboration between various stakeholders, the project supports locally rooted innovation pathways and can serve as a scalable blueprint for sustainable, biomass-based heating transitions beyond Togo.

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- [3] LabTogo – Aufbau von Forschungskapazitäten und Demonstration von Technologien zur Nutzung der Biomassepotenziale in Togo, Federal Ministry of Research, Technology and Space, 02.01.2020–31.12.2025
- [4] Krüger, D., Mutlu, Ö., 2023. "The Apeli: An Affordable, Low-Emission and Fuel-Flexible Tier 4 Advanced Biomass Cookstove", *Energies*, 16 (7), 3278.
- [5] HeRoTogo – Entwicklung einer Roadmap für die nachhaltige Wärmeerzeugung mit Biomasse in Togo und Demonstration ausgewählter Technologien entlang des gesamten Nutzungspfades, Federal Ministry of Research, Technology and Space, 01.03.2024–28.02.2027 (FKZ: 03SF0749)

→ **Further information:**
www.dbfz.de/en/herotogo

PROJECT SUMMARY

Duration:

01/03/2024–28/02/2026

Status:

Ongoing

Project partner:

West African Science Center
on Climate Change and
Adapted Land Use
(WASCAL)

Contact:

Dr. Dennis Krüger

Project number:

03SF0749

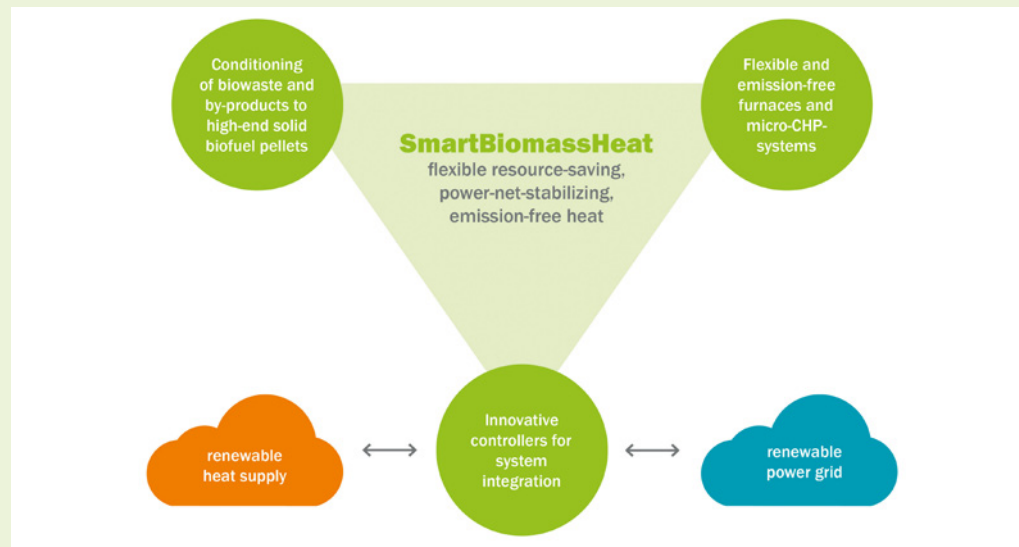
Funding body:

Federal Ministry of Research,
Technology and Space (BMFTR)



With funding from the:





Research focus area “SmartBiomassHeat”

The research focus is on the small-scale, renewable provision of heat in individual buildings and small groups of buildings, up to village communities or districts, using other renewable energy sources and networked, intelligent heating technologies based on biomass, which primarily comes from residual materials, by-products and waste. The aim is to optimise the use of all renewable heat sources, both technologically and economically, by using biomass-based heating technologies flexibly and in line with demand. To this end, the entire chain from the refinement of biomass fuels to new conversion plants and the integration of biomass heating systems, which in the future will also be designed as heating, power and cooling systems, into the heating and electricity grid is to be mapped, examined individually and in combination, simulated and optimised. By means of the necessary technical component development and the connecting control research and development, these are to be guided from flexible operation (including micro and small-scale CHP) to efficient,

environmentally friendly, economical, safe, demand-adapted, flexible and sustainable (smart) operation.

With climate protection becoming an increasingly urgent issue, the research focus is also shifting more and more towards the short-term effects of the combustion of carbon-based fuels. Therefore, the levels of observation are increasingly being extended to include coupled material utilisation options for biomass before and after combustion. Extended material utilisation cascades, a more system-friendly integration of biomass combustion including high-temperature heat supply and the reuse of combustion residues such as ashes and coals are being specifically researched.

→ **Further information:**
www.dbfz.de/en/research/research-focus-areas/smartbiomassheat

Important reference projects and publications

- Project:** BioFe – Biomassenutzung in der Eisenerzeugung unter wirtschaftlichen und CO₂-mindernden Randbedingungen, Saxon Development Bank (SAB), 01.06.2024–31.05.2027 (FKZ: 100704873)
- Project:** bVB1ReTr – Kompaktierung von biogenen Reststoffen und analytische Produkt- und Prozessbewertung (biogeniV bV-B1, TV DBFZ), Federal Ministry of Research, Technology and Space, 01.08.2025–31.07.2028 (FKZ: 03WIR4908A)
- Project:** BioSmoke – Rauch und Bioaerosole: Freisetzung, Prozesse und Auswirkungen in einem sich ändernden Klima, Federal Ministry of Research, Technology and Space, 01.04.2025–31.10.2028
- Project:** ETH-Soil – Bodenverbesserung in Äthiopien durch die energetische und materielle Nutzung landwirtschaftlicher Reststoffe, Federal Ministry for Economic Cooperation and Development (BMZ), 01.07.2021–31.12.2026 (FKZ: 2021.0119.4)
- Project:** MOOReturn – Moor-Klimaschutz und Wertschöpfung verbinden durch Wiedervernässung und Paludikultur, Federal Ministry of Agriculture, Food and Regional Identity, 01.01.2025–31.12.2027 (FKZ: 2222MT007A)
- Publication:** Adam, R.; Kirsten, C.; Schedl, A.; Azócar, L.; Lenz, V. (2026). “A comparative cradle-to-grave GHG assessment approach of cultivated and residual woody and herbaceous biomass utilization pathways”. *Renewable Energy*, Vol. 256. S. 124511. DOI: 10.1016/j.renene.2025.124511.

- Publication:** Al-Addous, Mohammad; Baqain, Mais; Bdour, Mathhar; Lenz, Volker (2025): Enhancing energy sustainability: integrating concentrated solar power in Jordan’s oil shale extraction. In: *International Journal of Low-Carbon Technologies* (20), S. 453–465. DOI: 10.1093/ijlct/ctae297
- Publication:** Allahseh, Duaa; Böttner, Jan; Al-Addous, Mohammad; Lenz, Volker (2025): Advancements in hybrid heating systems for residential applications. In: *Energy Exploration & Exploitation* 43 (5), Artikel 01445987251336405, S. 2221–2275. DOI: 10.1177/01445987251336405.
- Publication:** Mekonnen, B.; Wilske, B.; Addisu, B.; Nigussie, A.; Siegfried, K.; Gizachew, S.; Yimer, T.; Mohammed, B.; Ahmed, M.; Abera, T.; Nebiyu, A.; Worku, R.; Regassa, A.; Firomsa, T.; Husien, A.; Worku, G.; Lema, A.; Tilahun, A.; Assefa, K.; Dume, B.; Eshete, G.; Pollex, A. (2025). “Biochar-based fertilizers increase crop yields in acidic tropical soils”. *Biofuels, Bioproducts and Biorefining*, Vol. 19, Nr. 4. S. 1124–1142. DOI: 10.1002/bbb.2777.
- Publication:** Richter, L.; Lenz, V.; Dotzauer, M.; Seifert, J. (2025). “Coordinated energy systems in decentralized districts: Evaluating the cellular approach for improved grid stability and renewable integration”. *Smart Energy*, Vol. 20. S. 100215. DOI: 10.1016/j.segy.2025.100215.



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6.5 LangEFeld: Project on the Practical Feasibility of Electrostatic Precipitators



“Field trials involving electrostatic precipitators on wood log stoves show that toxic dust particles can be efficiently removed from the flue gas under real-world conditions. Nevertheless, a significant need for further development to improve practical suitability and operational stability has been identified and defined.”

Prof. Dr. rer. nat. Ingo Hartmann,
Project Manager

LangEFeld – Long-term monitoring and performance of particle precipitators for single-room wood stoves in the field

The combustion of biogenic solid fuels results in emission of significant quantities of pollutants such as particulate matter. The formation of these particles depends, amongst other things, on the combustion system, the fuel and the operating mode of the fireplace. It is well known that residential, manually fed wood-burning stoves do not comply with statutory emission limits in real-world operation. This applies not only to the existing stock of appliances, currently estimated at 11,7 million single-room fireplaces. Even new stoves currently available on the market cannot meet the emission limits in practical operation. The pollutant levels of log-burning stoves in real-world operation are generally at least twice as high as the certified test values. To effectively reduce particulate matter emissions and lower air pollution in residential areas caused by toxic dust particles, electrostatic precipitators (ESP) must be integrated into the combustion system or retrofitted into the chimney or on the chimney top. Previous field measurements on electrostatic precipitators were mostly carried out over just one or at most two heating seasons, mainly on central heating systems, with the electrostatic precipitators not always proving to be fully functional and often only available to a limited extent.

Tab. 1: A table listing the work packages in the “LangEFeld” project

WP	Title of the work package	Responsible
1	Project coordination	TFZ
2	Suitability of measuring instruments for electrically charged particles	TFZ, DBFZ
3	Characterization of dust, fly ash and fuels	HFR
4	Bed tests	TFZ, HFR, DBFZ
5	Long-term monitoring and performance of electrostatic precipitators	TFZ, HFR, DBFZ
6	Catalytic converter ageing	DBFZ
7	Preliminary weak point analysis and potential for optimization	TFZ, HFR, DBFZ
8	Reporting and knowledge transfer	TFZ, HFR, DBFZ

The aim of the ‘LangEFeld’ project was therefore to retrofit various electrostatic precipitators on small-scale combustion plants in the field and, for the first time, to gather operational experience over several heating seasons by continuously recording operational data, thereby monitoring their performance. In particular, the availability of the electrostatic precipitators in the field, as well as their precipitation efficiency before and after the field trial phase on test beds, were to be determined in order to identify possible ageing effects and malfunctions and thus assess the long-term suitability of the electrostatic precipitators under real-world conditions. Various measurement methods were used to assess the separation efficiency. Among other things, the influence of the electrostatic charge of the dust particles on the measurement result had to be examined. As the number of particles must also be measured within the framework of the ‘Blue Angel for Wood-burning Stoves’ quality label, various measurement methods for determining the particle number concentration and particle size distribution on test beds before and after the precipitator were to be analyzed. Overall, potential recommendations for practical application were derived regarding operational safety, further development

and the prevention of incorrect operation or malfunction. At the same time, a basis was established to enable the development of more effective dust abatement measures in the future, as well as to derive effective user guidelines and support measures for such retrofittable components.

Methods/Measures

The project was divided into a total of eight work packages. Table 1 shows the work packages and the responsibilities of the participating project partners³ for these work packages:

The contents of the work packages are described in more detail below.

– WP1 (Project Coordination) ran throughout the entire project duration. This work package ensured the exchange and optimal integration of the various areas of expertise of all project partners.

³ TFZ: Technology and Support Centre (TFZ), HFR: Rottenburg University of Applied Sciences for Forestry, DBFZ: DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH

- _ At the DBFZ, WP2 (measurement equipment suitability) examined particle-count-based measurement methods and online measurement methods, whilst at the TFZ, current chimney sweep measurement methods and the novel EN-PME measurement method were employed and compared with gravimetric reference methods (VDI 2066, Part 1).
- _ In WP3, the composition and properties of the dusts were analyzed to determine the measurement methods to be used, and the appropriate test bed set-ups were defined on this basis. Analyses of all fuels were also carried out.
- _ In WP4, the specific specifications for the test bed measurements were developed by all three partners and aligned with the current status of DIN EN 33999. The test beds were set up at all three partners' sites to carry out measurements of the field test separators from the long-term monitoring in WP5 and to analyze various factors influencing the test bed measurements.
- _ In WP5, based on market research carried out in advance, three promising types of electrostatic precipitators from three different manufacturers were selected for long-term monitoring, and corresponding agreements were reached with the companies. Eight to ten precipitators of each type were installed in participating households and on the test bed (see Figure 25) and operated over two heating seasons wherever possible. During practical operation, both monitoring of the operating status and the collection of ash samples took place in the individual households.
- _ In WP6, commercially available catalysts were integrated into the wood-burning stove used at the DBFZ, characterized in terms of emissions on the test bed, and aged under real-world conditions. Emissions downstream of the stove were measured at regular intervals. In addition, small catalyst cores were subjected to a defined

- analysis in model gas, both in their fresh state and after ageing in the field facility.
- _ The results of the first two heating periods were jointly evaluated in WP7 by the scientific project partners within the framework of a coordinated data matrix. The data comprises all assignable and fully evaluated field data, such as fuel, ash and dust properties, the recorded mass flows (fuel, fly ash, etc.), all logged events such as malfunctions and repair-related outages, operating and standby times, electricity consumption data, emission measurement data and, where applicable, results of chimney sweep inspections.
- _ In WP8, all project results are currently being summarized in a final report, which is to be made available to the public as part of the 'Reports from the TFZ' series. During and after the completion of the entire project, systematic knowledge transfer to industry and practice has taken place or is taking place. In addition, knowledge transfer has been or is being carried out, with the results being published within the framework of workshops, such as the TFZ/DBFZ expert discussion 'Particle precipitators in domestic heating systems', or in relevant standardization and guidelines committees.

Milestones/Challenges

TFZ and DBFZ played an active role in the development of DIN/TS 33999-1:2025, attending various standardization meetings and providing additional input to the standardization process. The results regarding the actual temperatures at the dust precipitators were submitted to the standards committee. Furthermore, TFZ and DBFZ participated in the development of VDI 3670-1/2/3. At the first event, chimney sweeps were informed about the specific features of the dust precipitators, its mode of operation and clean-



Fig. 25: ESP installation at a field site

ing procedures, and the LangEFeld project was presented in general terms. During the second event, the TFZ reported on the results of the first heating season and sought feedback from the participating chimney sweeps. It became apparent that the precipitators do not cause any problems when cleaning the chimney with an integrated precipitator and, furthermore, do not result in any significant additional time expenditure. The project's results have been presented in various presentations and publications, primarily at national level [1], [2], [3], [4], [5]. The full results are being compiled in more detail within the individual sub-projects, and the final report is currently being drafted jointly.

Due to the relatively high variability in emissions from manually fed wood log combustion systems, laboratory tests were carried out under controlled and reproducible conditions in parallel with the test bed measurements. The activity (abatement efficiency)

in the new state was determined using core samples from the catalysts in a laboratory reactor. The catalysts were aged in the stove on the test bed and, towards the end of the project, examined in a laboratory reactor to determine their activity in the aged state. In addition, the catalysts were occasionally measured directly on the test bed during the project period. No systematic ageing could be detected. Rather, the operating conditions and the quality of combustion had a strong influence on the results.

Initially, an increase in emission levels (CO and organic carbon) was observed after just a few cycles; however, these returned to their initial levels after more than 300 cycles. The catalyst was blown clean with compressed air only once during the entire ageing process to remove coarse particles. Consequently, no deactivation of the catalysts used was observed during ageing on the test bed.

