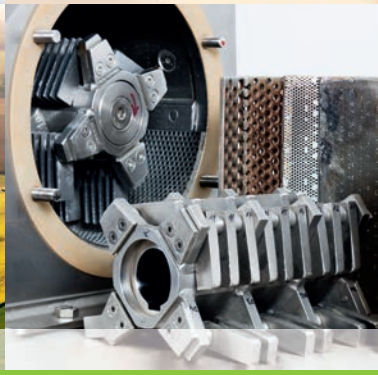
Deutsches Biomasseforschungszentrum
gemeinnützige GmbH

DBFZ





ANNUAL REPORT 2015

DIRECTIONS

By train: to Leipzig main station. Take tram line 3/3 E (towards Taucha/Sommerfeld) as far as the Bautzner Strasse stop. Cross over the road, passing the car park on the right, and go straight on through gate number 116, after approximately 100 metres turn left, the DBFZ entrance is 60 metres further along on the left-hand side.

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").

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

Deutsches Biomasseforschungszentrum
gemeinnützige GmbH

DBFZ

ANNUAL REPORT 2015

CONTENT

1 PREFACE

Dear Reader,

Following the re-alignment and re-focusing of research activities and the introduction of knowledge-based services in 2014, the five new research focus areas have been driven forward energetically over the past year in order to lay the groundwork for the 'smart bioenergy' of the future. International activities (particularly within the EU, and in South America, China and India) have also been steadily advanced, enhancing the international repute of the DBFZ.

Despite the more difficult underlying conditions for bioenergy research, 2015 was the DBFZ's best year to date in terms of third-party funding, with numerous new R&D projects being initiated. Preparations for the major new building also progressed well, enabling plans to made for laying of the foundation stone in Summer 2016. The DBFZ is very well set to meet the challenges of the next 5 to 10 years as a key national institution researching the uses of biomass both as an energy source and as integrated raw material.

We would, as ever, like to take this opportunity to thank most sincerely all those who have supported and assisted us in the past year, with wide-ranging suggestions for our work, and through project commissions: our shareholders, the Supervisory Board, the Research Advisory Council, government ministries, project funding agencies, and all our project partners. We are determined to continue on the road to success in cooperation with you in 2016. Your support is vital to us.

We hope you will find our 2015 Annual Report interesting and entertaining. We cordially invite you also to attend our next DBFZ Annual Conference on September 8th and 9th, 2016. For details visit: **www.dbfz.de/jahrestagung**.

Prof. Dr. Michael Nelles
(Scientific Managing Director)

Daniel Mayer
(Administrative Managing Director)

2
INTERVIEW WITH PROF. DR. DANIELA THRÄN

"The possibilities for the energy transition and for climate protection are now better then ever ..."

Prof. Dr. Daniela Thrän

Prof. Dr. Thrän: In the Summer of 2015, you and a number of other scientists at the DBFZ published a book titled "Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future energy systems". How should we understand the word 'smart' in relation to bioenergy?

Daniela Thrän: What we were attempting to do with the book was set out the current status quo of bioenergy use, and to indicate the direction in which development needs to advance from a scientific perspective. Bioenergy is currently undergoing a transition from single to combined use within largely renewable energy supply systems. The term 'smart' means that bioenergy is capable of being integrated intelligently into an existing renewables system. Factors such as storeability and all-weather availability are key attributes of bioenergy which will play a more prominent role within the energy system in future.

That means bioenergy is the balancing factor within the renewable energy mix?

Daniela Thrän: Exactly. Bioenergy can help cover the residual demand for electricity, heat and mobility that remains after the impact of energy-saving measures and use of fluctuating renewable energy sources. Renewables-based energy systems of the future will need to optimise how the various sources are combined. Flexibility and on-demand energy production are key in that context, and they are aspects on which we at the DBFZ are working intensively. Flexibility means: bioenergy plants are able to respond to fluctuations in the system as can occur – depending on the technology – within seconds or within days. The challenge is also to adapt that flexibility to the different needs within the energy supply system. On-demand production is thus always adapted to requirements in the specific application case – whether that be a smart biomass heater in the basement of a family home or the highly flexible biogas plant in a virtual power plant.

Your book also provides an overview of the changed policy framework conditions which have had a major impact on the development of bioenergy in recent years. How do you assess the current political situation, on a national level, with regard to bioenergy?

Daniela Thrän: The role of bioenergy is currently in a state of flux in all sectors (power, heat and fuel). A number of different factors are involved in this: the rapid growth in bioenergy use in the second half of the 2000s; the increasing competition for land area; and the successful launch onto the market of other renewable energy sources. So the possibilities for the energy transition and for climate protection are now better then ever. Based on the way the debate is currently being framed, however, I am very concerned that the boom might now be followed by an exaggerated backward step. So greater political stability is vital to ensure that the knowledge and technical advances in biomass use for energy are preserved for the future. The amendment to the Germany's Renewable Energy Sources Act scheduled for 2016, the Federal Government's biofuels strategy post-2020 and the shaping of the transition in heating energy provision (the so-called 'Wärmewende'), are key pillars in implementing flexible bioenergy provision in the various sectors.

The 21st Climate Change Conference in Paris in December of last year adopted a global climate control agreement. What is your assessment of the Paris resolution?

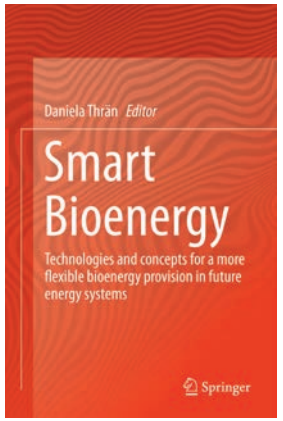


Fig. 1 Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future energy systems

Daniela Thrän: Around 43 % of the reduction in CO_2 by renewables stems from bioenergy; that has to be advanced further in a practical way. Improving efficiency, cutting costs, as well as more closely examining the environmental impact and macro-economic aspects of climate protection, are the key challenges. Like renewable resources in general, bioenergy provision has a very much more visible impact on the landscape than fossil fuel extraction. The resultant conflicts were given insufficient consideration in the past. In this context, the DBFZ together with the Leipzig-based Helmholtz Centre for Environmental Research (UFZ) and other institutions is researching into suitable monitoring and assessment methods.

The versatility of biomass has led to it being seen as a 'multi-talented' renewable energy source. Fuel, heat, power: which area of bioenergy use do you think is most promising?

Daniela Thrän: The question is not so much 'where', but 'how' bioenergy is used. In terms of improving flexibility, it is the power sector – especially biogas – which is the most advanced. In the motor fuel sector, it is clear to see that over the longer term applications will shift away from cars to other mobility options such as heavy load transportation or air travel. With regard to the heat sector, there is still quite a bit of work for us to do. Together with the renewable energy research alliance FVEE, which we joined in early 2015, we last year set forth some initial considerations on the transition in heating energy provision (the 'Wärmewende') which were incorporated into a joint position paper.

What scientific methods is the DBFZ pursuing in this regard?

Daniela Thrän: The DBFZ is investigating issues relating to smart bioenergy provision in five different research focus areas. With regard to the 'Wärmewende', the first to mention is the DBFZ's 'SmartBiomassHeat' research focus area, which is working intensively on the transformation of heat provision from biomass. We are at present faced with a wide variety of obstacles in this area, including separate power and heat production, and only very isolated combined heat and power plant installations. There is a need for technical development based on the fact that – on the one hand – residues and waste are increasingly being used as raw materials, and – on the other hand – bioenergy has to be delivered in smaller units and with a high level of control capability. In practical terms, that means that high-quality fuels such as biomethane or ENplus-certified pellets are assigned greater importance and should be advanced accordingly. The aims in this must be to develop more efficient, lower-emission conversion plants for combined heat and power provision, and also to use more biogenic residual materials and low-quality by-products for heat supply.

Are biogenic residues and waste the energy source materials of the future?

Daniela Thrän: The exploitation of previously unused biogenic waste and residues as energy sources and integrated raw materials is a key area of focus of the DBFZ's work, as it is for the Department of Waste Management and Material Flow of the University of Rostock headed by my colleague Prof. Dr. Nelles. As a research institution, we are seeing a clear trend away from traditional agricultural primary raw materials such as rape and maize to residues and waste materials. That approach is also in line with Federal Government targets. Our analysis in Autumn 2015, presented in conjunction with the Regrowable Resources Agency FNR, indicates that around a third of the technical residual material potential in Germany is currently unused. This mainly relates to logging residues, straw, and liquid and solid manure. Moreover, municipal waste is in some places barely used as a source of energy. One interesting method for improving usage is hydrothermal carbonisation (HTC). It converts greencut, biowaste or biogenic residual waste content into environmentally friendly biocoal by means of water and pressure. The

by-products of this process, such as the process water, can also be used as raw materials for the chemical industry. That is a very good example of cascaded use of residual materials.

You are a member of the Federal Government's Bioeconomy Council. What ideas from the research field are you able to contribute to bioeconomy policy?

Daniela Thrän: The aim of the Bioeconomy Council is to establish a multi-sector knowledge-based bioeconomy in Germany which minimises the use of fossil fuels and brings to market new, sustainably created products and services. In Summer 2015 the Bioeconomy Council published a Bioenergy Paper setting forth the key data for successful implementation of a bioeconomy in Germany. The intent is that the Bioenergy Strategy should contribute to shaping the bioeconomy in an economically beneficial and sustainable way, oriented to the three strategic objectives of climate protection and sustainability; avoidance of conflict with security of food supply; and system stability and technology leadership.

How are those visions being implemented in practice?

Daniela Thrän: The aim of our R&D work in this area is to investigate new and innovative methods and put them into practice. The DBFZ is a member of the Central Germany Bioeconomy Cluster, as part of which we are working on a joint project investigating how nitrogen-free fibres from biogas production can be used in the woodworking industry. The aim is to open up new value creation options for biogas plants. Another project is concerned with the decomposition of biomass containing lignocellulose in anaerobic processes. This is focused on recovering input products for the chemical industry combined with biogas production. An example of a new product which the DBFZ is helping to develop is an additive for pelletising which is derived from residues with high lignin content. As part of the BioEconomy Cluster, in cooperation with the UFZ and the Leipzig Trade Academy HHL, we are also investigating how the ecological, economic and social effects on future Bioeconomy Regions can be managed (for more see article beginning on page 37). The results of all these research activities are important also with a view to advancing the concept of the bioeconomy within the framework of policy discussions.

The "Biomass Energy Use" programme has been running very successfully under the leadership of the Federal Ministry for Economic Affairs and Energy (BMWi) since 2008. Can you outline the aims of the programme?

Daniela Thrän: The programme was launched under the auspices of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMU) as a contribution to climate protection. At the time, bioenergy was firmly under discussion as part of the measures to achieve climate protection goals. The projects were heavily influenced by that view. The programme is now in its seventh year, and the focus is more on research and development projects for the practical development of competitive technologies, particularly in relation to incineration, carburetion and digestion of biomass. By systematically collecting and documenting assessment and test methods for bioenergy applications in various methodological guides, we have also established a key basis for improved research and development.
As of today (February 2016), the programme has invested some 48 million euro in projects which are either still ongoing or have been completed. A total of 104 alliances have been launched, with over 260 directly involved scientific and industrial project partners. It is a relatively small programme, but with a very broad spread of participants, in keeping with the range of different bioenergy technologies. In November 2015 we hosted the 6th Status Conference, at which all the projects were actively interlinked and findings were exchanged. The event also, we hope, provided lots of new suggestions and project ideas for the participants' own work.

New ideas drive innovation in science and industry. How can the DBFZ put them into practice?

Daniela Thrän: Scientific innovation is a core aspect of our work at the DBFZ. As a research institution with predominantly applied research, we do of course have many possibilities at our disposal to develop and ultimately also technically implement those ideas. However, we are reliant on industrial partners to do so. We have established a highly innovation-oriented environment based on our growing network, our wide-ranging contacts with small and medium-sized enterprises, new business spin-offs from our work, as well as the Bioenergy Innovation Centre. We

Fig. 2 Podium discussion at the 6th Status Conference of the Federal Ministry for Economic Affairs and Energy's "Biomass Energy Use" programme

are also working to drive forward innovation in specific key technologies, such as hydrothermal carbonisation. Intensive discussions at workshops and conferences often give rise to new scientific approaches which we subsequently are able to put into practice in conjunction with partners.

A personal question to finish with: You work as a scientist for the DBFZ, the Helmholtz Centre for Environmental Research and the University of Leipzig, and live in Berlin. What do you find specially attractive about Leipzig as a base for scientific work?

Daniela Thrän: Leipzig, and especially the Leipzig Science Park, offers me as a scientist lots of possibilities. The reason why the DBFZ located here back in February 2008 was that our predecessor institution, the Institute for Energy and Environment (IE), was already long-established on the site, so a more or less seamless transition was made. The existing infrastructure and projects, as well as some of the staff, were retained, so research at the Leipzig based could be continued almost without interruption. Today, the DBFZ not only has quite good technical facilities but – together with the nearby Helmholtz Centre for Environmental Research (UFZ), the University of Leipzig and various other scientific institutions – has built up an extensive scientific network which enables us to undertake research relat-

ing to the energy transition with an interdisciplinary scope. Leipzig has generally established an outstanding reputation within the scientific community in the wide field of energy and environmental research over the past 10 years. So I am naturally very happy to be working and contributing to what is being done here.

Thank you for the interview.

In profile:

Prof. Dr. Daniela Thrän is Deputy Scientific Managing Director of the DBFZ and head of the “Systemic contribution of biomass” research focus area. She also heads the Department of Bioenergy (BEN) at the Helmholtz Centre for Environmental Research – UFZ, and is Professor of Bioenergy Systems at the University of Leipzig. Her book “Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future energy systems” was published in Summer 2015 by Springer Verlag (doi 10.1007/978-3-319-16193-8).

Further information: **www.smart-bioenergy.de**

3
BIOENERGY RESEARCH FOCUS AREAS AT THE DBFZ

There remain many challenges and questions regarding the integration of biomass into the existing energy system. How can energy efficiency be improved? How can competing usage conflicts be circumvented? Or emissions into soil, water and the air be avoided, and what can and must the 'smart' bioenergy of the future be like? These and other questions are expertly and independently investigated and answered by German Biomass Research Centre (DBFZ). The mission of the DBFZ is to develop technical solutions and devise wide-ranging concepts for the economically, ecologically and socially sustainable use of biomass as an energy source based on applied leading-edge research. The DBFZ's scientific staff also investigate and predict potential areas of conflict between the various goals associated with the development of bioenergy, setting forth detailed plans as to how such conflicts can be avoided and eliminated. The DBFZ seeks to expand knowledge in relation to the scope and limitations of regrowable resources as an energy source and integrated raw material within a bio-based economy ('bioeconomy'). It also aims to safeguard the leading position enjoyed by Germany in the sector for the long term.

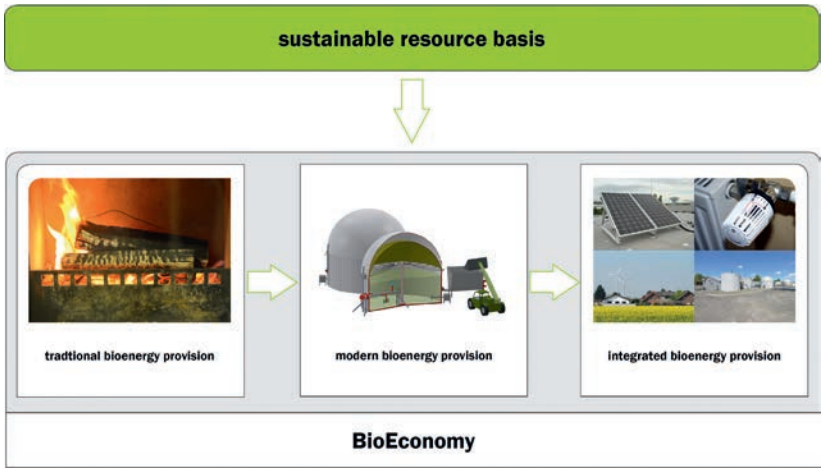


Illustration: DBFZ, 2015

Fig. 3 Development stages for integrated smart bioenergy supply

FOCUS FOR APPLIED LEADING-EDGE RESEARCH

In 2014 the DBFZ established five areas of focus for its scientific research. They are oriented to the future trends and research policy challenges and the background conditions relating to the use of biomass as a source of raw materials and energy (including the strategies of the German Federal Government, such as the BioEconomy 2030 national research strategy, the National Bioeconomy Policy Strategy, the Federal Government's Mobility and Motor Fuel Strategy, the Biorefineries Roadmap, etc.). Other cornerstones include the conditions dictating grant aid and subsidy policy, unique selling points within the research landscape, and in particular the sound infrastructure of the DBFZ. In order to exploit useful synergies within the DBFZ, the five research focus areas are split organisationally across its four research departments: Bioenergy Systems, Biochemical Conversion, Thermo-Chemical Conversion, and Biorefineries

3.1
RESEARCH FOCUS I: SYSTEMIC CONTRIBUTION OF BIOMASS

"Smart Bioenergy use in small, very precisely controlled plants will be a building block of integrated suppy systems and be able to contribute to the sustainable energy supply of tomorrow."

(Prof. Dr. Daniela Thrän, Head of the research focus area "Systemic contribution of biomass")

This area of research focus will contribute to the creation of sustainable bioenergy strategies at national and international level. To that end, it will identify regional and global biomass potential and investigate and assess the wide-ranging options offered by different biomass recovery concepts. The primary aim is to answer methodological and technical system-related questions on the efficiency and sustainability of biomass use from economic, ecological and technical viewpoints, incorporating both the land resources used as well as treatment and conversion technologies specific to the energy source. The combination of these topic areas provides the basis for deriving strategies and recommendations for action for decision-makers in the political and business spheres.

BIOMASS POTENTIAL OF RESIDUES AND WASTE MATERIALS – STATUS QUO IN GERMANY (BIOPOT)

Germany depends on imports for 71 % of its energy. The use of biogenic residues and waste materials as an energy source is already an essential element of the renewable energy system. The extent to which the levels of use can be increased depends fundamentally on the available biomasses and the defined aims. Any

assessment of opportunities and risks does, however, demand an appropriate data base.
There are currently no standardised quality requirements or minimum standards for calculating biomass potential, and the published results are in some cases highly controversial. The BIOPOT project appraises the current status quo of knowledge relating to potential for using biomass in the form of residues and waste materials in Germany across all relevant institutions. The partners in the project were:

- Prof. Dr. Udo Mantau (Information systems for raw material resources)
- Prof. Dr. Bernd Mahro City (University of Applied Science)
- Thuringian Institute of Agriculture (TLL)
- Deutsches Biomasseforschungszentrum (DBFZ)

Existing published studies and findings from ongoing projects being run by the partners were presented in a concise review. The core scientific outcome of the project is a schematic produced jointly by the project team setting out current biomass potential for residues and waste materials. A total of 93 single biomasses were analyzed, broken down into the following five residue categories:

- Wood and forestry residue products
- Agricultural by-products
- Municipal waste
- Industrial residue products
- Residues and waste materials from other land areas.

The establishment of clear parameters for defining biomass potential across all institutions helped to make the results already obtained by the partners more comparable. This included joint definition of unambiguous (sub-)categories of single biomasses as well as consistent application of definitions of potential and the relevant physical units. The data collected includes (where available) details of theoretical and technical biomass potential, as well as current use of the material concerned as raw materials and as an energy source. The comparison unit chosen across all

categories was tonnes of dry matter (t DM). All the collated results relate to the present, and incorporate no future projections. No recalculations were carried out in the course of data collation.
Against the background of sustainable use of biomass as a raw material resource and an energy source, this work serves – among other purposes – as a key decision-making basis for the definition of future research topics and policy strategies within the context of the targeted establishment of a bioeconomy.

Fig. 4 FNR series "Regrowable resources", volume 36

PROJECT RESULTS

Result 1: The theoretical biomass residue potential predominantly comprises by-products and residues from agriculture, woodworking and forestry, which account for almost three quarters of the total.

Of 93 single biomasses evaluated, consistent relevant data was collated for 77. The current known theoretical biomass residue potential for those biomasses in Germany is found to be 151.1 million t DM (Figure 5). 43 % of the total consists of woodworking and forestry residues; 30 % agricultural by-products; 12 % municipal waste; 9 % industrial residues; and 6 % residues from other land areas.

Result 2: Two thirds of the current technical biomass residue potential is being used as raw materials or as an energy source. One third is currently not being used, or no evidence of use is available.

As a result of restrictions, 43.1 million t DM (= 29 %) of the theoretical potential cannot be used. The data is unclear with regard to a further 9.7 million t DM. The total verifiable technical biomass residue potential is 98.4 million t DM. Of that total, 67.4 million t DM (= 69 %) is being used as a raw material or as an energy source. Some 30.9 million t DM (= 31 %) is not being used, or no use is known (Figure 5).

Result 3: Current unused biomass potential is concentrated on a small number of biomasses in comparatively high quantities.

Some 95 % of the unused potential relates to the three biomasses logging residues (approximately 38 %), animal excrement (approximately 29 %) and cereal straw (approximately 27 %). A further 4 % relate to wood from landscape conservation. Owing to the mandatory disposal and recycling requirements in Germany, there is little to no unused potential in relation to municipal waste and industrial residues.

Result 4: The data on the theoretical potential of approximately seven out of every 10 tonnes can be classed as good to very good. With regard to the remaining three out of 10 tonnes there is some uncertainty.

The data relating to woodworking and forestry residues and agricultural by-products in particular can be classed as good to very good. These biomasses account for some 73 % of the theoretical potential. In the municipal waste category, a distinction can be made between two methods. The volumes and use of some biomasses (such as biowaste from the ‘brown bin’, green waste, etc.) are statistically recorded. The statistical recording of other biogenic waste (such as residues from commercial catering, used cooking oil, etc.) is incomplete, or no records are available at all. Any extrapolation or estimation in this context results in uncertainty. In relation to industrial residues, too, volumes can normally only be determined indirectly by evaluating the relevant processes. The data relating to residual materials from “other land areas” must be classed as particularly uncertain. These are biomasses which are in some cases disposed of/recycled by local authorities but not recovered fully for cost reasons (such as biomass from municipal green

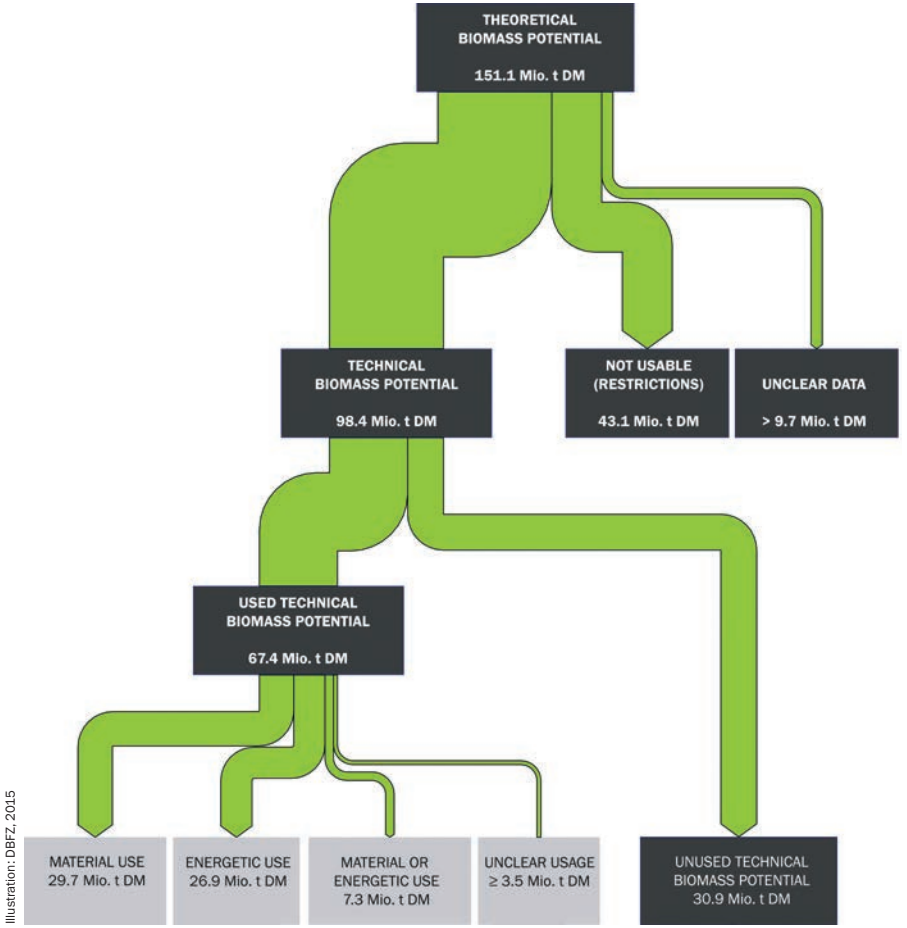


Illustration: DBFZ, 2015

Fig. 5 Biomass potential of residues and waste materials and their current use – Status quo in Germany in the form of a Sankey diagram

areas). In relation to material from landscape conservation, too, it cannot be determined with certainty which source areas are included in the calculation at what yield levels. As the sensitivity of the underlying calculation parameters (e. g. yield, water content, recovery rate, etc.) is very high, this area is subject to high levels of uncertainty.

Result 5: 67.4 million t DM is currently being used as a raw material or as an energy source. The extent to which existing material flows can be diverted to higher-grade or more efficient use is unclear.

It might be possible to divert the residues already firmly established in use as raw materials or as an energy source to higher-grade or more efficient use (such as cascade use). To date, however, no adequate studies have been made as to the effects and market shifts which might result from the provision of financial incentives for example.

Result 6: Sustainable use of biomass resources requires continuous recording of biogenic residues and assessment of their use as raw materials and as an energy source.

The project results map most of the currently available data. The timing of the individual result is not consistent. In order to assess trends in single biomasses over time, appropriate monitoring is required. This requires agreement on the methodology and relevant calculation parameters, as well as a communications and data structure spanning all the institutions concerned.

RECOMMENDED ACTION

Biomass use is comparatively well covered by continuous market monitoring and primary data acquisition. However, there are only isolated instances of cross-checking against national biomass potential, including imports and exports (e. g. raw material monitoring of wood), and the picture provided is very patchy, especially in relation to biogenic residues. An overview across all subject areas can currently only be produced for single cases, and at considerable effort and expense. There is at present no overarching responsibility for these matters. To produce regular information on biomass potential and current use, a continuous reporting system must be established. This must present the types, availability, recording and use of the various relevant residual material fractions, so as to provide information over the years on the extent to which residual material flows are being integrated into the system of cascaded use as raw materials and energy sources targeted by policy-makers.

Project summary

Duration: 10/2014–03/2015
Status: finished
Project partner: Prof. Dr. Udo Mantau, Prof. Dr. Bernd Mahro, Thuringian Institute of Agriculture (TLL)
Contact: André Brosowski, Prof. Dr. Daniela Thrän
Project number: 22020114
Funding body: Federal Ministry of Food and Agriculture (BMEL)

With support from
Federal Ministry of Food and Agriculture
by decision of the German Bundestag

In order to establish such a reporting system, the requirements and key parameters must be discussed, bindingly specified and continuously monitored and fulfilled across all the institutions concerned. There are at present no suitable organisational and data structures or clearly defined responsibilities between data-holding and data-delivering institutions. A new working group should systematically close the data gaps and implement routine reporting. In the long term, monitoring of biogenic resources will enable assessment based on appropriate quality data and over time, so aiding the decision-making process for the further framing of bioenergy policy.

A further focus in future should be on the quality of the methodology for calculating biomass potential. The basic parameters underlying the often highly complex calculations must be presented more clearly, in order to track and compare results more effectively. Biomass-specific harmonisation of calculation methods and the introduction of minimum standards would be appropriate ways to safeguard data quality over the long term.

In view of the different target groups (policy-makers, market players, the public at large, etc.) and their differing information needs, the question as to the form in which findings can be made available must be also be resolved. In this context, database structures must be created and existing structures interlinked. In compliance with legal requirements (such as regarding data protection), research results should be edited in a media-friendly way and published in line with the target groups' needs. Suitable (online) methods should be considered for this.

PROSPECTS FOR 2016

The project consortium recommends the following five concrete measures as the next steps:

1. Establishment of a continuous monitoring system to provide long-term information on biomass potential and use. Requirements:
   - Definition of responsibilities and an appropriate organisational structure
   - Networking and interchange between data-recording and data-holding institutions
   - Establishment of powerful (foundation) database structures for collating and updating data on biogenic resources
   - Routine reporting

2. Development of sustainable, economically viable process chains and technologies to exploit unused biomass potential.

3. Analysis of key unknown biomass potential, e. g.:
   - Landscape conservation materials: Geodata-based analysis of biomass potential and polling of relevant groups on management practices and use
   - Intermediate crop potential (increasing straw potential based on humus delivery)
   - Analysis of the input-output differential on the wood waste market

4. Identification of synergies between institutions researching biomass potential, harmonisation of methods and introduction of minimum standards for calculating biomass potential.

5. Creation of a register of biogenic residue materials (where appropriate with statutory backing)

Key reference projects and publications

Project: SECTOR – Production of Solid Sustainable Energy Carriers from Biomass by Means of Torrefaction, EU-Project, 31.12.2011–30.06.2015 (FKZ: GA 282826)
Project: Caricom – Unterstützung institutioneller Strukturen für die Förderung erneuerbarer Energien und Energieeffizienz in der Karibik, GIZ GmbH, 01.11.2014–30.04.2015
Project: stadtPARTHEland, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.09.2014–31.08.2019 (FKZ: 033L119E)
Project: Entwicklung der BM-Verstromung bei Fortschreibung der aktuellen EEG-Vergütung, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e.V., 01.09.2015–30.11.2015 (FKZ: 22400815)
Project: Nachhaltige Bioökonomie, Helmholtz-Zentrum für Umweltforschung – UFZ, 01.12.2011–30.11.2015
Publication: Thrän, D. (Hrsg.) (2015): Smart Bioenergy. Technologies and concepts for a more flexible bioenergy provision in future energy systems. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.
Publication: Bohnet, S.; Haak, F.; Gawor, M.; Thrän, D. (2015): Technisch-ökonomische Begleitforschung des Bundeswettbewerbes „Bioenergie-Regionen“: Endbericht Fördermaßnahme 2009–2012. DBFZ Report Nr. 23. DBFZ. Leipzig – ISSN 2190-7943 (Print)/ISSN 2197-4632 (Online).
Publication: Hennig, C.; Brosowski, A.; Majer, S.: Sustainable feedstock potential – a limitation for the bio-based economy? In: Journal of Cleaner Production. S. 1–3. doi: http://dx.doi.org/10.1016/j.jclepro.2015.06.130 – ISSN 0959-6526.
Publication: Zech, K.; Oehmichen, K.; Grasemann, E.; Michaelis, J.; Funke, S.; Seiffert, M. (2015): Technical, economic and environmental assessment of technologies for the production of biohydrogen and its distribution: Results of the Hy-NOW study. In: International Journal of Hydrogen Energy. Bd. 40 (Nr. 15). S. 5487–5495. doi: 10.1016/j.ijhydene.2015.01.177 – ISSN 0360-3199.
Publication: Thrän, D.; Dotzauer, M.; Lenz, V.; Liebetrau, J.; Ortwein, A. (2015): Flexible bioenergy supply for balancing fluctuating renewables in the heat and power sector - a review of technologies and concepts. In: Energy, Sustainability and Society. Bd. 5 (Nr. 1). S. 35. doi: 10.1186/s13705-015-0062-8 – ISSN 2192-0567.

Contact

Prof. Dr. Daniela Thrän
Phone: +49 (0)341 2434-435
E-Mail: daniela.thraen@dbfz.de

3.2
RESEARCH FOCUS II: ANAROBIC PROCESSES

"Biofas plants must become more flexible in terms of their substrates and energy delivery. Only then will they be able to continue making a major contribution to the safeguarding of energy supplies in future."
(Dr. Jan Liebetrau, Head of the research focus area "Anaerobic processes")

Processes using micro-organisms to convert biomass under anaerobic conditions form the basis of many biotechnologies for the production and supply of material and energy sources. The "Anaerobic Processes" research focus area primarily develops efficient and flexible methods of biogas production to meet the needs of future energy systems. Linkage to material recycling processes enhances the added value. To that end, the research focus area develops tools for process monitoring and control, concepts for flexible, low-emission plants and operating regimes, methods of assessing and optimising efficiency, as well as to maximise material turnover, particularly for difficult substrates.

The flexible generation of electric power from biogas will be a key element of future energy supply to compensate for fluctuating energy sources. Factors driving this are the fact that the plant portfolio comprises more than 3500 MW of installed power (Scheftelowitz et al., 2015, S. 16), and biogas plants have been set up everywhere on a decentralised basis, so it will be much less costly to expand the network. In addition, the way biogas plants operate opens up wide-ranging options for delivering system services such as on-demand infeed, control energy or balancing energy (Grope et al., 2011). In order to fulfil these tasks, biogas production must be increasingly decoupled from conversion. In the case of electricity generation at biogas plants, this is possible based on the creation of appropriate

gas storage capacities and scaleable biogas production. Process-integrated gas management, optimising use of available storage capacity, can play a major role in delivering system services and avoiding emissions and flare gas loss. The aim of the project described in the following is to technically improve gas storage systems – in particular level measurement – and integrate them into biogas plant process control systems.

MANBIO – DEVELOPMENT OF TECHNICAL MEASURES TO IMPROVE GAS MANAGEMENT OF BIOGAS PLANTS

Agricultural biogas plants in Germany are designed mostly for constant energy supply. A number of technical options are available to supply energy from biogas plants on demand, including expanding their storage and power generating capacities. With regard to flexible plant operation in particular, reliable indication of gas storage levels is a key function of gas management, as it dictates the switching points for conversion units and the gas flare. In practice, however, considerable discrepancies are observed between the indicated and actual levels. Recent surveys by the DBFZ show that 32 % of plant operators polled have seen their fermenter pressure cut-outs activated at least once a month, though in most cases without the primary gas consumers failing. The causes are suspected to be in the feed regime and in the gas management itself.
Many biogas plants are fitted with pneumatically supported double-membrane gas reservoir hoods, as shown in figure 6. Pressure supported and pressure free storage roof systems with single or double membrane construction are generally used. Pressure-supported systems tend to be less well suited to flexible operation, as the necessary pressure gradient between the storages can only be assured when the storages are not completely full (Kube et al. 2013). In practice, the interaction of multiple biogas storages is often unsatisfactory. Theoretical storage capacities can thus not be fully utilised in plant operations. Consequently, biogas is wasted due to tripping of the low-pressure and high-pressure cut-outs of individual storages and unnecessary flare gas loss. At the same time, a safety risk is seen in practice when low-pressure cut-outs draw in outside air to compensate for pressure differences.

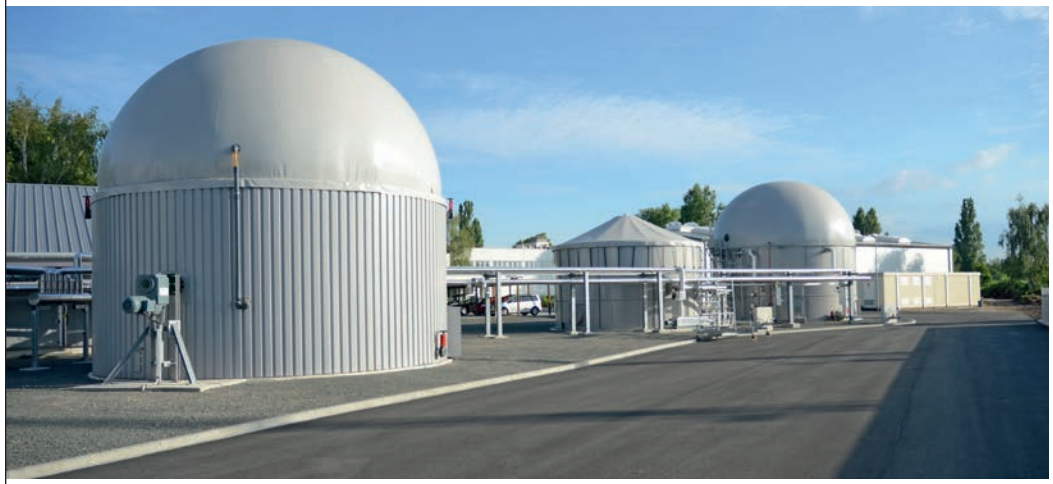


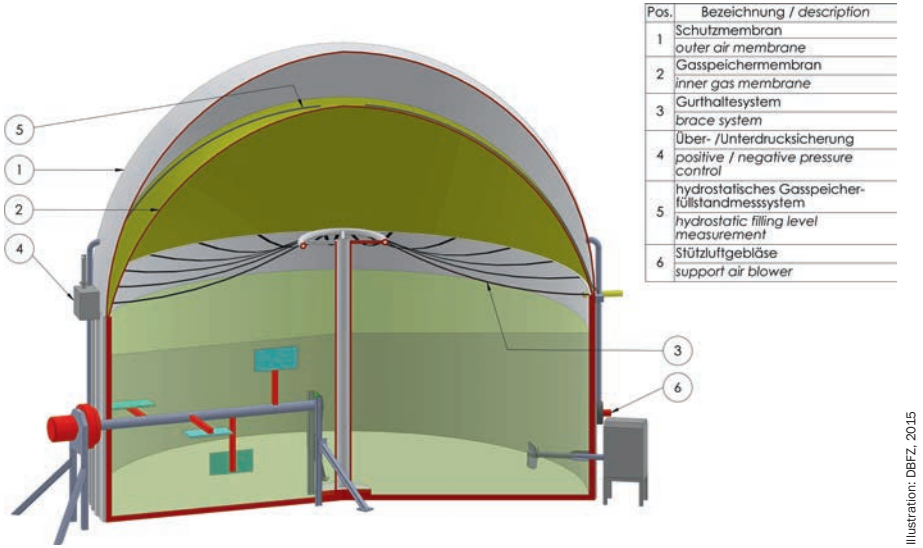
Fig. 6 DBFZ research biogas plant (continuous stirred tank reactor with pneumatically supported double membrane gas storage roof at front left)

AIMS

The aims of the ‘ManBio’ project are, firstly, to improve the accuracy of gas storage level measurement at biogas plants. This is intended to provide reliable and more accurate switching point determination for the conversion units. Other aims are the development of an integrated system to link the gas storages to the gas production and the conversion units; the development of tapping strategies when operating multiple gas storages; and increased utilisation of the capacities of existing systems based on integrated technological and operational measures. Finally, improved management is being targeted in order to minimise gas losses resulting from maintenance procedures, gas production spikes, or a generally more flexible biogas production process.

MEASURES

The project is divided into five work packages. Its basis is a technical analysis of commonly used systems and the factors influencing the operation of gas storage systems. Building on that, subsequent steps will be modification of a measurement system, modelling of influencing factors, and integration into the plant automation system. Technical implementation and trialling in continuous operation will be carried out at the DBFZ’s research biogas plant and at least one other



Pos.	Bezeichnung / *description*
1	Schutzmembran *outer air membrane*
2	Gasspeichermembran *inner gas membrane*
3	Gurthaltesystem *brace system*
4	Über- /Unterdrucksicherung *positive / negative pressure control*
5	hydrostatisches Gasspeicher-füllstandmesssystem *hydrostatic filling level measurement*
6	Stützluftgebläse *support air blower*

Illustration: DBFZ, 2015

Fig. 7 Continuous stirred tank reactor with pneumatically supported double membrane gas storage roof

biogas plant, managed by the practice partner of Awite Bioenergie GmbH. Finally, recommended action for practical plant operation will be set out with reference to ecological and economic appraisals.

MEASURES CARRIED OUT AT THE RESEARCH BIOGAS PLANT

As part of the research project a number of technical modifications have been made to the DBFZ's research biogas plant. One such measure is the upgrading of a gas volume flow measurement system. This permits exact quantification of the inflowing and outflowing raw biogas. This basic measurement layout enables testing of various level measurement systems on the gas storage. Another measure is

the addition of a hydrostatic filling level measurement system (water level gauge technique) mounted on the inner gas storage membrane. Figure 7 shows the two installed diametrically arranged water level gauge (Hydrostatic filling level measurement, no. 5). The modification of a conventional rope pull technique concludes the major construction works on the research biogas plant. Simpler rope pull technique and the water level gauge technique have been employed in practice for years. In the project, the measurement systems are being investigated in terms of their indication and change behaviour in response to various operating states and weather conditions. Comparable modifications are being carried out on a practice plant operated by project partner Awite. This is testing the mode of operation of the modified measurement system. In order to map the full spectrum of gas storage techniques, an additional storage concept was considered alongside the technical outfitting when selecting the practice plant. As a result, two different storage systems are being used: a pneumatically assisted double-membrane gas storage hood on the research biogas plant and a horizontal pressure free gas storage bag at the practice plant. The modified cable pull will deliver measurement data for modelled gas storage level measurement and optimisation. The functionality of the storage measurement technique and the model will be verified on the practice plant.

MODEL-ASSISTED GAS STORAGE LEVEL MEASUREMENT AND OPTIMISATION

The aim of the model-assisted gas storage level measurement and optimisation is to improve gas storage level measurement based on modelling against a gas volume balance, thus optimising storage capacity utilisation by pre-calculating gas volumes. To do that end, plant data relating to substrate quality, feed timing (planned and past) and feed quantities will be applied in robust simulation models in order to pre-calculate the expected gas inflows for a gas storage. Co-generation data, CHP plant running times and gas qualities will additionally be applied to quantify the gas outflow from the storage. The pressure, temperature and composition of the gas in the storage will also be recorded for correction of the gas intake volume so as to include it in pre-calculation of the actual gas volume. This

will then enable recommendations to be made to adapt the feed regime in order to avoid under/overproduction. Reducing the number of malfunction incidents in the gas storage will not only improve the economic viability of a plant but also avoid greenhouse gas emissions.

In making biogas plants more flexible, however, targeted rationalisation can also be employed to ensure gas is produced primarily during times when power generation by the CHP plant is to be concentrated. It has been shown that feed management can also be used to respond to short-term fluctuations in demand (Mauky et al., 2015). To be able to forecast and manipulate gas formation rates in line with demand, predictive control is required. A control system of this kind has been developed at the DBFZ and successfully tested at the DBFZ research biogas plant and at the “Unterer Lindenhof” biogas plant of the University of Hohenheim (Mauky et al., in print).

PROSPECTS FOR 2016

The next steps in the research project will be focused on investigating the features of the various level measurement systems and on the integration and evaluation of the model for gas storage level measurement in the research biogas plant’s process control system. The results of the investigations of level measurement systems will then be compared against the modelling results and the adequacy of the various systems will be appraised. In parallel with this, gas storage level measurement will be trialled on a practice plant using an external gas bag operated by project partner company Awite. On that basis, starting in mid-2016 an economic and ecological assessment of the favoured systems will be conducted. This will consider various scenarios of plant operation, in order to map a broad spectrum of

Contact

Dr. Jan Liebetrau
Phone: +49 (0)341 2434-716
E-Mail: jan.liebetrau@dbfz.de

the practice plants and their possible states. Finally, all the results will be collated in order to present recommendations for the modification of existing and construction of new integrated and separate gas storage systems at a biogas plant.

Sources

Scheftelowitz, M., Rensberg, N., Denysenko, V., Daniel-Gromke, J., Stinner, W., Hillebrand, P., Naumann, K., Peetz, D., Hennig, C., Thrän D., Beil, M., Kasten, J., Vogel, J. (2015): Stromerzeugung aus Biomasse – Vorhaben IIa (Zwischenbericht Mai), Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (BMUB).

Grope, J.; Schaubach, K; Müller, M. (2011) Systemdienstleistungen lassen sich auch mit Biogasanlagen bereitstellen. Vortrag gehalten: enertec/TerraTec 2010 – Forum Bioenergie. Am 25. Januar 2011 in Leipzig.

Kube, J.; Krebs, C.; Remde, C. (2013) Gasmanagement zur Vermeidung von unkontrollierten Emissionen durch Überdrucksicherungen. Vortrag gehalten: 7. Fachtagung Biogas 2013 Energieträger der Zukunft. Am 11. Juni 2013 in Nürtingen.

Mauky, E.; Jacobi, F. H.; Liebetrau, J.; Nelles, M. (2014): Flexible biogas production for demand-driven energy supply – Feeding strategies and types of substrates. In: Bioresource Technology. doi: 10.1016/j.biortech.2014.08.123.

Mauky, E., Weinrich, S., Jacobi, H. F., Neagele, H. J., Liebetrau, J., Nelles, M. (2016): Model predictive control for demand-driven biogas production in full-scale. In: Chemical Engineering & Technology. doi: 10.1002/ceat.201500412 (in print)

Key reference projects and publications

Project: Bedarfsgenaue Regelung von Energie aus Biomasse (RegEnFlx), Sächsische Aufbaubank (SAB), 01/2013–11/2014 (FKZ: 100143221)

Project: Potenziale zur Steigerung der Leistungsfähigkeit von Biogasanlagen – Energetische Effizienz von Repoweringmaßnahmen, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e.V., 01.01.2014–30.04.2016 (FKZ: 22400912)

Project: RegioBalance – Bioenergie-Flexibilisierung als regionale Ausgleichsoption im deutschen Stromnetz, Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit/Projektträger Jülich, 01.08.2013–31.12.2015 (FKZ: 03KB087A)

Project: Klimaeffekte einer Biomethanwirtschaft, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e.V., 03/2011–08/2014 (FKZ: 22009310)

Publication: Jacobi, F. H.; Mauky, E. (10/2014): Neue Ansätze zur Flexibilisierung von Biogasanlagen. In: Nelles, M. (Hrsg.): DBFZ-Jahrestagung Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?! DBFZ-Jahrestagung 2014. S. 81–87. Leipzig – ISSN 2199-9384.

Publication: Mauky, E.; Jacobi, F. H.; Liebetrau, J.; Nelles, M. (2014): Flexible biogas production for demand-driven energy supply – Feeding strategies and types of substrates. In: Bioresource Technology. doi: 10.1016/j.biortech.2014.08.123.

Publication: Reinelt, T.; Westerkamp, T.; Liebetrau, J. (2014): Klimarelevante Emissionen aus Biogasanlagen mit Biogasaufbereitung und Einspeisung in das Erdgasnetz. In: VDI Berichte. Emissionsminderung 2014 Stand – Konzepte –

Fortschritte. Bd. 2214. S. 203–213. VDI-Verlag GmbH – ISBN 978-3-18-092214-0.
Publication: Trommler, M.; Barchmann, T. (2014): Flexible Biogaskonzepte im wirtschaftlichen Vergleich. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Festschrift. Konferenz 5 Jahre BMU-Förderprogramm „Energetische Biomassenutzung“: Wege zur effizienten Bioenergie. Schriftenreihe des BMU-Förderprogramms „Energetische Biomassenutzung“. Bd. 15. S. 275–284. DBFZ. Leipzig – ISSN 2199-2762.
Publication: Weinrich, S.; Nelles, M. (2014): Critical comparison of different model structures for the applied simulation of the anaerobic digestion process. In: Tagungsband Progress in Biogas III. S. 22. Stuttgart – ISBN 978-3-940706-07-2.
Publication: Westerkamp, T.; Reinelt, T.; Oehmichen, K.; Ponitka, J.; Naumann, K. (2014): KlimaCH4 - Klimaeffekte von Biomethan. DBFZ-Report Nr. 20. DBFZ. Leipzig – ISSN 2197-4632 (Print), 2197-4632 (Online)

Project summary

Duration:	09/2014–02/2017
Status:	running
Project partner:	DBFZ Deutsches Biomasseforschungszentrum gGmbH, Awite Bioenergie GmbH
Contact:	Mathias Stur
Project number:	03KB094A
Funding body:	Project Management Jülich/Federal Ministry for Economic Affairs and Energy (BMWi) – Funding programme „Biomass energy use“

Federal Ministry for Economic Affairs and Energy

Funding programme Biomass energy use

3.3 RESEARCH FOCUS III: PROCESSES FOR CHEMICAL BIOENERGY CARRIERS AND FUELS

“Key elements in implementing the objectives of the Bioeconomy Strategy are research into and development of innovative technologies to maximize the flexibility, efficiency and sustainability of biorefinery concepts. They will enable a wide variety of different products made from biomass to be used as sources of materials and energy.”

(Dr. Franziska Müller-Langer, Head of the research focus area “Processes for chemical bioenergy carriers and fuels”)

This area of research focus is an important element of the overall process chain from the raw biomass material to biofuels and chemical bioenergy sources as products of biorefineries. In addition to process and concept development, it also comprises implementation on a laboratory and pilot plant scale, as well as assessment of technical systems. The primary aim is to contribute by innovative technology to the flexible operation, high efficiency and sustainable conception of biorefineries, thereby also fulfilling the requirements within the context of the bioeconomy.

To that end, chemical refinement focused on hydrothermal processes (HTP) will be advanced. The development of fractioning for solid-liquid and liquid-liquid separation plays a key role as a link between the individual areas of research focus (in particular in conjunction with anaerobic processes and HTP interim products). Another element is the development of synthesis gas processes to create high-grade products, focused on biomethane in the form of bio-synthetic natural gas (bio-SNG). In the short term, an exemplary HTP-based biorefinery concept will be developed. To that end, the work within the research focus area will concentrate

on (i) analysis of relevant individual processes and required system components; (ii) preliminary trials for selected individual processes (e.g. HTP, carburetion, methanisation to form SNG) and (iii) reparation of an accompanying technical systems assessment (focus: material and energy balancing, cost and economic viability, environmental impact).

BIOECONOMY CLUSTER/ACCOMPANYING RESEARCH PLANT CONCEPT ANALYSIS AT DBFZ

The development and design of new biomass-based technologies and processes for biorefineries poses a complex and multi-layered challenge owing to the different raw materials, the wide range of potential products and the innovative nature of the technical processes. In order to identify and utilise the potential for optimisation through new processes and technologies early on, right from the development phase, appropriate assessment methods are essential. Those methods must permit robust analysis of purely technical characteristics, costs and other economic factors, as well as ecological factors, to provide a comparative classification in the context of sustainable bioeconomy concepts. These action areas will also be designated and promoted as key research fields within the framework of the relevant national action plans of the German Federal Government and as set out in the "National Bioeconomy Research Strategy 2030" and the "Biorefineries Roadmap". The core aims of the "Plant balance analysis and assessment" subproject were thus to develop, analyse, assess and optimise biorefinery concepts.

As part of the "plant concept analysis" work package, various laboratory and pilot plant scale technologies of the BioEconomy Cluster were linked to beech-wood-based biorefinery concepts. These were scaled-up in process simulations to large-scale technical plant operations such as would typically be needed for commercial applications. To do that end, process design and simulation methods as well as cost analysis and life-cycle assessment (LCA) were applied and developed to meet the needs of bio-based technologies.

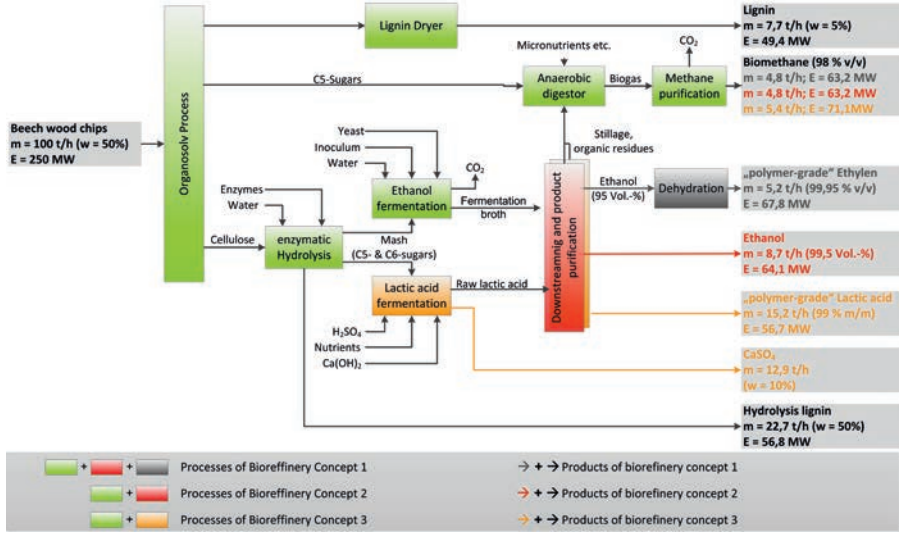


Illustration: DBFZ, 2015

Fig. 8 Block diagrams including mass(m) and energy (E) balances of the three biorefinery concepts investigated

KEY RESULTS

In order to identify suitable process paths, an input-output structure was initially defined. Potential raw materials and products for the purpose were specified in conjunction with the BioEconomy Leadership Cluster partners. Building on that, various biorefinery concepts were developed within an overarching process structure. From the various concepts, promising refinery models were identified and modelled in detail and subjected to balance analysis using process simulation software. The process design produced three biorefinery concepts which were subjected to more detailed analysis (Figure 8).

Suitable alternatives for optimisation of the biorefinery concepts were identified by an iterative process based on the sustainability assessment and the resultant key economic and ecological parameters. Figure 9 presents an overview of four biorefinery concepts based on the economic and ecological criteria. The ecological life-cycle assessment was carried out by the efficiency appraisal method ReCiPe, with scaling based on global environmental effects and hierarchical weighting.

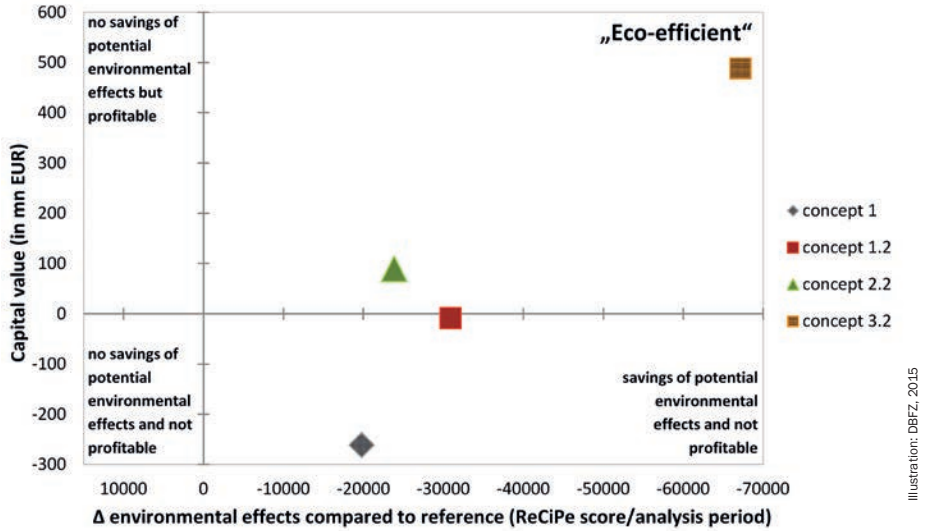


Illustration: DBFZ, 2015

Fig. 9 Comparison of biorefinery concepts based on criteria of eco-efficiency

THE PLANT CONCEPT ANALYSIS RESULTS IN THE FOLLOWING CORE STATEMENTS:

The biorefinery concepts investigated were designed and analysed applying the technologies developed and enhanced within the BioEconomy Cluster on the basis of robust literature data. The trend is observed that the three biorefinery concepts have high demand for process water, and accordingly large amounts of process energy, in particular process steam, such as for product cleaning and recovery. The application of targeted optimisation methods (such as heat integration) can significantly reduce consumption of process water and energy.

The success of the biorefinery concepts investigated here will be decisively determined by the most complete and cost-effective possible use of all raw material components. The hemicellulose fraction is used in the three concepts investigated to produce biogas and biomethane. Utilising this fraction for the targeted production of chemicals such as sugars, furans and/or organic acids by hydrothermal and/or fermentative methods offers great potential. Further research is required for this.

The construction and operation of large-scale beechwood-based biorefineries can be economically viable. Key factors in this are the willingness to pay for bio-based products and price trends in fossil-fuel reference products.

Recovery of base chemicals (such as ethylene) from biomass requires large raw material capacities of at least 400,000 t/a (dm) in order to compete with fossil-fuel sources and also provide discernible potential for substitution. The production of specialty chemicals such as lactic acid, or of niche products, can be viable even on a smaller scale.

All the biorefinery concepts presented show major savings compared to conventional (fossil-based) technologies in relation to their impacts on global warming and resource consumption. In terms of eutrophy, toxicity and fine dust formation, the indicators are higher. Applying a scaling and weighting based on social preferences, however, the significance of those categories is not judged to be as high as the savings in terms of global warming and resource consumption.

Methods of process design and ecological life-cycle assessment have been upgraded for application to biorefinery concepts. The life-cycle assessment and eco-efficiency analysis, in particular, considered methodological challenges which occur in conjunction with all newly developed bio-based technologies. The methods developed and enhanced in the project are also applicable to non-bio-based technologies.

Key reference projects and publications

Project: Demonstrationsvorhaben KomBiChemPro – Fein- und Plattformchemikalien aus Holz durch kombinierte chemisch-biologische Prozesse – Teilvorhaben B“, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 15.11.2015–14.05.2018 (FKZ: 031B0083B)

Project: Spitzencluster BioEconomy, TG 4, Bioraffinerie zur integrierten hydrothermalen Produktion von Brennstoff sowie der Grundchemikalien Phenol und Furan aus Biomasse, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.11.2014–30.09.2017 (FKZ: 031A445A)

Project: Spitzencluster-BioEconomy: „TG 5, Begleitforschung: Nachhaltige wettbewerbsstrategische Handlungskonzepte und Steuerungsinstrumente des BioEconomy-Cluster in Mitteldeutschland, TP 5.1.1“, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.07.2012–30.06.2017 (FKZ: 031A078B)

Project: Verbundvorhaben FEBio@H2O Flüssige Energieträger aus einer integrierten hydrothermalen Umwandlung von Biomasse, Teilprojekt „Biomasseabbau und Gesamtprozess“, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.01.2013–31.12.2015 (FKZ: 03EK3508A)

Project: GRAIL – Glycerol Biorefinery Approach for the Production of High Quality Products of Industrial Value, EU-Projekt, 01.11.2013–31.10.2017 (GA 613667)

Publication: Köchermann, J.; Schneider, J.; Matthischke, S.; Rönsch, S. (2015): Sorptive H2S removal by impregnated activated carbons for the production of SNG. In: Fuel Processing Technology. Bd. 138. S. 37–41. doi: 10.1016/j.fuproc.2015.05.004 – ISSN 0378-3820.
Publication: Müller-Langer, F.; Dahmen, N. (2015): Biofuels for transport in Germany. In: IEA Task39 Newsletter. S. 4–12. Newsletter Issue 41. Datum: 12/2015.
Publication: Müller-Langer, F.; Klemm, M. (2015): Liquid and gaseous biofuels for the transport sector. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 107–120. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.
Publication: Rönsch, S.; Schneider, J.; Matthischke, S.; Schlüter, M.; Götz, M.; Lefebvre, J.; Prabhakaran, P.; Bajohr, S. (2015): Review on methanation – From fundamentals to current projects. In: Fuel. Bd. 166. S. 276–296. doi: 10.1016/j.fuel.2015.10.111 – ISSN 0016-2361.
Publication: Zech, K.; Oehmichen, K.; Grasemann, E.; Michaelis, J.; Funke, S.; Seiffert, M. (2015): Technical, economic and environmental assessment of technologies for the production of biohydrogen and its distribution: Results of the Hy-NOW study. In: International Journal of Hydrogen Energy. Bd. 40 (Nr. 15). S. 5487–5495. doi: 10.1016/j.ijhydene.2015.01.177 – ISSN 0360-3199.