When comparing the different levels of active component loading, no difference or advantage was observed on the test bed for the higher loading. In the case of the precipitators managed by the DBFZ, there were occasional failures of thermocouples due to condensation, disruptive noises during cleaning or other malfunctions during the two heating periods, with the result that by the end of the second heating period, four out of eight precipitators were still in operation. At a site with very low flue gas temperatures, the flue gas fan installed in the precipitator failed towards the end of the heating season. The cause of the thermocouple failure was identified and attributed to insufficient insulation of the connection between the sensor and the cable. Failure of the thermocouples can be prevented by insulating the connection between the sensor and the connection cable using a waterproof heat-shrink seal.

The reason for the failure of the flue gas fan could not be clearly identified. It is suspected that, at this site, a defect in the flue gas fan was caused by condensate build-up due to excessively low flue gas temperatures at the precipitator. At the same site, towards the end of the heating period, it was no longer possible to establish a stable high-voltage field. After cleaning the precipitator, the field could be generated stably again. This is further evidence that contamination from accumulated condensate led to problems at the precipitator. Thus, the continuous exposure to excessively cold flue gas was identified as a clear weak point of the precipitators investigated by the DBFZ. The flue gas temperatures at the precipitator inlet should be at least 70 °C to prevent the accumulation of large quantities of condensate in the precipitator. Another general weakness of the ESP type investigated by the DBFZ lies in its heavy weight and the necessity of installing it at the chimney outlet. This results in numerous installation challenges, particularly

with pitched roofs and brick chimneys. The need for a power supply on the roof is also generally a weakness or challenge for all roof-mounted ESP (installed at the chimney outlet). Cleaning and maintenance on the roof alone are very labor-intensive.

Perspectives

As numerous potential improvements for ensuring the stable long-term operation of electrostatic precipitators under real-world conditions have been identified, the field studies are to be continued. Some of these improvements have already been partially implemented by the participating manufacturers. Several weaknesses can be remedied through relatively simple technical and organizational measures. When installing downstream electrostatic precipitators, effective operation requires accompanying support from the manufacturer (or another party) to ensure proper commissioning and function across different types of chimneys, wood-burning stoves and domestic systems. During the two heating seasons to date, insufficient data has been collected to make reliable statements regarding the effectiveness of electrostatic precipitators over extended operating periods. Field studies should therefore be continued. The measurement methods and operational status monitoring must be further developed for this purpose. The partners therefore aim to carry out further field studies in a second project phase.

Sources

- [1] Hartmann, I.; Ulbricht, T.; König, M. (2023). *Forschungsarbeiten zur Emissionsminderung bei Einzelraumfeuerstätten am DBFZ*. Lecture given: World of Fireplaces, Leipzig, 17.–19.04.2023.
- [2] Hartmann, I.; König, M. (2024). *Langzeitmonitoring und Funktionalität von Staubabscheidern für Einzelraumfeuerungen im Feld: LangEFeld*. Lecture given: Fachverband Schornsteintechnik: Technischer Workshop, Maisach, 11.04.2024.
- [3] Müller, M.; König, M.; Bindig, R. (2025). *Wirkung elektrostatischer Abscheider an Biomasse Feuerungsanlagen auf die Partikelanzahl und -größenverteilung*. Lecture given: 16. Fachgespräch Partikelabscheider in häuslichen Feuerungen, Straubing, 11.–12.02.2025.
- [4] Müller, M.; König, M.; Bindig, R. (2025). *Influence of electrostatic precipitators at small-scale biomass combustion systems on particle number emissions and particle size distributions*. Lecture given: 28th ETH-Nanoparticles Conference, Zürich (Switzerland), 16.–19.06.2025.
- [5] Müller, M. (2025). *Partikelmessung und -minderung an Holzfeuerungen*. Lecture given: VDI Vortragsreihe "Engineering in der Praxis", Leipzig, 26.11.2025

→ Further information:
www.fnr.de/index.php?id=11150&fkz=2220NR108B

PROJECT SUMMARY

Duration:

01/01/2023–31/12/2025

Status:

Completed (final report currently being drafted)

Project partner:

Technology and Support Centre (TFZ), Rottenburg University of Applied Forestry

Contact:

Prof. Dr. Ingo Hartmann

Project number:

2220NR108C

Funding body:

The Federal Ministry of Agriculture, Food and Regional Identity (BMLEH), via the Fachagentur Nachwachsende Rohstoffe e. V. (FNR) – the BMLEH's project management body for the Sustainable Renewable Resources funding programme

With support from



by decision of the German Bundestag



Fachagentur Nachwachsende Rohstoffe e.V.



The research focus area “Catalytic Emission Control”

The vision of a climate-neutral and sustainable bioeconomy and the associated premises place very high demands on the research area of “Catalytic Emission Control” in terms of pollutant-free bioenergy use. In particular, the increased use of biogenic residual and waste materials of varying quality presents a challenge for emission-free utilisation. The focus here is on reducing emissions from combustion processes for bioenergy sources by using and combining with solid catalysts. In particular, climate-relevant methane (CH₄), toxic volatile organic compounds (VOC), semi-volatile and non-volatile hydrocarbons such as polycyclic aromatic hydrocarbons (PAH) and polychlorinated dioxins and

furans (PCDD/PCDF), soot particles (black carbon) and nitrogen oxides (NOX) must be largely reduced. The overarching goal of the research focus is to investigate long-term and high-temperature stable, recyclable and cost-effective catalysts with no or significantly lower proportions of precious metals. In particular, the combination of catalysts with additional emission control methods is to be researched in detail.

→ Further information:

www.dbfz.de/en/research/research-focus-areas/catalytic-emission-control

Important reference projects and publications

Project: BioSmoke – Rauch und Bioaerosole: Freisetzung, Prozesse und Auswirkungen in einem sich ändernden Klima, Federal Ministry of Research, Technology and Space, 01.04.2025–31.10.2028

Project: MeKat – Entwicklung eines Methanoxidationskatalysators auf Basis von biogenem Silika für die Entfernung von Methan im Abgas von Biogas-BHKW, Federal Ministry for Economic Affairs and Energy, 01.01.2023–31.12.2025 (FKZ: 03EI5456)

Project: RESCR – Entwicklung und Demonstration einer brennstoffflexiblen SCR-Nachrüstlösung für Reststofffeuerungen, Federal Ministry for Economic Affairs and Energy, 01.07.2025–30.06.2028 (FKZ: 03EI5490A)

Project: TWOx – Entwicklung eines preisgünstigen und ressourceneffizienten Systems zur Abgasnachbehandlung für Holzgas-BHKW, Federal Ministry for Economic Affairs and Energy, 01.01.2024–31.12.2025 (FKZ: 03EI5470)

Project: UFP-MESS – Messung ultrafeiner Partikel aus Kleinfeuerungsanlagen, German Environment Agency (UBA), 27.07.2022–30.11.2025 (FKZ: 3721522050)

Publication: Schliermann, T.; Bindig, R.; Stolze, B.; Lange, L.; Öffner, F.; Ercolano, G. (2025). *Ent-*

wicklung eines kostengünstigen, robusten und ressourcenschonenden Systems zur Abgasnachbehandlung für Holzgas Blockheizkraftwerke. Lecture given: 25. Fachkongress Holzenergie, Würzburg, 30.09.–01.10.2025.

Publication: Müller, M.; Owusu Prempeh, C. (2025). *Pyrolysis cookstove for cooking and biochar production addressing agricultural households in Ethiopia*. Poster presented: 2. Africa Climate Summit, Addis Abeba (Ethiopia), 08.–10.09.2025.

Publication: Hartmann, I.; Müller, M. (2025). *Vorstellung der Studie zu Speicherfeuerstätten*. Lecture given: OfenCampus, Velten, 26.06.2025.

Publication: Wöhrl, T.; König, M.; Moos, R.; Hagen, G. (2025). “Monitoring of Ammonia in Biomass Combustion Flue Gas Using a Zeolite-Based Capacitive Sensor”. *Sensors* (ISSN: 1424-8220), Vol. 25, Nr. 17. DOI: 10.3390/s25175519.

Publication: Stolze, B.; Bindig, R.; Hartmann, I. (2025). Optimierung der physikalischen Oberflächeneigenschaften von biogenem Silica für den Einsatz als Katalysatorträger. In: Thrän, D.; Händler, Tina (Hrsg.) *Statuskonferenz Bioenergie: 20.–21.11.2025*. Leipzig: DBFZ. (Reader Energetische Biomassenutzung). ISBN: 978-3-946629-98-6. S. 95.



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7

The DBFZ PhD programme



The DBFZ's PhD programme, which has been running since 2013, offers PhD students at the DBFZ a wide range of opportunities to explore topics in the field of bioenergy and the bioeconomy and to apply the knowledge they have gained in applied research. To carry out their research projects, PhD students have access to state-of-the-art facilities in the DBFZ's well-equipped laboratories, technical facilities and offices.

Supervision by experienced scientists ensures high-quality PhD support and research. In addition, events such as the Doctoral Colloquium BIOENERGY AND BIOBASED PRODUCTS or the DBFZ Annual Conference offer early-career researchers an excellent opportunity to gain a foothold in the scientific community at an early stage, as well as to present their own research topics and discuss them with experts. Furthermore, they are given the opportunity to consolidate their experience through committee work.



Tab. 2: An overview of PhD figures

Number of PhD projects in 2025	51
of which are supervised at the DBFZ (in collaboration with 15 national and international universities)	34
of which supervised at the University of Rostock	17
of which successfully completed by 2025	7

Doctorates successfully completed

In her doctoral thesis, entitled “Strategies for demand side management in biorefineries – Exploring new frontiers in enhancing load flexibility and optimization”, **Lili Sophia Röder** examined how the volatility of the electricity supply to biorefineries from renewable sources can be addressed. One approach is the implementation of demand-side management (DSM) strategies. DSM involves controlling electricity consumption in response to electricity availability, rather than regulating electricity generation.

→ Her work has been published as **DBFZ Report No. 52** and is available as a free download:



Kerstin Wilde's doctoral thesis examines the development of the bioeconomy in Northern Europe within the field of transition research. The thesis focuses on three sectors – building materials, basic chemicals and plastics – whose business models still need to be brought into line with the goal of environmental sustainability.

→ Her work has been published as **DBFZ Report No. 54** and is available as a free download:



In his doctoral thesis, **Jakob Köchermann** investigated various process strategies with the aim of improving the efficiency of furfural production. Furfural is a versatile bio-based chemical used in the manufacture of solvents, resins and plastics, as well as in the agricultural and food industries, and can thus serve as a substitute for fossil-based chemicals. Hydrothermal reactive distillation (HRD) proved to be particularly efficient in this context, as it continuously removes furfural and thus minimises side reactions. Overall, the approaches presented offer promising opportunities for optimising furfural production.

→ His work has been published as **DBFZ Report No. 53** and is available as a free download:



On 1 September 2025, **Mario König** successfully defended his doctoral thesis on the topic of “Development and application of novel SCR catalysts for low-temperature denitrification of exhaust gases from the thermochemical conversion of biogenic solid fuels”. The aim of the thesis was to identify a suitable low-temperature SCR catalyst for biomass combustion that can be produced, used and disposed of in a cost-effective and environmentally friendly manner.

→ His work has been published as **DBFZ Report No. 55** and is available as a free download:



8th Doctoral Colloquium BIOENERGY AND BIOBASED PRODUCTS

The international event series “Doctoral Colloquium BIOENERGY AND BIOBASED PRODUCTS” aims to connect early-career researchers in the field of bioenergy with one another, as well as with experienced scientists and industry leaders, to exchange knowledge and discuss research gaps and challenges. In addition, the organisers of the event series worked to promote and continuously expand networking and the exchange of information between scientific institutions active in relevant areas of bioenergy and biotechnology research.



Fig. 26: 8th Doctoral Colloquium at the University of Stuttgart

DOC2025: 74 participants from ten different countries

The eighth edition of the event series took place at the University of Stuttgart from 10 to 12 September 2025, under the academic coordination of the University of Stuttgart and the Valbio research network, and under the patronage of Prof. Dr. Michael Nelles (DBFZ/University of Rostock). A total of 74 participants from ten different countries attended the event and networked with one another on a scientific level. The theme of this year's edition was 'From Bioenergy to Bio-based Products', reflecting the wide variety of processes and approaches in the field of bioenergy and bio-based processes. One key insight from this year's event: bio-based

processes and products are increasingly in demand by industry, making a career in this field particularly desirable against this backdrop. The 300-page conference proceedings are available to download from the DBFZ website.

→ Further information:

www.doc-bioenergy.de

www.linkedin.com/showcase/doctoral-colloquium-bioenergy

www.dbfz.de/en/press-media-library/publication-series/conference-reader

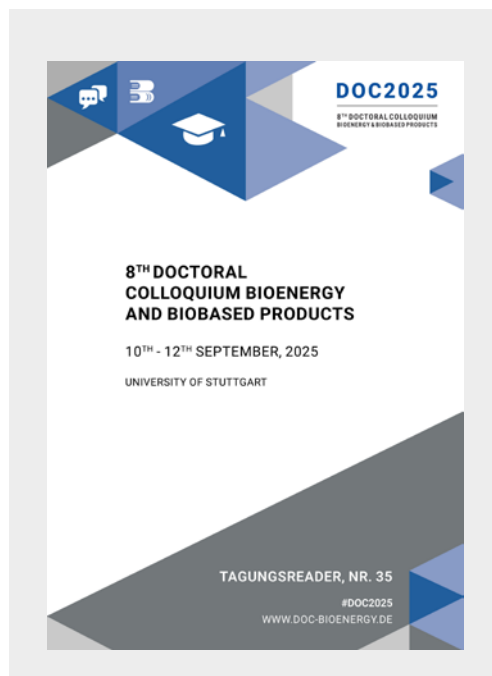


Fig. 27: Conference Reader for the 2025 Doctoral Colloquium

SAVE THE DATE!

The 9th edition of
the event series
will take place on
23/24 September 2026
at the DBFZ
in Leipzig.