Project summary

Duration:	07/2012–06/2017
Status:	running
Project partner:	Helmholtz Centre for Environmental Research – UFZ and Leipzig Trade Academy HHL (Subproject within the Bioeconomy Cluster)
Contact:	Arne Gröngröft, Stefan Majer, Dr.-Ing. Franziska Müller-Langer
Project number:	FKZ 031A078B
Funding body:	Federal Ministry of Education and Research/ Project Management Jülich

BioEconomy Cluster

INVENTED IN GERMANY

Federal Ministry of Education and Research

Contact

Dr. Franziska Müller-Langer
Phone: +49 (0)341 2434-423
E-Mail: franziska.mueller-langer@dbfz.de

3.4 RESEARCH FOCUS IV: SMARTBIOMASSHEAT

"Future heat supply from biogenic solid fuels must become much more efficient, flexible and tailored to system requirements – it needs to get smarter!"

(Dr. Volker Lenz, Head of the research focus area "SmartBiomassHeat")

The research focus area concentrates on small-scale, renewable heat production in single units and small combinations up to village or town neighbourhood scale using intelligent heat technologies interlinking other renewable energy sources and based on biomasses primarily originating from residues, by-products and wastes. The primary aim is to make optimal technological and economic use of all renewable heat resources based on flexible, demand-adapted deployment of heat technologies based on biomass. This involves mapping the entire chain from grafting of the biomass fuels through new conversion plants to integration into the heat and power grid of the biomass heaters (executed in future also as combined heat and power plants), analysing, simulating and optimising them individually and collectively. It will also entail the necessary technical component development and linking control research and development through flexible operation (including micro- and small-scale CHP) to achieve efficient, environmentally friendly, economical, safe, demand-adapted, flexible and sustainable (smart) operation (SmartBiomassHeat).
The project described in the following demonstrates the DBFZ's research into the key question of the data and communications integration of a rapidly increasing number of producers and consumers into a single network with the aim of creating stable, cost-effective power supply.

E-COCKPIT (AUTOMATED OUTPUT SAFEGUARDING IN A GRID OF A THOUSAND DISTRIBUTED ENERGY PRODUCERS APPLYING AN ICT COCKPIT APPROACH BASED ON THE CONCEPT OF SUPPLY CHAIN MANAGEMENT)

The "E-Cockpit" project's overarching goal was to develop a prototype ICT-aided research and demonstration platform in order to implement and study the global application scenario of supply chain management in the energy sector. The platform was designed to centrally collate and process data from small-scale plants connected to the electricity grid (Figure 10) and provide the data in prepared form to the supply chain players who need it in order to perform their functions optimally. This involved transferring measurement data from linked plants to the platform in accordance with the international standard IEC 61850. That standard has been in force in the power sector in relation to secondary technologies for the construction of new, or modification of existing, substations for some 15 years, but has to date not been applied to the low-voltage grid (too complex to configure, and too expensive). In addition to mapping application scenarios on the research platform, the project aimed to determine how the data links of the power producers can be most usefully implemented in terms of data volumes, data resolution, number of measuring points and the like – that is to say, what an energy information network, or ICT-based platform, has to deliver for the players in the energy sector depending on their respective market roles. The transparent provision and processing of plant data was not envisaged for a specific market role (e. g. virtual power plants from the retail perspective), but was to be investigated in terms of benefit for all market players.

While the general intention in the course of the project was focused on additionally obtaining measurement data from the distribution network and enabling power producers to influence the grid through ICT means, the project also revealed that the grid usability of plants has to be considered in a highly differentiated way – by both producers and consumers. Critical factors in these considerations are the grid and consumer structures. To cite just one example: requirements in urban areas of conventionally heavy energy consumption, with well developed power grids, are lower than in rural areas with sporadic oversupplies of electricity. Moreover, many technical connection conditions have been upgraded in recent years and adapted to requirements in terms of the shift in the producer structure (centralised fossil-fuel and nuclear power to distributed renewables) and of the power grid (both the transport network and even more so the distribution network, i. e. low voltage up to 110 kV high voltage) ('SysStabV system stability regulation for the first time in 2012; 'SDLWindV' system services regulation for the first time in 2009). At the same time, the expansion of grids has been driven forward (see the grid development plans of the four German transmission system operators since 2012; 'NABEG' Act stipulating measures to speed up grid development of 2011). All this initially eased some of the problems which are forcing grid system operators to intervene more in grid management in the face of the massive expansion of renewables producers: lack of reactive power infeed, potential voltage band infringements (voltage rise), lack of possibilities for reducing effective power at connected distributed producers. A key aspect in this is the 50.2 Hz issue (simultaneous shutdown of all PV plants on reaching the 50.2 Hz grid frequency limit). Nevertheless, the number of manual interventions by the grid system operators has increased substantially, as a means of assuring technical safety, reliability and quality of power supply within their areas of responsibility, and in the case

Fig. 10 Photovoltaic plant in the DBFZ test field

of the transmission system operators in order to assume system responsibility jointly with the distribution network operators. In short: framework conditions have been created which more closely than to date consider the changed requirements of the power grid at the level of electrotechnical integration: that is to say, locally.

RESULTS

The project revealed that the organisational and regulatory barriers are greater than the technical ones. Proof of technical feasibility was provided. Owing to the lack of market, however, only prototype equipment was available. That circumstance, too, has changed. The protection profiles and technical guidelines of the German Federal Office of Information Technology Security (BSI) for ICT components to safeguard data exchange with billing equipment in the power grid (Smart Meter Gateways and security modules) have been published. The draft Act relating to the Digitisation of the Energy Transition of Autumn 2015 assigns the function of the administrator of this equipment in the Measuring Point Operations Act (MSbG) to a market role. This point explicitly, relating to the previously unclarified responsibility of a gateway provider (for meters, but also for other measurement data from the power grid which does not lie within the area of responsibility of the grid operator) was one of the biggest obstacles in establishing the research and demonstration platform, because it also entails issues such as access rights concepts, data protection, IT security and data ownership, with potential remuneration models for data provisioning (Figure 11).
In the course of the project it likewise became clear that it does not make sense to equip every mini electrical system (whether at the producer or at the consumer) with a smart meter capable of communicating beyond property boundaries, to generate, process and utilise masses of data regardless of the structure of the power grid. These findings coincide with the stipulation in the draft MSbG act that smart metering systems should only be installed in plants of 7 kW installed power and above (in the case of CHP and EEG-compliant plants) and where annual consumption is 6,000 kWh or more. Nevertheless, the plans do envisage the use of state-of-the-art metering systems for smaller installations by the year 2032,

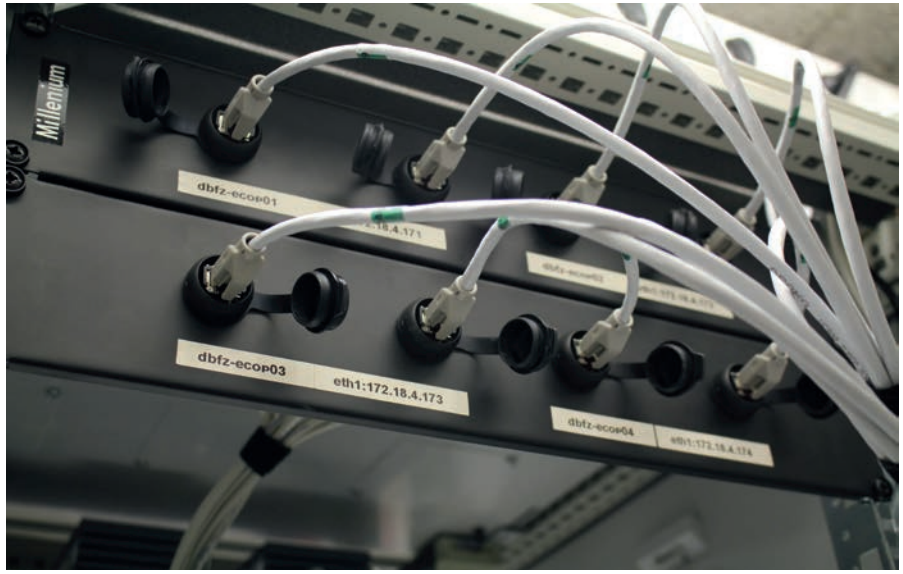


Fig. 11 Integration of gateways into the IT infrastructure

Fig. 12 Wind turbine electrical cabinet with grid monitoring and provision of measurement data to the gateway

incorporating technical features to visualise consumption data. As a result, from then on even mini-plants would have on-site measurement data available for autonomous controls at locations with and without their own energy producers. The kinds of miniature processors, controllers or the like which should be used to build such control systems remains to be investigated (Figure 12).

PROSPECTS FOR 2016

The framework has been set out. For residential and small commercial properties the question is not whether but when the acquisition and utilisation of data for optimised energy use will begin. Locale interconnected networks are the best option to consider in this context. The use of autonomous control systems working with up-to-date data from the power grid and so relatively independent of computer hackers or power market prices can effectively exploit the potential for shifting energy consumption and local production, and so provide one of the potential contributors to the remodelling and operation of a future-proof power grid. From the perspective of our research focus area, it is irrelevant whether the use of a state-of-the-art control solution is remunerated or stipulated as mandatory by the regulators.

For more information visit: **www.smartbiomassheat.de**

Project summary

Status:	finished
Project partner:	Institute for Applied Informatics (InfAI) e. V. at the University Leipzig
Contact:	Kerstin Wurdinger, Dr. Andreas Ortwein
Project number:	100127660
Funding body:	Sächsische Aufbaubank – Förderbank – (SAB)

SAB Sächsische AufbauBank

Key reference projects and publications

Project: KOMBIOPT – Energiemanagementsystem zur kombinierten Nutzung erneuerbarer Energien, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.02.2015–31.07.2017 (FKZ: 22403113)

Project: Untersuchung und Screening erweiterter Qualitätsparameter zur Verbesserung der emissionsrelevanten Holzpelletqualität in der Praxis, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.03.2015–30.09.2015 (FKZ: 22017914)

Project: IbeKET – Innovatives bedarfsangepasstes Kommunal-Energieträger-Konzept, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 15.09.2013–31.01.2016 (FKZ: 03KB088D)

Project: MiscPellTherm – Miscanthus-Mischpellet Brenner mit kleiner Wärmeleistung; Experimentelle Brennerentwicklung auf dem Prüfstand, Bundesministerium für Wirtschaft und Energie/AiF, 01.07.2014–30.06.2017 (FKZ: KF2028012ST4)

Project: KIC Inno Energy Construction of small-to-medium capacity boilers for clean an efficient combustion of biomass for heating, KIC Inn Energy, EU-Projekt, 05.04.2012–31.03.2016

Publication: Wurdinger, K.; Dotzauer, M.; Schaubach, K.; Ziegler, D.; Ortwein, A. (2015): Herausforderungen bei der Modellierung einer IKT-Plattform für Akteure der Energiebranche. In: Tagungsband zur ETG-Fachtagung: Von Smart Grids zu Smart Markets 2015. Bd. 145. S. 1–6. Berlin, Offenbach: VDE-Verlag. Kassel – ISBN 978-3-8007-3897-7.

Publication: Schmidt, S.; Wurdinger, K. (2014): Versuchsfeld zur Untersuchung flexibler Strombereitstellung dezentraler Energieerzeuger. In: DBFZ-Jahrestagung Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?! S. 212–213. Leipzig – ISSN 2199-9384.

Publication: Sprick, S., Ryll, T., Wurdinger, K., Werner, A., Franczyk, B., Grieger, M., Pfeifer, J., Wehlitz, R.: Regenerative Energien Management-Cockpit (REMC): Informationstransparenz in Energiewertschöpfungsnetzwerken. In: Werner, A., Kühne, S., Arnold, G., Schmidt, J. (Hrsg.): Proceedings. Energy EcoSystems Conference 2013. Leipziger Beiträge zur Informatik: Band XLII. Leipzig – ISBN: 978-3-941608-29-0.

Publication: Sprick, S., Ortwein, A., Wurdinger, K.: Supply Chain Management in renewable energy networks. Advanced Research in Scientific Areas 2012, International Virtual Conference, 3.–7. Dezember 2012. – http://www.arsa-conf.com.

Contact

Dr. Volker Lenz
Phone: +49 (0)341 2434-450
E-Mail: volker.lenz@dbfz.de

3.5
RESEARCH FOCUS V: CATALYTIC EMISSION CONTROL

"Researching and developing catalytic processes for emission control in the combustion of biomass energy sources to safeguard the essential eco-friendliness of bioenergy."

(Dr. Ingo Hartmann, Head of the research focus area "Catalytic emission control")

The primary aim for this focus area is to do research on catalytic emission control for combustion processes using solid-state catalysts and having gaseous, liquid and solid bioenergy sources. The focus is on catalytic reduction of the combustion emissions methane (CH_4), non-methane volatile organic compounds, semi- and non-volatile hydrocarbons such as polycyclic aromatic hydrocarbons (PACs) and polychlorinated dibenzodioxins/polychlorinated dibenzofurans (PCDD/PCDF), soot particles (black carbon) and nitrogen oxides (NO_x). These pollutants can be substantially reduced by catalytic exhaust systems and integrated methods. The aim is to develop catalysts and processes which permit virtually zero-emission combustion of bioenergy sources in line with environmental requirements.

DEMONSTRATION OF METHODS OF COMBINED REDUCTION FOR NITROGEN OXIDES AND FINE DUST IN COMBUSTION PLANTS

The sustained growth in biomass use as an energy source must be more extensively based on biogenic by-products and residues in the future, because food production must not be impaired and the use of biomass as a raw material resource

is becoming increasingly important. Agricultural residues such as straw are particularly attractive, as there is sufficient unused potential, and their use avoids competitions between food and energy crops for land. However, the combustion of alternative biomasses produces more dust and nitrogen oxide emissions than natural wood fuels, and those emissions pose a significant risk to human health and the environment. Suitable methods for the abatement of dust and nitrogen oxides from the combustion of alternative biomasses have only been available for large-scale plants in the megawatt range by now. However, biogenic residues such as straw can only be used in a cost-effective and ecologically way in the low and medium power range. Moreover, distributed plants can be constructed and operated much more flexibly in terms of adaptation to demand. A broad-based market coverage is only possible in the low and medium power range if economically viable waste gas cleaning methods are available which reliably enable compliance with existing emission limits.

The 'TA Luft' clean air regulations in Germany are currently being revised and it is likely that the limits for dust and nitrogen oxides will be tightened. When using non-woody biogenic solid fuels, the 'TA Luft' limits apply as from a nominal heat output of 100 kW. To date, only a dust collector was required in order to meet the existing limit requirements. In future, when using alternative biogenic solid fuels secondary reduction of nitrogen oxide emissions will additionally be necessary, because primary measures such as air staging, fuel staging and exhaust gas recirculation cannot achieve adequate reduction of nitrogen oxide formation from nitrogen contained in the fuel. With this background, it is the aim of the joint research project to develop a method for removing dust from flue gases combined with simultaneous reduction of nitrogen oxides for furnaces operated with non-woody biomass fuels, which can be cost-effectively deployed in the power range (up to 1 MW).

WORKING AIMS

The basis of the flue gas cleaning system is a catalytic-coated fabric material which enables dust separation by means of a fabric filter to be combined with selective catalytic reduction (SCR) of NO_x. The dust is separated on the outer surface of the filter element and the nitrogen oxide is then reduced on the catalytic coated inside. The reducing agent is injected into the waste gas upstream of the filter. Alternatively, the NH_3-slip of a combined non-catalytic reduction (SNCR) can be used. Both ammonia gas and urea solution can be used as reducing agent. The waste gas cleaning method developed in the project uses urea (32.5 % solution) – a method which has also been successfully used for some time to reduce nitrogen oxides in the motor vehicle sector. The urea solution offers major advantages in terms of availability and handling.

The flue gas cleaning method will be developed for the power range from 0.1 to 1 MW. Since the application of secondary measures entails increased capital investment and operating costs, it is only cost-effective above a certain power range. Mature solutions for the power range well above 1 MW already exist on the market. The method is being developed so that the future emission limits in Germany can be clearly and safely maintained and permanent trouble-free operation can be ensured. The following technical developments are intended in detail:

- Prototype development of a catalytically active fabric filter for the power range (0.1–1 MW)
- Development and construction of a dosing system for the reducing agent
- Research into the combination of SNCR and SCR methods
- Safeguarding the long-term stability of the SCR catalyst
- Development of an overall system control for the boiler, dust filter and dosing system
- Demonstration of the method at a grate furnace for wood chips and chopped straw and also straw pellets

The following target values (reference: 11 vol. % O_2) are set for the cleaned waste gas:

- Dust ≤ 5 mg/m³ i. n.
- NO_x ≤ 50 mg/m³ i. n.
- NH_3 ≤ 5 mg/m³ i. n.

PILOT PLANT AND PROCESS SCHEMATIC

The developments and configuration tests are being carried out on a step grate furnace with 120 kW nominal output (fuel: wood chips and straw) at the DBFZ. The pilot plant is automatically controlled by a PLC (programmable logic controller) developed by the Fraunhofer Institute for Factory Operation and Automation (IFF). The plant's operating state is continuously monitored by different sensors, e. g. temperature, O_2 and NO_x.

For the tests, a flue gas system was constructed with a downstream cyclone spark arrester. For the boiler start-up phase, a bypass was integrated to bypass the filter until the necessary gas temperature is reached. When flue gas passes through the filter in the cold state, condensation and sticking of the filter tubing can occur, as well as possible deactivation of the catalytically active filter. Moreover, the bypass serves as a safety device in the event of unacceptable high pressure drop at the filter. The filter was also fitted with an auxiliary heater for more rapid heating and targeted adjustment of the temperatures at the filter. As a result, the influence of the temperatures on the nitrogen oxide reduction performance of the filter can also be systematically investigated.

Taking into account the necessary investment in relation to the achievable reduction, various possibilities for the combined reduction of dust and nitrogen oxides will be investigated. Potential options are a single application of the SCR method with injection of the reducing agent directly upstream of the catalytically active filter as well as a combination of SNCR and SCR.

Fig. 13 Pilot plant outside view (left) and inside view (right)

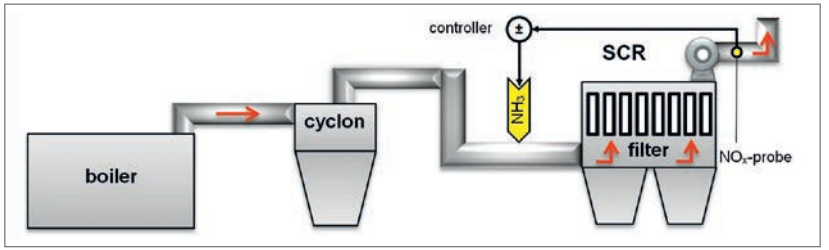


Illustration: DBFZ, 2015

Fig. 14 SCR method with measurement of the NOx concentration in the pure gas

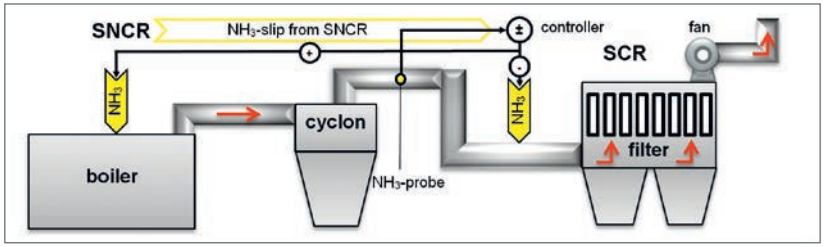


Illustration: DBFZ, 2015

Fig. 15 Combination of SNCR and SCR methods

Figure 14 shows the system having only an injection of the reducing agent upstream of the filter. Here, the NO_x content is measured by a sensor in the flue gas downstream of the catalytically active filter and is regulated with the quantity of reducing agent injected into the waste gas line. This simultaneously has the advantage that the NO_x emissions are continuously monitored, thereby also enabling verification of regulatory compliance.

Figure 15 shows the combination of SNCR and SCR methods. The reducing agent is initially injected directly into the combustion chamber. In the SNCR method, NH_3 slip normally occurs which can be used for further catalytic reduction of the nitrogen oxides remaining in the waste gas. A NH_3 sensor upstream of the filter measures the amount of the reductant remaining in the waste gas and adjusts it by way of a set point controller. Potential options in this are injection of the reducing agent into the combustion chamber as an isolated process as well as parallel dosing of the reducing agent into the furnace and upstream of the filter.

PROSPECTS FOR 2016

After the pilot plant was set up and put into operation in 2015, the plan for 2016 is to conduct extensive combustion experiments with wood chips, straw pellets and chopped straw as fuels. The separation rate of the dust filter and the nitrogen oxide

reduction rate of the SCR function will be measured in the process. First the variant with SCR-only will be tested, and the dosing of the reducing agent into the flue gas will be optimized. This will involve the variation of several parameters such as the nozzle geometry and diameter, the location and angle of injection, and the amount of reducing agent as well as the optimization of the process with a view to achieving the flue gas targets. Afterwards experiments at various power levels and with the different fuels can be performed. A second variant will be investigated in 2016 in dominating the SNCR and SCR methods. For the method presented in Figure 15 there are still different implementation options, which will be investigated in more detail dependent on the interim results obtained. If the results are positive, an application for a follow-up project will be submitted, in which the flue gas cleaning process will be advanced and optimized with regard to long-term stability and economic viability.

Project summary

Duration:	09/2014–08/2016
Status:	running
Project partner:	Dr. Weigel Anlagenbau GmbH, Industrietechnik Barleben GmbH, Fraunhofer Institute for Factory Operation and Automation (IFF)
Contact:	Mario König
Project number:	03KB096 A-D
Funding body:	Federal Ministry for Economic Affairs and Energy/ Project Management Jülich

Federal Ministry for Economic Affairs and Energy

Funding programme Biomass energy use

Contact

Dr. Ingo Hartmann
Phone: +49 (0)341 2434-451
E-Mail: ingo.hartmann@dbfz.de

Key reference projects and publications

Project: Nachrüstung zum katalytischen Abbau von gasförmigen organischen Emissionen aus Kaminöfen, Deutsche Bundesstiftung Umwelt, 01.08.2013–31.01.2015 (FKZ: 31032)

Project: GASKAT – Emissionsarmer Scheitholzvergaserkessel mit integriertem Katalysator und optimierter Verbrennungsregelung, Bundesministerium für Wirtschaft und Energie/AiF, 01.01.2013–30.11.2015 (FKZ: KF2028006ST2)

Project: Demonstration von Verfahren zur kombinierten Reduktion von Stickoxiden und Feinstaub aus Biomassefeuerungen, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.09.2014–31.08.2016 (FKZ: 03KB096A)

Project: Untersuchung innovativer Ansätze zur Minderung der Schadstoffemissionen von Kaminöfen durch katalytisch wirksame Baugruppen – Hauptphase „NEKO – Neuartiger emissionsarmer Kaminofen“, Deutsche Bundesstiftung Umwelt/Specht, 01.04.2013–31.03.2015

Project: Schnelltest zur Alterungsnachstellung von Dieselkatalysatoren im Betrieb mit Biokraftstoffen, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e.V./Forschungsvereinigung Verbrennungskraftmaschinen, 01.10.2014–30.09.2017 (FKZ: 22014514)

Publication: König, M.; Hartmann, I.: „Scheitholzvergaser mit integriertem Katalysator“, Poster auf dem 6. Fachkolloquium – Effiziente und schadstoffarme Verbrennungstechnologien für Biomasse, 12. Mai 2015, Stuttgart.

Publication: Matthes, M.; Hartmann, I. (2015): Einsatz von Nachrüstmodulen an Kaminöfen zur Effizienzsteigerung und Emissionsminderung. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Bioenergie – Mehr als eine sichere Reserve !? 6. Statuskonferenz am 11./12. November 2015. Reader des Förderprogramms Energetische Biomassenutzung. S. 20–21. DBFZ. Leipzig.

Publication: Bindig, R.; Butt, S.; Hartmann, I. (2015): Emission Abatement at Small-Scale Biomass Combustion Unit with High-Temperature Catalysts. In: Advanced Biofuels: Using Catalytic Routes for the Conversion of Biomass Platform Molecules. S. 189–202. 1. Auflage. Apple Academic Press. Oakville, Kanada – ISBN 978-1-77188-132-6

Publication: Ahmad Alyosef, H.; Schneider, D.; Wassersleben, S.; Roggendorf, H.; Weiß, M.; Eilert, A.; Denecke, R.; Hartmann, I.; Enke, D. (2015): Meso/Macroporous Silica from Miscanthus, Cereal Remnant Pellets, and Wheat Straw. In: ACS Sustainable Chemistry & Engineering. Bd. 3 (Nr. 9). S. 2012–2021. doi: 10.1021/acssuschemeng.5b00275.

Publication: Matthes, M.; Hartmann, I.; Groll, A.; Riebel, U. (2015): Investigation on application and performance of emission reduction measures at a pellet boiler. In: Biomass Conversion and Biorefinery. S. 1–13. doi: 10.1007/s13399-015-0187-1 – ISSN 2190-6815.

4 COOPERATION AGREEMENTS, NETWORKING, INNOVATION

Scientific cooperation with centres of higher education and other research establishments is an essential element of the DBFZ's work. The focus of in-house activities is on realising the defined research goals based on applied research and development (R&D). Subsidiary topics are considered in conjunction with network partners, so as to spread the relevant knowledge as broadly as possible. The aim is to create stable scientific networks based on active interchange between key national and international partners in the field of bioenergy research and development and bioeconomics. Ongoing collaboration with permanent partners is maintained in particular with regard to basic research and in areas in which the DBFZ has not yet established detailed specialist expertise. A strategic cooperation with the Helmholtz Centre for Environmental Research (UFZ) to carry out the necessary basic research relating to assessment of bioenergy systems and into the microbiological principles underlying biochemical processes has been established in recent years. As part of the cooperation, the DBFZ's Bioenergy Systems research department works closely with the UFZ's Bioenergy Department. And the DBFZ's Biochemical Conversion research department works closely with the UFZ's Microbiology Department.

An intensive cooperation between the DBFZ's research focus areas and the Department of Waste Management and Material Flow of the University of Rostock relating to the recovery of organic wastes and residues for energy use has been established. The applied research and development work of the DBFZ is also carried out in close cooperation with industrial partners. This ensures the necessary practical orientation, as well as providing detailed insights into markets, so enabling a focus on innovative and realisable solutions. The DBFZ assures the

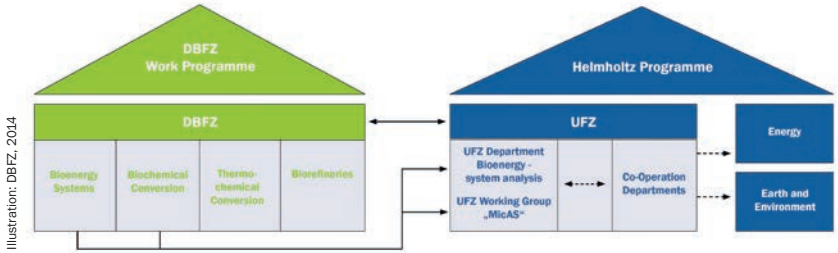


Illustration: DBFZ, 2014

Fig. 16 Cooperation between DBFZ and UFZ

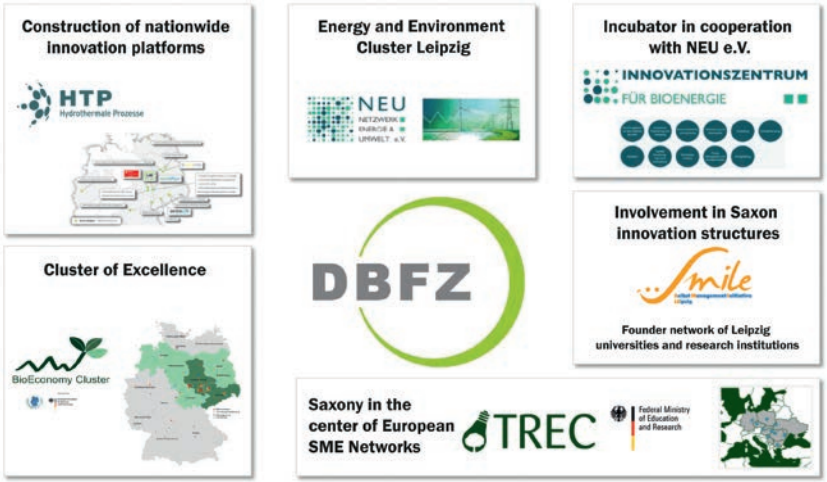


Fig. 17 The DBFZ within regional industrial networks

adoption of a neutral, holistic view in cooperation projects with industry. The approach enables the DBFZ to apply its extensive expertise to market-oriented R&D projects. Intensive participation by business is the norm in third-party funded projects. The DBFZ's research departments maintain extensive national and international links with companies which carry out R&D in the relevant fields. These cooperation agreements fulfill the requirement of industry participation and orientation to market needs in funded projects.

In addition to its outstanding regional networking links at the location within the Energy and Environment Cluster (NEU e. V.) in Leipzig and industry-related memberships of R&D networks such as "Energy Saxony e. V.", the DBFZ is also actively involved in research clusters such as the BMBF BioEconomy Cluster, in which it coordinates entire research fields. The DBFZ also seeks to participate in other research clusters and to handle specific subject areas in state-wide multiplier organisations. The DBFZ actively interlinks industrial and scientific players in the course of specially funded subject-specific innovation forums aimed at creating institutionalised innovation networks.

Contact

Romann Glowacki
Phone: +49 (0)341 2434-464
E-Mail: romann.glowacki@dbfz.de

START-UP NETWORK WITH SMILE

Since early 2015 the DBFZ has been a partner in the Leipzig-based start-up network "SMILE". The network enables DBFZ staff and interested parties from the scientific and business communities to participate in a wide range of seminars, workshops and coaching sessions for start-ups. Thanks to the DBFZ's membership of the "SMILE" network, the spin-offs from its work can also benefit from grants and pre-launch support from the EXIST start-up scheme.

Specific aims of SMILE at the DBFZ are:

- Raising awareness for entrepreneurial activity
- Qualification for teaching the necessary skills and knowledge to create business models, manage business start-ups and support personal development
- Supporting the development of business models and plans, aiding the search for partners to finance business models, and backing the market launch of start-up business products and services
- Implementing innovative measures to promote pilot applications of start-up products and services
- Advancement of networking with the start-up initiatives in the state of Saxony in executing joint project measures

For additional information visit: **www.smile.uni-leipzig.de**

Contact

Ronny Kittler
Phone: +49 (0)341 2434-470
E-Mail: ronny.kittler@dbfz.de

5
EXECUTIVE SUPPORT TEAM

"The world of science is becoming ever more complex and dynamic. Good management is therefore a key factor in the success of scientific establishments looking to survive and prosper in the international competitive environment."

(Dr. Nikolaus Blum, Commercial Director of the Helmholtz Centre Munich)

The DBFZ's administration departments (Executive support Team) report directly to the Scientific Managing Director Prof. Dr. Michael Nelles. Alongside the Press and Public Relations department, the Research, Innovation and International coordinators work closely with the four DBFZ research departments to utilise synergies in strategic research and project management, consortium creation and internationalisation for the entire research centre.

Fig. 18 The scientific administration departments and the Press and Public Relations department of the DBFZ

5.1
INNOVATION COORDINATOR

The rapid implementation of the scientific results obtained by the DBFZ and its partner into marketable products, processes and services is supported and coordinated by the Innovation Coordinator Dipl. Holzwirt Romann Glowacki. His administration department establishes network links among partners in the fields of industry, finance and applied bioenergy research, as well as involving public-sector administration. One of the key tasks of the Innovation Coordinator is to consolidate and utilise these competencies along the innovation chain in order to create an environment which promotes innovation.
2015 was marked by a strategic re-alignment of the DBFZ. The main aim is for the five research focus areas to provide the DBFZ with a more distinct scientific profile. The role of the Innovation Coordinator in this is to supervise and enable rapid translation of the scientific results obtained by the DBFZ and its partners into marketable products, processes and services. Along with the ongoing development of the innovation strategy, the key tasks of the Innovation Coordinator in 2015 were to procure third-party funding from and with industry for the DBFZ and to publish the results of projects/activities together with industry.

PROACTIVE DEVELOPMENT OF IN-HOUSE R&D NETWORKS

In June 2015, the instigation of the “Hydrothermal Processes” innovation forum (**www.htp-inno.de**) marked the launch of a Hydrothermal Processes (HTP) innovation network. With HTP, water-rich biogenic residue flows can be converted into solid, liquid or gaseous carbon carriers and enriched further. The innovation forum sponsored by the Federal Ministry of Education and Research (BMBF) brought

Fig. 19 Hydrothermal Processes Forum held on June 15, 2015 in Leipzig

together skills and key players from research and industry all across Germany. In addition to identifying concrete value chains, project consortia were pre-structured and R&D projects developed. The results were published in a comprehensive work titled Innovationsforum “Hydrothermale Prozesse”. The network is open by design, and is targeted at all the players along the value chains from wet biogenic residue flows, from the residual material producer or disposal contractor, through plant construction, to the processors of solid or liquid biogenic carbons from all industrial sectors, including use for chemicals, as raw materials, and as an energy source. The extraction and processing of oils, phenols, solid carbons, hydrophobic filter media, adsorbents, catalyst carriers, through to solid or liquid energy source materials is the focus of ongoing R&D network development.
Another activity launched in 2015 was the creation of a ‘growth core’ titled SERAPLANT in the field of nutrient recycling. The growth core is based in Leipzig

(the main driver being LAV Markranstädt GmbH), and it is oriented to various nutrient recycling processes. The DBFZ is an active member, and is the lead organisation in the field of thermo-chemical conversion. The aim is for nutrient recycling to be strategically integrated into various biomass-processing value chains (Bioeconomy, Bioenergy) through the DBFZ. The Fraunhofer IKTS in Dresden is the lead organisation.
In 2015 the Innovation Coordinator additionally coordinated Subject Area 4 relating to use of biomass as an energy source within the BioEconomy Cluster under the auspices of the Federal Ministry of Education and Research (BMBF). Tasks of the Innovation Coordinator which were also performed comprehensively in 2015 included regular meetings, presentations and interchange with the five other Subject Area leads, participation in subject-related conferences (including the 2015 "Global Bioeconomy Summit" in Berlin), and close coordination with the management board of the BioEconomy e. V. organisation.

THE BIOENERGY INNOVATION CENTRE

At the core of the innovation strategy is the Bioenergy Innovation Centre. It serves as the central body for driving innovation processes, as well as a platform for business relocation, start-ups and spin-offs. The funding is provided by the Energy & Environment Network NEU e. V. It is thus independent of the DBFZ. A key role is the creation of a simple incubator function for research institution staff looking to start their own businesses and bioenergy companies looking to locate in the region. The aim is to open up and support attractive pathways to self-employment. As well as motivating staff, the Bioenergy Innovation Centre offers them a way to translate their own developments into marketable products and services. The Innovation Centre is being integrated into the regional innovation structure, including through the BMBF-sponsored GISBERT project within the framework of the BioEconomy Cluster. The task of the Innovation Coordinator is to manage the Innovation Centre and the cooperation with the NEU e. V.

REGIONAL NETWORKING WITH NEU e. V. AND ENERGY SAXONY

The Innovation Coordinator is also a member of the management board and treasurer of the Energy & Environment Network NEU e. V. In the past year once again, weekly meetings ensured very close and intensive links with the city of Leipzig. In 2015 the Innovation Coordinator additionally stood in as the DBFZ's representative at the members' assembly of the Energy Saxony e. V. The aim of that organisation is to provide a network for energy-related R&D activities in Saxony. To that end, the Innovation Coordinator contributed to the development of the State of Saxony Energy Research Strategy, initiated and coordinated by Energy Saxony e. V.

Additional information (partially in german language):
www.dbfz.de/web/forschung/kooperationen.html
www.innovationszentrum-bioenergie.de/
www.energiemetropole-leipzig.de/de/schwerpunkte/bioenergie
www.energy-saxony.net/en.html

Contact

Romann Glowacki
Phone: +49 (0)341 2434-464
E-Mail: romann.glowacki@dbfz.de

5.2 COORDINATOR OF INTERNATIONAL KNOWLEDGE AND TECHNOLOGY TRANSFER

International activities are of increasing importance against the background of the DBFZ's greater visibility in Europe and beyond. Alongside the ongoing joint acquisition of (research) projects with partners, cooperation with leading international universities and extramural research institutions will be further intensified in future. In this way, the scientific research focus areas can be backed by the aim of engaging in top-level research and attaining a leading position in the research sphere. The task of the Coordinator of International Knowledge and Technology Transfer, Dr. Sven Schaller, is to make the accumulated expertise of the DBFZ accessible to interested partners worldwide through joint research projects, exchange of doctoral candidates and reciprocal research secondments (working in close cooperation with the Research Coordinator). A further task of the scientific administration department is to support and selectively expand the international network. This work also includes proposing and arranging reciprocal visits by decision-makers, and organising international workshops and conferences.

COOPERATION AGREEMENT WITH THE UNIVERSITY OF SÃO PAULO

One of the highlights of 2015 was the signing of a cooperation agreement with the Instituto de Energia e Ambiente of the University of São Paulo. The University is regularly ranked top in Latin America by some margin. On the basis of the agreement, the DBFZ's top-level research will be strengthened and joint project acquisition promoted over the coming years through a doctoral candidate and scientist exchange programme.

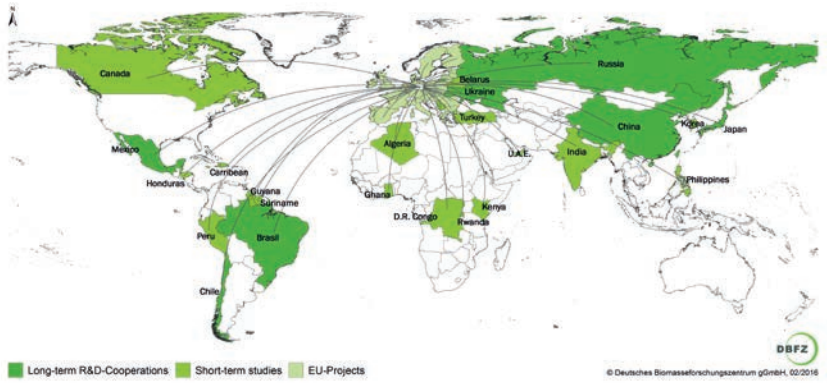


Fig. 20 International activities of the DBFZ

With a view to the DBFZ's expanding activities in the Caribbean region and the increasing opening-up of Cuba, on June 15, 2015 the DBFZ signed a cooperation agreement with the leading-edge technology institution InSTEC (Instituto Superior de Tecnologías y Ciencias Aplicadas). The agreement is under the auspices of the Ministry of Higher Education (MES), and its two research focus areas are nuclear and environmental sciences. As stressed by Prof. Dr. Michael Nelles and InSTEC Rector Prof. Dra. Bárbara Idalmis Garea Moreda at the signing ceremony, the co-

Fig. 21 Cooperation agreement signed with InSTEC (Inswtituto Superior de Tecnologías y Ciencias Aplicadas) on June 15, 2015

operation will be rapidly put into practice. The focus initially will be on a doctoral candidate exchange programme, but plans for the future also include projects relating to the use of agricultural residues and solid municipal waste as an energy source and as raw materials. InSTEC is one of the leading universities in all Latin America in the field of environmental sciences.

SUMMER SCHOOL WITH TOP CHINESE UNIVERSITIES

Existing contacts with major Chinese universities in the field of biomass and waste recycling were further intensified in 2015. With the support of the Chinese-German Centre for Science Promotion, the German-Chinese Summer School on the use of biogenic waste and residues as an energy source and for raw materials was held at the DBFZ and at the University of Rostock from October 11 to 17, 2015.

Fig. 22 Participants in the Summer School in Leipzig

A total of 36 student scientists, doctoral candidates and lecturers from the DBFZ, the University of Rostock, the University of Leipzig, the HAWK, the FH Lübeck, the University of Tongji, the China Agricultural University and the China University of Petroleum took part in the Summer School. Lectures, group discussions and tours of the DBFZ, the environmental lab of the University of Rostock, the HTC and dry fermentation plant in Halle-Lochau and the waste disposal centre in Rostock enabled the participants to expand their knowledge and discover development trends in the use of biogenic waste and residues as an energy source and for raw materials, as well as to build personal networks and develop ideas for specific joint research projects in Germany and China.

Fig. 23 Prof. Dr. Michael Nelles accompanying the state visit of German Chancellor Dr. Angela Merkel in Hefei (China) on October 30, 2015

DBFZ BACKS WORLD BANK PROJECT TO BUILD SIX PILOT BIOGAS PLANTS IN HEBEI (CHINA)

The DBFZ continues to be very heavily engaged in China. In order to improve the quality of Chinese biogas plants, a total of six plants in the province of Hebei are being backed with know-how and technology Made in Germany as part of a project partially financed by the World Bank. The high-calibre international group of scientific experts providing advice and support is headed by Prof. Dr. Michael Nelles, the Scientific Managing Director of the DBFZ. “As a consortium of experts, we are delighted to be carrying out the World Bank project. China is a growth market particularly for the combined raw material and energy use of biogenic waste and residues – a field which we will be looking to actively promote and develop based on our extensive expertise,” commented Professor Nelles in the course of a research visit to China. The extent to which the two countries have fostered cooperation in scientific research over recent years was also demonstrated during the visit to China of German Chancellor Dr. Angela Merkel in late October. On the occasion of the visit, Prof. Nelles represented the DBFZ and the University of Rostock in marking the 30th anniversary of the successful cooperation between the University of Hefei and German universities and research institutions in the field of biomass and waste recycling.

SUCCESSFUL CONCLUSION OF THE EU “SECTOR” PROJECT

The future of torrefication was discussed on May 6, 2015 at the final meeting of the EU-sponsored „SECTOR“ project in Leipzig. The aim for the more than 20 international project partners from science and industry was to advance torrefication technologies and introduce torrefied biomass onto the market. In the course of the project, the complete value chain was comprehensively assessed by means of logistics and end-use tests of torrefied biomass in combination with laboratory, pilot and demonstration plant experiments as well as sustainability analyses. At the final meeting, project coordinator Prof. Dr. Daniela Thrän gave a positive appraisal of the three-and-a-half year research work: “The SECTOR consortium has done very good work, and has been able to show that torrefied biomass has a promising

Fig. 24 Final meeting of the EU “SECTOR” project at the DBFZ on May 7, 2015

future both in terms of use as an energy source and as a raw material – especially in an international context.”

Contact

Dr. Sven Schaller
Phone: +49 (0)341 2434-551
E-Mail: sven.schaller@dbfz.de

5.3
RESEARCH COORDINATOR

The Research Coordinator's administration department supports links among scientists between the disciplines and research departments, as well as with other research institutions, and so helps to utilise synergies and promote expertise in-house. The key tasks of the administration department include:

- Monitoring of medium- and long-term research planning
- Evaluation of and advice on national and international project submissions and support to the inter-departmental development of project submissions
- Hosting of internal information and training events in relation to current tenders, project request submission and management
- Preparing, organising and supervising internal and external evaluations and supporting the Research Advisory Council (RAC)
- Optimising the DBFZ's scientific management and quality assurance based on good scientific practice
- Coordinating information exchange with and reporting to the institutional sponsor, the Federal Ministry of Food and Agriculture (BMEL), on research activities at the DBFZ
- Implementing the doctoral programme and supporting the DBFZ's doctoral candidates.

RESEARCH PLANNING AND H2020 PROJECT DEVELOPMENT

In 2015 the main task of the Research Coordinator's administration department was to implement the DBFZ's research and development strategy in relation to its participation in the EU framework research programme H2020. To do that end, the Research Coordinator attended the Horizon 2020 Energy Info Day 2015 in Brussels and organised two on-day in-house workshops on the subject of project submission in H2020. DBFZ staff were also supported in a submission for the Call WASTE-7 and in two submissions for European Training Networks of the Marie Skłodowska-Curie Actions. The DBFZ was awarded four European projects in 2015.

- MetHarmo/Method harmonization and validation for the quantification of methane emissions from biogas plants (ERA-NET Bioenergy 2016–2018)
- REFAWood/Resource-efficient fuel additives for reducing ash related operational problems in waste wood combustion (ERA-NET Bioenergy 2016–2018)
- Record Biomap/Research Coordination for a Low-Cost Biomethane Production at Small and Medium Scale Applications (H2020 2016–2018)
- BIOSOL/Development and demonstration of a hybrid CSP-biomass gasification boiler system (ERANETMED 2016–2018)

RESEARCH ADVISORY COUNCIL

As well as preparing and organising the meeting of the DBFZ's Research Advisory Council in November 2015, work was focused on expanding the Council to include six new members. By resolution of the Research Advisory Council, new members of the DBFZ's Research Advisory Council with effect from 2016 will be Prof. Dr. Claudia Kemfert (German Institute for Economic Research), Maria Barbosa PhD (Wageningen UR), Prof. Dr. habil. Christina Dornack (Technical University of Dresden), Prof. Evelyne Thiffault (University of Laval), Prof. Grit Walther (RWTH Aachen) and Prof. Andrea Kruse (University of Hohenheim).

The Research Coordinator also supported the upgrading of the DBFZ library as part of the function's knowledge management role. As a result, the DBFZ is set to join the catalogue of BMEL research institutions. This will mean the organisation's numerous publications will gradually be made accessible worldwide through the joint catalogue.

GERMAN-FRENCH NETWORK WITH THE DFBEE

Office franco-allemand pour les énergies renouvelables
Deutsch-französisches Büro für erneuerbare Energien

In April 2015 the DBFZ joined the German-French Renewable Energy Bureau (DFBEE). The DFBEE is an information and networking platform relating to the energy transition for Germany and France. Within this framework, the Bureau regularly organises events such as conferences, seminars and webinars enabling decision-makers and industry experts to engage in interchange on current questions and challenges relating to renewable energy. The first DBFZ presentations were made during 2015. A first DBFZ publication to be circulated within the renewables network in France and Germany is currently being produced with the support of the Research Coordinator. Other publications will follow within the same framework.

DOCTORAL CANDIDATES' SEMINAR

The doctoral candidates' seminar is a key element of the DBFZ's doctoral programme. It provides a forum for detailed scientific discussion of the results of doctoral work, as well as for interchange between the doctoral candidates and their internal and external supervisors. The third doctoral candidates' seminar was held on March 12/13, 2015 at the DBFZ. On both days, the doctoral candidates presented their projects and interim results, and discussed them together with their supervisors from the DBFZ and the universities. As well as engaging in scientific discussions, the attendees were called upon to vote for the best presentation. The winner of the first prize – a 50 euro book token – was Mirjam Matthes from the DBFZ's Thermo-Chemical Conversion research department with her presentation on the subject of "Catalytic emissions reduction in small-scale furnaces".

Fig. 25 Doctoral candidates seminar at the DBFZ on March 12, 2015

Contact

Dr. Elena Angelova
Phone: +49 (0)341 2434-553
E-Mail: elena.angelova@dbfz.de

6
DOCTORAL PROGRAMME

The doctoral programme at the DBFZ has been in existence since September 2012, regulating the procedures and the rights and obligations of the doctoral candidates. The participants in the programme are assigned a mentor at the DBFZ, and are also able to take professional training courses and attend scientific conferences. They are required to publish the results of their research academically, to submit regular reports on the progress of their work, and to take part in an annual doctoral candidates' seminar. The programme also incorporates a four-week stay at a location abroad. Candidates should normally complete their doctorates after three years. It is possible to obtain a doctorate while working at DBFZ in cooperation with a university. Doctoral posts are funded from the DBFZ's budget (BMEL work programme), through third-party projects, or by grants. Eleven doctorates were completed at the DBFZ and in cooperation with the UFZ and the University of Rostock in 2015. A total of 38 doctorates are currently under supervision at the DBFZ, 12 of them in cooperation with the Helmholtz Centre for Environmental Research – UFZ (in a cooperation between the UFZ Department of Bioenergy – Systems Analysis and in the joint Microbiology of Anaerobic Systems working group "MicAS"). The DBFZ especially promotes and supports on-the-job continuing professional development. Sixteen members of staff acquired their doctorates while working for the organisation.

EXAMPLE DOCTORATE OF LEANDRO JANKE

Development of a biogas concept integrated to the Brazilian Sugarcane Industry

The sugar and bioethanol production in Brazil is responsible for the generation of large amounts organic waste. Part of the lignocellulosic materials are still underused in low efficiency cogeneration systems (i. e. bagasse) or burned and/or left to decay on fields (i. e. straw), while the remaining waste fractions (i. e. vinasse and filter cake) are directly applied on the sugarcane fields as fertilizers without any previous recovery of value-added products. The present research proposes to develop a biogas concept that integrate the anaerobic digestion process to the current sugar and bioethanol production in order to diversify the product portfolio

Fig. 26 Doctoral candidate Leandro Janke

and increase the energy balance of the sugarcane plants. The following steps are being carried out: a) evaluation of the organic waste mass and energy flows, b) determination of biochemical methane potential of the different organic waste, c) optimization of anaerobic digestion process in continuous reactors, and d) technological and economical evaluation of the biogas end use. The results from biochemical methane potential assays shows an average specific CH_4 production of 260, 281, 228 NmL/gVS, respectively, for filter cake, bagasse, straw, and 273 NmL/gCOD for vinasse. When these results are applied to an average size sugarcane plant in Brazil (4 million tons of cane per year), it would be possible to produce between 40,000–56,000 Nm_3 CH_4 per day during the sugarcane season by vinasse digestion, and complemented with the same daily CH_4 production during the sugarcane offseason through the digestion of filter cake combined with a fraction of the remaining lignocellulosic waste (1–6 % of bagasse or straw). Currently, investigations on continuous reactors are being carried out in order to optimize a flexible digestion system that could be operated with different types of substrate along the sugarcane season and offseason.

Publications

Janke, L.; Leite, A.; Nikolausz, M.; Schmidt, T.; Liebetrau, J.; Nelles, M.; Stinner, W. (2015): Biogas Production from Sugarcane Waste: Assessment on Kinetic Challenges for Process Designing. In: International Journal of Molecular Sciences. Nr. 16. S. 20686–20703. doi: doi:10.3390/ijms160920685 – ISSN 1422-0067.

Janke, L.; Leite, A. F.; Nikolausz, M.; Radetski, C. M.; Nelles, M.; Stinner, W. (2016): Comparison of start-up strategies and process performance during semi-continuous anaerobic digestion of sugarcane filter cake co-digested with bagasse. In: Waste Management. Bd. 48. S. 199–208. doi: 10.1016/j.wasman.2015.11.007 – ISSN 0956-053X.

© wen mingming / Fotolia.com

Janke, L.; Leite, A.; Batista, K.; Weinrich, S.; Sträuber, H.; Nikolausz, M.; Nelles, M.; Stinner, W. (2016): Optimization of hydrolysis and volatile fatty acids production from sugarcane filter cake: Effects of urea supplementation and sodium hydroxide pretreatment. In: Bioresource Technology. Bd. 199. S. 235–244. doi: 10.1016/j.biortech.2015.07.117 – ISSN 0960-8524.

Janke, L.: Leite, A.; Batista, K.; Silva, W.; Nikolausz, M.; Nelles, M.; Stinner, W. (2016): Enhancing biogas production from vinasse in sugarcane biorefineries: Effects of urea and trace elements supplementation on process performance and stability. In: Bioresource Technology (in press).

Contact

Dr. Elena Angelova
Phone: +49 (0)341 2434-553
E-Mail: elena.angelova@dbfz.de

Table 1 List of current doctoral works at the DBFZ excluding cooperation partners UFZ/ University of Rostock, as per: February 2016

Name	Dissertation subject	Institution	Type of doctorate
Bindig, René	Cleaning of waste gases from small-scale biomass furnaces on new-style monolithic catalysts	University Leipzig	Doctorate (on-the-job)
Bloche-Daub, Karina	Regional added value from use of biomass as an energy source	University Leipzig	Doctorate (work programme)
Butt, Saad	High-temperature oxidation of pollutants on solid-state catalysts	University Leipzig	Doctorate (on-the-job)
Büchner, Daniel	Optimised control strategies for pellet/ solar combination plants to enhance system efficiency while at the same time minimising environmental impact	Technical University of Dresden	Doctorate (on-the-job)
Dernbecher, Andrea	Method for modelling thermo-chemical biomass conversion in a CFD-based simulation	Technical University of Berlin	Doctorate (work programme)
Horschig, Thomas	Application of system dynamics for modelling of the German and European biomethane markets	University Leipzig	Doctorate (work programme)
Gröngröft, Arne	Optimisation of the conversion efficiency of bioethanol refineries	Technical University of Hamburg-Harburg	Doctorate (on-the-job)
Janke, Leandro	Biogas from residues of the sugar and ethanol industries in Brazil	University Rostock	Doctorate (grant)
Kirsten, Claudia	Contribution to optimising the pelletising behaviour of fermentation residues and hay from landscape conservation and their combinations	Technical University/ Mining Academy Freiberg	Doctorate (on-the-job)
Kretzschmar, Jörg	Development of an electrochemical sensor platform for biogas reactors	Technical University of Dresden	Doctorate (work programme)
Koch, Christian	Development of a new non-thermal plasma process for the highly efficient treatment of non-volatile species from the thermo-chemical conversion of biomass	University Leipzig	Doctorate (grant)
König, Mario	Catalytically assisted reduction in gaseous and particulate emissions from wood burning in Chilean households	University of Leipzig/University of Talca	Doctorate (on-the-job)
Kröger, Michael	Thermo-chemical utilisation of algae focused on hydrothermal processes	University of Rostock	Doctorate (on-the-job)
Krüger, Dennis	Development and system integration of a micro-combined heat and power plant for solid biomass	Technical University of Chemnitz	Doctorate (on-the-job)
Mathhar Abdelmahdi, Bdour	Development of Combined heat, power and cooling system based on agricultural residues and biogenic waste	Universität Rostock	Doctorate (grant)
Matthes, Mirjam	Emissions reduction in small-scale biomass furnaces based on integrated catalysis	Leipzig College of Technology, Economics and Culture (HTWK)	Doctorate (on-the-job)
Matthischke, Steffi	Load flexibility of catalytic reactors based on the example of the methanisation of carbon oxides	Technical University of Clausthal	Doctorate (grant)
Mauky, Eric	On-demand biogas supply based on process control	Universität Rostock	Doctorate (on-the-job)
Müller, Liane	Improving the efficiency of the anaerobic degradation of nitrogen-rich compounds by the use of enzymes	Universität Rostock	Doctorate (on-the-job)
Rönsch, Cornelia	Development of a method for utilising chimney-sweeping trade data for energy reporting	University of Leipzig	Doctorate (work programme)
Seidler, Andreas	Trace substance analysis by time and location in biomass solid fuel furnaces by means of laser mass spectrometry	Universität Rostock	Doctorate (external)
Schlüter, Michael	Optimisation of the process of methanising carbon monoxide for application in the low temperature range	Universität Rostock	Doctorate (work programme)

7
PEOPLE AND MOMENTS

The focus of the DBFZ's press and public relations activities in 2015 was once again on communicating and publicising its numerous scientific research results. At more than 30 in-house events hosted in conjunction with cooperation partners, the DBFZ presented its work as a research institution and expanded its existing networks. A total of six events forming part of the Leipzig Scientific Forums series were held in 2015, with forums on biogas, solid biomass/miscanthus and biofuels being hosted at the DBFZ as well as at the cooperation partners' locations and at the "enertec/TerraTec" Central Germany Energy Fair. The forums again saw a significant increase in attendees in the past year, and the series will be repeated in its tried and proven form in 2016. An up-to-date listing of scheduled forum dates can be found at **www.dbfz.de/fachgespraeche**.

The sixth network conference of the Federal Ministry for Economic Affairs and Energy sponsored "Biomass Energy Use" programme was held in Leipzig on November 11/12, 2015. It attracted some 130 bioenergy specialists from industry and scientific research under the motto: "Bioenergy – more than a safe reserve!?". Differing assessments were made in response to the question of whether bioenergy will in future assume more than a reserve function within the renewable energy mix. The approaches presented for process optimisation, energy-efficient, flexible plants and particle separators did, however, provide some important impetus for the transition to renewables in power and heat supply.

According to the ifo Institute, Eastern Germany has enormous potential in the so-called clean tech fields. They account for a greater proportion of the economy as a whole than in Western Germany. Against that background, the fourth CIO Campus of the CLEANTECH INITIATIVE for Eastern Germany was held on December 10, 2015 in cooperation with the DBFZ. Under the motto: "Technical solutions for raw material- and energy-efficient biomass use", the event held at the 'Kubus' complex in Leipzig presented the latest approaches in the field of bioeconomy, practical experience reports from a commercial perspective, and possibilities for the promotion of innovative and resource-efficient technologies in companies. Some major sponsorship programmes were presented at the event (EU Horizon 2020, BMWi 'Inno-KOM-Ost' innovation promotion scheme and SMILE higher education institution business start-up network). Then various papers and project presentations provided a comprehensive insight into scientific and commercial practice.

Fig. 27 Participants in the Miscanthus Forum on December 2, 2015 at the DBFZ's fuel conditioning and combustion lab

Major events cast their shadows: We would like to take this early opportunity to publicise the DBFZ annual conference, which will be held on September 8/9, 2016 in the conference centre of the Leipziger Foren complex. Various sessions will cover current research topics relating to the use of biomass as an energy source. Side-events including the HTP forum on "Hydrothermal processes – Technologies for value creation through use as raw materials and as an energy source" will round off the event programme. Come along to meet interesting speakers and colleagues, and find out the status quo in bioenergy research. For details and registration visit the conference website at **www.dbfz.de/jahrestagung**.