DOC2026

9TH DOCTORAL COLLOQUIUM
BIOENERGY & BIOBASED PRODUCTS



List of current PhD research projects at the DBFZ

(As at: February 2026)

* Successful completion in 2025

Adam, Roman

Investigating the compaction of biomass using DEM simulation

[Technical University of Berlin](#)

Angbé, Kassé Jean Hugues

Process development for the utilization of residues from cocoa cultivation using pyrogenic processes

[University of Rostock](#)

Bindig, René

Procedure for developing catalysts for reducing emissions from incinerators

[Martin-Luther-University Halle-Wittenberg](#)

Delory, Felix

Model-based monitoring of anaerobic digestion plants

[Technical University of Berlin](#)

Dietrich, Sebastian

Synthesis of Light Hydrocarbons from Biogas

[Technical University of Berlin](#)

Dotzauer*, Martin

Business assessment of policy instruments to achieve the expansion targets of bioenergy plants in the electricity sector using object-oriented programming

[University of Leipzig](#)

d'Espinay*, Ana Careirra

Bioenergy production optimization through complementary effluents management

[University of Leipzig / University of Lisbon](#)

Erofeev, Yury

Towards a Harmonized Global Aviation GHG Accounting Framework: Integrating LCA, Sustainable Aviation Fuels, and Non-CO₂ Effects into Scope 3 Reporting

[University of Leipzig](#)

Grimm*, Daniel

Oyster mushroom cultivation on straw: productivity, sustainability and adaptability to the case of Uganda

[University of Kassel](#)

Hellmann, Simon

Process Monitoring and advanced control of agricultural biogas plants

[Technical University of Chemnitz](#)

Karras, Tom

Biomass supply costs for biogenic waste

[University of Leipzig](#)

Klüpfel, Christan Paul

Hydrothermal liquefaction of biomass residues

[Technical University of Berlin/ Aarhus University, Denmark](#)

Köchermann*, Jakob

Hydrothermal Conversion of Hemicellulose Sugars for the Production of Furfural

[Technical University of Berlin](#)

König*, Mario

Investigations into the development and application of new SCR catalysts for the reduction of nitro-gen oxides in exhaust gases from the thermo-chemical conversion of biogenic solid fuels

[Martin-Luther-University Halle-Wittenberg](#)

Kurth, Matthias

Mass transfer descriptions of carbon membranes for water, hydrogen and methane

[Technical University of Berlin](#)

Lenhart, Markus

Determination of factors influencing climate-relevant emissions at biowaste treatment plants on the basis of various field measurement methods

[Still open](#)

Majer, Stefan

The Role of Sustainability Certification as a Co-Regulation Instrument for the sustainability of value chains in the EU Bioeconomy

[University of Rostock](#)

Manolikakes, Nikolaus

Investigation of bonding mechanisms of organic binders in iron ore agglomeration

[Still open](#)

Matlach, Julian

Determination of factors influencing climate-relevant emissions at biowaste treatment plants on the basis of various field measurement methods
[Magdeburg-Stendal University of Applied Sciences](#)

Meola, Alberto

Artificial Intelligence for process simulation of anaerobic digestion plants
[University of Leipzig](#)

Nieß, Selina

Methanation catalysts for the direct biogas methanation of purified biogas
[Technical University of Berlin](#)

Pouresmaeil, Shabnam

Bioelectrochemical Power-to-Gas using bed electrodes based on biochar
[University of Leipzig](#)

Putra, Rafiandy Dwi

Exploring various ways of using biomass in the direct reduction process to decarbonise iron and steel production
[Freiberg Mining University](#)

Reitmayer, David

Measurement and simulation of wildfires and emissions (provisional)
[Technical University of Dortmund](#)

Richter, Lukas

Optimised energy management in a power cell
[Technical University of Dresden](#)

Richter, Sören

Development of bioeconomy scenarios up to 2050
[University of Leipzig](#)

Röder*, Lilli Sophia

Strategies for demand side management in biorefineries – Exploring new frontiers in enhancing load flexibility and optimization
[Ruhr University Bochum](#)

Siol, Christoph

Assessing new technologies for the circular bio-economy with combined environmental and economic LCSA
[University of Leipzig](#)

Sumfleth, Beike

Integrated Assessment Framework for Low-ILUC-Risk Certification of Sustainable Biofuels
[University of Leipzig](#)

Weber, Svenja Nathalie

Elimination and sorption behavior of veterinary antibiotics during digestion of dry chicken manure
[University of Rostock](#)

Wedwitschka, Harald

Development of methods for characterising the ingredients used in box fermentation processes
[University of Rostock](#)

Wilde*, Kerstin

Transition towards a bioeconomy: discourses, vantage points, and actors' contextualized institutional work
[Martin-Luther-University Halle-Wittenberg](#)

Wollnik, Ronja

Decision support for regional integration of bio-based carbon dioxide removal in Germany
[University of Leipzig](#)

Yuan, Bomin

Investigation and modelling of the influence of the recirculation of partially treated digestate on methane yield and process efficiency
[Technical University of Berlin](#)

→ **Further information:**
www.dbfz.de/en/career/phd-program

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 E-mail: elena.angelova@dbfz.de



List of current PhD research projects with the University of Rostock

(As at: February 2025)

Amin, Alfred

The influence of material flows on the resilience of bioenergy plants
[University of Rostock](#)

Asiedu, Zipporah

Developing a sustainable model for management and sustainability of bioeconomy urban metabolism; Accra as a case study
[University of Rostock](#)

Barner, Norman

Cold Atmospheric Plasma applications as a green technology in food waste reduction
[University of Rostock](#)

Beguedou, Essossinam

Development of holistic research based implementable strategy for TOGO to supplement the industrial energy requirements through alternative fuels
[University of Rostock](#)

Bewani, Rzgar

Increasing the efficiency of mechanical-biological residual waste treatment through the fermentation of the liquids after pressing the organic fractions
[Still open](#)

Boochoon, Urvyn

Optimisation of R&D processes in the field of anaerobic processes
[University of Rostock](#)

Chaher, Nour El Houda

Potential of Sustainable Concept for Handling Organic Waste in Tunisia
[University of Rostock](#)

Darmey, James

Continuous process biogas production from municipal solid wastes from Ghana
[University of Rostock](#)

Ender, Tommy

A concept for the treatment and nutrient recovery from process water used in the hydrothermal carbonisation of waste
[University of Rostock](#)

Gbiete, Djangbadjoa

Biohydrogen Production from Food Waste through an Integrated Biochemical and Thermochemical System
[University of Rostock](#)

Häner, Jurek

Investigations on Biogas Plants in a Collective System
[University of Rostock](#)

Kleine, Timo

Process optimisation of farm manure
[University of Rostock](#)

Lara, Cynthia

Assessing the Carbon Footprint of Agricultural Products and Residues
[University of Rostock](#)

Oldenburg, Katrin

Acoustic freezing process: Optical quality control using chocolate and fruit as examples to reduce waste in the food industry
[University of Rostock](#)

Vincent, Lynn

Extension of energy system modelling for Thuringia – survey of biomass potential, expansion of bioenergy pathways, life cycle assessment
[University of Rostock](#)

Weppel, Johanna

Options for mechanical-biological waste treatment plants (MBT) in the context of future technical, social and legal conditions
[University of Rostock](#)

Wiechert, Julian

Extended sector responsibility for sustainable tourism and circular economy
[University of Rostock](#)

8

Public Relations: People & Media

The aim of making applied biomass research visible and accessible to interested visitors, a specialist audience, as well as industry and project partners remained the focus of our public relations work in 2025: Over 60 events (internal and external), nearly 1,000 visitors, numerous scientific publications, position papers and background documents, engaging videos, social media posts, as well as press and media relations have helped us communicate our diverse research topics to our target groups and engage in scientific dialogue with the scientific community and the general public.

Visitors to the DBFZ

In 2025, the DBFZ's visitor management team welcomed a total of 955 visitors in 88 groups, who were given guided tours of laboratories, technical facilities and the site – a new record. Highlights included, in particular, the public events 'Leipzig Night of Education' on 23 May 2025 and the 'Long Night of Science' on 20 June 2025. In addition, numerous students visited the DBFZ as part of excursions, including groups from HTWK Leipzig, the University of Leipzig, the University of Bayreuth, Zittau/Görlitz University of Applied Sciences and Merseburg University of Applied Sciences. Trade visitors, project meetings and internal event formats also fostered discussion on current research topics, provided insights into the DBFZ's research infrastructure and brought the centre to life as a place of dialogue between science, industry and the public. In this way, the DBFZ once again demonstrated its role as an open research hub that disseminates knowledge, facilitates exchange and fosters interest in bioenergy.

Event management

With its specialist events, the DBFZ once again provided a wide range of platforms for exchange, networking and knowledge transfer in 2025. The focus was on technical discussions on current topics in bioenergy research, including flexibility options in the biogas sector, particle precipitators in domestic heating systems, renewable energy in transport, substrate disintegration processes and hybrid heat supply using bioenergy. Particular emphasis was placed on dialogue with experts from academia and industry. In our established collaboration with the Technology and Support Centre (TFZ), current developments in the field of particle precipitators were also presented and discussed. The events offered participants not only technical insights into the latest research findings, but also the opportunity for interdisciplinary exchange and networking across institutional boundaries. People from both Germany and abroad attended the DBFZ's specialist events, thereby enhancing the centre's visibility.

Public events

Whilst specialist events are primarily aimed at an expert audience, in the summer of 2025 the DBFZ also specifically opened its doors to the general public. By taking part in the 'Leipzig Night of Training' and the 'Long Night of Science', the centre offered interested visitors vivid insights into current research activities and potential career paths in applied biomass research. The "Leipzig Night of Education" took place for the first time at the DBFZ on 23 May 2025. The "Long Night of Science" on 20 June 2025 also attracted around 200 visitors, clearly demonstrating the high level of public interest in the DBFZ's topics within the region as well.



Fig. 28: Large crowds at the 'Long Night of Science'

SAVE THE DATE!

DBFZ Annual Conference 2026

At a time of great challenges, we are sending a signal of new beginnings: the DBFZ Annual Conference 2026, to be held on 8–9 September 2026, will focus on five key research themes that point the way towards a climate-neutral and bio-based future. Our vision is to use our research to actively contribute to the major goal of 'Climate Neutrality 2045'. We look forward to presenting our work at the Annual Conference and developing it further together with you.



→ Further information:
www.bioenergiekonferenz.de





Fig. 29: The DBFZ events team

Event highlights for 2026

04 February 2026

17th Expert Talk "Particle precipitators in domestic heating systems"

05 February 2026

Biogas Expert Talk, Nossen

23 April 2026

Action Day "Girl's Day"/"Boy's Day"

09/10 June 2026

Expert Forum on Hydrothermal Processes

12 June 2026

Leipzig Night of Education

08/09 September 2026

DBFZ Annual Conference 2026

23/24 September 2026

9th Doctoral Colloquium BIOENERGY AND BIOBASED PRODUCTS

29 September 2026

Biorefinery Day 2026

→ You can find an overview of our events at:

www.bioenergie-events.de

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Fig. 30: A new format for science communication: "Knowledge on Green"

Video production/ Multimedia Feature

"Bringing research to life" – under this motto, a wide range of topics were last year visualised and presented to our target audiences in the form of engaging videos and multimedia content. The video content produced in 2025 included not only individual research topics, but also a newly conceived portrait series entitled "Knowledge on Green" ("Wissen auf Grün"): In this video series, DBFZ staff members sit down in their own workplaces and talk – in an engaging and entertaining way – about their work and the day-to-day challenges of life in academia. Available on LinkedIn, YouTube and the DBFZ website.

Other video productions focused, among other things, on showcasing individual research groups ("DBFZ Insight") or the explanatory series "Briefly informed", in which scientific topics – such as "How will we heat our homes in the future?" – are explained and contextualised briefly and clearly by experts from the DBFZ. In the area of project communication, a range of interactive multimedia presentations were also developed. Through images and sound, as well as engaging background information, complex research topics are made easily accessible to both the general public and experts alike.

→ Further information:

www.dbfz.de/pressemediathek/mediathek/videos (german)

www.youtube.com/@dbfz_de

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Fig. 31: Audiovisual presentations of working groups (german language with subtitles)

Press & Media

In 2025, researchers from the DBFZ were once again in demand as experts for various podcasts, TV interviews, press reports and scientific assessments. Of particular note were interviews regarding the “MOOReturn” research project and the official opening of the state-of-the-art pilot plant for the production of renewable methane and green hydrogen from biogenic residues (Pilot-SBG). Various podcasts featuring DBFZ scientists covered topics including the “Monuments of the Future” event series, the state of the bioenergy sector in Germany, and the DBFZ start-up “clever BioTechnologies”.

Would you like to stay up to date on bioenergy and receive information about the latest developments and research projects? Sign up for our press mailing list.

→ Further information:

www.dbfz.de/en/press-media-library/press

SOCIAL MEDIA

The DBFZ is active on social media and looks forward to hearing from you.

→ Feel free to follow us and stay up to date!



DBFZ Scientists in the media



Fig. 32: In several media reports, project manager Roman Adam has provided information about the ‘MOOReturn’ project



Fig. 33: Project managers Karin Naumann and Philipp Knötig in an interview with MDR to mark the official opening of the ‘Pilot-SBG’ pilot plant

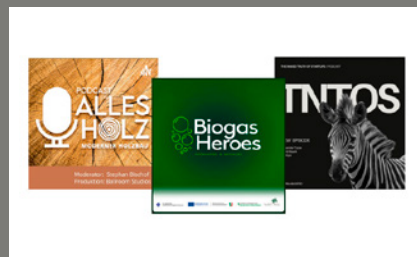


Fig. 34: Researchers from the DBFZ appeared as guests on various podcasts



Fig. 35: New and freely available issues of the ‘Conference Reader’, ‘DBFZ Report’, ‘Annual Reports’ and Focus brochures

Publications/Series

Theses, research reports, special issues, focus brochures, annual reports and conference proceedings – the volume of academic output in the ‘Publications’ section remained high in 2025. In total, around a dozen scientific publications were prepared and made available for free download on the DBFZ website – a comprehensive compendium of freely accessible knowledge on a wide variety of aspects of biomass research!

All DBFZ publications are available as PDF downloads from the following links:

→ Downloads:

www.dbfz.de/en/reports

www.dbfz.de/en/conference-reader

www.dbfz.de/en/brochures

www.dbfz.de/en/annual-report

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9

International research in Africa



Scientific project work and knowledge transfer in an international (non-European) context are among the DBFZ's key objectives. The aim is to make the DBFZ's scientific expertise available to international partners and to initiate research collaborations. Particularly in Africa, the DBFZ supports the development of research infrastructure for biomass applications and implements projects aimed at introducing clean, cost-effective and locally producible cookstoves, improving soil quality using bioenergy technologies, and conducting life-cycle analyses of biochar applications. An important cooperation partner in this context is the Federal Ministry for Economic Cooperation and Development (GIZ), with which the DBFZ has maintained a cooperation agreement since 2010 and has since implemented more than 35 projects.

Flexible greenhouse gas calculators for assessing compost and biochar

The production and use of biochar and compost can help to improve soil fertility and promote carbon sequestration. To systematically monitor emissions and emission savings from composting and the production of biochar from biogenic waste, the DBFZ, in collaboration with GIZ, has developed flexible greenhouse gas calculators for assessing compost and biochar for stakeholders in

Benin, Madagascar and India. These calculators can be flexibly expanded to adapt both the products under consideration and the accounting methods. The national and regional project teams at GIZ are also equipped with these calculators to quantify the emissions and emission savings from GIZ projects in the areas of biochar, soil improvement and composting. The results from the initial use of the calculators also clearly identified the drivers and hotspots in the emissions balances for composting and biochar production, enabling the derivation of concrete recommendations for best-practice facilities.

Production of biochar

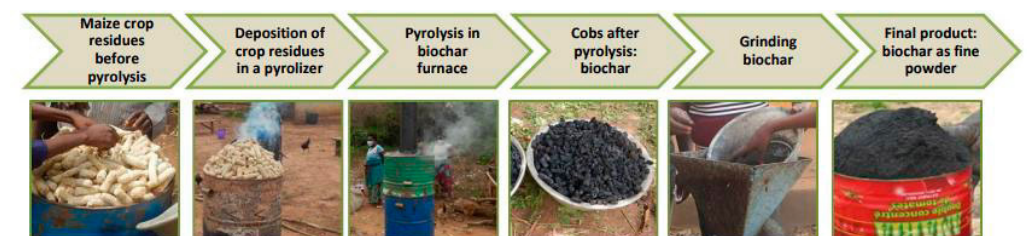


Fig. 36: Process flow for the production of biochar

The “LabTogo” research project has been successfully completed

As part of the research project “Establishment of Research Activities and Demonstration of Technologies for Utilising Biomass Potential in Togo”, a GIS-based resource screening was carried out to identify the spatial and energy potential of available biomass and biogenic residues. The resulting interactive maps enable, for example, decisions on the location of facilities for processing or utilising the respective biomass. Furthermore, a highly efficient, extremely low-emission and cost-effective stove (APELI) was developed to replace traditional open fires (see page 52). In addition, a fully equipped biomass laboratory has been established at the University of Lomé in Togo, which has been handed over to the university’s researchers. This laboratory is intended to become the central research and service facility for biomass energy use, not only for Togo but for the entire West African region.