VISITORS

Wide-ranging delegations from the scientific community, industry and the political sphere once again visited the DBFZ in 2015, touring its laboratories and test beds to find out all about the current status quo in biomass research. Among the highlights was the visit of the State of Saxony Minister of the Environment and Agriculture, Thomas Schmidt on September 11, 2015. In the summer we were able to welcome various state and federal deputies as well as Mr. Burkhard Jung, the Mayor of the City of Leipzig. The Mayor was impressed by the progress of both the scientific and infrastructural work being carried out at the DBFZ, and assured the institution of the full support of the city of Leipzig.

Fig. 28 Liane Flammigen (from the staff of federal parliament member Bettina Kudla) and federal parliament member Monika Lazar (Bündnis 90/Die Grünen party) at the DBFZ on July 9, 2015

In addition to many local and national visitor groups, a wide variety of different international visitors, including from Japan, China, Indonesia, Pakistan, South Africa, Argentina, Brazil, the USA and Cuba, again visited the DBFZ in 2015, taking back with them many new ideas to spread around the world.

PUBLICATIONS

Three new editions of the "DBFZ Report" series were published in 2015. The thematic spectrum of the publications ranged from "Technical-economic research accompanying the Federal Competition 'Bioenergy Regions'" (Report no. 23), through "Biomass for heat generation – Methods for quantifying fuel input" (Report no. 24) through to "Retrofit solution for the catalytic degradation of gaseous organic emissions from fireplaces" (Report no. 25). Additionally in 2015, two digital conference readers on the "Thermally treated biofuels" side-event (International Biomass Conference & Exhibition 2015 in Vienna) and on the occasion of the 6th Separators Forum "Particle separators in domestic furnaces" in Straubing were published. The in-house programme support for the BMWi "Biomass Energy Use" programme issued numerous new publications as part of its series, all of which are available free of charge at **www.energetische-biomassenutzung.de/en/home.html**.

Fig. 29 Mayor of Leipzig Burkhard Jung at the DBFZ's engine test bed on June 22, 2015

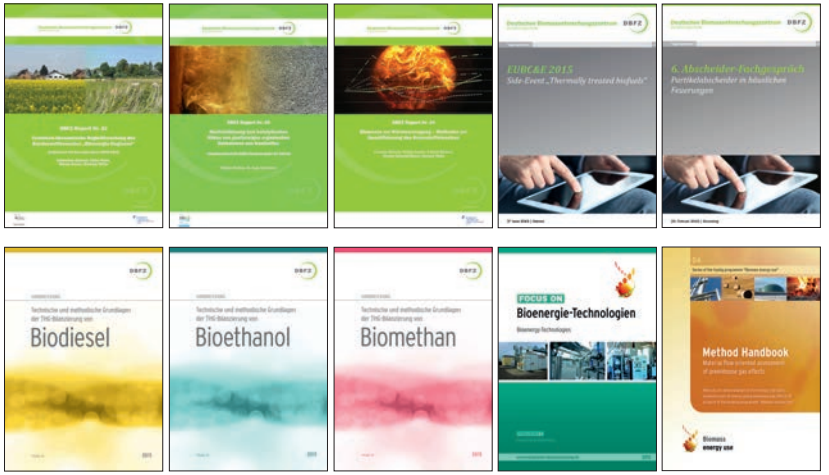


Fig. 30 New publications in 2015 (selection)

As part of the project sponsored by the Federal Ministry of Food and Agriculture (BMEL) on "Recommendations for auditing greenhouse gas analyses of biofuels", in late 2015 the DBFZ additionally compiled three brochures for biofuel auditors. The object of the recommendations is to collate information on raw material processing and biofuel production technologies and provide the information as an aid to auditors reviewing submitted greenhouse gas analyses. The three brochures are oriented to the major current national biofuel options – namely biodiesel, bioethanol and biomethane – and include a description of the technology, plausibility tables for typical input and output quantities of production plants, a specimen calculation for greenhouse gas analysis, as well as a Frequently Asked Questions (FAQs) section relating to the auditing of greenhouse gas analyses.

Downloads

www.dbfz.de/referenzen-publikationen.html
www.energetische-biomassenutzung.de/de/downloads/veroeffentlichungen.html
www.dbfz.de/thg-handouts

Contact

Paul Trainer
Phone: +49 (0)341 2434-437
E-Mail: paul.trainer@dbfz.de

Katja Lucke
Phone: +49 (0)341 2434-119
E-Mail: katja.lucke@bfz.de

8 CONTRACT RESEARCH AND SCIENCE-BASED SERVICES

As an institution primarily conducting applied research, the DBFZ seeks to engage in close cooperation with project partners from industry, and offers an extensive portfolio of contract research and science-based services. They extend beyond the research focus areas presented here, and are targeted at policy-makers, industrial clients, non-profit organisations, consultants and supervisory bodies. The work is handled on an interdepartmental basis, so that the entire expertise of the DBFZ can be deployed comprehensively and efficiently for the following consulting and technical services.

Fig. 31 Applied bioenergy research at the DBFZ's fuel technical centre

8.1
POLICY ADVICE

By its very nature, research into the sustainable use of biomass as a material and energy source covers a wide range of different subject areas and levels of analysis. These must be regularly collated and processed in order to provide targeted assistance and support to decision-makers in government and industry. In this context, the DBFZ offers a wide range of consulting services for policy decision-makers. They include, for example, long-term monitoring of trends in bioenergy markets (comprising various projects relating to power generation from biomass and use of biofuel) and, on that basis, support in framing policy instruments (e. g. EEG, EEWärmeG, Biokraft-NachV, etc.). The services also offer targeted support to policy decision-makers through the compilation of commentaries (such as in connection with new legislation) and position papers (mainly concerning the current potential for use of biogenic waste and residues as energy source materials, the portfolio of waste wood plants, the use of heat, and the consequences of a change to the biofuel quota). In addition to collecting, evaluating and presenting data and information on market trends, available biomass potential or the characteristic variables of available and future bioenergy technologies (costs, technical characteristics or potential environmental impact), in past years the DBFZ has also developed tools for devising medium- and long-term bioenergy scenarios as a means of strategy development (in the framework of the Milestones 2030 research project) and provides scientific support to strategic projects (mobility and motor fuel strategies).

Fig. 32 Key work of the Policy Advice department in 2015

OVERVIEW OF SERVICES

- Scientific support to strategic policy development and derivation of recommended action
- Commentaries on legislative procedures and support in their development
- Development and implementation of suitable monitoring systems under changing (research) policy framework conditions

Whereas policy advice seeks to cover the broadest possible range of issues in relation to biomass, the following consulting and other service offers are focused on selected topics and target groups.

Contact Policy advice

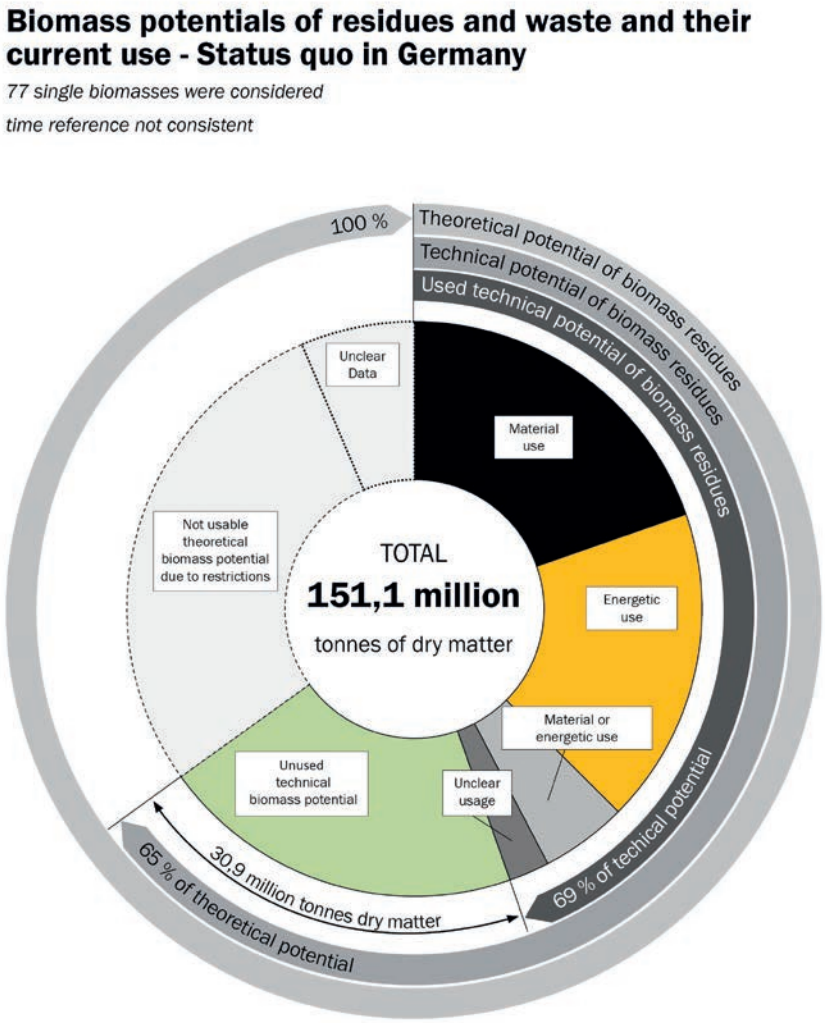
Prof. Dr. Daniela Thrän
Phone: +49 (0)341 2434-435
E-Mail: daniela.thraen@dbfz.de

8.2 MARKET ANALYSES AND DATA PROVISION

As a result of the growing contribution of bioenergy in substituting fossil fuels, regional and international raw material markets are being continually expanded. With the parallel development of the bioeconomy sector and the already established players involved in use as a raw material source, the number of players on the market potentially competing for the limited available biomass is rising. Against the background of steadily rising demands in terms of efficient usage technologies for sustainable bioenergy production and use, a comprehensive, up-to-date data set is the strategic key to customised planning and to the ongoing development of policy framework conditions. This includes depiction of trends in markets, trading flows and prices. A further aim is also to collect and provide customised technological, economic and ecological data for the analysis and assessment of biomass production and supply concepts and technology options. A further possibility is to provide established and potential market players with transparent information on the continually rising quality and sustainability demands.

Illustration: DBFZ, 2014

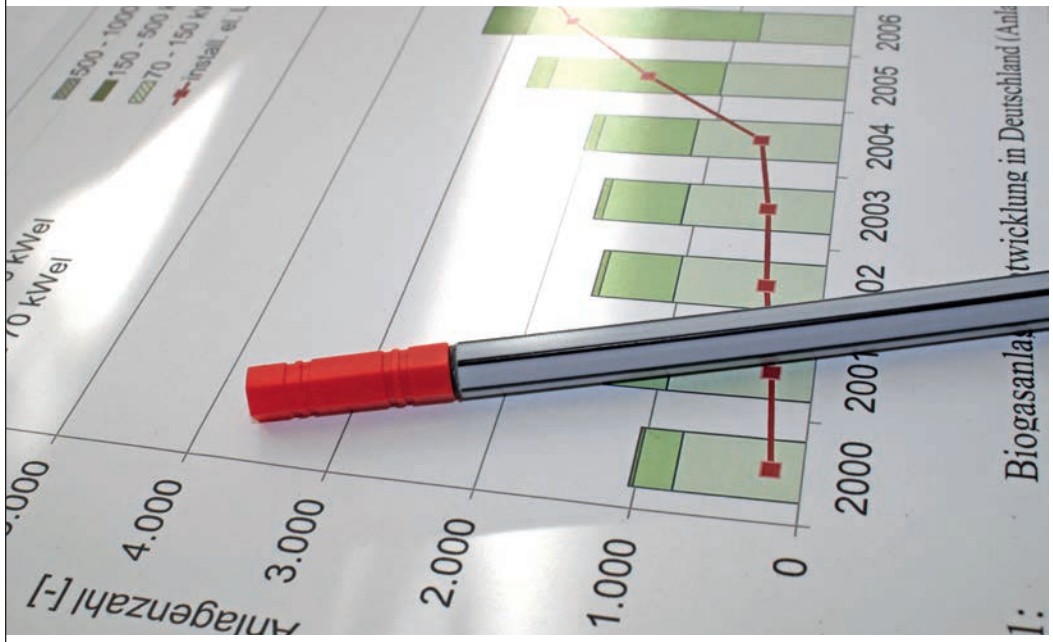
Fig. 33 Example views of the DBFZ data pool



Source:
FNR-Forschungsprojekt, FKZ 22020114

Brosowski, A.; Adler, P.; Erdmann, G.; Stinner, W.; Thrän, D.; Mantau, U.; Blanke, C.; Mahro, B.; Hering, T.; Reinholdt, G. (2015): Biomassepotenziale von Rest- und Abfallstoffen - Status Quo in Deutschland. Fachagentur Nachwachsende Rohstoffe e.V. (FNR). Gülzow-Prüzen – ISBN 978-3-942147-29-3

Fig. 34 Biomass potentials of residues and waste and their current use



OVERVIEW OF SERVICES

- Determination of biomass potential and development of strategies for different players on biomass markets (material and energy use)
- Monitoring of market and technology trends, including systematic recording in databases; drafting of market and technology overview reports; forecasting future development trends
- Data provision on biomass/bioenergy trading: costs, prices and quantities
- Provision of structural data on the power, heat and fuel market as well as analysis of the marketing strategies of plant and grid operators (e. g. for on-demand energy supply)
- Analysis of biomass production and supply cost (cost-supply curves)

Depending on the question at hand, efficiency and sustainability analyses can be conducted in the course of economic, ecological and technical assessment and underpinned by sensitivity calculations and scenario analyses. This also applies to the evaluation of market and system integration concepts for flexible bioenergy supply.

8.3
TECHNICAL, ECONOMIC AND ECOLOGICAL ASSESSMENT

The increasing competition for limited biomass resources, allied to the continually rising and changing demands in terms of economic and ecological performance capability, is driving a rise in pressure on bioenergy plant operators to innovate and optimise. The DBFZ offers market players a range of services for the analysis and optimisation of existing and future bioenergy technologies and concepts. Alongside appraisals of the technical, economic and ecological characteristics of bioenergy plants, the analyses offered provide a suitable basis for process and concept optimisation.

OVERVIEW OF SERVICES

Technical evaluation

- Material and energy life cycle assessment
- Technical feasibility
- Technology screening and learning curves
- Characteristic data based evaluation (e. g. specific efficiencies, availabilities, quality level, classification by technical development status)

Economic evaluation

- Feasibility studies and assessment of usage/operating concepts including costs of new plant, plant upgrades or repurposing projects

- Cost and economic viability analyses for biogenic supply concepts (power, heat, fuels, chemical bioenergy sources)
- Analysis of value chains based on life cycle cost analyses
- (LCC, Social Life Cycle Assessment) and assessments as to the regional added value of the contribution of biomass usage concepts

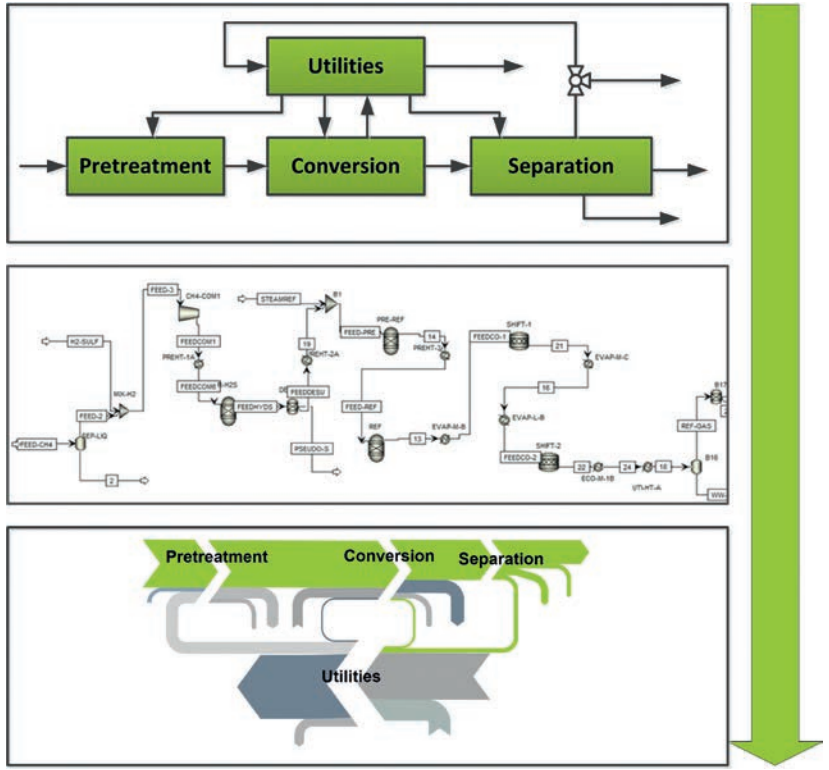


Illustration: DBFZ, 2015

Fig. 35 From the plant design concept, through process simulation, to technical assessment

Ecological assessment

- Life cycle assessment (LCA) referred to greenhouse gas emissions and other environmental impact (including biological water balance, humus, eutrophication, acidification) as well as primary energy consumption
- Competing land use

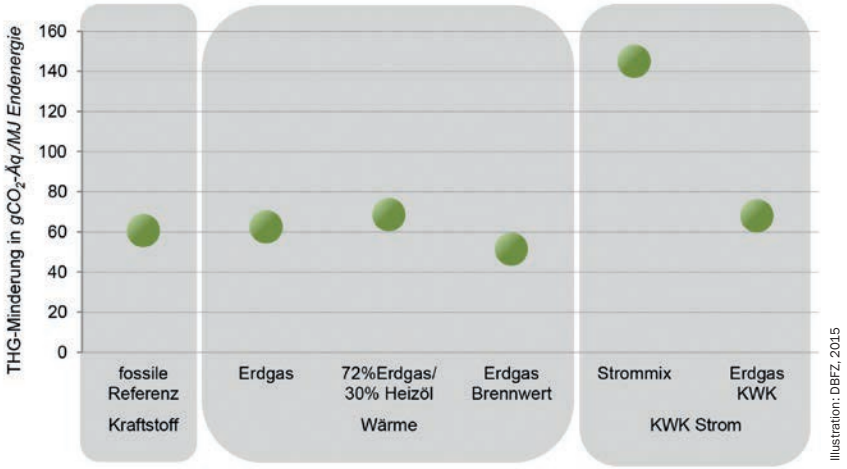


Illustration: DBFZ, 2015

Fig. 36 Potential for greenhouse gas reduction through the use of biomethane in various options

8.4 CONCEPT AND PROCESS DEVELOPMENT AND OPTIMISATION

Concept and process development plays a key role in bioenergy research, as a means of meeting the challenges of changing political and social conditions.

OVERVIEW OF SERVICES

- Development of new process concepts
- Testing and development of new technologies and process steps
- Optimisation of existing technologies, process steps and material flow management concepts
- Process modelling and simulation (static and dynamic), including flowchart simulation
- Kinetic measurements
- Development of control concepts
- Upscaling of processes

8.5
SCIENTIFIC SUPPORT TO R&D PROJECTS

The DBFZ has been providing scientific support to the “Biomass Energy Use” programme sponsored by the Federal Ministry for Economic Affairs and Energy for the last eight years, functioning as an instrument of linkage and knowledge transfer. In the course of events such as scientific conferences and workshops, 104 projects and 262 project partners in the SME sector have to date been successfully interlinked. Other key aspects are the collation of the scientific output of the programme participants and transfer of the results to various interested parties (in the fields of policy-making, research and practical application). To this end, a series of scientific papers was developed specially for the grant aid programme, to date comprising 20 volumes and five specialist booklets published on various keynote topics (biogas, solid fuels, Milestones 2030, etc.). The programme service also supports projects scientifically in the process of harmonising methodology. In the course of intensive discussions with the programme participants, the measurement methodologies relating to biogas and fine dust were enhanced and a method handbook (in German and English) updated.

OVERVIEW OF SERVICES

- Initiation of and scientific support to demo and pilot plants
- Accompanying scientific research on complex R&D projects
- Scientific advice and support to bioenergy initiatives of local authorities/ regions

Fig. 37 Scientific research accompanying the BMWi-sponsored “Biomass Energy Use” programme

- Scientific support to research programmes by:
  - Interlinking between projects
  - Converging scientific output (press and public relations)
  - Enhancing visibility and presentation of programmes (enhancing the perception of all subsidiary projects as an integrated cluster)
- Coordination of events and compilation of publications
- Support to ongoing scientific and technical dialogue
- Coordination of harmonisation procedures

8.6 KNOWLEDGE AND TECHNOLOGY TRANSFER

The DBFZ offers comprehensive expertise in the field of knowledge and technology transfer. As well as hosting the Leipzig forums on the subjects of biogas/solid biomass/miscanthus and biofuels, this also includes organising conferences on specific focus topics (e.g. hydrothermal processes, process metrology of biogas plants, computational fluid dynamics CFD, dust collectors in domestic furnaces). In addition, the DBFZ issues numerous publications (concluding reports, dissertations, guides, handbooks and collections of conference paper) providing an extensive portfolio of scientific reports which are made available free of charge on the Internet. The Bioenergy Innovation Centre manages and coordinates specific innovation processes as well as establishing and developing national and international networks. A wide range of cooperation projects in Germany and internationally provide continuous knowledge and technology transfer in the form of workshops, guides and employee training courses.

OVERVIEW OF SERVICES

- Organisation and hosting of scientific and technical events (forums, conferences, workshops)
- Coordination of innovation processes
- Drafting of guidelines and handbooks
- Development and compilation of Web-based information platforms and Open Source portals
- Training and development courses

8.7
TECHNICAL-SCIENTIFIC SERVICES (SELECTION)

Complementing the aforementioned services, the DBFZ offers a special technical R&D infrastructure in the three research departments: Biochemical Conversion, Thermo-Chemical Conversion and Biorefineries. Technical-scientific services are offered to plant and machinery manufacturers, process developers, plant operators and other companies and institutions carrying out R&D. A detailed listing of the various technical facilities on the DBFZ site can be found at the end of this Annual Report starting on page 130.

BIOCHEMICAL CONVERSION DEPARTMENT

The Biochemical Conversion department researches the production of energy source materials from biomass using micro-organisms. Its focus is on technologies for biogas recovery and use. It also considers the efficient use of material flows and closed nutrient circles, as well as supporting the demonstration of new and improved plants and components. All activities are undertaken against the background of detailed evaluation of the market and of the technical state of the art, assured by participation in various monitoring projects. As part of its intensive cooperation with the Helmholtz Centre for Environmental Research – UFZ, it also provides answers to wide-ranging questions relating to the properties of the micro-organisms involved and their population dynamics.

Services

- Process optimisation based on discontinuous and continuous fermentation experiments (5–500 l)
- Substrate and digestion residue analysis
- Microbiological monitoring of biogas plants
- Upscaling experiments on the research biogas plant
- Testing of sensors and technology components in the biogas process
- Emissions measurement, leak detection

THERMO-CHEMICAL CONVERSION DEPARTMENT

The Thermo-Chemical Conversion department handles a range of topics associated with the thermo-chemical conversion of biogenic solid fuels for the efficient, on-demand supply of heat and/or power as well as refrigeration. Research services can be offered all along the chain, from the fuel (preparation, conditioning, pelletisation), through the development and optimisation of furnaces and micro-CHP plants (including CFD assistance) also in conjunction with pollution control measures (catalysis and separation), through to the control of single plants and system networks (also with other heat sources, as well as power grid integration). Additionally, laboratory and field emission tests (measuring dust and CO, also accredited in accordance with DIN EN ISO/IEC 17025:2005) can be performed, as can separator tests to DIN spec 33999 and catalyst tests, complete with discussion of results and assignment to specific bioenergy markets.

Services

- Development, characterisation, pre-treatment and additive mixing of fuels
- Incineration experiments and comparative classification
- Separator measurement according to DIN 33999 (in future also accredited)
- Accredited dust and CO measurements
- Catalyst tests including discussion of results
- CFD simulation of thermodynamic processes

Fig. 38 The DBFZ offers a wide range of technical-scientific services

BIOREFINERIES DEPARTMENT

The core subjects of the Biorefineries department are processes for chemical bioenergy source materials and fuels. The focus is on efficient chains and innovative biorefinery concepts for synthesis gas and hydrothermal processes. This also includes implementation of process elements in the technical centre, incorporating laboratory analytics for comprehensive chemical-physical characterisation of biomasses and productions as well as test bed investigations of the motor behaviour of liquid and gaseous biofuels. Activities are rounded off by technical assessment, costing and ecological evaluation of different master concepts for biorefineries or a wide range of different biofuels. Investigations also cover the balancing and optimisation of processes, as well as concepts based on stationary and dynamic flowchart simulations. Another aim is to initiate demonstration projects and monitor them scientifically.

Services

- Pilot plant experiments relating to:
  - Hydrothermal carbonisation and liquefaction
  - Packed bed and dust gasification
  - Packed bed methanation
  - Separating processes
- Investigation of the behaviour of fuels and their emissions on engine test beds

ANALYTICAL LAB

The analytical lab investigates the chemical composition of liquid motor fuels and solid fuels, biogas substrates, by-products and residual products, ashes, filtration

Fig. 39 Work in the DBFZ analytics lab

dusts and waste water in order to assess the possibilities for use of the various biomasses. Based on current research projects, topics relating to glycerin analytics can also be covered. The lab is equipped with: a Karl Fischer headspace titrator; a bomb calorimeter; a Stabinger viscometer; ion chromatography; elementary analysis; EC/OC; ICP-OES; an ignition point analyser; a copper corrosion test; microwave digestion systems; and a freeze dryer. Since 2015, the lab additionally features a UV-VIS spectrometer, a refractometer, and two GC-MS units to identify and quantify organic components. Analysis is carried out in accordance with commonly applied standards and based on a problem-oriented methodology.

Services

- Elemental/inorganic analytics: Determination of primary and secondary components by means of ICP, sample and microwave decomposition
- Small-scale analyses: Water content, total ash, loss on ignition, dry matter, volatile components, mechanical parameters

- Incineration analyses: Elemental analysis, EC/OC analysis, incineration decomposition, determination of calorific value
- Aqueous solutions: pH value, conductivity, typical anions
- Filter analyses: Preparation and after-treatment of filters, weighing for fine dust measurements, preparation for weighing of rinse residues
- Fuel analytics/Organic analytics: Flash point according to Pensky-Martens, density, kinematic and dynamic viscosity, ester content, acid number, saponification number, iodine number, total contamination, oil content, sample extraction for organic parameters

The central point of contact for the Contract research and Science-based Services is the DBFZ Innovation Coordinator, Romann Glowacki.

Contact

Romann Glowacki
Phone: +49 (0)341 2434-464
E-Mail: romann.glowacki@dbfz.de

9 ORGANISATION AND STRUCTURE OF THE DBFZ

The DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH (German Biomass Research Centre; DBFZ for short) was established in Berlin on February 28, 2008 with the aim to investigate and illuminate the complex issues relating to the supply and use of bioenergy. The following sections briefly set out its scientific mission, structure, controlling bodies, financing, personnel and activities on scientific bodies.

Fig. 40 The DBFZ main building at Torgauer Strasse 116

9.1
SCIENTIFIC MISSION

"Application-oriented research and development in the use of regrowable resources as an energy source and integrated base material within the bioeconomy, giving particular consideration to innovative technologies, economic impact and environmental concerns."

(Scientific mission according to Articles of Association)

The DBFZ was established by the former German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) with the aim of establishing a central scientific research institution covering all the fields relevant to bioenergy, to bring together the findings of the highly diverse German research community in the sector. The scientific mission of the DBFZ is to support the efficient integration of biomass as a valuable resource for sustainable energy supply based on wide-ranging applied research. The mission incorporates technical, ecological, economic, social policy and energy business aspects all along the process chain, from production, through supply, to use. The DBFZ drives and supports the development of new processes, methodologies and concepts in close cooperation with industrial partners. It also maintains close links with public-sector research bodies in Germany in the agricultural, forestry and environmental sectors, as well as with European and global institutions. Working from this broad research base, the DBFZ is also tasked to devise scientifically sound decision-making aids for government policy-makers.

9.2 THE FOUR RESEARCH DEPARTMENTS

To provide the organisational framework for its wide-ranging scientific research activities, the DBFZ has established four closely cooperating research departments. While the Biochemical Conversion, Thermo-Chemical Conversion and Biorefineries departments primarily conduct applied research, the Bioenergy Systems department provides policy advice as well as compiling potential analyses, acceptance studies and scenarios for biomass use.

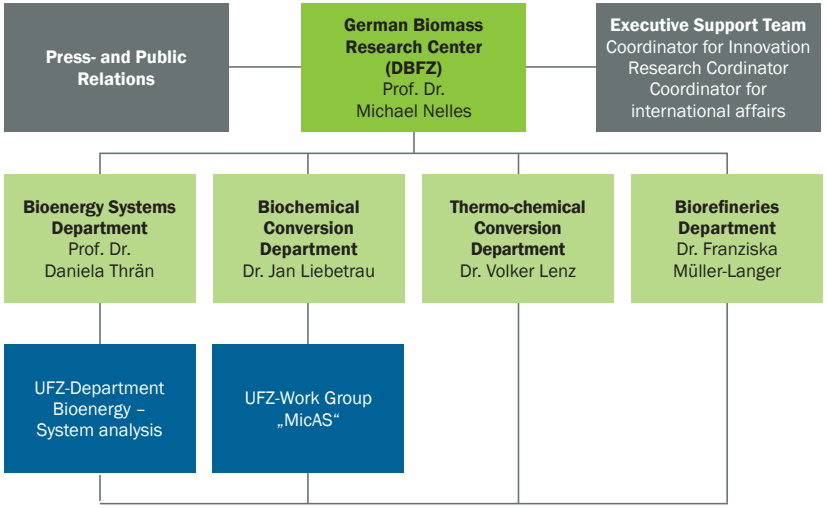


Fig. 41 The four research departments of the DBFZ including the administration departments

9.3 CONTROLLING BODIES: SUPERVISORY BOARD AND RESEARCH ADVISORY COUNCIL

The DBFZ is a non-profit limited liability company (“gemeinnützige GmbH”) under German tax law. The sole shareholder in the DBFZ is the German Federal Ministry of Food and Agriculture (BMEL). The international Research Advisory Council provides advice on the scientific work of the DBFZ. The Research Advisory Council comprises 10 national and eight international biomass scientists of high repute. The members of the Research Advisory Council are appointed by the Supervisory Board (Figure 42).

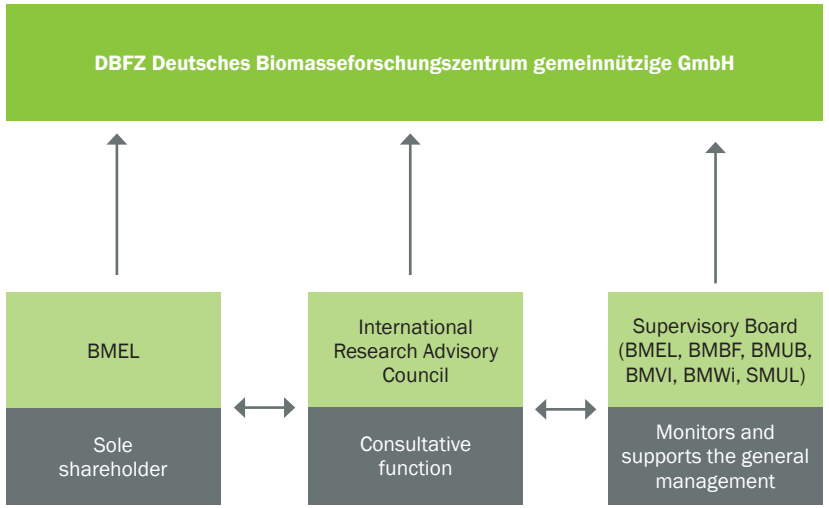


Fig. 42 The controlling bodies of the DBFZ

THE DBFZ SUPERVISORY BOARD

The key substantive and organisational decisions relating to the development of the federal research establishment are taken by the Supervisory Board, which is chaired by the Federal Ministry of Food and Agriculture (BMEL). Other members are the Federal Ministry of Education and Research (BMBF), the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Federal Ministry of Transport and Digital Infrastructure (BMVI), the Federal Ministry for Economic Affairs and Energy (BMWi) and the Ministry of the Environment and Agriculture of the state of Saxony (SMUL).

Supervisory Board members:

(as per: 17. February 2016)

Bernt Farcke (Chairman)
Head of Department 52 “Sustainability, regrowable resources”,
Federal Ministry of Food and Agriculture (BMEL)

Deputy Director General Berthold Goeke (Deputy Chairman)
Head of Department “KI I Climate Protection Policy”,
Federal Ministry for the Environment, Nature Conservation,
Building and Nuclear Safety (BMUB)

Anita Domschke
Head of Department of Agriculture and Forestry,
Ministry of the Environment and Agriculture of the state of Saxony (SMUL)

Deputy Director General Dr. Dorothee Mühl
Head of Department III B Electric Power,
Federal Ministry for Economic Affairs and Energy (BMWi)

Dr. Christoph Rövekamp
Head of Divison – Divison 722: Basic Energy Research,
Federal Ministry of Education and Research (BMBF)

Birgitta Worringen
Head of Department G2 – Sustainable Mobility, Energy, Logistics
Federal Ministry of Transport and Digital Infrastructure (BMVI)

THE RESEARCH ADVISORY COUNCIL

The international members of the Research Advisory Council advise the DBFZ on its scientific activities. This ensures that the institutionally funded research carried out by the DBFZ is scientifically sound and of maximum relevance to the future use of bioenergy as part of the energy system. The Research Advisory Council of the DBFZ was reconstituted in part in late 2015. It comprises ten national and eight international experts from the bioenergy sector.

Research Advisory Council members

(as per: 25 January 2016)

Member	Organisation	Location and country
Barbosa, PhD Maria	Microalgal Biotechnology AlgaePARC, Wageningen University	Wageningen (Netherlands)
Bauen, Dr. Ausilio	Imperial College London	London (England)
Bill, Prof. Dr. Ralf	University of Rostock – Faculty of Agricultural and Environmental Sciences	Rostock (Germany)
Chiaramonti, Prof. Dr. David (Chairman)	Renewable Energy Consortium R&D, University of Florence	Florence (Italy)
Christen, Prof. Dr. Olaf	Martin Luther University, Halle-Wittenberg	Halle/Saale (Germany)
Dach, Prof. Dr.Jacek	Poznan University of Life Sciences	Posnan (Poland)

Member	Organisation	Location and country
Dong, Prof. Dr. Renjie	China Agricultural University (CAU)	Beijing (China)
Dornack, Prof. Dr. Christina	TU Dresden – Institute for Waste and Lifecycle Management	Dresden (Germany)
Hartmann, Dr. Hans	Technology and Promotion Centre at the Regrowable Resources Competence Centre (TFZ)	Straubing (Germany)
Hirth, Prof. Dr. Thomas	Karlsruhe Institute of Technology (KIT); University of Stuttgart – Faculty of Energy, Process Engineering and Biotech	Stuttgart (Germany)
Kemfert, Prof. Dr. Claudia	German Institute for Economic Research (DIW Berlin)	Berlin (Germany)
Kruse, Prof. Dr. Andrea	University of Hohenheim, Stuttgart	Stuttgart (Germany)
Meyer, Prof. Dr. Bernd	Institute for Energy Process Engineering and Chemical Engineering, TU Mining Academy Freiberg	Freiberg (Germany)
Moreira, Dr. José Roberto	Universidade de São Paulo, Instituto de Eletrotécnica e Energia	São Paulo (Brazil)
Serrano, Prof. Dr. David	IMDEA Energy Institute	Madrid (Spain)
Teutsch, Prof. Dr. Georg	Helmholtz Centre for Environmental Research UFZ	Leipzig (Germany)
Thiffault, PhD Evelyne	University Laval Canada Québec	Québec (Canada)
Walther, Prof. Dr. Grit	RWTH Aachen – Faculty of Economic Sciences	Aachen (Germany)

9.4
FACTS AND FIGURES: FINANCING AND PERSONNEL DEVELOPMENT

The DBFZ was established with the legal form of a “GmbH” (limited liability company) and as an accredited non-profit organisation (“gemeinnützige GmbH”). This provides it with the necessary flexibility and transparency to obtain public research funding and also to carry out research and consulting operations on behalf of third parties. The DBFZ is financed by institutional funding from the German Federal Ministry of Food and Agriculture (BMEL) as well as by competitively procured project grants and revenue from acquired research contracts.
The BMEL provided the DBFZ with funding of approximately € 9.9 million in 2015, of which some € 3.4 million was allotted to capital investment. Despite the persisting uncertainty regarding bioenergy policy, more than € 6.3 million in third-par-

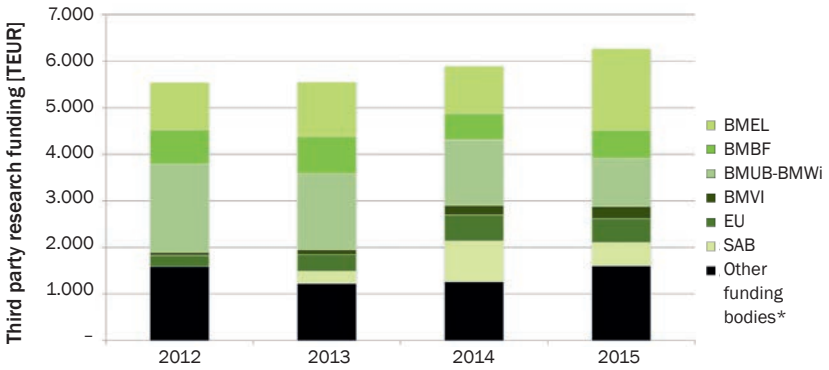


Fig. 43 Overview of third-party funding revenues from 2012 to 2015
(* Industrial contract research and services for private and public-sector clients)

ty funding was again procured in 2015. The proportion of total revenue from industrial contract research and services totalled approximately € 1.1 million. The project revenues of the BMEL stem from research programmes of the Fachagentur Nachwachsende Rohstoffe e. V. (Regrowable Resources Agency; FNR) and the Bundesanstalt für Landwirtschaft und Ernährung (Federal Office for Agriculture and Food; BLE). In 2015, the highest expenditure of the DBFZ was its personnel cost, which accounted for some 42 % of total expenditure, followed by operating expenses (18 %) and capital investments (40 %). The high proportionate level of capital investment relates to the new building project (2015–2020).

PERSONNEL DEVELOPMENT

The DBFZ employed 193 salaried staff on average in 2015. Including the scientific administration departments and the press and public relations staff, 158 people were employed in scientific/technical posts and 36 in administration. Figure 44 shows the shares of total workforce in the various departments in 2015. Some 100 members of DBFZ staff are aged from 28 to 37, making that the most heavily represented age group (Figure 45).

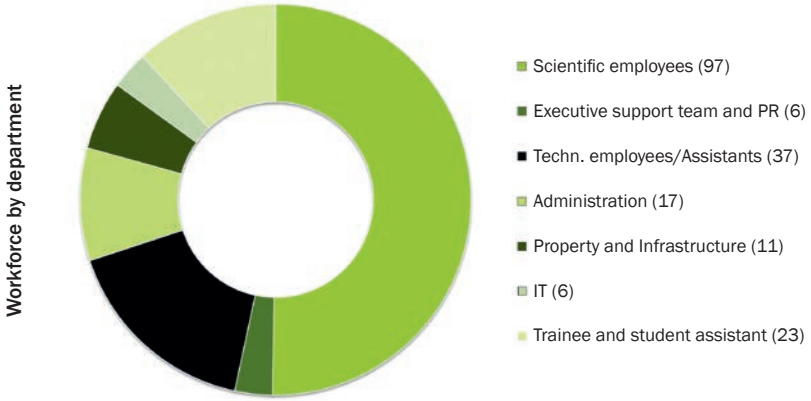


Fig. 44 Breakdown of the DBFZ workforce by department (as per: 31 December 2016)

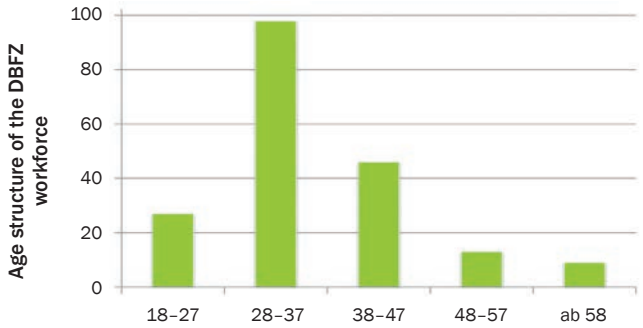


Fig. 45 Age structure of the DBFZ workforce

A wide range of work was supervised at the DBFZ once again in 2015. There was a substantial increase over the previous year in work on masters dissertations especially. A total of 43 intern and student study projects and 69 bachelors, masters and diploma dissertations were supervised. A total of 36 visiting scientists, foreign interns and grant-funded students also worked at the DBFZ in 2015 (Figure 46).

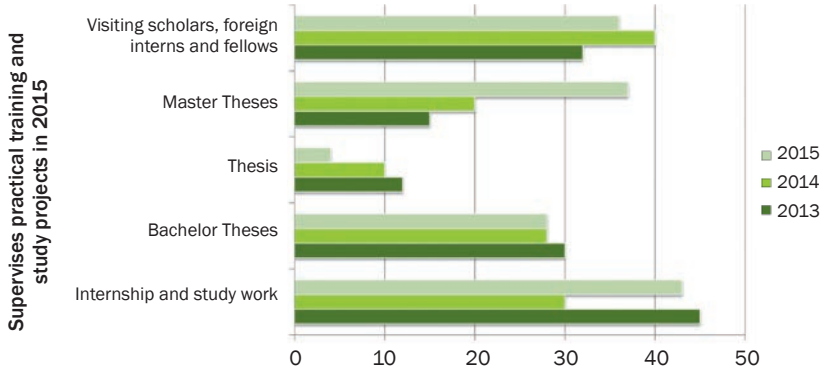


Fig. 46 Overview of study projects supervised at the DBFZ in 2015 compared to previous years (as per: February 2016)

9.5 REPRESENTATION ON SCIENTIFIC BODIES, ADVISORY BOARDS AND COMMITTEES

The DBFZ seeks to maintain intensive knowledge transfer with other institutions and the scientific community at large. This is in keeping with its objectives of conducting applied research and utilising its results for practical benefit. To that end, DBFZ scientists are members of a wide variety of scientific bodies, advisory boards, working groups, networks and committees, as well as holding (visiting) professorships in Germany and abroad.

SCIENTIFIC ADVISORY BOARDS/MANAGEMENT BOARDS/DIRECTORATES (SELECTION)

- aireg Aviation Initiative for Renewable Energy in Germany e. V.
- Arbeitsgemeinschaft Stoffspezifische Abfallbehandlung, ASA e. V. (Working group on material-specific waste treatment)
- Association of German engineers (VDI), Mecklenburg-Western Pomerania
- Bialystok Environmental Research Centre (in formation)
- BioFuelNet Canada Inc.
- BioEconomy e. V., BMBF Excellence Cluster Bioeconomy
- Bioeconomy Council of the Federal Republic of Germany
- Biomass to Power and Heat programme committee, Hochschule Zittau/Görlitz
- Biomass Use Competence Centre Schleswig-Holstein
- Bundesverband Bioenergie e. V. (BBE; German Federal Bioenergy Association)
- Chinese-German Centre for Environmental Technology and Knowledge Transfer (CETK) of the Province of Anhui, Hefei (China)
- Curatorium of Energy and Environmental Foundation Leipzig
- Deutsche Gesellschaft für Abfallwirtschaft (DGAW)/German Society for Waste Management

- Energy Advisory Board of Saxony, state level
- Energy & Environment Network NEU e. V., Leipzig
- Energy Saxony initiative (Renewables Saxony)
- European Biomass Conference and Exhibition (EUBC&E) – Program Committee
- Export Initiative RETech “Recycling & Waste Management in Germany” of the German Federal Government (BMUB, BMWi, BMZ)
- Förderkreis Abgasnachbehandlungstechnologien für Dieselmotoren e. V. (FAD e. V.) (Association for the promotion of waste gas final treatment technologies for diesel motors)
- German-Chinese Centre in the Province of Anhui (China)
- Helmholtz Centre for Environmental Research UFZ, Leipzig
- Institute of Non-Conventional Chemistry at the University of Leipzig
- Renewables Research Alliance (FVEE)
- Scientific Advisory Board of the European Biogas Association (EBA), Brussels (Belgium)
- Scientific Committee, “Conference on Sustainable Energy and Environmental Development – SEED 2016”, AGH University of Science and Technology, Crakow (Poland)
- Scientific Committee “International Scientific Conference and Workshops – Innovative Buildings” (InBuild), AGH University of Science and Technology, Crakow (Poland)
- Scientific Committee “6th International Renewable Energy Congress” (IREC 2015), Hammamet (Tunisia)
- Scientific Committee “International Conference on Sustainable Development”, Belgrade (Serbia)
- Scientific Committee, “European Biomass Conference and Exhibition” (EUBC&E)
- Scientific Committee, International Conference on Solid Waste 2015: Knowledge Transfer for Sustainable Resource Management (ICSWHK2015), Hong Kong (China)
- Scientific Committee, 5th International Conference on Solid Waste Management (IConSWM 2016), Bangalore (India)
- Scientific journal “Müll & Abfall” (Waste & Refuse)
- Scientific journal “Waste Management”
- Senate and research leadership group of the German Federal Ministry of Food and Agriculture (BMEL)

© BIOCOM AG

Fig. 47 Prof. Dr. Daniela Thrän in the German Federal Government’s Bioeconomy Council (2. from right)

- State Energy Council of Mecklenburg-Western Pomerania – Research & teaching
- State of Mecklenburg-Western Pomerania Economic-Scientific Strategy Council (future field Energy & Environment)
- Steering committee for 2nd stage of 1. BImSchV (Ordinance governing small and medium-sized furnaces under the Federal Immission Control Act) and head of Technology working group
- ZIM network – Applications and research network for radio wave technology (RWTec)

WORKING GROUPS/COMMITTEES

- Ad Hoc working group of the German Federal Environmental Agency (UBA) on 1. BImSchV (Ordinance governing small and medium-sized furnaces under the Federal Immission Control Act)
- Bioeconomy working group of the Structural Commission on Technology Assessment and Design, Saxony Academy of Sciences, at state level
- Cultural landscapes working group of the Landesheimatbund Sachsen-Anhalt e. V. (State of Saxony-Anhalt heritage association)
- German Environmental Aid Programme, “Blue Angel” working group
- European Biofuels Technology Platform (EBTP), WG1 European Technology
- European Biofuels Technology Platform (EBTP), WG4 Policy and Sustainability
- Think Tank Helmholtz-Gemeinschaft UFZ research community
- IEA Bioenergy, Task 39 “Commercializing Conventional & Advanced Liquid Biofuels from Biomass”
- IEA Bioenergy, Task 40 “Sustainable International Bioenergy Trade – Securing Supply and Demand”

- "Library Concepts" working group of the BMEL departmental research establishments
- Life-cycle assessment working group of the "Biomass Energy Use" programme
- "OpenAgrar" working group of the BMEL departmental research establishments
- Platform for Renewable Heating and Cooling (ETP-RHC)
- ProcessNet – Sustainable Production, Energy and Resources (SuPER), energy process engineering
- ProcessNet – Sustainable Production, Energy and Resources (SuPER), high-temperature engineering
- ProcessNet- Sustainable Production, Energy and Resources (SuPER), integrated material and energy use of biomass
- ProcessNet- Sustainable Production, Energy and Resources (SuPER), alternative fuels
- Senate working group on sustainability assessment (BMEL)
- Senate working group on regrowable resources (BMEL)

DIN/ISO STANDARDISATION COMMITTEES (SELECTION)

- DIN-FAM committee NA 062-06-32 AA "Requirements for liquid fuels"
- DIN: NA 172 "Standardisation committee: Basics of environmental protection (NAGUS)"
- DIN: NA 172-00-10 AA "Sustainability criteria for biomass"
- DIN: NA 062-05-82 AA "Solid biofuels"
- ISO committee 238, ISO/TC 255 "Solid Biofuels"
- ISO TC 238 WG7 + WG4
- ISO standardisation committee ISO/TC 255 Biogas
- Contribution to the working group on DIN 33999 "Dust collector testing"
- VDI 3461 Pollution control of the thermo-chemical gasification of biomass in cogeneration
- VDI 3475-3 Pollution control; plants for the mechanical and biological treatment of municipal waste
- VDI 3670 Waste gas purification – downstream dust reduction systems for small and medium small-scale furnaces for solid fuels

- VDI 4630 Digestion of organic substances – Substrate characterisation, sampling, material data acquisition, fermentation experiments
- VDI/DIN: Working group on the production of biocarbonisates, Kommission Reinhaltung der Luft (Clean Air Commission)

PROFESSORSHIPS

- Environmental Management in the Department of Economic Engineering, Ernst-Abbe-Hochschule (EAH), Jena
- Faculty of Agricultural and Environmental Sciences, University of Rostock
- Faculty of Energy and Environmental Sciences, Shenyang Aerospace University (China)
- Faculty of Environmental Technology and Biotechnology, University of Hefei (China)
- Institute of Renewable Energy, China Petroleum University Beijing (China)
- Institute for Infrastructure and Resource Management, Department of Bioenergy Systems, University of Leipzig

NETWORKS/ASSOCIATIONS/PLATFORMS (SELECTION)

- Association of German Engineers (VDI)
- Bioenergy network within the Energy and Environment Network (Netzwerk Energie und Umwelt e. V.)
- Biofuels Research Network (ForNeBIK)
- Combustion Institute (German section)
- DECHEMA, regrowable resources working group
- DECHEMA Society for Chemical Technology and Biotechnology
- Dena Biogaspartner (German Energy Agency)
- Energy Raw Materials Network (ERN)
- International Energy Agency (IEA)
- KUP network
- RAL-Bundesgütegemeinschaft Brennholz (Federal fuel wood quality control group)
- VGB PowerTech e. V.

10
TECHNICAL EQUIPMENT

The DBFZ has at its disposal a wide range of technical systems, test beds, laboratories and scientific tools. The following lists the available capacities.

RESEARCH BIOGAS PLANT

The research biogas plant extends the range of application-oriented research being carried out at the DBFZ to enhance process understanding and improve the efficiency of biogas production. The dimensioning of the fermenters allows experiments to be conducted on a technical scale, so ensuring good transferability of results into practice. The facility features two independent lines with identical capacity which can be operated as a single- or two-stage system, with optional hydrolysis. The first line is a wet fermenter with a main fermenter in the form of a stationary stirred tank with a central agitator. The second line can optionally be run with a main fermenter of identical design or with a plug-flow fermenter.

Fig. 48 The DBFZ's Research biogas plant

A post-digester with a gas storage cover collects the fermentation residues from both lines and routes them to the fermentation residue store. The biogas is used in a 75 kWel CHP (combined heat and power) plant to cover the facility's own energy demand. Surplus power can be fed into the DBFZ grid. For substrate supply, small amounts of self-produced silage can be stored on-site.To measure the gas production volumes precisely, the fermenters are fitted with permanent covers. Terminal units in the pipeline system and at the gas capture point permit sampling and the installation of measuring instruments.

BIOGAS LAB

The Biogas Lab is designed and equipped to simulate large-scale technical processes on a laboratory and semi-technical scale, complete with the corresponding analytics. Its aims are to optimise processes and to improve basic understanding of the individual processes involved in methane formation. It operates extensive (continuous and discontinuous) pilot plants with reaction volumes between 0.25 and 500 litres, as well as the research biogas plant. It investigates a wide variety of substrate mixes from agriculture, the waste management sector and industry on behalf of research and industrial partners. Alongside in-process analytics, the laboratory's trace analytics function is one of its key areas of activity. Resources available to the scientists include high-performance liquid chromatography (HPLC) as well as gas chromatographs (GCs) for analysis of interim products. The cooperation agreement with the Helmholtz Centre for Environmental Research – UFZ means microbiological analyses are also possible. As well as laboratory simulation and the associated stationary systems, resources also include various instruments for conducting field measurements. In combination, these resources the efficiency and emissions of large-scale plants to be assessed.

EMISSION MEASUREMENTS

The Biochemical conversion department has an extensive range of measuring instruments for the identification of diffuse methane leakage. The portfolio in-

Fig. 49 The DBFZ's biogas lab

cludes an imaging system capable of visualising methane losses in real time, a methane laser, as well as various hand-held instruments with which point sources of methane can be detected. There is also an extensive range of equipment for quantifying climate-related emissions, from both controlled and diffuse sources. Methodological resources include open and closed hoods. Optical remote measurement methods can also be employed to determine emissions based on laser spectrometry and dispersion models. The department also has at its disposal explosion-proof sensors and methods for the continuous monitoring of operational methane emissions from overpressure/underpressure safety systems.

Fig. 50 Emissions measurements in the field

ANALYTICAL LAB

The DBFZ's analytical lab investigates the chemical composition of liquid motor fuels and solid fuels, biogas substrates, by-products and residual products, ashes, filtration dusts and waste water in order to assess the possibilities for use of the various biomasses. Based on current research projects, topics relating to glycerin analytics can also be covered. The lab is equipped with: a Karl Fischer headspace titrator; a bomb calorimeter; a Stabinger viscometer; ion chromatography; elementary analysis; EC/OC; ICP-OES; an ignition point analyser; a copper corrosion test; microwave digestion systems; and a freeze dryer. Since 2015, the lab additionally features a UV-VIS spectrometer, a refractometer, and two GC-MS units to identify and quantify organic components. Analysis is carried out in accordance with commonly applied standards and based on a problem-oriented methodology.

FUEL TECHNICAL CENTRE

The DBFZ's fuel technical centre investigates and develops the key process steps to convert (aqueous) biomass flows into solid (e. g. biocoal), liquid (motor fuels) and gaseous (e. g. methane) bioenergy sources and base chemicals. A wide range of test stands are available to investigate the process steps of hydrothermal carbonisation (HTC) and hydrothermal liquefaction, biomass gasification, gas purification and catalytic synthesis. Experimental results are applied to complete and validate various plant simulations.

For the hydrothermal laboratory experiments, the DBFZ operates three batch reactors (2 x 500 ml, 1 x 10 l), a continuous tubular reactor and a two-stage continuous line. In addition to screening of a wide variety of different biomasses, extensive experiments are conducted on individual biomasses to determine the dependency of the reaction parameters on the yield and composition of the products. The liquid and solid (interim) products are chemically and fuel-technically analysed in the DBFZ's analytical lab.

The hydrothermal laboratory experiments are conducted as part of research projects and as service contract work.

Two laboratory gasifiers, a dust gasifier and a fixed bed gasifiers, as well as a reactor for adsorptive gas purification are available for investigation of the biomass gasification process. The dust gasifier converts biomass with particle diameters below 1 mm into a synthesis gas with low tar content at temperatures of up to 1200 °C and under atmospheric pressure with air and oxygen as the gasification agents. The fixed bed gasifier is rated for temperatures up to 1050 °C (heating up to 950 °C), pressures up to 20 bar and freely selectable mixtures of oxygen, nitrogen, air, water vapour and CO_2 as the gasification agents. It can be used to determine the characteristic values of the gasification reactions occurring in the various layers of the fixed bed. The unique features of this fixed-bed laboratory gasifier are the high variability of the gasification agent in combination with the maximum pressure 20 bar, the gravimetric fixed bed analysis during the gasification reaction, and the facility to take gas samples for analysis at three different height levels of the bed. The gas samples are transmitted to the analysers and conditioned at temperatures of approximately 450 °C, so that the tar components can be kept in the gaseous state and analysed.

Fig. 51 Fixed-bed gasifier at the DBFZ's fuel technical centre

Fig. 52 500 ml stirred batch reactor at the DBFZ's fuel technical centre

A reactor heatable up to 450 °C, into which sorbents (such as impregnated activated carbons, zinc and copper oxide) can be filled in three separate chambers, completes the laboratory gasifiers. A mobile small-scale pilot plant for the two-stage hot detarring of product gases from biomass gasification has also been developed, built and put into operation.

Four fixed-bed reactors are currently being used to research the catalytic conversion of synthesis gas into fuels and base chemicals such as methane (SNG) and alkenes. Three of them are tubular reactors, the fourth is a plate reactor. Two reactors are heated by a furnace, while the two others are tempered with thermal oil. Water vapour content and chemical toxicity (e. g. hydrogen sulphide) can be specified. It is also possible to return product gas (cooled) by means of recirculation pumps in order to control educt turnovers, product yields, and the reactor temperature. The aim is to investigate the dynamic reactor behaviour and the product gas composition in response to fluctuating synthesis gas qualities and volume flows (e. g. Power-to-Gas) as well as the catalyst deactivation. A unique feature is the broad temperature and pressure window ($T \leq 850$ °C, $p \leq 60$ bar) in which the reactors can be operated. This enables different reactor concepts and operating conditions to be compared directly.