The project, coordinated by the DBFZ, was funded by the former Federal Ministry of Education and Research (BMBF) and carried out in collaboration with the African partner organisation WASCAL. Even after the project’s completion, the collaboration between the DBFZ, WASCAL and the University of Lomé will continue. Currently, measures for the quality management (QM) certification of the biomass laboratory in accordance with internationally recognised standards are being developed and implemented in collaboration with scientists from the DBFZ. In a further follow-up project, Togolese craftsmen are being trained in the manufacture and marketing of the APELI stove, and the necessary production capacities are being established.

→ **Further information:**
www.dbfz.de/en/labtogo
www.dbfz.de/en/togo-story
 (Multimedia story)

Fig. 37: Opening of the biomass laboratory with scientists from the DBFZ in Togo



ETH-Soil: The path towards a transformation of smallholder agriculture in Ethiopia

In the “ETH-Soil” project, commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ), more than 100 multipliers and 1,000 smallholder farmers have been trained in biochar-based fertilizers (BBF) production and application by the end of 2025. Field test and soil monitoring data concerning the effects of BBF have been evaluated and first results are published. BBF has shown particularly positive effects on soil health and fertility, especially in degraded soils. These impacts are being documented through commissioned field research conducted by Ethiopian research institutes⁴, as well as through results monitoring in collaboration with responsible governmental partners. Evidence indicates that BBF can achieve equal or higher yields compared to those obtained with “optimal” applications of synthetic fertilizers. In widespread use among smallholder farmers, BBF resulted in yield increases of 11–30 % for key staple crops in 2025. At the same time, the development of a certification system for carbon sequestration associated with the application of BBF to soils is attracting considerable interest.

The findings regarding the rehabilitation of acidified and salinised land using biogenic residues together with the smallholder

⁴ see, for example: Mekonnen, B., Wilske, B., Addisu, B., Nigussie, A., Siegfried, K., Gizachew, S., Yimer, T., Mohammed, B., Ahmed, M., Abera, T., Nebiyu, A., Worku, R., Regassa, A., Firomsa, T., Husien, A., Worku, G., Lema, A., Tilahun, A., Assefa, K., Dume, B., Eshete, G. and Pollex, A. (2025), Biochar-based fertilizers increase crop yields in acidic tropical soils. *Biofuels, Bioprod. Bioref.*, 19: 1124-1142. <https://doi.org/10.1002/bbb.2777>



Fig. 38: Presentation of gifts to Ethiopian farmers

farmers’ excitement about the visible effects motivated the Oromia region to integrate this approach into other projects funded by European donors and the World Bank to ensure its continuation. The results of the ETH-Soil project also impressed the Ministry of Agriculture who selected them for presentation at the African Climate Summit (ACS2) in 2025, also in view of its anticipated host role for COP32 in 2027.

→ **Further information:**
www.eth-soil.com



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Fig. 39: DBFZ researcher Dr. Betelhem Mekonnen Muluneh conducting field trials with biochar-based fertiliser on trial plots at Jimma University (ETH-Soil)

International scientists at the DBFZ – What are you currently working on?



Thi Thanh Thao Tran Thermo-chemical Conversion

“As a researcher on the ‘MOOReturn’ project, I contribute my expertise in technical project management to support coordination efforts. My work includes, amongst other things, reviewing the construction plans for a peat fibre plant in Malchin and developing innovative and sustainable product options based on peat fibre.”



Mohammad Scherwan Yousefihigh Biorefineries

“I hold a Master’s degree in Chemical and Environmental Engineering, with experience in areas such as biogas technology and the use of charcoal from gasification as a cement additive. I have been working as a research assistant in the field of biorefineries since 2024. I am currently project manager on the ‘HyCS-Biomass’ project, in which we are researching hydrogen supply through the coupling of biomass gasification and the iron-steam cycle.”



Lieselotte Van Looveren Biochemical Conversion

“I am a Scientist and, as a biochemical industrial engineer, I am involved in three research projects in the field of biochemical conversion. My research focuses on investigating the effectiveness of enzymes from beaver intestines in the biogas process, as well as analysing the effects of ultrasonic pretreatment in agricultural biogas plants.”



Laura Garcia Laverde Bioenergy Systems

“As head of the ‘Biomass in the Energy System’ working group, my responsibilities include supporting the development and evaluation of bioenergy and bioeconomy scenarios, as well as decision-making tools for strategic planning. My work focuses on developing methods and indicator-based monitoring systems for assessing and analysing the systemic integration of biomass into energy and material applications.”

10 Knowledge and technology transfer



The DBFZ conducts applied research and development (R&D) using a wide range of facilities, test beds and laboratories. Its primary aim is to translate scientific findings from research projects into practical applications. Whether technological – in the form of an improved production process or a new product derived from bio-waste – or knowledge-based, for example through the provision of information on available raw material potential or statements on planned legislative changes: research has an impact when it reaches its respective target audience.

10.1 Knowledge transfer

MOOReturn – Combining peatland climate protection and economic value creation through rewetting and paludiculture

The 'MOOReturn' project combines peatland restoration with economic value creation in the Malchin region. Through the gradual rewetting of several hundred hectares of

peatland along the Upper Peene (Mecklenburg-Western Pomerania), annual greenhouse gas savings of around 5,000 tonnes are achieved. The interdisciplinary research project, supported by nine partners from academia, industry and local government, is investigating innovative processing techniques for peatland biomass and its diverse utilisation pathways. The focus is particularly on product pathways for paper and packaging materials, fibreboard and building materials, as well as chemical feedstocks.

Fig. 40: Flooded moorland areas with economic value



The processing plant for peatland biomass is being built on an industrial scale (peat fibre plant) in the model region of Malchin. The region is characterised by lowland moors with wet meadows and a diverse range of sedge and rush species. However, conventional methods for processing hay often reach their limits here.

The processing of peat biomass is intended to be residue-free, which is why the production of fertilisers from by-products of the processing procedure is also being investigated. In addition to environmental benefits resulting from reduced greenhouse gas emissions and increased biodiversity, economic incentives are being created for farmers. The florafuel® processing method used enables the flexible processing of various types of biomass, thereby ensuring a resilient value chain.

With the florafuel® process, Werner GmbH from Munich, a partner in the project, has

developed a patented technology for the efficient processing of biomass. The collaboration stems from previous DBFZ projects, in particular the MobiFuels project, which had already investigated the processing of deciduous leaves. The florafuel® process uses a precise washing and pressing process to homogenise peat biomass and reduce salt and ash content. This produces a loose, fibrous precursor, the further use of which is currently being investigated at the DBFZ. Planning for the construction of the Moor-FaserWerk has already begun, with completion scheduled for the end of 2027.

→ **Further information:**
www.dbfz.de/mooreturn (german language)

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10.2 Technology transfer

TWOx – Development of a cost-effective and resource-efficient exhaust gas after-treatment system for wood gas CHP plants

Low-quality wood sources, such as various types of waste wood, offer great potential for combined heat and power generation in wood gas CHP plants. At the same time, they pose a major challenge in terms of increased pollutant emissions. In Switzerland, strict-

er emission limits are under discussion or are already in force, making it considerably more difficult for small to medium-sized combined heat and power (CHP) plants to enter the market. Against this backdrop, the aim of the BMWF-funded 'TWOx' project (FKZ: 03E15470) is to develop a cost-effective and resource-efficient exhaust gas after-treatment system for wood gas CHP plants in the small to medium output range. This is intended to ensure the competitiveness and economic viability of wood gas CHP plants in the future as well.



Fig. 41: Wood gas CHP plant operated by project partner LiPRO Energy

As part of a joint project with LiPRO Energy GmbH & Co. KG and Emission Partner GmbH & Co. KG, a catalytic converter system based on three-way catalytic converters (TWC) and an optional oxidation catalyst was developed. By optimising the operation of the CHP unit and adjusting the wood gasifier to suit the fuel, it is possible to achieve consistently low emissions of nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds (VOCs) through the use of suitable TWC catalytic converter systems.

Using a mobile catalyst test facility (MoKatTA) adapted for the catalyst system, small-scale laboratory catalysts were initially tested in the actual exhaust gas from a wood gas CHP plant operated by project partner LiPRO Energy, thereby identifying suitable

catalysts or catalyst combinations for optimised operation. Building on this, ageing tests were carried out on the selected catalysts in the MoKatTA on-site using the actual exhaust gas from the CHP plant. Following the development of the full-scale catalyst system and its installation on a wood gas CHP plant (LiPRO HKW 50) belonging to the project partner LiPRO Energy, endurance testing was conducted to determine service life. Finally, economic analyses were carried out to provide an overall assessment.

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10.3 BMWE research programme “Biomass to Energy”



The diverse potential of bioenergy is driving the energy transition forward in key areas and playing a decisive role in making the entire energy system renewable, resilient and future-proof. With a particular focus on the ‘Energy use of biogenic residues and waste materials’, the funding area of the same name has been part of the German government’s energy research programme since 2008 and is funded by the Federal Ministry for Economic Affairs and Energy (BMWE).

Together with around 800 network partners, the accompanying research project explores the potential of biomass, identifies synergies and promising approaches, and adapts the findings to the operational logic of relevant stakeholders – such as plant manufacturers, municipal waste management companies or political decision-makers. The team is also in regular contact with the project management Jülich and the Federal Ministry for Economic Affairs and Energy. In addition, the accompanying research programme coordinates the Bioenergy Research Network and is thus well integrated into the broader German energy research landscape. Formats such as workshops, focus issues, and the Bioenergy Talk create space for diverse perspectives and discussions. In summer 2025, the contract

for the accompanying research was renewed for a further four years and awarded to the DBFZ (starting in April 2026); it will continue to be carried out at the DBFZ during the upcoming funding period until the end of March 2030.

45 projects, 14 involving the DBFZ

In 2025, the accompanying research programme supported around 45 funded projects investigating the potential of biogenic residues and waste materials for energy production; in addition to its accompanying research mandate, the DBFZ is involved in 14 further projects within this funding area. Biogenic residues and waste materials are used in a wide range of applications (see HanfNRG, page 36) and can be utilised to provide heat, electricity or fuels. The processes under investigation frequently generate by-products that offer economic added value, thereby facilitating market introduction. Current research priorities include the provision of non-fossil heat for local authorities and industry, as well as the flexible production of electricity, gas and methane depending on the availability of other renewable energies.

Review of the 2025 Bio- energy Status Conference

A biennial highlight is the Bioenergy Status Conference, which was held in 2025 at the Media Campus Villa Ida in Leipzig. Attended



Fig. 42: Bioenergy Status Conference at the Villa Ida Media Campus

by around 120 guests, the event offered a comprehensive scientific programme featuring seven lecture sessions, six workshops, three keynote speeches and countless informal discussions on the current potential of bioenergy. The community proved to be vibrant and open: a third of the participants were attending for the first time, as a live survey revealed.

The topics covered at the Status Conference ranged from resilient energy networks and heat supply for local authorities and high-temperature processes to hydrogen, carbon sequestration and flexible, electricity-market-oriented plant management. In conclusion: bioenergy innovations can strengthen the circular economy, stabilise the energy system and reduce costs. It is crucial that these promising approaches are put into practice; supporting this remains a key task for accompanying research. At the end of the conference, Prof. Dr. Daniela Thrän officially stepped down from her role as project leader, thanked the team for their excellent and long-standing collaboration, and wished the accompanying research a successful start to the new funding period.

→ Further information:

www.energetische-biomassenutzung.de/en
www.forschungsnetzwerke-energie.de/home

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Recent publications from the funding programme:

Händler, T.; Röbisch, J. (Hrsg.) (2025). *Focus on Bioenergie im Strom- und Wärmemarkt: Flexibilisierung & alternative Brennstoffe. Projektergebnisse 2023–2024*. Leipzig: DBFZ. (Fokusheft Energetische Biomassenutzung). ISBN: 978-3-949807-13-8. DOI: 10.48480/mraf-xv75.

Händler, T.; Röbisch, J. (Hrsg.) (2025). *Focus on Bioenergie und Wasserstoff: Neue Entwicklungen bis hin zur kommerziellen Anwendung. Projektergebnisse 2023–2024*. Leipzig: DBFZ. 85 S. (Fokusheft Bioenergie & Wasserstoff, 1/2025). ISBN: 978-3-949807-12-1. DOI: 10.48480/m18p-ys30.

Händler, T.; Röbisch, J. (Hrsg.) (2025). *Focus on Bioenergie und Wasserstoff: Neue Entwicklungen bis hin zur kommerziellen Anwendung. Konferenzbeiträge "Wasserstoff aus biogenen Reststoffen" vom 29. & 30. April 2025*. Leipzig: DBFZ. 53 S. (Fokusheft Bioenergie & Wasserstoff, 2/2025). ISBN: 978-3-949807-32-9. [Statusseminar "Wasserstoff aus biogenen Reststoffen", Rutesheim, 29.–30.04.2025]. DOI: 10.48480/g25p-6q02.

Thrän, D.; Händler, T. (Hrsg.) (2025). *Statuskonferenz Bioenergie: 20.–21.11.2025*. Leipzig: DBFZ. 109 S. (Reader Energetische Biomassenutzung). ISBN: 978-3-946629-98-6. [Statuskonferenz Bioenergie, Leipzig, 20.–21.11.2025]. DOI: 10.48480/kbm5-ta86.

Brödner, R.; Händler, T.; Schade, A. F.; Thrän, D. (2025). *The use of biomass and biogenic residues for energy: Challenges and need for action. Position paper by the Research Network Bioenergy on the EU Bioeconomy Initiative*. [s. l.]: [s. n.]. [8] S.

10.4 Policy advice

Since its foundation, advising the Federal Government on issues relating to the use of biomass for energy and materials has been one of DBFZ's core tasks, as stipulated in its Articles of Association. As a scientific institution, the DBFZ strives to make relevant research findings accessible to interested political stakeholders and to provide scientific advice to policy-makers on issues surrounding the use of biomass. Against this backdrop, the DBFZ has continuously expanded its services for policy-makers in ministries and parliaments, as well as for the specialist public, in recent years. Policy advice has primarily taken the form of scientific statements, background or discussion papers, (short) studies on current political processes, as well as lectures and expert discussions.

Highlights in 2025

In 2025, a large part of the consultancy work centred on the EU Renewable Energy Directive (RED). The 2023 amendment to this directive had to be transposed into national law in Germany, which required various national legislative acts to be amended.

This included, in particular, the German greenhouse gas reduction quota (GHG quota), which mandates a binding reduction in greenhouse gas emissions from transport. A comprehensive background paper outlined various scenarios for the potential future use of biofuels, electricity, hydrogen and other options to meet the quota. The analyses made it clear that the targets set out in the government's draft GHG quota were insufficient to achieve Germany's climate protection targets in the transport sector (see page 44).

In addition, the DBFZ drew up recommendations for reducing the risk of fraud in the GHG quota, which had caused a stir in the past in connection with international carbon credits and misdeclared palm oil imports. Data on the availability and current use of used cooking oil (UCO) was also provided to help assess the implications of future eligibility.

Additional advisory work in the context of the RED focused on questions such as how the new funding restrictions on energy from mature timber would affect the production of wood pellets in Germany (likely to be minimal) and whether the funding of biomass electricity from renewable raw materials



Fig. 43: Published background paper: 'Scenarios for the GHG quota in the context of the 2025 draft bill and the Climate Protection Act up to 2045' (german language)



such as maize would be in line with the new version of the Directive (probably yes). The DBFZ also provided technical support for the transposition of the updated RED sustainability criteria into national law.

In the summer and autumn of 2025, the EU invited comments on two new documents of great significance for the future of the bioeconomy: the updated Bioeconomy Strategy and the European Circular Economy Act. The DBFZ submitted comments on both initiatives, recommending more specific targets and a focus on policy instruments that do not further increase the overall consumption of biomass. Other issues at EU level included the potential consequences of failing to meet climate targets in the land use sector (LULUCF) and how national emissions trading schemes deal with greenhouse gas emissions from wood used for energy.