Expertise in the production of fuels and base chemicals is being gradually built at the DBFZ. The aim is to investigate of different treatment technologies for substrates from upstream conversion steps as fermentation, hydrothermal processes or hydrotreatment in flexible plants

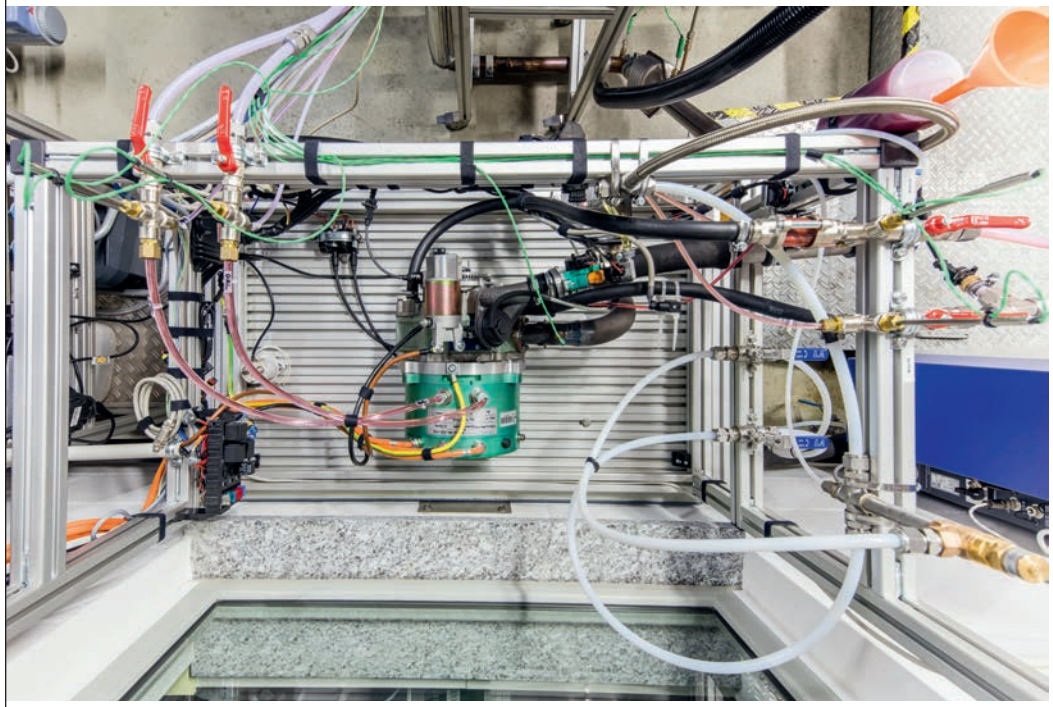


Fig. 53 Range-extender test rig on the DBFZ's engine test bed

ENGINE TEST BED

In response to the increasing complexity of demand placed on motor fuels, the DBFZ is setting up an engine test bed for research purposes. The primary aim is to test new-style renewables-based fuels in combustion engines. Specifically, the single-cylinder research engine is used to test thermodynamic implementation (such as power output and consumption), legally limited and unlimited raw emissions, engine oil dilution and the application of exhaust gas cleaning systems in terms of the fuel. A variety of different measurement and analytical techniques are used. Exhaust emissions can be measured by FTIR spectrometer, smoke meter, PMD, FID, lambda meter and NDIR, among other methods. Further analytical facilities are available in conjunction with the in-house analytical lab. The combustion process is analysed by high-pressure indexing, with online visualisation. Moreover, a freely programmable automation system enables typical engine properties such as speed, load, rail pressure, charge air pressure, engine oil temperature and coolant temperature to be freely configured and continuously recorded

(up to 100 Hz). The modular design of the test bed also enables modifications to combustion engines to be implemented quickly and autonomously.
With a view to the steady progression of electromobility in Germany, technical potential can be analysed on a specially built test bed for range-extender modules (range extenders extend the range of plug-in electric vehicles while driving). Regeneratively powered electric vehicles combined with regeneratively powered range-extender modules can help to dispel prejudices against electromobility and at the same time open up opportunities for new-style fuels which are only available regionally in small quantities. The installed test bed can be applied to a variety of set-ups thanks to its modular design.

TECHNICAL CENTRE WITH 10 COMBUSTION TEST BEDS

In the combustion lab the DBFZ conducts experiments on raw or pre-conditioned biomass by means of thermo-chemical conversion. It is also able to carry out detailed analysis of exhaust gas emissions and particulate formation processes. The combustion lab is equipped with a full-flow dilution tunnel test bed, two separator test beds with variable volumetric flow, a tiled stove test bed, a catalytic converter development stand, 15 exhaust analysers (including FTIR, SMPS, exposition chamber) and seven dust measurement devices as well as eight boiler vessels on various different experimental setups.

FUEL CONDITIONING AND COMBUSTION LAB

Based on its extensive and widely respected experience and know-how, the DBFZ's fuel conditioning and combustion lab together with its analytical lab conduct a wide variety of tests and experiments in close cooperation with leading scientific and industrial partners. Fuel conditioning experiments can be performed on a wide variety of different fuels. A warehouse facility covering an area of over 800 m² currently holds more than 150 different fuel variants. The fuel conditioning and combustion lab has dedicated conditioning systems and a new 30 kW ring-matrix press with which it conducts experiments in the production of new-style biogenic solid fuels,

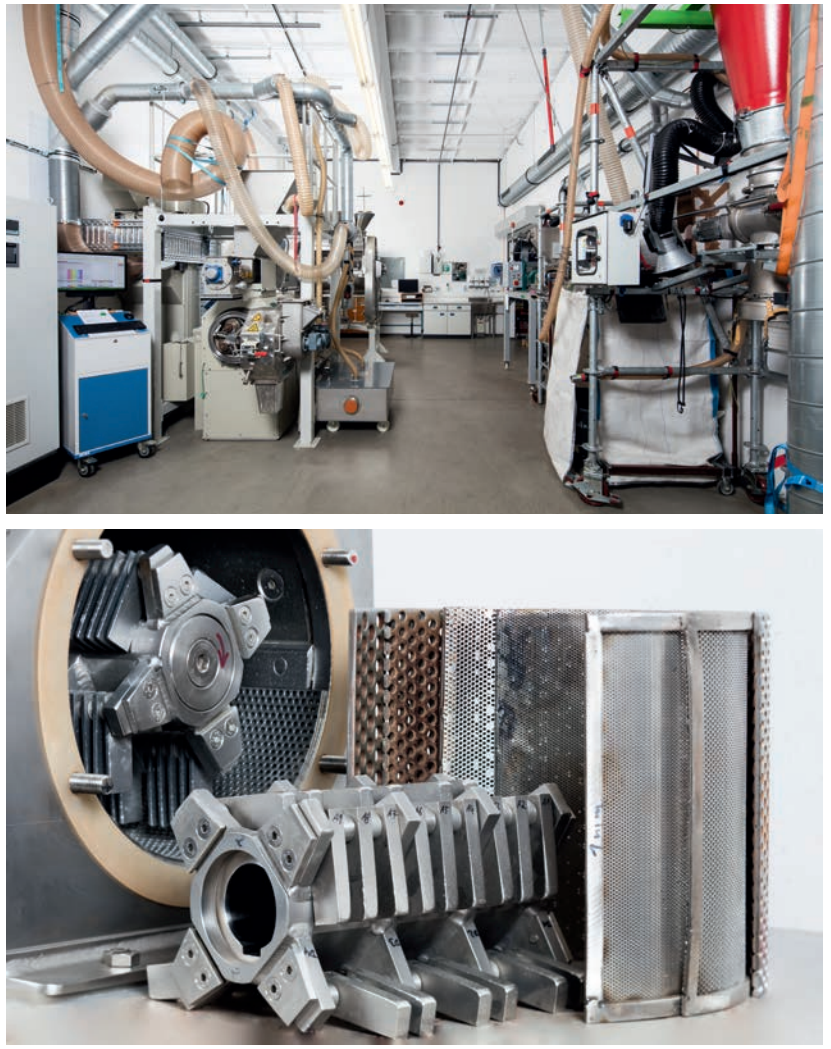


Fig. 54 DBFZ fuel conditioning and combustion lab/compacting technique

particularly including fuel mixes. The pellets produced can be fully characterised in accordance with European standards governing solid biofuels.

DATABASES

The “Systemic contribution of biomass” research focus area collects wide-ranging data to monitor trends on the bioenergy market and systematically extends its accumulated data set. The data includes technical and economic information, details relating to licensing law and information of relevance to stakeholders, such as for the German bioenergy plant portfolio or on market trends in biogenic fuels. In many cases time-series charts are provided. Standardised data management tools and geographic information systems (GIS) are used for data evaluation and retention. The available data relating to the bioenergy plant portfolio in Germany and to international fuel markets and trading flows offers private and public-sector decision-makers an outstanding means of considering strategic policy issues and making market-related decisions on the foundation of soundly-based facts. They are also enabled to assess market dynamics against the background of changing framework conditions and predict future development trends.

ASSESSMENT METHODS AND SCENARIOS

The limited biomass potential must be utilised efficiently to safeguard the long-term future of the energy system. In view of the many and varied properties and usage options of biomass, methods and tools are required to manage the sectoral deployment of biomass in accordance with social needs (such as for climate protection or to deliver system services). To that end, the “Systemic contribution of biomass” research focus area devises and develops methods for assessing the technical, ecological, social and economic effects of biomass use for energy production. The development of dynamic scenarios offers the possibility to assign the results within various contexts. In conjunction with the DBFZ’s database of current bioenergy technologies, they can be deployed to support decision-makers in the political and business spheres.

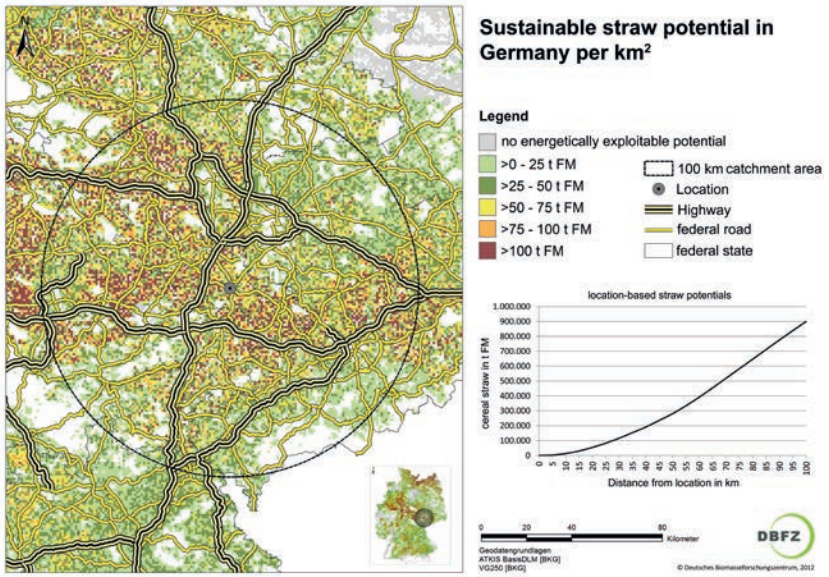


Fig. 55 Presentation of sustainable straw potential in Germany

POTENTIAL ANALYSES

In order to assess the availability of sustainable raw materials and residues, the DBFZ is developing a far-reaching model which can be used to calculate regional, national and international biomass potential for energy production. Tools employed include geographic information systems (GIS) to localise biomass potential. Scenarios are then developed in conjunction with the latest statistics, official base geo-data and freely available geo-data. Alongside freely accessible information, a joint project enables a large number of individual topics to be covered specific to the needs of the client concerned.

Further information: **www.dbfz.de/biomassepotenziale**

11
CONTACTS

GENERAL MANAGEMENT

Scientific Managing Director

Prof. Dr. Michael Nelles
Phone: +49 (0)341 2434-112
E-Mail: michael.nelles@dbfz.de

Administrative Managing Director

Dipl.-Kfm. (FH), LL. M. Daniel Mayer
Phone: +49 (0)341 2434-112
E-Mail: daniel.mayer@dbfz.de

HEADS OF THE RESEARCH FOCUS AREAS

Systemic contribution of Biomass

Prof. Dr. Daniela Thrän
Phone: +49 (0)341 2434-435
E-Mail: daniela.thraen@dbfz.de

Anaerobic Processes

Dr. Jan Liebetrau
Phone: +49 (0)341 2434-716
E-Mail: jan.liebetrau@dbfz.de

Processes for chemical bioenergy sources and fuels

Dr. Franziska Müller-Langer
Phone: +49 (0)341 2434-423
E-Mail: franziska.mueller-langer@dbfz.de

SmartBiomassHeat

Dr. Volker Lenz
Phone: +49 (0)341 2434-450
E-Mail: volker.lenz@dbfz.de

Catalytic emission control

Dr. Ingo Hartmann
Phone: +49 (0)341 2434-541
E-Mail: ingo.hartmann@dbfz.de

EXECUTIVE SUPPORT TEAM

Coordinator for Innovation

Dipl.-Holzwirt Romann Glowacki
Phone: +49 (0)341 2434-464
E-Mail: romann.glowacki@dbfz.de

Research Coordinator

Dr. Elena H. Angelova
Phone: +49 (0)341 2434-553
E-Mail: elena.angelova@dbfz.de

Coordinator for international affairs

Dr. Sven Schaller
Phone: +49 (0)341 2434-551
E-Mail: sven.schaller@dbfz.de

12
WORK AND PROJECT RESULTS

The most important publications from 2015 are listed to show the current working areas of the DBFZ. The language of the title reflects the language of the publication/project.

Monographs

Bockreis, A.; Faulstich, M.; Flamme, S.; Kranert, M.; Mocker, M.; Nelles, M.; Quicker, P.; Rettenberger, G. (Hrsg.) (2015): 5. Wissenschaftskongress Abfall- und Ressourcenwirtschaft der Deutschen Gesellschaft für Abfallwirtschaft am 19./20. März 2015 in Innsbruck, 308 Seiten. Innsbruck, Österreich – ISBN 978-3-902936-66-0.

Bohnet, S.; Haak, F.; Gawor, M.; Thrän, D. (2015): Technisch-ökonomische Begleitforschung des Bundeswettbewerbes „Bioenergie-Regionen“: Endbericht Fördermaßnahme 2009-2012. DBFZ Report Nr. 23. DBFZ. Leipzig – ISSN 2190-7943 (Print)/ISSN 2197-4632 (Online).

Brosowski, A.; Adler, P.; Erdmann, G.; Stinner, W.; Thrän, D.; Mantau, U.; Blanke, C.; Mahro, B.; Hering, T.; Reinholdt, G. (2015): Biomassepotenziale von Rest- und Abfallstoffen – Status Quo in Deutschland. Fachagentur Nachwachsende Rohstoffe e.V. (FNR). Gülzow-Prüzen – ISBN 978-3-942147-29-3.

Dornack, C.; Scholwin, F.; Liebetrau, J.; Faßauer, B.; Nelles, M. (Hrsg.) (2015): Tagungsband zur 10. Biogastagung Dresden, Anaerobe Biologische Abfallbehandlung am 29./30. September 2015. 239 Seiten. Dresden – ISBN 978-3-934253-90-2.

Flamme, S.; Gallenkemper, B.; Gellenbeck, K.; Rotter, S.; Kranert, M.; Nelles, M.; Quicker, P. (Hrsg.) (2015): Tagungsband 14. Münsteraner Abfallwirtschaftstage (AWT 2015) am 24./25. Februar 2015. Münsteraner Schriften zur Abfallwirtschaft. Bd. 16. 428 Seiten. Münster – ISBN 978-3-98111-42-5-6.

Holmgren, M. A.; Hansen, M. N.; Reinelt, T.; Westerkamp, T.; Jorgensen, L.; Scheutz, C.; Delre, A. (2015): Measurements of methane emissions from biogas production. Energiforsk. Stockholm – ISBN 978-91-7673-158-1.

Klemm, M.; Glowacki, R.; Nelles, M. (Hrsg.) (2015): Innovationsforum Hydrothermale Prozesse. 114 Seiten. DBFZ. Leipzig – ISBN 978-3-9817707-3-5.

Lenz, V.; Ulbricht, T. (2015): Staubabscheider in häuslichen Feuerungen. 1. Aufl. DBFZ. Leipzig – ISBN 978-3-9817707-4-2 (Online).

Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.) (2015): 2nd conference on Monitoring & process control of anaerobic digestion plants. Reader des Förderprogramms Energetische Biomassenutzung. 64 Seiten. DBFZ. Leipzig – ISSN 2366-4169

Majer, S.; Gröngröft, A.; Drache, C.; Braune, M.; Meisel, K.; Müller-Langer, F.; Naumann, K.; Oehmichen, K. (2015): Technische und methodische Grundlagen der THG-Bilanzierung von Biodiesel. DBFZ. Leipzig – ISBN 978-3-9817707-0-4.

Matthes, M.; Hartmann, I. (2015): Nachrüstlösung zum katalytischen Abbau von gasförmigen organischen Emissionen aus Kaminöfen. DBFZ Report Nr. 25. DBFZ. Leipzig – ISSN 2190-7943.

Meisel, K.; Braune, M.; Gröngröft, A.; Majer, S.; Müller-Langer, F.; Naumann, K.; Oehmichen, K. (2015): Technische und methodische Grundlagen der THG-Bilanzierung von Bioethanol. DBFZ. Leipzig – ISBN 978-3-9817707-1-1.

Moeller, L.; Zehnsdorf, A.; Thrän, D.; Pfeiffer, D. (Hrsg.) (2015): FOCUS ON: Schaumbildung in Biogasanlagen. Fokusheft Energetische Biomassenutzung. DBFZ. Leipzig – ISSN 2192-1156

Nelles, M. (Hrsg.) (2015): Tagungsreader zum Side-Event „Thermally treated biofuels“ im Rahmen der European Biomass Conference and Exhibition 2015 (EUBC&E). Tagungsreader Bd. 3. DBFZ. Leipzig – ISSN 2199-9856 (Online).

Nelles, M.; Hartmann, H.; Lenz, V. (Hrsg.) (2015): Tagungsreader zum 6. Abscheider-Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. Tagungsreader Bd. 2. DBFZ. Leipzig – ISSN 2199-9856 (Online).

Nelles, M. (Hrsg.) (2015): Einfluss regionaler und standortspezifischer Faktoren auf die Allgemeingültigkeit ökologischer primärenergetischer Bewertungen von Biogas. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge), Bd. 51. Dissertation Daniela Dressler, 227 Seiten – ISBN 978-3-86009-434-2.

Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. 427 Seiten. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Nelles, M. (Hrsg.) (2015): Spurenelementkonzentrationen und biologische Aktivität in NaWaRo-Biogasfermentern. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge), Bd. 53. Dissertation Nils Engler. 134 Seiten – ISBN 978-3-86009-427-3.

Nelles, M. (Hrsg.) (2015): Möglichkeiten der Effizienzsteigerung bei der anaeroben Vergärung von Weizenschlempe. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge), Bd. 54. Dissertation Thomas Schmidt, 154 Seiten – ISBN 978-3-86009-428-0.

Nelles, M. (Hrsg.) (2015): Principles, Opportunities and Risks associated with the transfer of environmental technology between Germany and China using the example of thermal waste disposal. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge), Bd. 55. Dissertation Thomas Dorn, 252 Seiten – ISBN 978-3-86009-429-7.

Nelles, M. (Hrsg.) (2015): Biogas in einer zukünftigen Energieversorgungsstruktur mit hohen Anteilen fluktuierender Erneuerbarer Energien. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge), Bd. 56. Dissertation Uwe Holzhammer, 280 Seiten – ISBN 978-3-86009-430-3.

Oehmichen, K.; Naumann, K.; Drache, C.; Postel, J.; Braune, M.; Gröngröft, A.; Majer, S.; Meisel, K.; Müller-Langer, F. (2015): Technische und methodische Grundlagen der THG-Bilanzierung

von Biomethan. 50 Seiten. DBFZ. Leipzig – ISBN 978-3-9817707-2-8.

Rönsch, C.; Sauter, P.; Bienert, K.; Schmidt-Baum, T.; Thrän, D. (2015): Biomasse zur Wärmeerzeugung – Methoden zur Quantifizierung des Brennstoffeinsatzes. DBFZ Report Nr. 24. 139 Seiten. DBFZ. Leipzig – ISSN 2190-7943 (Print)/ISSN 2197-4632 (Online).

Rönsch, S. (2015): Anlagenbilanzierung in der Energietechnik – Grundlagen, Gleichungen und Modelle für die Ingenieurpraxis. Springer Fachmedien. Wiesbaden – ISBN 978-3-658-09686-1.

Stinner, W.; Stur, M.; Paul, N.; Riesel, D. (2015): Gülle-Kleinanlagen. Fachagentur Nachwachsende Rohstoffe e. V. (FNR). Gülzow-Prüzen.

Stryi-Hipp, G.; Baur, F.; Borggrefe, F.; Gerhardt, N.; Hauer, A.; Horst, J.; Huenges, E.; Kastner, O.; Lenz, V.; Martin, N.; Nast, M.; Riepl, M.; Rockendorf, G.; Rzepka, M.; Schossig, P.; Schüwer, D.; Thess, A.; Thrän, D.; Wunschick, F.; Wuschig, C. (2015): Erneuerbare Energien im Wärmesektor – Aufgaben, Empfehlungen und Perspektiven. Positionspapier des ForschungsVerbunds Erneuerbare Energien. ForschungsVerbund Erneuerbare Energien (FVEE) (Hrsg.). Bonifatius GmbH. Paderborn, Berlin.

Thrän, D. (Hrsg.) (2015): Smart Bioenergy. Technologies and concepts for a more flexible bioenergy provision in future energy systems. 185 Seiten. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Thrän, D.; Arendt, O.; Ponitka, J.; Braun, J.; Millinger, M.; Wolf, V.; Banse, M.; Schaldach, R.; Schüngel, J.; Gärtner, S.; Rettenmaier, N.; Hünecke, K.; Hennenberg, K.; Wern, B.; Baur, F.; Fritsche, U.; Gress, H.-W. (2015): Meilensteine 2030. Elemente und Meilensteine für die Entwicklung einer tragfähigen und nachhaltigen Bioenergiestrategie. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. Bd. 18. 226 Seiten. Leipzig – ISSN 2199-2762.

Thrän, D.; Hennig, C.; Rensberg, N.; Denysenko, V.; Fritsche, U.; Eppler, U. (2015): IEA Bioenergy Task 40: Country Report Germany 2014. IINAS – International Institute for Sustainability Analysis and Strategy GmbH. Darmstadt, Leipzig.

Thrän, D.; Pfeiffer, D. (Hrsg.) (2015): Effizient, umweltverträglich, dezentral. Neue Konzepte für die Nutzung von biogenen Festbrennstoffen. Teil 3. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. Bd. 20. DBFZ. Leipzig – ISSN 2199- 2762.

– (Eds.) (2015): Method Handbook. Material flow-oriented assessment of greenhouse gas effects. Methods for determination of technology indicators, levelized costs of energy, and greenhouse gas effects of projects in the funding programme „Biomass energy use“. Series of the funding programme „Biomass energy use“. Bd. 4. DBFZ. Leipzig – ISSN online 2364-897X.

– (Hrsg.) (2015): Neue Wege zur Prozessoptimierung in Biogasanlagen Teil 3. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. Bd. 19. DBFZ. Leipzig – ISSN 2199-2762

– (Hrsg.) (2015): Steckbriefe Biogas. Wärme aus Biomasse. Effiziente dezentrale und emissionsarme Konzepte für Kraft-Wärme-Kopplung und Kleinfeuerungsanlagen. DBFZ. Leipzig.

– (Hrsg.) (2015): Bioenergie – Mehr als eine sichere Reserve!? 6. Statuskonferenz am 11./12. November 2015. Reader des Förderprogramms Energetische Biomassenutzung. DBFZ. Leipzig – ISSN 2366-4169.

Thrän, D.; Ponitka, J.; Arendt, O. (Hrsg.) (2015): Ponitka, J.; Arendt, O.; Lenz, V.; Daniel-Gromke, J.; Stinner, W.; Ortwein, A.; Zeymer, M.; Gröngröft, A.; Müller-Langer, F.; Klemm, M.; Braun, J.; Zeug, W.; Thrän, D.; O’Keeffe, S.; Millinger, M. (2015): FOCUS ON: Bioenergie-Technologien. Fokusheft Energetische Biomassenutzung. DBFZ. Leipzig – ISSN 2192-1156.

Wong, J. W. C.; Tyagi, R. D.; Nelles, M.; Selvam, A. (Hrsg.) (2015): Proceedings of the International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. Hong Kong, China – ISBN 978-988-19988-9-7.

Book contributions

Billig, E.; Witt, J.; Klemm, M.; Kirsten, C.; Khalsa, J.; Thrän, D. (2015): Intermediate biofuels to support a flexible application of biomass. In: Thrän, D. (Hrsg.): Smart Bioenergy. Technologies and concepts for a more flexible bioenergy provision in future energy systems. S. 121–140. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Bindig, R.; Butt, S.; Hartmann, I. (2015): Emission Abatement at Small-Scale Biomass Combustion Unit with High-Temperature Catalysts. In: Advanced Biofuels: Using Catalytic Routes for the Conversion of Biomass Platform Molecules. S. 189–202. 1. Auflage. Apple Academic Press. Oakville, Kanada – ISBN 978-1-77188-132-6.

Bloche-Daub, K.; Witt, J.; Lenz, V.; Nelles, M. (2015): Märkte und Trend von Energien weltweit, in der EU und in Deutschland. In: Herbes, C.; Friege, C. (Hrsg.): Marketing Erneuerbarer Energien: Grundlagen, Geschäftsmodelle, Fallbeispiele. S. 29–60. Springer Gabler. Wiesbaden. doi 10.1007/978-3-658-04968-3 – ISBN 978-3-658-04967-6 (Print), ISBN 978-3-658-04968-3 (eBook).

Brosowski, A. (2015): Methodology for determination of biomass potentials. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Method Handbook. Material flow-oriented assessment of greenhouse gas effects. Methods for determination of technology indicators, levelized costs of energy, and greenhouse gas effects of projects in the funding programme „Biomass energy use“. Series of the funding programme „Biomass energy use“. Bd. 4. S. 40–48. DBFZ. Leipzig – ISSN online 2364-897X.

– (2015): Reststoffpotenziale für hydrothermale Prozesse. In: Klemm, M.; Glowacki, R.; Nelles, M. (Hrsg.): Innovationsforum Hydrothermale Prozesse. S. 21–24. DBFZ. Leipzig – ISBN 978-3-9817707-3-5.

Daniel-Gromke, J.; Reinelt, T.; Postel, J. (2015): Optimierter Anlagenbetrieb von Biogasanlagen. In: Zehnsdorf, A.; Thrän, D.; Moeller, L.; Pfeiffer, D. (Hrsg.): FOCUS ON: Schaumbildung in Biogasanlagen. Fokusheft Energetische Biomassenutzung. S. 25–29. DBFZ. Leipzig – ISSN 2192-1156.

Dotzauer, M.; Naumann, K.; Billig, E.; Thrän, D. (2015): Demand for the flexible provision of bioenergy carriers – an overview of the different energy sectors in Germany. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 11–31. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Fühner, C.; Clemens, A. (2015): Rohstoffe aus dem Sanitärsektor. In: Klemm, M.; Glowacki, R.; Nelles, M. (Hrsg.): Innovationsforum Hydrothermale Prozesse. S. 99–101. DBFZ. Leipzig – ISBN 978-3-9817707-3-5.

Grünes, J.; Nelles, M. (2015): Phosphor – ein Baustein des Lebens. In: Klemm, M.; Glowacki, R.; Nelles, M. (Hrsg.): Innovationsforum Hydrothermale Prozesse. S. 35–37. DBFZ. Leipzig – ISBN 978-3-9817707-3-5.

Hansjürgens, B.; Wüstemann, H.; Bertram, C.; Bonn, A.; Dehnhardt, A.; Döring, R.; Doyle, U.; Elsasser, P.; Hartje, V.; Jensen, R.; Osterburg, B.; Rehdanz, K.; Röder, N.; Scholz, M.; Thrän, D.; Vohland, K. (2015): Synergien und Konflikte von Klimapolitik und Naturschutz: Zusammenfassung und Handlungsoptionen. In: Hartje, V.; Wüstemann, H.; Bonn, A. (Hrsg.): Naturkapital Deutschland – TEEB DE (2015): Naturkapital und Klimapolitik – Synergien und Konflikte. S. 191–210. Technische Universität Berlin, Helmholtz-Zentrum für Umweltforschung – UFZ. Berlin, Leipzig – ISBN 978-3-944280-15-8.

Hildebrandt, J.; Budzinski, M.; Siebert, A.; Bezama, A.; Thrän, D. (2015): Further developments of Life Cycle Sustainability Assessment (LCSA) frameworks in the context of bioeconomy. In: Bruckner, T.; Gawel, E.; Holländer, R.; Thrän, D.; Weinsziehr, T.; Verhoog, M. (Hrsg.): Zehn Jahre transdisziplinäre Nachhaltigkeitsforschung an der Universität Leipzig: Festschrift anlässlich des zehnjährigen Bestehens des Instituts für Infrastruktur und Ressourcenmanagement (IIRM). Studien zu Infrastruktur und Ressourcenmanagement. Bd. 5. S. 125–130. Logos Verlag. Berlin – ISBN 978-3-8325-4158-3.

Horschig, T.; Billig, E.; Thrän, D. (2015): Biomethane – a valuable contribution to energy revolution in Germany. In: Bruckner, T.; Gawel, E.; Holländer, R.; Thrän, D.; Weinsziehr, T.; Verhoog, M. (Hrsg.): Zehn Jahre transdisziplinäre Nachhaltigkeitsforschung an der Universität Leipzig: Festschrift anlässlich des zehnjährigen Bestehens des Instituts für Infrastruktur und Ressourcenmanagement (IIRM). Studien zu Infrastruktur und Ressourcenmanagement. Bd. 5. S. 131–133. Logos Verlag. Berlin – ISBN 978-3-8325-4158-3.

Klemm, M.; Glowacki, R. (2015): Die Strategie hinter der Innovation. In: Klemm, M.; Glowacki, R.; Nelles, M. (Hrsg.): Innovationsforum Hydrothermale Prozesse. S. 6–10. DBFZ. Leipzig – ISBN 978-3-9817707-3-5.

Köchermann, J. (2015): Klimaneutraler Brennstoff für Kraftwerke. In: Klemm, M.; Glowacki, R.; Nelles, M. (Hrsg.): Innovationsforum Hydrothermale Prozesse. S. 51–52. DBFZ. Leipzig – ISBN 978-3-9817707-3-5.