At national level, the DBFZ supported the evaluation of the Renewable Energy Sources Act (EEG) in relation to biomass, as well as the German government's preparations for measures to promote renewable gases.

Overview of services

- _ Providing scientific support for legislative and administrative law-making processes
- _ Supporting the development of political strategies in the field of bioenergy and biomass
- _ Monitoring and regulatory impact assessment
- _ Analysing the climate, energy, environmental and research policy frameworks of the bioeconomy

→ Further information:

www.dbfz.de/en/services/policy-advice

www.dbfz.de/en/press-media-library/more-publishments/statements-studies

www.dbfz.de/en/policy-blog

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Science-based services

As a research institute focusing primarily on applied research, the DBFZ seeks close cooperation with project partners from the business sector and, to this end, offers a comprehensive range of contract research as well as a wide variety of science-based and technical services. These extend beyond the DBFZ's five main research focus areas and are aimed equally at policymakers, the business sector, associations, experts and committees. The work is carried out in a cross-departmental and interdisciplinary manner, ensuring that the DBFZ's full range of expertise can be utilised comprehensively and efficiently for the following consultancy and technical services.

Science-based services

- _ Market analysis and data provision
- _ Technical, economic and environmental assessment
- _ Concept and process development and optimisation
- _ Scientific support for R&D projects
- _ Scenario development
- _ Knowledge transfer & OpenData

→ **Further information:**

www.dbfz.de/en/services/science-based-services

at plant and mechanical engineering firms, process development companies, plant operators, and other R&D-driven companies and institutions. In addition, there is the option, within the framework of project collaborations, to utilise the services of the analytical lab (chemical composition and fuel properties of solid biofuels, biogas substrates, liquid fuels, by-products from agriculture and forestry, and other biogenic residues and waste materials, as well as their conversion products such as ash, filter dust, HTC coals and process water).

The DBFZ's pilot plant (Pilot-SBG) is operated largely automatically and collects extensive process data for digital analysis. It combines proven and innovative technologies and was successfully operated using agricultural residues in 2024 and 2025. In 2026, municipal waste will be used. Thanks to its modular design, the plant can also be flexibly used and expanded in future projects to address research questions relating to the bioeconomy and biorefineries.

Technical-scientific services

In addition to the services mentioned above, the DBFZ offers a specialised R&D infrastructure in the three technical research departments of biochemical conversion, thermochemical conversion and biorefineries. These technical and scientific services are aimed

→ **Further information:**

www.dbfz.de/en/projects/pilot-sbg/

Biochemical Conversion Department:

- _ Market analysis (based on the annual operator survey, among other things), forecasting and strategy consulting
- _ Scientific support for the development of plant components
- _ Balancing and evaluation of processes in terms of efficiency, technical feasibility and economics
- _ Characterisation of substrates for biochemical conversion (digestibility, gas potential, etc.)
- _ Biogas process analysis and characterisation of biochemical processes, mainly anaerobic processes
- _ Experiment design (batch and continuous experiments, microbial electrochemical experiments)
- _ Concept development for specific site conditions
- _ Determination of energy quantities (electricity, heat) and identification of optimisation potential



Fig. 44: Pilot plant for renewable methane (Pilot-SBG)

Thermo-chemical Conversion Department:

- _ Development and characterisation of solid biogenic fuels and raw materials including pre-treatment, additive incorporation and compaction
- _ Combustion tests and comparative analysis of the combustion properties of combustion systems and fuels
- _ Particulate matter emission measurements using separators
- _ Comparative measurements for particulate matter analysers (mass and number)
- _ Characterisation and classification of pyrolysis coals into utilisation pathways
- _ Investigation of catalyst technology
- _ Catalyst investigations on the test bed and in practice with regard to efficiency and emissions
- _ Catalyst screening in model and real gas
- _ Catalyst characterisation through physisorption and chemisorption measurement
- _ Catalyst synthesis
- _ Development of innovative concepts for integrated renewable heating systems
- _ Simulation of renewable heating solutions

Biorefineries Department:

Pilot plant tests on:

- _ thermochemical biomass digestion
- _ hydrothermal synthesis, carbonisation and liquefaction
- _ hydrotreatment of biogenic oils
- _ fixed bed gasification
- _ synthesis gas processes
- _ gas cleaning
- _ solid-liquid/liquid-liquid separation processes for biogenic resources from aqueous media
- _ Pilot-SBG-Plant

Tab. 3: Tabular overview of contact persons in the laboratories, test beds and technical facilities of the DBFZ

Department	Description	Contact
Biochemical Conversion Department	Research Biogas Plant	Florian Wedler-Geyer E-Mail: Florian.Wedler-Geyer@dbfz.de Christian Krebs E-Mail: christian.krebs@dbfz.de
	Biogas lab	Dr. Nils Engler E-Mail: nils.engler@dbfz.de Katrin Strach E-Mail: katrin.strach@dbfz.de
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→ Further information:

www.dbfz.de/en/services/technical-and-scientific-services



Fig. 45: Extensive and state-of-the-art research infrastructure at the DBFZ

12 Networks, Research Associations and Committee work

Scientists at the DBFZ are members of a wide variety of scientific networks and research consortia relating to the fields of bioeconomy and bioenergy. Strong networking within the national and international research landscape, as well as with industry, has been of great importance since the DBFZ was founded. The aim of this committee work is to contribute to finding comprehensive and sustainable solutions to the complex challenges posed by the energy and raw materials transition.

Scientific collaborations with universities and research institutes

Scientific collaboration with universities and other research institutions is an essential part of the DBFZ's networking activities. The focus is on implementing defined research objectives within the framework of applied research and development (R&D). In the field of energy recovery from organic waste and residues, there has been a strategically oriented collaboration for several years between the DBFZ's research focus areas and the Rostock Chair of Waste and Resource Management (ASW), represented by the scientific managing director of the DBFZ, Prof. Dr. Michael Nelles. Questions regarding the system evaluation of bioenergy and the microbiological fundamentals of biochemical processes are addressed within the framework of a long-standing collaboration with the neighbouring Helmholtz Centre for Environmental Research – UFZ.

DBFZ researchers make a significant contribution to raising the profile of the DBFZ and to expanding scientific networks through their lecturing activities at a total of 13 universities and higher education institutions (including the University of Leipzig, the University of Rostock, the University of Hamburg-Harburg, Chemnitz University of Technology, Dresden University of Technology, Anhalt University of Applied Sciences,

Merseburg University of Applied Sciences and HTWK Leipzig). Cooperation with countries outside Europe, particularly with China, has been continuously expanded in recent years. DBFZ researchers serve as visiting professors at Hefei University and other renowned universities in China.

IEA BIOENERGY

The DBFZ continues to be very successfully represented within the IEA Bioenergy network in the new triennium 2025–2027. With participation in six out of eleven working groups (Tasks 37, 39, 40, 42, 44 and 45), the DBFZ is actively involved in an international network of around 200 experts dedicated to advancing bioenergy research. DBFZ staff members hold key leadership roles in this context – both at the level of tasks and work packages and as leaders of cross-task projects (Inter-Task Projects, ITPs).

Among the key highlights of 2025 were the participation of several tasks in EUBCE 2025 in Valencia, a technical presentation at the IEA Biorefinery and Biomethane Event in Wageningen, and the preparation of and participation in the workshop “Biomass and Hydrogen – Allies for Net Zero” in Paris, in collaboration with IEA Paris and IEA Hydrogen. In addition, the DBFZ organised the webinar “Synergies of renewable hydrogen and biobased value chains: case studies”, which attracted several hundred participants.

The IEA Bioenergy Annual Report 2024 included a feature article by Task 44 on the topic of “Flexible Bioenergy – Enabler for Energy Transition for Zero-Emission Energy Systems”. In addition, the IEA Bioenergy News newsletter, Volume 37(1), August 2025, featured a special article by Task 40 on the topic “Bioenergy with Carbon Capture and Storage or Utilisation: Deployment perspectives”. Both publications were produced with significant input from the DBFZ. Further achievements include numerous published reports and factsheets, as well as accreditation to continue the inter-task project “Management of biogenic CO₂: BECCUS Phase 3” during the current triennium. Ten of the 11 IEA Bioenergy Tasks are collaborating on this project, which is led by the DBFZ.

→ **Further information:**

www.ieabioenergy.com

www.dbfz.de/en/feature/iea-bioenergy

Committee activities of DBFZ scientists

Scientists at the DBFZ serve as experts on a wide variety of scientific bodies, advisory boards, working groups, networks and committees, as well as holding positions as (visiting) professors both in Germany and abroad. The aim of this involvement in such bodies is to foster close collaboration with the scientific community.



Fig. 46: Kick-off for the 2025–2027 triennium: Task 40 meeting in Stockholm (Sweden) in September 2025

Tab. 4: DBFZ committee activities (as of February 2026)

Committee	Function	Country	Since
Association for the Promotion of Exhaust Gas After-treatment Technologies for Combustion Engines (FAD)	Member of the Advisory Board	Germany	2013
Austrian Biomass Association	Member of the scientific committee	Austria	2022
BioEconomy Cluster of BioEconomy e. V.	Member of the Advisory Board	Germany	2012
Biomass to Power and Heat	Member of the Programme Committee	Germany	2014
Circular Economy 4 Africa	Member of the Executive Board	Germany	2020
Doctoral Colloquium BIOENERGY AND BIOBASED PRODUCTS	Patron/Member of the Scientific Advisory Board & the Programme Advisory Board	Germany	2018
EdDE – Association of the German Waste Management Industry	Member of the Board of Trustees	Germany	2026
Energy and Climate Protection Advisory Council of the Saxon State Ministry for Environment and Agriculture (SMUL)	Member	Germany	2021
Energy and Environment Foundation Leipzig	Member of the Board of Trustees	Germany	2013
European Biogas Association (EBA)	Member of the Scientific Advisory Board	Belgium	2019
European Union Aviation Safety Agency (EASA): ICAO CAEP Working Group 5 – Aviation Fuels	Member & Lead WG	International	2025
Export initiative RETech “Recycling & Waste Management in Germany” of the German Federal Government (BMUKN, BMW, BMZ)	Member of the Board and Head of the China Working Group	Germany	2014
German Association for Waste Management e. V. (DGAW)	Member of the Management Board	Germany	2014
Helmholtz Centre for Environmental Research – UFZ	Member of the scientific advisory board	Germany	2013
IEA Bioenergy, Task 37 “Energy from Biogas”	Member	International	2019
IEA Bioenergy, Task 39 “Biofuels to Decarbonize Transport”	German Management	International	2014
IEA Bioenergy, Task 40 “Deployment of biobased value chains”	Co-task leader, German Management	International	2019
IEA Bioenergy, Task 42 “Biorefining in a Circular Economy”	German Management	International	2025
IEA Bioenergy, Task 44 “Flexible bioenergy and system integration”	Co-task leader, German Management	International	2019
IEA Bioenergy, Task 45 “Climate and sustainability effects of bioenergy within the broader bioeconomy”	German Management	International	2019
Institute for Non-Classical Chemistry e. V. at the University of Leipzig (INC)	Member of the Advisory Board	Germany	2013
International Solid Waste Association (ISWA)	Coordinator of Germany’s activities	Netherlands	2022

Committee	Function	Country	Since
ISWA Germany (RETech & DGAW)	Board spokesperson	Germany	2022
IWWG – International Waste Working Group	Member of the Managing Board	Italy	2023
LaNDER ³ –Hochschule Zittau/Görlitz	Member of the Advisory Council	Germany	2017
Mecklenburg-Western Pomerania State Energy Council	Member and Head of the F&L Working Group	Germany	2012
Ministry of Agriculture, Environment and Consumer Protection Mecklenburg-Western Pomerania	Member of the Scientific Advisory Board	Germany	2017
Renewable Energy Research Association (FVEE)	Member of the Directorate	Germany	2015
Research Steering Committee of the Federal Ministry of Agriculture, Food and Regional Identity (BMLEH)	Member	Germany	2012
Scientific journal “Müll & Abfall”	Member of the Advisory Council	Germany	2007
Strategy Council for Business and Science Mecklenburg-Western Pomerania	Member of the Strategy Council for Business and Science	Germany	2014
verbio Biofuel and Technology “Straw in the Tank” Conferences	Member of the Scientific Advisory Board	Germany	2017
Yes-Programm “Young Entrepreneurs in Science”	Member	Germany	2021



Working groups

Committee	Function	Country	Since
Agru Interlaboratory Test, Board of Trustees for Technology and Building in Agriculture (KTBL)	Member	Germany	2018
Bioeconomy WG of the Structure-Related Commission on Technology Assessment and Design (Saxon Academy of Sciences in Leipzig)	Member	Germany	2020
BMW Dialogue Platform “Industrial Bioeconomy”, WG4 “Communication”	Member	Germany	2021
DECHEMA		Germany	
– Expert Group “Industrial Use of Renewable Resources”	Member		2020
– Expert Group “Measurement and Control in Biotechnology”	Member		2018
– ProcessNet-Sustainable Production, Energy and Resources (SuPER), “Alternative Fuels and Combustibles”*	Member		2014
– ProcessNet-Sustainable Production, Energy and Resources (SuPER), “Energy Process Engineering”*	Member		2015
EERA Bioenergy Subprogramme		EU/Belgium	
1: Sustainable production of biomass	Member		2019
2: Thermochemical platform	Member		2019
3: Biochemical platform	Member		2019
4: Stationary bioenergy	Member		2019
5: Sustainability/Techno-economic analysis/Public acceptance	Member		2019
6: Digitalization for Energy	Member		2023
7: (temporary) Working Group: Resilience & Preparedness	Member		2025
8: (temporary) Working Group: The disruptive nature of AI	Member		2025
9: (temporary) Working Group: Innovation Hubs	Member		2025
European Biofuels Technology Platform (ETIP Bioenergy)		EU/Belgium	
WG1 Biomass availability	Member		2007
WG4 Policy and Sustainability	Member		2008
German RETech Partnership “Recycling & Waste Management in Germany”	Member of the International Working Group (Emerging and Developing Countries)	Germany	2017
Taskforce Biomethane	Member	EU/Belgium	2022
Taskforce Biomethane	Member	EU/Belgium	2025
Taskforce Biomethane, BEST – Bioenergy and Sustainable Technologies GmbH, Austria	Member	Germany	2025
Thuringia’s Raw Materials Strategy, Free State of Thuringia	Member	Germany	2025
WG Biogas of VGB PowerTech e. V.	Member	Germany	2019

Committee	Function	Country	Since
WG "Library concepts" of the BMLEH departmental research institutions	Member	Germany	2016
WG "OpenAgrar" of the BMLEH departmental research institutions	Member	Germany	2016
WG on Substance-Specific Waste Treatment (ASA) e. V.	Member of the Advisory Board	Germany	2009
"WIR!" Innovation cluster Waste to Value	Member	Germany	2022

* ProcessNet is an initiative of Dechema and VDI-GVC

Networks/associations/platforms (selection)

Committee	Function	Country	Since
BioEconomy e. V.	Member	Germany	2012
BioWEconomy of the European Commission	Member Core Group/Initiators	EU/Belgium	2020
Central German Energy Network Association	Member of the Advisory Board	Germany	2014
Committee on the Sustainability of Biofuels and Bioliquids of the European Commission	Member	EU/Belgium	2017
DFBEW German-French Office for the Energy Transition	Member	Germany/ France	2016
Energy Committee of the Leipzig Chamber of Industry and Commerce (IHK)	Member	Germany	2016



Committee	Function	Country	Since
Energy Saxony e. V.	Member	Germany	2013
European Biogas Association (EBA)	Member	EU	2023
Förderverband Humus e. V. (FVH)	Member of the Scientific Advisory Board	Germany	2019
Network for Carbon Cycle Economy (NK2)	Member	Germany	2019
Network Technology and Operations Forum of the German Electrical and Electronic Manufacturers' Association (VDE)	Member	Germany	2025
PREVENT Waste Alliance	Member	Germany	2020
Renewable Energies Research Association (FVEE), Hydrogen expert committee	Member	Germany	2020
Sustainable Development Solutions Network (SDSN) of the German Development Institute	Member of the Extended Steering Committee	Germany	2016

DIN/ISO – Standard committees (selection)

Committee	Function	Country	Since
Association of German Engineers e. V. (VDI)		Germany	
_ VDI 3670 "Flue gas cleaning – downstream dust abatement equipment for small combustion plants for solid fuels"	Chairman		2014
_ VDI 3670 "Flue gas cleaning – downstream dust abatement equipment for small combustion plants for solid fuels"	Member		2014
_ VDI 3896 Emission Reduction – Upgrading Biogas to Natural Gas Quality	Member of the Policy Committee		2019
_ VDI 4630 "Fermentation of organic substances – substrate characterisation, sampling, substance data collection, fermentation tests"	Member		2025
_ VDI 4635 "Power-to-x: CO ₂ provision"	Member		2020
CEN – European Committee for Standardization TC 454 Algae and algae products	Chairman WG 3 "Productivity"	Belgium	2015
German Institute for Standardisation e. V. (DIN)		Germany	
_ Municipal Technology Working Committee (NKT), NA 051 BR 05 SO "Autonomous sanitary facilities"	Contributors		2023
_ Working committee "Requirements for liquid fuels", NA 062-06-32 AA	Member		2020
_ Working committee "Liquefied gases, requirements and testing", NA 062-06-31 AA	Member		2021
_ Working Group "Dust separator testing", DIN 33999	Member		2012
_ Working committee "Biogas", NA 032-03-08 AA	Member		2015
_ Working committee "Pyrogenic carbons", NA 062-02-85 AA	Chairwoman		2021
_ Working committee "Biogenic solid fuels", NA 062-05-82 AA	Member		2019

Committee	Function	Country	Since
International Organization for Standardization (ISO)		Switzerland	
_ ISO 19867-1:2018 Part 1 "Clean cookstoves and clean cooking solutions"	Contributors		2023
_ ISO TC 238 Solid Biofuels WG 1 "Terminology"	Convenor		2022
_ ISO TC 238 Solid Biofuels WG 2 "Fuel specifications and classes"	Task leader		2020
_ ISO TC 238 Solid Biofuels WG 7 "Safety of solid biofuels"	Member		2019
_ ISO/TC 238 Task Group 1 "Biochar"	Member		2021
_ ISO TC 255 Biogas WG 1 "Terms, definitions and classification scheme for the production, conditioning and utilization of biogas"	Member		2015
VDI/DIN Commission on Air Pollution Control (KRdL)		Germany	
_ WG 3933 "Production of biomass carbonisates"	Member		2013
_ Committee for Basic Guidelines "Bioeconomy, bio- Contributor 2021 logical transformation – terms, methods, definitions"	Contributor		2021
_ Guideline Preparation Committee VDI 3475 Sheet 8, "Emission Reduction; Digestate Treatment Plants"	Chair		2021
_ Guideline Preparation Committee VDI 3475 Sheet 9 "Emission Reduction; Manure Processing Plants"	Chair		2021
_ NA 134-04-03-03 UA Diffuse Emissions – Gas Camera	Member		2025

Professorship

College/University	Function	Country	Since
Anhui University Hefei	Visiting Professorship	China	2023
Department of Energy, Buildings, Environment (teaching and research area: process engineering, waste and recycling management), University of Applied Sciences Münster	Professorship	Germany	2023
Faculty for Agriculture, Civil and Environmental Engineering, University of Rostock	Professorship	Germany	2006
Faculty for Agriculture, Civil and Environmental Engineering, University of Rostock	Professorship	Germany	2025
Faculty of Energy and Environmental Science, Shenyang Aviation University	Visiting Professorship	China	2011
Faculty of Environmental and Biotechnology, Hefei University	Visiting Professorship	China	2002
Faculty of Natural and Environmental Sciences, Zittau/Görlitz, University of Applied Sciences	Professorship	Germany	2023
Institute for Renewable Energy, Petroleum University Beijing	Visiting Professorship	China	2014
Leipzig University of Applied Sciences (HTWK Leipzig)	Professorship	Germany	2020
National Centre of International Scientific and Technological Bioenergy Research (iBEST), Chinese Agricultural University (CAU), Beijing	Associate professor	China	2017
Technical University of Hamburg-Harburg	Honorary professorship	Germany	2024

Universität
Rostock  Traditio et Innovatio

 Hochschule
Zittau/Görlitz
UNIVERSITY OF APPLIED SCIENCES

HTWK
Hochschule für Technik,
Wirtschaft und Kultur Leipzig

TUHH
Technische
Universität
Hamburg



Contact

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13

Organisational structure of the DBFZ

To carry out the wide range of research tasks, the DBFZ is organised into four research departments, reflecting the various energy sources the DBFZ is working on. While the departments of biochemical conversion, thermo-chemical conversion and biorefineries mainly work on applied research tasks, the bioenergy systems department, in addition to policy advice, includes potential analyses, acceptance studies, a wide range of scenarios for biomass use and database-driven web applications (data lab).

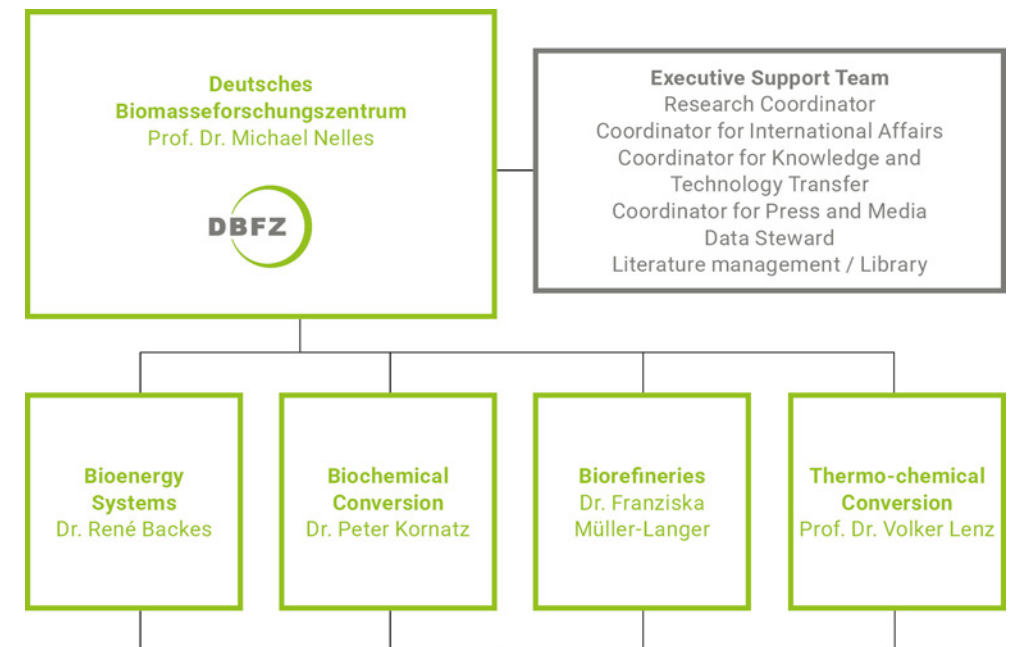


Fig. 47: The four research departments of the DBFZ and the Executive Support Team (as of February 2026)

13.1 Management, executive support team and controlling bodies

Since its foundation in 2008, the DBFZ has been managed jointly by two managing directors, who have divided the tasks between research and administration. In close cooperation with the heads of the five research focus areas and the executive support team,

the most important scientific objectives of the DBFZ are defined and evaluated and further developed in regular strategy meetings together with the Supervisory Board and the Research Advisory Council.

The general management



Scientific Managing Director
Prof. Dr. mont. Michael Nelles
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E-mail: michael.nelles@dbfz.de



Administrative Managing Director
Dr. rer. nat. Christoph Krukenkamp
Phone: +49 (0)341 2434-111
E-mail: christoph.krukenkamp@dbfz.de

Heads of the research focus areas



Systemic Contribution of Biomass
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E-mail: rene.backes@dbfz.de



Anaerobic Processes
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SmartBiomassHeat
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Catalytic Emission Control
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Executive Support Team



Research Coordinator
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 E-mail: elena.angelova@dbfz.de



Coordinator for international Knowledge- and Technology Transfer
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Coordinator for Knowledge and Technology Transfer
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 Phone: +49 (0)341 2434-118
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Coordinator Press and Media
 Paul Trainer
 Phone: +49 (0)341 2434-437
 E-mail: paul.trainer@dbfz.de



Data Steward
 Dr. rer. nat. Torsten Thalheim
 Phone: +49 (0)341 2434-136
 E-mail: torsten.thalheim@dbfz.de

Controlling Bodies

The Supervisory Board

Decisions regarding content and organisation for the strategic and organisational development of the DBFZ are made by the Supervisory Board, which is currently (as of February 2026) chaired by the Federal Ministry of Agriculture, Food and Regional Identity (BMLEH). Other members include the Federal Ministry of Research, Technology

and Space (BMFTR), the Federal Ministry for the Environment, Climate Protection, Nature Conservation and Nuclear Safety (BMUKN), the Federal Ministry of Transport (BMV) and the Saxon State Ministry for Economic Affairs, Labour, Energy and Climate Protection (SMWA).

The Supervisory Board met at the DBFZ on 27 June and 11 November 2025.

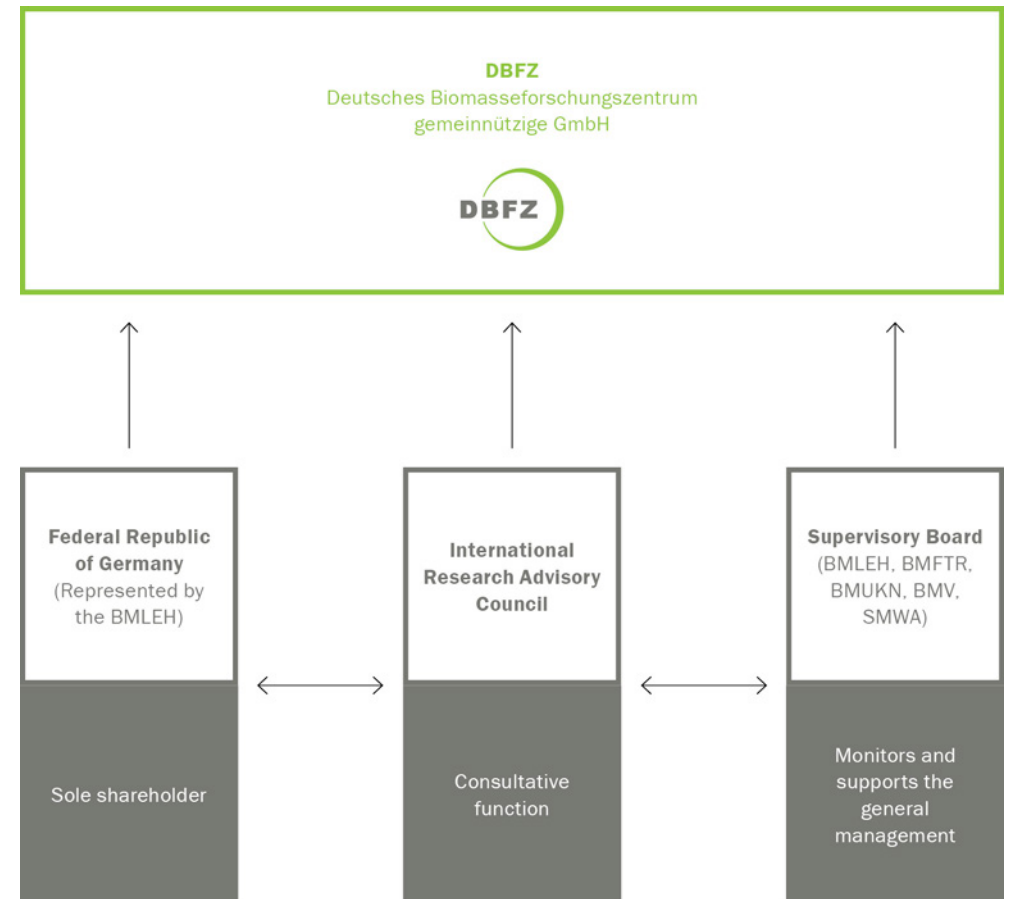


Fig. 48: The controlling bodies of the DBFZ (as of February 2026)

The members of the Supervisory Board are the persons listed below:
(as at 4 February 2026)



Olaf Schäfer (Chairman)
Ministerial Director
Head of Sub-Department "Climate Protection, Biodiversity, Sustainability and Bioeconomy"
Federal Ministry of Agriculture, Food and Regional Identity



Katharina Schwarz
MinDirig'in
Head of working group NII5, Natural and environmental affairs in genetic engineering and the bioeconomy
Federal Ministry for the Environment, Climate Action, Nature Conservation und Nuclear Safety



Dr. Dirk Orlamünder
Head of Department 5 "Energy, Climate Protection and Mining"
Saxon State Ministry for Economic Affairs, Labour, Energy and Climate Protection



Martin Waldhausen
Head of Department KB7 "Climate Protection in Agriculture and Forestry, Biomass"
Federal Ministry for the Environment, Climate Action, Nature Conservation und Nuclear Safety



Dr. Kerstin Zimmermann
Government Director, Department F (Future Planning),
Division F22 'Energy, Hydrogen Technologies'
Federal Ministry of Research, Technology and Space



Birgit Breitfuß-Renner
MinDirig'in
Head of Subdepartment G1 "Policy issues and strategies for passenger and freight transport"
Federal Ministry for Transport

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The Research Advisory Council

The Research Advisory Council (RAC), comprising nationally and internationally renowned bioenergy experts, has been advising the DBFZ on the direction of its diverse scientific activities since its foundation in 2008. The Council's advice ensures that research funded by institutional grants is scientifically sound and of the utmost relevance to the current and future use of bioenergy within the energy system. The term of the current Council runs from 2024 to 2027.



Fig. 49: Annual meeting of the Research Advisory Council at the DBFZ (28 October 2025)

Tab 5: The members of the Research Advisory Council are the persons listed below (as at 4 February 2026)

Chiaramonti, Prof. Dr. David
Polytechnic University of Turin – DENERG – Department of Energy "Galileo Ferraris"; RE-CORD – Renewable Energy Consortium for Research and Demonstration
[Turin, Italy](#)

Moos, Prof. Dr. Ralf
University of Bayreuth, Faculty of Engineering
[Bayreuth, Germany](#)

Dong, Prof. Dr. Renjie (Deputy Chairman)
China Agricultural University (CAU) – National Center for International Research of BioEnergy Science and Technology
[Beijing, China](#)

Murphy, Prof. Dr. Jerry
University College Cork – Professorship of Civil Engineering
[Cork, Ireland](#)

Dornack, Prof. Dr. Christina (Chair woman)
Technical University of Dresden – Institute of Waste Management and the Circular Economy
[Dresden, Germany](#)

Thiffault, PhD Evelyne
Laval University – Department of Wood and Forest Sciences
[Québec, Canada](#)

Hartmann, Dr. Hans
Technology and Support Centre (TFZ)
[Straubing, Germany](#)

Thrän, Prof. Dr. Daniela
Helmholtz Centre for Environmental Research – UFZ
[Leipzig, Germany](#)

Kemfert, Prof. Dr. Claudia
German Institute for Economic Research (DIW Berlin)
[Berlin, Germany](#)

Wagemann, Prof. Dr. Kurt
DECHEMA – Society for Chemical Engineering and Biotechnology
[Frankfurt am Main, Germany](#)

Kothe, Prof. Dr. Erika
Friedrich-Schiller-University Jena, Professorship for Mikrobial Communication
[Jena, Germany](#)

Walter, Prof. Dr. Arnaldo
University of Campinas – Department of Energy
[Campinas, Brazil](#)

13.2 Financial Report 2025

The DBFZ was established in 2008 as a limited liability company (GmbH) operating within the remit of the former Federal Ministry of Food and Agriculture (BMEL) as an institutional grant recipient, and is recognised as a non-profit organisation under Section § 52 (2) (1) of the German Fiscal Code (AO). The organisation’s aim is to access public research funding in a flexible and transparent manner and to carry out research and consultancy work on behalf of third party funding.

The DBFZ is funded through institutional funding to cover shortfalls from the Federal Ministry of Agriculture, Food and Regional Identity, as well as through competitively awarded project grants, contract research and services. In 2025, the DBFZ received EUR 13,4 million in funding from the BMLEH. In addition, approximately EUR 13,1 million in third-party funding was secured. On the expenditure side, personnel and material costs accounted for the lion’s share at EUR 12,7 million. Additional expenditure of EUR 3,4 million was allocated to investments and the construction of the new technical centre.

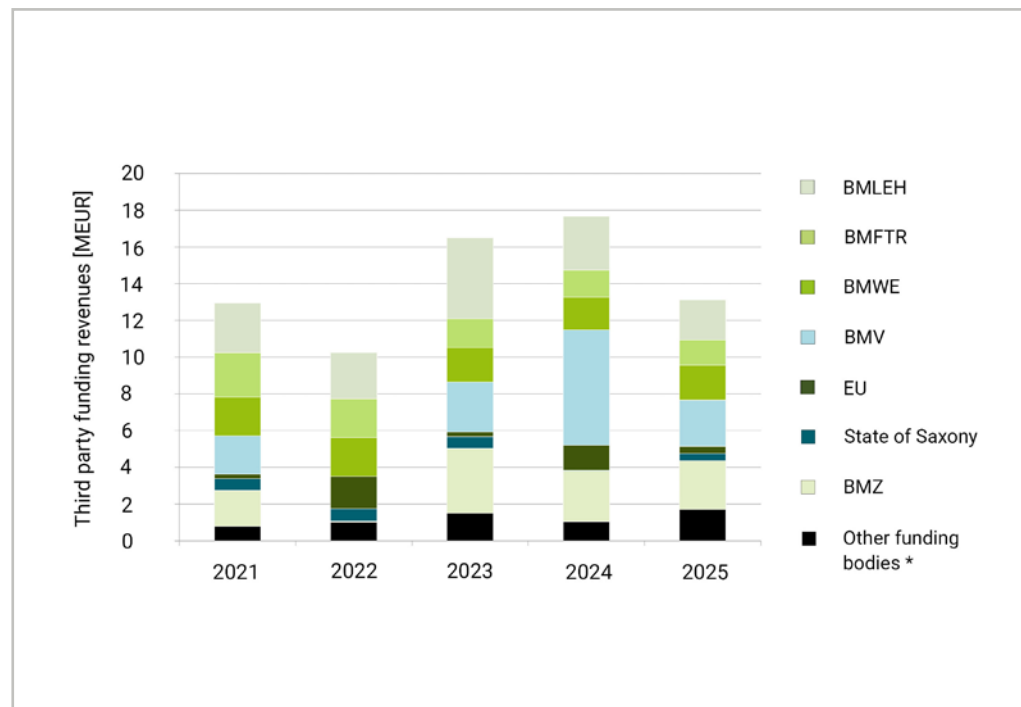


Fig. 50: Overview of external funding income for 2021–2025 (provisional figures)
* Contract research and services for private and public sector clients.

13.3 Personnel/Training

As at 31 December 2025, 272 people from 23 countries were employed at the DBFZ. Of these, 208 (including executive support team) were in the scientific/technical departments and 64 in the administrative department (including the departments for infrastructure and property management, as well as IT). In 2025, too, a wide range of projects were supervised at the DBFZ. In total, 12 internship and student

research projects, as well as 29 Bachelor’s, Master’s and diploma theses, received academic supervision. In addition, a total of 42 visiting researchers, international interns and scholarship holders worked at the DBFZ.

The proportion of female employees has fallen slightly compared with last year, to 43.38 %.

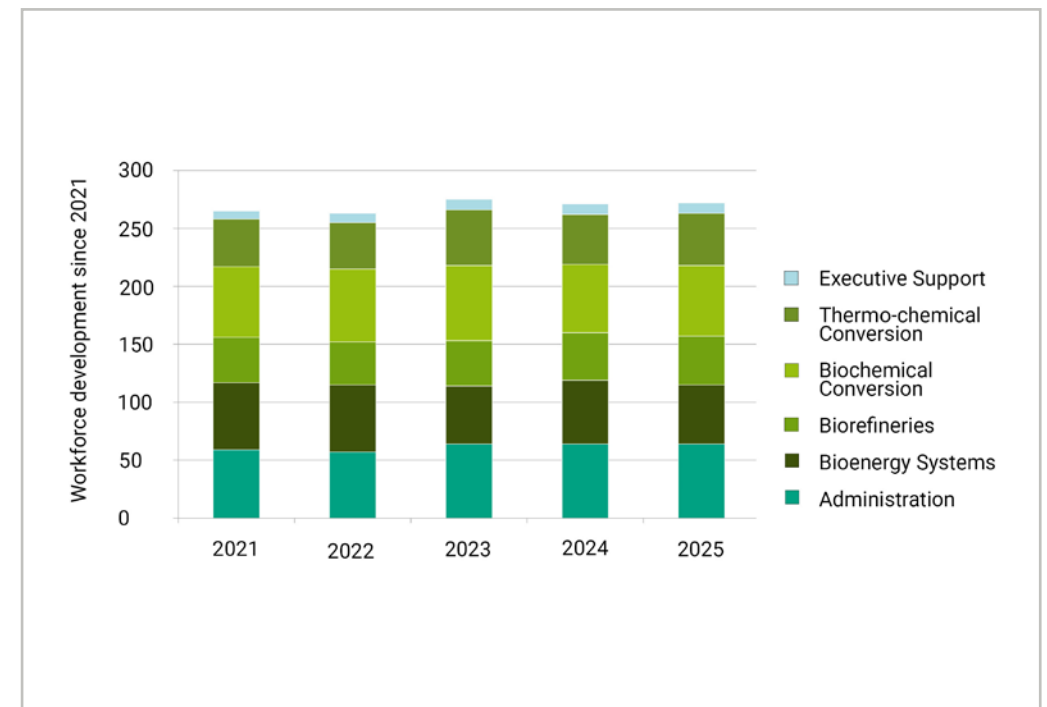


Fig. 51: Workforce development at the DBFZ (as at 31 December 2025)

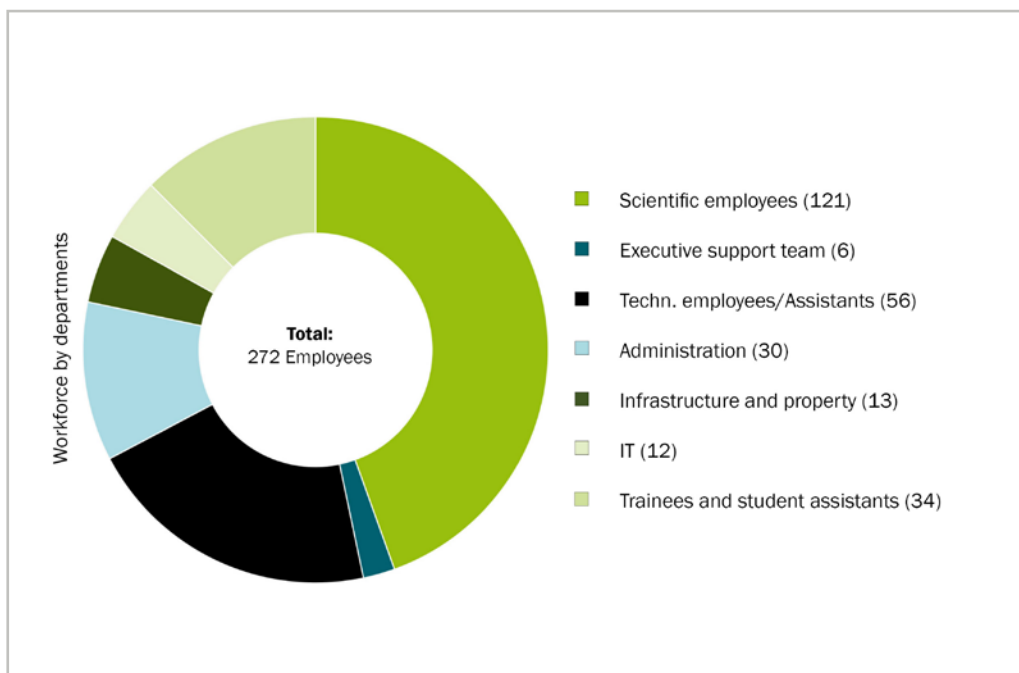
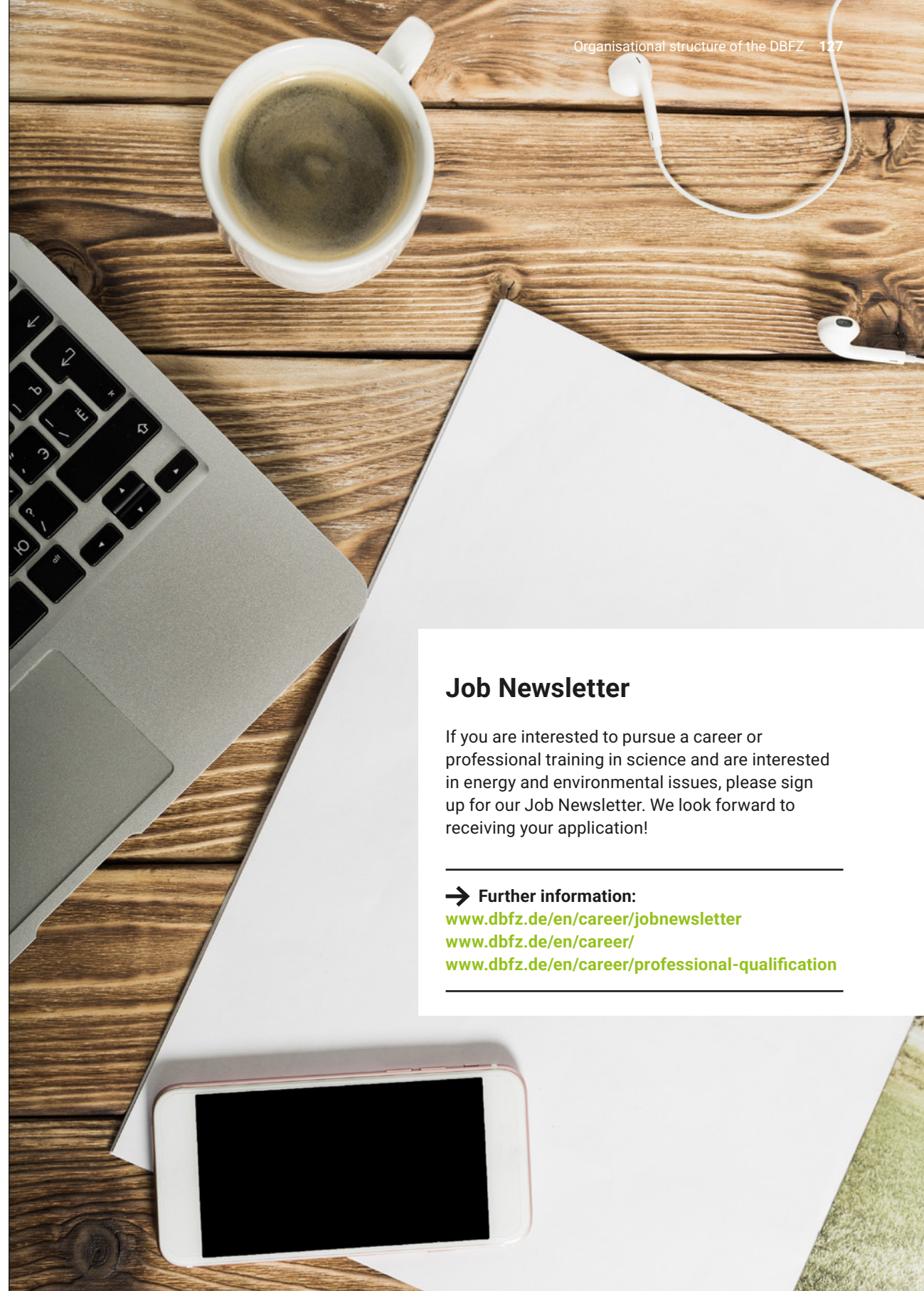


Fig. 52: Overview of workforce by department (as at 31 December 2025)

Tab. 6: Overview of the proportion of women in the various sectors (as at 31 December 2025)

Departments	Number of employees	Of which female	Proportion of women
Scientific staff	121	53	43,80 %
Executive Support Team	6	2	33,33 %
Administration	30	26	86,67 %
Infrastructure and property management	13	2	15,38 %
IT	12	3	25,00 %
Technical staff/assistants	56	18	32,14 %
Trainees/assistants	34	14	41,18 %
Total	272	118	43,38 %



Job Newsletter

If you are interested to pursue a career or professional training in science and are interested in energy and environmental issues, please sign up for our Job Newsletter. We look forward to receiving your application!

→ Further information:

- www.dbfz.de/en/career/jobnewsletter
- www.dbfz.de/en/career/
- www.dbfz.de/en/career/professional-qualification

14

Annex: Projects and Publications

Major projects and publications from 2025 are listed below to illustrate the current working areas of the DBFZ. The language of the title reflects the language of the project/publication.

Projects (selection)

Federal Ministry of Agriculture, Food and Regional Identity (BMLEH)

- AntbioHK – Auswirkungen des verstärkten Einsatzes von Geflügelexkrementen in BGA auf die Belastung der Gärreste mit Antibiotika, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.05.2022–30.09.2025 (FKZ: 2221WD002A)
- BCLOOKUP – Pyrolyse sekundärer landwirtschaftlicher Biomassen: Datenbank zu Pflanzenkohle-Eigenschaften und agronomische Bewertung, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.09.2023–31.08.2029 (FKZ: 2823HUM005)
- BiberZym – Vergärung von lignifizierter Biomasse durch den Einsatz von Enzymkombinationen aus dem Verdauungstrakt des eurasischen Bibers, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.02.2023–31.12.2025 (FKZ: 2221NR031A)
- BioSim – Nachwuchsforschergruppe zur modellbasierten Zustandsüberwachung und Prozessführung an Biogasanlagen, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.11.2020–30.06.2026 (FKZ: 2219NR333)
- BiTop – Prozessoptimierung eines Bioraffinationsverfahrens zur Gärrestaufbereitung mit dem Ziel der Gewinnung von Torfersatzstoffen unter Praxisbedingungen an Biogasanlagen; TV 2 DBFZ: Prozesskettenoptimierung, Ökonomische Bewertung und regionale Übertragbarkeit dezentraler Strategien, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.12.2024–31.12.2026 (FKZ: 2224MT005B)
- BK-BiT – Stoffstroeme-BK: Analyse zum Rohstoff-, Technologie- und Nachhaltigkeitspotenzial biobasierter Kunststoffe in Deutschland; TV 2 – BK-BiT: Potenzialanalysen und Technologiebewertung für Biopolymere aus biogenen Rest-, Abfallstoffen und Nebenprodukten, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.09.2024–31.08.2026 (FKZ: 2223NR075B)
- ELEVATOR – Elektrochemische Valorisierung furanreicher Prozessströme aus dem hydrothermalen Aufschluss landwirtschaftlicher Reststoffe, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.05.2023–30.04.2026 (FKZ: 2221NR027B)
- EmmiLa – Verbundvorhaben: Biogaserzeugung aus Wirtschaftsdünger: Emissionsminimierte Wirt-

schaftsdüngerlagerung TV 1: „Gesamtkonzeption, Koordination, Entwicklung, wissenschaftliche Begleitung und Wissenstransfer, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.10.2024–30.09.2027 (FKZ: 2224NR031A)

FlexApp – Fütterungsmanagement für flexible Biogasanlagen im Praxisbetrieb, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.01.2023–31.12.2025 (FKZ: 2221NR043A)

FoodLoop – Aufwertung von Abfallstoffen und Nebenzeugnissen der Lebensmittelproduktion und Verarbeitung mit Hilfe der industriellen Insektenzucht, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.03.2025–29.02.2028 (FKZ: 281A903A22)

GülleÖA – Entwicklung und Erstellung eines Manuskripts zur Herstellung einer Broschüre zur Vergärung von Wirtschaftsdünger in landwirtschaftlichen Biogasanlagen (Güllebrochure), Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.12.2023–28.02.2026 (FKZ: 2223WD002A)

HYTORF2 – Herstellung und Bewertung von Torfersatzstoffen auf Basis der hydrothermalen Umwandlung aus biogenen Reststoffen, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.11.2022–31.10.2025 (FKZ: 2221MT014A)

IEA_T44 – IEA Bioenergy Task 44 Flexible Bioenergy and System Integration 2025-2027, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.01.2025–31.03.2028

KIDA – Künstliche Intelligenz & Daten-Akzelerator, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.03.2022–31.12.2025 (FKZ: 28DKIDA005)

LangEFel – Langzeitmonitoring und Funktionalität von Staubabscheidern für Einzelraumfeuerungen im Feld, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.01.2023–31.12.2025 (FKZ: 3130081)

MehrWiDü – Mehr Wirtschaftsdünger in landwirtschaftlichen Biogasanlagen: Abbau der rheologischen und nährstoffseitigen Herausforderungen, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.07.2025–30.06.2028 (FKZ: 2223WD001A)

MEMO – Methanemissionsmodell für offene Gärprodukt-/Güllelager, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.11.2021–30.06.2026 (FKZ: 2220WD003X)

MethaMin – Minimierung von Methanemissionen bei der Lagerung von Wirtschaftsdüngern, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.10.2022–30.06.2026 (FKZ: 2221WD004A)

MOOReturn – Moor-Klimaschutz und Wertschöpfung verbinden durch Wiedervernässung und Paludikultur, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.01.2025–31.12.2027 (FKZ: 2222MT007A)

OptiFood – Nachhaltige insektenproteinhaltige Lebensmittel auf Basis landwirtschaftlicher Einsatz- und Reststoffe, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 15.04.2024–14.04.2027 (FKZ: 281A808A21)

RobustGemüse – Resilienz im ökologischen Gemüsebau – Entwicklung und Erprobung von Strategien und Innovationen durch Praxisforschung (ROBUST-Gemuese), Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.12.2025–30.11.2028

SoBioII – SoBio2 – Szenarien einer optimalen Biomasseverteilung in der Bioökonomie (unter Betrachtung der Sektoren Ernährung, Bau, Chemie, Energie und unter Berücksichtigung der C-Speicherung) im Kontext der Klimaschutzziele und SDGs bis 2030/2050, Inhouse, 01.05.2023–30.04.2026

StarTE – Klimawirksame Torfminderung durch stabile und hochwertige Torfersatzstoffe für Kultursubstrate (ehemals GärBest), Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.01.2026–31.01.2028 (FKZ: 2224MT007A)

WDSonic – Steigerung der Effizienz der Wirtschaftsdüngervergärung durch Einsatz von Ultraschall-Desintegrationsverfahren, Bundesministerium für Landwirtschaft, Ernährung und Heimat, 01.05.2023–31.12.2025 (FKZ: 2222WD105B)

Federal Ministry for Economic Affairs and Energy (BMWE)

BeForce – Begleitforschung Bioenergie, Bundesministerium für Wirtschaft und Energie, 01.04.2021–31.03.2026 (FKZ: 03EI5400)

BioH2 – Klimaneutrale Wärmenutzung und Wasserstoffherzeugung aus biogenen Rest- und Abfallstoffen, Bundesministerium für Wirtschaft und Energie, 01.01.2024–31.12.2026 (FKZ: 03EI5472)

BioHybrid – Verbundvorhaben: BioHybrid – Entwicklung eines systemdienlichen biomassebasierten Hybridsystems; Teilvorhaben: Integration biomasse-basierter Wärmeerzeuger in das Hybridsystem, Bundesministerium für Wirtschaft und Energie, 01.04.2024–31.03.2027 (FKZ: 03EI5474A)

CarboFe – Entwicklung und Validierung eines innovativen Eisen-Kohlenstoff Präparates zur Gasreinigung und Effizienzsteigerung des Biogasprozesses – CarboFerro, Bundesministerium für Wirtschaft und Energie, 01.01.2023–30.09.2026 (FKZ: 03EI5453)

DeDiaPro – Verbundvorhaben: DeDiaPro – Demonstration von Methoden zur Diagnose, Prognose & Behebung von nicht-nominalen Betriebszuständen in biomassebasierten Versorgungssystemen; Teilvorhaben: Entwicklung von Methoden, Modellen & Werkzeugen zur Fehlerdiagnose und -prognose mit Fokus auf brennstoffbezogene Fehler, Bundesministerium für

Wirtschaft und Energie, 01.02.2024–31.07.2026 (FKZ: 03EI5471A)

EEGMon – Vorbereitung und Begleitung bei der Erstellung eines Erfahrungsberichtes gemäß § 99 Erneuerbare-Energien-Gesetz (EEG 2023) zum spartenspezifischen Vorhaben „Stromerzeugung aus Biomasse, Gülle, Biomethan sowie Klär-, Deponie- und Grubengas“, Bundesministerium für Wirtschaft und Energie, 15.11.2023–14.11.2027

H2Verg – Vergasung biogener Reststoffe als Quelle wasserstoffreicher Gase, Bundesministerium für Wirtschaft und Energie, 01.08.2022–31.07.2026 (FKZ: 03EI5445A)

HanfNRG – Untersuchung der stofflichen und energetischen Nutzung von Reststoffen der Hanffaserproduktion, Bundesministerium für Wirtschaft und Energie, 01.10.2022–31.12.2025 (FKZ: 035EI5448A)

HemiCoat – Konversion von Hemicellulose zu Beschichtungen, Bundesministerium für Wirtschaft und Energie, 01.09.2024–31.08.2026 (FKZ: 01IF00399C)

HyCSBio – Nutzung eisenbasierter Module zur Versorgung mit hochreinem Wasserstoff unter Druck auf der Basis der Luftvergasung biogener Reststoffe, Bundesministerium für Wirtschaft und Energie, 01.11.2024–31.10.2027 (FKZ: 03EI5479A)

MaxBioAbf – Neue Verfahrenskombination für eine maximale Energiegewinnung aus Bioabfällen mit Nährstoffrecycling, Bundesministerium für Wirtschaft und Energie, 01.04.2025–31.03.2028 (FKZ: 03EI5482D)

MeKat – Entwicklung eines Methanoxidationskatalysators auf Basis von biogenem Silika für die Entfernung von Methan im Abgas von Biogas-BHKW, Bundesministerium für Wirtschaft und Energie, 01.01.2023–31.12.2025 (FKZ: 03EI5456)

MoBioInd – Analyse zum zukünftigen Einsatz von (hybriden) Bioenergiekonzepten für die Industriewärme in Konkurrenz zu anderen erneuerbaren Energien im Rahmen einer Energiesystemmodellierung mit BENOPTex, Bundesministerium für Wirtschaft und Energie, 01.07.2025–31.12.2027 (FKZ: 03EI5492B)

MulTro – Entwicklung einer störstofftoleranten Mehrzweck-Trommelreakorttechnologie MTR; Teilvorhaben: Entwicklung Technikumsmaßstab, Bundesministerium für Wirtschaft und Energie, 01.08.2025–31.07.2028 (FKZ: 03EI5484A)

PaCoSil – Verbrennung regionaler Reststoffe zur energetischen Nutzung von Biomasse mit gekoppelter Erzeugung von biogenem Silika für Feinstaubfilter-Prozesse „PaCoSil“, Bundesministerium für Wirtschaft und Energie, 01.07.2021–30.06.2024 (FKZ: 03EI5436A)

PUELPE! – Verbundvorhaben Pülpegas – Entwicklung einer Pilotanlage zur Vollverwertung von Weizenpülpe und automatisierte Systemintegration in die industrielle Stärkeproduktion, Bundesministerium

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RESCR – Entwicklung und Demonstration einer brennstoffflexiblen SCR-Nachrüstlösung für Reststofffeuerungen, Bundesministerium für Wirtschaft und Energie, 01.07.2025–30.06.2028 (FKZ: 03EI5490A)

TWOx – Entwicklung eines preisgünstigen und ressourceneffizienten Systems zur Abgasnachbehandlung für Holzgas-BHKW, Bundesministerium für Wirtschaft und Energie, 01.01.2024–31.12.2025 (FKZ: 03EI5470)

Federal Ministry of Research, Technology and Space (BMFTR)

AgroBioL – Praxistaugliche Agroforst-Biomeiler-Systeme für zukunftsfähige Landwirtschaftsbetriebe – AgroBioLab, Bundesministerium für Forschung, Technik und Raumfahrt, 01.01.2026–31.12.2028 (FKZ: 03WIR7518A)

AltCell2 – Alternative Cellulosequellen für künstliche Cellulosefasern 2, Bundesministerium für Forschung, Technik und Raumfahrt, 01.08.2025–31.01.2028 (FKZ: 03WIR3810C)

BioCas – Verbundprojekt CDRterra: Multi-Level-Governance von Biomassenutzung in Kaskaden – Teilprojekt 2: Beschreibung und Bilanzierung, Bundesministerium für Forschung, Technik und Raumfahrt, 01.11.2025–31.10.2028 (FKZ: 01LS2506B)

BioNET – Biomasse-basierte Negativ-Emissions-Technologien, Bundesministerium für Forschung, Technik und Raumfahrt, 01.01.2022–30.06.2025 (FKZ: 01LS2107B)

BioSmoke – Rauch und Bioaerosole: Freisetzung, Prozesse und Auswirkungen in einem sich ändernden Klima, Bundesministerium für Forschung, Technologie und Raumfahrt, 01.04.2025–31.10.2028

BioZ-RP – WIR! – BioZ – Rahmenprojekt III: Life Cycle Analyse/Nachhaltigkeitsbewertung & Wirksamkeitsanalyse, Bundesministerium für Forschung, Technik und Raumfahrt, 01.09.2022–31.12.2025 (FKZ: 03WIR5303)

bVB1ReTr – Kompaktierung von biogenen Reststoffen und analytische Produkt- und Prozessbewertung (biogeniV bV-B1, TV DBFZ), Bundesministerium für Forschung, Technik und Raumfahrt, 01.08.2025–31.07.2028 (FKZ: 03WIR4908A)

DiP Agro – Wirkungspfade zu einer möglichen Etablierung von Agroforstsystemen auf der Landschaftsebene als Beitrag zur Klimaresilienz Süd-Sachsen-Anhalts und Dekarbonisierung seiner chemischen Industrie, DiP Agroforst, Bundesministerium für Forschung, Technik und Raumfahrt, 04.07.2024–31.03.2028 (FKZ: 031B1457I)

DiP-BR – Begleitforschung der Digitalisierung pflanzenbasierter Wertschöpfungsketten zur Entwicklung

eines partizipativen und lernenden Nachhaltigkeits-Monitorings (BegleitDiP), Bundesministerium für Forschung, Technik und Raumfahrt, 01.08.2024–31.12.2028 (FKZ: 031B1479C)

DiPisum – Digitalisierungsgetriebene Entwicklung Sachsen-Anhalts zu einem Innovationszentrum für Erbsenzucht, -anbau und -verwertung, Bundesministerium für Forschung, Technik und Raumfahrt, 01.04.2024–31.12.2028 (FKZ: 031B1444I)

E-Boot 2 – Entwicklung einer Ernteprozesskette mit Erntetechnologie zur umweltschonenden Ernte von Wasserpflanzen, Bundesministerium für Forschung, Technik und Raumfahrt, 01.08.2021–30.04.2026 (FKZ: 031B1095)

HeRoTogo – Entwicklung einer Roadmap für die nachhaltige Wärmeerzeugung mit Biomasse in Togo und Demonstration ausgewählter Technologien entlang des gesamten Nutzungspfades, Bundesministerium für Forschung, Technik und Raumfahrt, 01.03.2024–28.02.2027 (FKZ: 03SF0749)

LabCon2 – Versteigerung und methodische Weiterentwicklung des Biomasselabors an der Universität von Lomé, Togo, Bundesministerium für Forschung, Technik und Raumfahrt, 01.03.2024–31.12.2026 (FKZ: 03SF0742A)

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LigLue – Formaldehydfreie Bindemittel auf Basis biobasierter Ligninpolymere, Bundesministerium für Forschung, Technik und Raumfahrt, 01.04.2024–31.12.2028 (FKZ: 031B1450D)

LIGNUM – Mikrobielle Veredlung ligninbasierter Ströme zu nachhaltigen Biomaterialien; Teilvorhaben DBFZ: Integrierte Nachhaltigkeitsbewertung mittels Lebenszyklus- (LCA) und Technoökonomischer Analyse (TEA), Bundesministerium für Forschung, Technik und Raumfahrt, 02.01.2026–31.01.2029

STROHase – Silierung Trockener Restströme: Optimierung der Hydratisierung durch NSPasen, Bundesministerium für Forschung, Technik und Raumfahrt, 01.04.2023–31.03.2026 (FKZ: 031B1373C)

SYMOBIO2+ – Vorbereitung eines systemischen Monitorings der Bioökonomie in Deutschland (SYMOBIO 2Plus), Bundesministerium für Forschung, Technik und Raumfahrt, 01.04.2025–31.03.2027 (FKZ: 031B1129CX)

SysWeB – Systematische Identifizierung neuer regionaler Wertschöpfungsnetze der Bioökonomie – Teilvorhaben 1: Identifizierung regionaler Wertstoffströme aus der Ernährungswirtschaft, Bundesministerium für Forschung, Technik und Raumfahrt, 01.09.2025–31.08.2027 (FKZ: 03WIR5317B)

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 BOOST4BI – BOOST4BIOEAST, European Commission, 01.01.2024–31.12.2026 (GA 101133398)
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 HURRICAN – Sector-coupling hub for circular use of thermal and industrial waste, European Commission, 01.01.2024–31.12.2028 (GA 101138494)
 ICARUS – International Cooperation on best practices for sustainable Aviation biofuels, European Commission, 01.10.2023–30.09.2026 (FKZ: 101122303)
 NEXTSTEP – Next-gen of sustainable biobased chemical platforms and polymers: enhancing sustainability in European industry, European Commission, 01.06.2024–31.05.2028 (FKZ: Project 101157081)
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 SUSTRACK – Supporting the identification of policy priorities and recommendations for designing a sustainable track towards circular bio-based systems, European Commission, 01.11.2022–30.09.2025 (FKZ: 101081823)

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Research data

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