Kröger, M.; Wilde, N. (2015): Konversion zu flüssigen Energieträgern und Chemikalien. In: Klemm, M.; Glowacki, R.; Nelles, M. (Hrsg.): Innovationsforum Hydrothermale Prozesse. S. 77–81. DBFZ. Leipzig – ISBN 978-3-9817707-3-5.

Lenz, V.; Thrän, D. (2015): Flexible Heat Provision from biomass. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 83–105. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Liang, Y.; Kashdan, T.; Sterner, C.; Dombrowski, L.; Petrick, I.; Kröger, M.; Höfer, R. (2015): Algal Biorefineries. In: Pandey, A.; Höfer, R.; Taherzadeh, M.; Nampoothiri, M.; Larroche, C. (Hrsg.): Industrial Biorefineries and White Biotechnology. S. 35–90. Elsevier Science Ltd. Burlington – ISBN 978-0-444-63453-5.

Liebetrau, J.; Daniel-Gromke, J.; Jacobi, F. (2015): Flexible power generation from biogas. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 67–82. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Majer, S.; Thrän, D. (2015): Biomass resources and sustainability issues for a flexible bioenergy provision. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 33–48. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Müller-Langer, F.; Klemm, M. (2015): Liquid and gaseous biofuels for the transport sector. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 107–120. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Müller-Langer, F.; Klemm, M.; Schlüter, M. (2015): Synthetisches Methan aus Biomasse. In: van Basshuysen, R. (Hrsg.): Erdgas und erneuerbares Methan für den Fahrzeugantrieb: Wege zur klimaneutralen Mobilität. Der Fahrzeugantrieb. S. 128–133. Springer-Verlag. Wiesbaden – ISBN 978-3-658-07158-5.

Oehmichen, K.; Majer, S. (2015): Methodology for balancing greenhouse gas emissions and other emissions. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Method Handbook. Material flow-oriented assessment of greenhouse gas effects. Methods for determination of technology indicators, levelized costs of energy, and greenhouse gas effects of projects in the funding programme „Biomass energy use“. Series of the funding programme „Biomass energy use“. Bd. 4, S. 87–97. DBFZ. Leipzig – ISSN (online): 2364-897X

Ortwein, A.; Lenz, V. (2015): Flexible power generation from solid biofuels. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 49–66. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Tafarte, P.; Das, S.; Eichhorn, M.; Dotzauer, M.; Thrän, D. (2015): The potential of flexible power generation from biomass – a case study for a German region. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 141–159. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Thrän, D. (2015): General framework. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Method Handbook. Material flow-oriented assessment of greenhouse gas effects. Methods for determination of technology indicators, levelized costs of energy, and greenhouse gas effects of projects in the funding programme „Biomass energy use“. Series of the funding programme „Biomass energy use“. Bd. 4. S. 19–38. 1. Aufl. DBFZ. Leipzig – ISSN 2364-897X (Online).

– (2015): Introduction, The indicators at a glance. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Method Handbook. Material flow-oriented assessment of greenhouse gas effects. Methods for determination of technology indicators, levelized costs of energy, and greenhouse gas effects of projects in the funding programme „Biomass energy use“. Series of the funding programme „Biomass energy use“. Bd. 4. S. 16–18. 1. Aufl. DBFZ. Leipzig – ISSN 2364-897X (Online).

– (2015): Conclusion and Outlook. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 161–177. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

– (2015): Introduction. In: Thrän, D. (Hrsg.): Smart Bioenergy – Technologies and concepts for a more flexible bioenergy provision in future. S. 1–9. Springer-Verlag. Heidelberg – ISBN 978-3-319-16192-1.

Vohland, K.; Doyle, U.; Albert, C.; Bertram, C.; Biber-Freudenberger, L.; Bonn, A.; Brenck, M.; Burkhard, B.; Förster, J.; Fuchs, E.; Galler, C.; von Haaren, C.; Ibisch, P. L.; Kaphengst, T.; Klassert, C.; Klenke, R.; Klotz, S.; Kreft, S.; Kühn, I.; Marquard, E.; Mehl, D.; Meinke, I.; Naumann, K.; Reckermann, M.; Rehdanz, K.; Rüter, S.; Saathof, W.; Sauermann, J.; Scholz, M.; Schröder, U.; Seppelt, R.; Thrän, D.; Witing, F. (2015): Ökosystemleistungen, Biodiversität und Klimawandel: Grundlagen. In: Hartje, V.; Wüstemann, H.; Bonn, A. (Hrsg.): Naturkapital Deutschland – TEEB DE (2015): Naturkapital und Klimapolitik – Synergien und Konflikte. S. 67–99. Technische Universität Berlin, Helmholtz-Zentrum für Umweltforschung – UFZ. Berlin, Leipzig – ISBN 978-3-944280-15-8.

Journal articles (reviewed)

Ahmad Alyosef, H.; Schneider, D.; Wassersleben, S.; Roggendorf, H.; Weiß, M.; Eilert, A.; Denecke, R.; Hartmann, I.; Enke, D. (2015): Meso/Macroporous Silica from Miscanthus, Cereal Remnant Pellets, and Wheat Straw. In: ACS Sustainable Chemistry & Engineering. Bd. 3 (Nr. 9). S. 2012–2021. doi: 10.1021/acssuschemeng.5b00275.

Büchner, D.; Schraube, C.; Carlon, E.; von Sonntag, J.; Schwarz, M.; Verma, V. K.; Ortwein, A. (2015): Survey of modern pellet boilers in Austria and Germany – System design and customer satisfaction of residential installations. In: Applied Energy. Bd. 2015 (Nr. 160). S. 390–403. doi: 10.1016/j.apenergy.2015.09.055.

Bunzel, K.; Schäfer, R. B.; Thrän, D.; Kattwinkel, M. (2015): Pesticide runoff from energy crops: A threat to aquatic invertebrates? In: Science of the Total Environment. Bd. 537. S. 187–196. doi: 10.1016/j.scitotenv.2015.08.011.00489697.

Dahlin, J.; Herbes, C.; Nelles, M. (2015): Biogas digestate marketing: Qualitative insights into the supply side. In: Resources, Conservation and Recycling. Vol. 104, Part A S. 152–161. doi: 10.1016/j.resconrec.2015.08.013 – ISSN 0921-3449.

Daniel-Gromke, J.; Liebetrau, J.; Denysenko, V.; Krebs, C. (2015): Digestion of bio-waste – GHG emissions and mitigation potential. In: Energy, Sustainability and Society. Bd. 5 (Nr. 1). S. 1–12. doi: 10.1186/s13705-014-0032-6 – ISSN 2192-0567.

de Lange, M. F.; Zeng, T.; Vlugt, T. J. H.; Gascon, J.; Kapteijn, F. (2015): Manufacture of dense CAU-10-H coatings for application in adsorption driven heat pumps: optimization and characterization. In: CrystEngComm. Bd. 17 (Nr. 31). S. 5863–6060. doi: 10.1039/C5CE00789E – ISSN 1466-8033.

Döhling, F.; Weller, N. (2015): Pelletierung und energetische Nutzung von Mischbrennstoffen mit Zusatz von Lignin in Anlagen gemäß der 1. BImSchV. In: LANDTECHNIK. Bd. 70 (Nr. 2). S. 17–24. doi: 10.15150/lt.2015.2655 – ISSN 0023-8082.

Eschrich, R.; Schröder, J.; Hartmann, F.; Gläser, R. (2015): Alterung von Dieselabgaskatalysatoren im Betrieb mit Biokraftstoffen. In: MTZ Motortechnische Zeitschrift. Bd. 2015 (Nr. 1). S. 68–74 – ISSN 0024-8525.

Hennig, C.; Brosowski, A.; Majer, S. (2015): Sustainable feedstock potential – a limitation for the bio-based economy? In: Journal of Cleaner Production. S. 1–3. doi: http://dx.doi.org/10.1016/j.jclepro.2015.06.130 – ISSN 0959-6526.

Janke, L.; Leite, A.; Nikolausz, M.; Schmidt, T.; Liebetrau, J.; Nelles, M.; Stinner, W. (2015): Biogas Production from Sugarcane Waste: Assessment on Kinetic Challenges for Process Designing. In: International Journal of Molecular Sciences. Nr. 16. S. 20686–20703. doi: doi:10.3390/ijms160920685 – ISSN 1422-0067.

Janke, L.; Leite, A.; Batista, K.; Weinrich, S.; Sträuber, H.; Nikolausz, M.; Nelles, M.; Stinner, W. (2016): Optimization of hydrolysis and volatile fatty acids production from sugarcane filter cake: Effects of urea supplementation and sodium hydroxide pretreatment. In: Bioresource Technology. Bd. 199. S. 235–244. doi: 10.1016/j.biortech.2015.07.117 – ISSN 0960-8524.

Koch, C.; Kuchenbuch, A.; Kretzschmar, J.; Wedwitschka, H.; Liebetrau, J.; Müller, S.; Harnisch, F. (2015): Coupling electric energy and biogas production in anaerobic digesters – impacts on the microbiome. In: RSC Advances. Bd. 5 (Nr. 40). S. 31329–31340. doi: 10.1039/C5RA03496E – ISSN 2046-2069.

Köchermann, J.; Schneider, J.; Matthischke, S.; Rönsch, S. (2015): Sorptive H2S removal by impregnated activated carbons for the production of SNG. In: Fuel Processing Technology. Bd. 138. S. 37–41. doi: 10.1016/j.fuproc.2015.05.004 – ISSN 0378-3820.

Leite, A. F.; Janke, L.; Harms, H.; Zang, J. W.; Fonseca-Zang, W. A.; Stinner, W.; Nikolausz, M. (2015): Assessment of the Variations in Characteristics and Methane Potential of Major Waste Products from the Brazilian Bioethanol Industry along an Operating Season. In: energy and fuels. Bd. 29 (Nr. 7). S. 4022–4029. doi: 10.1021/ef502807s.

Leite, A. F.; Janke, L.; Lv, Z.; Harms, H.; Richnow, H.-H.; Nikolausz, M. (2015): Improved Monitoring of Semi-Continuous Anaerobic Digestion of Sugarcane Waste: Effects of Increasing Organic Loading Rate on Methanogenic Community Dynamics. In: International Journal of Molecular Sciences. Bd. 16 (Nr. 10). S. 23210–23226. doi: 10.3390/ijms161023210 – ISSN 1422-0067.

Matthes, M.; Hartmann, I.; Groll, A.; Riebel, U. (2015): Investigation on application and performance of emission reduction measures at a pellet boiler. In: Biomass Conversion and Biorefinery. S. 1–13. doi: 10.1007/s13399-015-0187-1 – ISSN 2190-6815.

May, T.; Koch-Singenstreu, M.; Ebling, J.; Stantscheff, R.; Müller, L.; Jacobi, F.; Polag, D.; Keppler, F.; König, H. (2015): Design and application of a synthetic DNA standard for real-time PCR analysis of microbial communities in a biogas digester. In: Applied Microbiology and Biotechnology. S. 6855–6863. doi: 10.1007/s00253-015-6721-z.

Mauky, E.; Jacobi, F. H.; Liebetrau, J.; Nelles, M. (2015): Flexible biogas production for demand-driven energy supply – Feeding strategies and types of substrates. In: Bioresource Technology. doi: 10.1016/j.biortech.2014.08.123.

Militar, J. G.; Ortwein, A.; Senorio, S. M.; Schade, J. (2015): Potential and Demand for Energy from Biomass by Thermo-chemical Conversion in the Province of Antique, Philippines – Part 1, Biomass Availability Analysis. In: Philippine Journal of Science. Bd. 143 (Nr. 2). S. 137–145 – ISSN 0031-7683.

Nelles, M.; Gruenes, J.; Rensberg, N.; Schüch, A. (2015): Utilization of Organic Waste and Residues – General Aspects and Innovative Solutions. In: Applied Mechanics and Materials. Bd. 768. S. 714–721. doi: 10.4028/www.scientific.net/AMM.768.714 – ISSN 1662-7482.

Poerschmann, J.; Weiner, B.; Wedwitschka, H.; Zehnsdorf, A.; Koehler, R.; Kopinke, F.-D. (2015): Characterization of biochars and dissolved organic matter phases obtained upon hydrothermal carbonization of Elodea nuttallii. In: Bioresource Technology. Bd. 189. S. 145–153. doi: 10.1016/j.biortech.2015.03.146 – ISSN 0960-8524.

Polag, D.; May, T.; Müller, L.; König, H.; Jacobi, F.; Laukenmann, S.; Keppler, F. (2015): Online monitoring of stable carbon isotopes of methane in anaerobic digestion as a new tool for early warning of process instability. In: Bioresource Technology. Bd. 197. S. 161–170. doi: 10.1016/j.biortech.2015.08.058.

Pous, N.; Koch, C.; Vilá-Rovira, A.; Balaguer, M. D.; Colprim, J.; Mühlenberg, J.; Müller, S.; Harnisch, F.; Puig, S. (2015): Monitoring and engineering reactor microbiomes of denitrifying bioelectrochemical systems. In: RSC Advances. Bd. 5 (Nr. 84). S. 68326–68333. doi: 10.1039/c5ra12113b.

Purkus, A.; Röder, M.; Gawel, E.; Thrän, D.; Thornley, P. (2015): Handling Uncertainty in Bioenergy Policy Design – A Case Study Analysis of UK and German Bioelectricity Policy Instruments. In: Biomass and Bioenergy. Bd. 79. S. 64–79. doi: 10.1016/j.biombioe.2015.03.029.

Raposo, F.; Borja, R.; Cacho, J. A.; Mumme, J.; Mohedano, A. F.; Battimelli, A.; Bolzonella, D.; Schuit, A. D.; Noguerol-Arias, J.; Frigon, J.-C.;

Penuela, G. A.; Mühlenberg, J.; Sambusiti, C. (2015): Harmonization of the quantitative determination of volatile fattyacids profile in aqueous matrix samples by direct injection using gaschromatography and high-performance liquid chromatographytechniques: Multi-laboratory validation study. In: Journal of Chromatography A. Bd. 1413. S. 94–106. doi: 10.1016/j.chroma.2015.08.008.

Rönsch, S.; Schneider, J.; Matthischke, S.; Schlüter, M.; Götz, M.; Lefebvre, J.; Prabhakaran, P.; Bajohr, S. (2015): Review on methanation – From fundamentals to current projects. In: Fuel. Bd. 166. S. 276–296. doi: 10.1016/j.fuel.2015.10.111 – ISSN 0016-2361.

Safer, M.; Tabet, F.; Ouadha, A.; Safer, K. (2015): A numerical investigation of structure and emissions of oxygen-enriched syngas flame in counter-flow configuration. In: International Journal of Hydrogen Energy. Bd. 40 (Nr. 6). S. 2890–2898. doi: doi:10.1016/j.ijhydene.2014.12.117.

Stinner, P. W. (2015): The use of legumes as a biogas substrate – potentials for saving energy and reducing greenhouse gas emissions through symbiotic nitrogen fixation. In: Energy, Sustainability and Society. Bd. 5 (Nr. 1). S. 1–7. doi: 10.1186/s13705-015-0034-z – ISSN 2192-0567.

Tabet, F.; Fichet, V.; Plion, P. (2015): A comprehensive CFD based model for domestic biomass heating systems. In: Journal of the Energy Institute. doi: 10.1016/j.joei.2015.02.003 – ISSN 1743-9671.

Tabet, F.; Gökalp, I. (2015): Review on CFD based models for co-firing coal and biomass. In: Renewable and Sustainable Energy Reviews. Bd. 2015 (Nr. 51). S. 1101–1114. doi: 10.1016/j.rser.2015.07.045 – ISSN 1364-0321.

Thrän, D.; Dotzauer, M.; Lenz, V.; Liebetrau, J.; Ortwein, A. (2015): Flexible bioenergy supply for balancing fluctuating renewables in the heat and power sector – a review of technologies and concepts. In: Energy, Sustainability and Society. Bd. 5 (Nr. 1). S. 35. doi: 10.1186/s13705-015-0062-8 – ISSN 2192-0567.

Vogel, T.; Nelles, M.; Eichler-Löbermann, B. (2015): Phosphorus application with recycled products from municipal waste water to different crop species. In: Ecological Engineering. Bd. 83. S. 466–475. doi: 10.1016/j.ecoleng.2015.06.044 – ISSN 0925-8574.

Weinrich, S.; Nelles, M. (2015): Critical comparison of different model structures for the applied simulation of the anaerobic digestion of agricultural energy crops. In: Bioresource Technology. Bd. 178. S. 306–312. doi: 10.1016/j.biortech.2014.10.138 – ISSN 0960-8524.

Zech, K.; Oehmichen, K.; Grasemann, E.; Michaelis, J.; Funke, S.; Seiffert, M. (2015): Technical, economic and environmental assessment of technologies for the production of biohydrogen and its distribution: Results of the Hy-NOW study. In: International Journal of Hydrogen Energy. Bd. 40 (Nr. 15). S. 5487–5495. doi: 10.1016/j.ijhydene.2015.01.177 – ISSN 0360-3199.

Journal articles

Bloche-Daub, K.; Witt, J.; Kaltschmitt, M.; Janczik, S. (2015): Erneuerbare Energien – Globaler Stand 2014. In: BWK – Das Energie Fachmagazin. Bd. 67 (Nr. 07-08-2015). S. 6–23 – ISSN 1618-193X.

Bohnet, S.; Haak, F. (2015): Energie für die Region. Mit Bioenergie lassen sich regionale Wertschöpfungsketten vom Rohstoff über die Logistik bis zur Vermarktung etablieren. In: Erneuerbare Energien – Das Magazin. Ausgabe 9 (26. Jahrgang). S. 30–35.

Fischer, E.; Postel, J.; Liebetrau, J.; Nelles, M. (2015): Wirkungs- und Nutzungsgrade der landwirtschaftlichen Biogaserzeugung aus nachwachsenden Rohstoffen und Gülle. In: VGB-PowerTech. Bd. 1/2. S. 68–73 – ISSN 1435-3199.

Holzhammer, U.; Stelzer, M.; Nelles, M.; Scholwin, F. (2015): Die neue Flexibilität der Stromwirtschaft und die zukünftige Rolle der Abfallwirtschaft. In: Müll und Abfall. Bd. 2015 (Nr. 02). S. 79–89 – ISBN 978-3-503-12493-0.

Knauer, T.; Neu, F.; Scholwin, F.; Nelles, M. (2015): Direktvermarktung des Rohbiogases als Alternative zur EEG-Vergütung für Neu- und Bestandsanlagen. In: Biogas Journal. Bd. 2015 (Nr. 05). S. 67–73 – ISSN 1619-8913.

Lenz, V.; Naumann, K.; Kaltschmitt, M.; Janczik, S. (2015): Erneuerbare Energien. In: BWK – Das Energie Fachmagazin. Bd. 2015 (Nr. 5). S. 68–87 – ISSN 1618-193X.

Liebetrau, J. (2015): Ein Jahr nach dem Schock. In: DLG-Mitteilungen. Bd. 2015 (Nr. 10). S. 42–45 – ISSN 0341-0412.

Nelles, M.; Dorn, T.; Morscheck, G.; Wang, Y.; Xu, A. (2015): Stand und Perspektiven der Abfallwirtschaft in der VR China. In: Müll und Abfall. Bd. 2015 (Nr. 4). S. 185–192 – ISSN 0027-2957.

Pfeiffer, D.; Stur, B.; Ponitka, J.; Arendt, O.; Thrän, D. (2015): Zehn Meilensteine für eine nachhaltige Bioenergiestrategie in Deutschland. In: Ökologisches Wirtschaften. Bd. 30 (Nr. 3). S. 46–50.

Postel, J.; Fischer, E.; Ehrendreich, F. (2015): Was ist sinnvoll? In: DLG Mitteilungen. Bd. 2015 (Nr. 10). S. 46–49 – ISSN 0341-0412.

Qian, M.; Oos, M.; Hongjun, Z.; Ruihua, L.; Nelles, M. (2015): Biogas Development in China. In: Biogas Journal. S. 33–36 – ISSN 1619-8913.

Schulte, N.; Gellenbeck, K.; Nelles, M. (2015): Qualitätsprüfungen für die haushaltsnahe Abfallsammlung – Umsetzungsvorschläge und Erkenntnisse aus der Praxis. In: Müll und Abfall. Fachzeitschrift für Abfall- und Ressourcenwirtschaft. Bd. 2015 (Nr. 12). S. 690–696 – ISSN 0027-2957.

Snell, H.; Nassour, A.; Nelles, M. (2015): PET-Recycling in Europa. In: Kunststoffe. Bd. 2015 (Nr. 8). S. 36–42 – ISSN 0023-5563.

– (2015): PET-Recycling in Europe. In: Kunststoffe international. Bd. 2015 (Nr. 8). S. 12–17 – ISSN 1862-4243.

Thrän, D. (2015): Torrefied biomass for energy production and bioeconomy. In: The Parliament, Politics, Policy and People Magazine. Nr. 406. S. 38.

– (2015): Biomass and beyond. In: International INNOVATION Disseminating science, research and technology. HORIZON 20/20 (Issue 187). S. 33–35.

Ulbricht, T.; Lenz, V. (2015): Nachgeschaltete Staubminderungseinrichtungen an Kleinfeuerungsanlagen, Aktuelle Marktsituation und VDI 3670. In: Gefahrstoffe – Reinhaltung der Luft. Bd. 2015 (Nr. 11–12). S. 492–496 – ISSN 0949-8036.

Witt, J. (2015): Thermische Modifizierung von Festbrennstoffen. In: Holz-Zentralblatt. Bd. 38 (DRW-Verlag Weinbrenner GmbH & Co KG). S. 912–913 – ISSN 0018-3792.

Contribution in conference transcripts

Barchmann, T.; Rensberg, N. (2015): Wirtschaftliche Bewertung von Anlagenkonzepten zur Bioabfallvergärung. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 231–240. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Beil, M.; Böckler, H.-B.; Daniel-Gromke, J.; Trommler, M. (2015): Monitoring des Biomethanproduktionsprozesses – Vorstellung des Forschungsprojekts MONA. In: Tagungsband des KTBL/FNR-Kongresses Biogas in der Landwirtschaft – Stand und Perspektiven. Bd. 508. S. 262–269. KTBL. Darmstadt – ISBN 978-3-945088-07-4.

Billig, E.; Thrän, D. (2015): Auswertung einer Delphi-Befragung zum Thema Technologievergleich zwischen Verfahren zur Biomethan- und Bio-SNG-Produktion. In: Tagungsband zum OTTI-Forschungskolloquium Bioenergie 2015. S. 143–147. OTTI Regensburg. Straubing.

Bloche-Daub, K.; Thrän, D. (2015): Additional Regional Benefit from Bioenergy Projects: Which Can Be the Best Waste Heat Utilization Concept for Biogas Plants? In: Conference Proceedings of the 23rd European Biomass Conference and Exhibition (EUBC&E). S. 1453–1456. Wien, Österreich – ISBN 978-88-89407-516 (Print), ISSN 2282-5819 (Online).

Bohnet, S.; Bloche-Daub, K. (2015): Großbaustelle Wärmewende. Herausforderungen bei der Umsetzung von Wärmeprojekten in Bioenergie-Regionen. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 41–50. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Braune, M.; Gröngröft, A.; Oehmichen, K.; Zech, K. (2015): Die Biokraftstoffproduktion in Deutschland – Stand der Technik und Optimierungsansätze. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 155–163. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Büchner, D.; Ulbricht, T.; Unterberg, L. (2015): ToxOAb – Entwicklung eines Probenahmesystems zur Extraktion von Stäuben aus Abgasen von Holzfeuerungen zur anschließenden toxikologischen Untersuchung. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Bioenergie – Mehr als eine sichere Reserve !? 6. Statuskonferenz 11./12. November 2015. Reader des Förderprogramms Energetische Biomassenutzung. S. 16–17. DBFZ. Leipzig – ISSN 2366-4169

Butt, S. (2015): Minderung der Schadstoffemissionen durch katalytisch wirksame Baugruppen in einem neuartigen Kaminofen. In: Nelles, M.; Hartmann, H.; Lenz, V. (Hrsg.): Tagungsreader zum 6. Abscheider-Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. S. 150–159. DBFZ. Leipzig. ISSN – 2199-9856 (Online).

Dahlin, J.; Herbes, C.; Nelles, M. (2015): Vermarktung von Biogas-Gärprodukten – die Perspektive der Anbieter. In: Tagungsband der Veranstaltung „Pflanzenbauliche Verwertung von Gärrückständen aus Biogasanlagen“. S. 204–214. Fachagentur nachwachsende Rohstoffe e. V. Berlin – ISBN 978-3-942147-27-9.

– (2015): Vermarktung von Biogas-Gärprodukten – die Perspektive der Anbieter. Abstract in: Tagungsunterlagen zur Fachtagung Pflanzenbauliche Verwertung von Gärrückständen aus Biogasanlagen. S. 27. Fachagentur nachwachsende Rohstoffe e. V. Gülzow-Prüzen.

Dahlin, J.; Herbes, C.; Nelles, M. (2015): Marketing of biogas fermentation residues – The providers' perspective. In: Abstract book of the 16th International RAMIRAN Conference. RAMIRAN 2015 – Rural-Urban Symbiosis. S. 7. Hamburg – ISBN 978-3-941492-95-0.

Dahlin, J.; Nelles, M.; Herbes, C. (2015): Vermarktung von Gärprodukten an Privathaushalte; Biogas in der Landwirtschaft – Stand und Perspektiven. In: Biogas in der Landwirtschaft – Stand und Perspektiven. KTBL/FNR-Kongress – Bio-

gas in der Landwirtschaft – Stand und Perspektiven. S. 307–315. Potsdam – ISBN 978-3-945088-07-4.

Daniel-Gromke, J.; Liebetrau, J.; Reinelt, T. (2015): Emission Situation of Anaerobic Digestion of Agricultural Residues and Bio-waste. In: Abstract book of the 16th International RAMIRAN Conference. RAMIRAN 2015 – Rural-Urban Symbiosis. S. 4. Hamburg – ISBN 978-3-94142-95-0.

– (2015): Emission Situation of Anaerobic Digestion of Agricultural Residues and Bio-waste. In: Proceedings of the 16th International RAMIRAN Conference. RAMIRAN 2015 – Rural-Urban Symbiosis. TUTech Verlag. Hamburg – ISBN 978-3-946 094- 02-9.

Daniel-Gromke, J.; Reinelt, T.; Liebetrau, J. (2015): Bewertung der Emissionssituation von Biogasanlagen. In: Biogas in der Landwirtschaft – Stand und Perspektiven. FNR/KTBL- Kongress. Bd. 508. S. 78–87. FNR/KTBL. Darmstadt – ISBN 978-3-945088-07-4.

Daniel-Gromke, J.; Stinner, W.; Liebetrau, J.; Nelles, M. (2015): Emission situation of bio-waste digestation. In: Kühle-Weidemeier, M.; Balhar, M. (Hrsg.): Waste-to-Resources. S. 115–127. Hannover – ISBN 978-3-95404-980-6.

Dernbecher, A.; Tabet, F.; Ortwein, A. (2015): A CFD-based approach for thermochemical conversion of straw. In: Proceedings of the European Combustion Meeting – 2015. S. 1–6. Budapest, Ungarn – ISBN 978-963-12-1257-0.

– (2015): CFD-Modellierung und experimentelle Untersuchung der thermochemischen Konversion von Stroh. In: VDI Bericht 2267 zum 27. Deutscher Flammentag. VDI Berichte 2267. S. 769–772. VDI-Verlag. Clausthal-Zellerfeld – ISBN 978-3-18-092267-6.

Döhling, F.; Kirsten, C.; Khalsa, J.; Weller, N. (2015): Foliage as solid fuel – Fuel enhancement by washing and mechanical leaching. In: Proceedings of the International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. S. 1002–1005. Hong Kong, China.

Döhling, F.; Ziegler, D.; Umbach, T.; Witt, J. (2015): Torrefizierte Holzpellets – Brennstoffeigenschaften und Verbrennungsverhalten. In: Conference Proceedings (online): World Sustainable Energy Days 2015 (WSED)/European Pellet Conference. Wels, Österreich.

Dornack, C.; Faßauer, B.; Liebetrau, J.; Scholwin, F.; Nelles, M. (2015): Stand und Zukunftsaussichten der Vergärung biogener Abfälle. In: Dornack, C.; Scholwin, F.; Liebetrau, J.; Faßauer, B.; Nelles, M. (Hrsg.) (2015): Tagungsband zur 10. Biogastagung Dresden, Anaerobe Biologische Abfallbehandlung am 29./30. September 2015. S. 1–12. Dresden – ISBN 978-3-934253-90-2.

Elnaas, A.; Nassour, A.; Nelles, M. (2015): Markets for solid waste management in the Arabic countries. In: Thomè-Kozmiensky (Hrsg.): Book for the International Recycling and Recovery Congress. Bd. 5. S. 85–96. Wien, Österreich – ISBN 978-944310-22-0.

Engler, N.; Scholwin, F.; Sutter, R.; Nelles, M. (2015): Performance enhancement of biogas digesters by post-treatment and recirculation of digestate. In: Cossu, R.; He, P.; Kjeldsen, P.; Matsufuji, Y.; Reinhart, D.; Stegman, R. (Hrsg.): Symposium proceedings of the 15th International Waste Management and Landfill Symposium. 11 Seiten. Santa Margherita di Pula, Italien – ISBN 9788862650212.

Engler, N.; Scholwin, F.; Sutter, R.; Nelles, M. (2015): Performance enhancement of biogas digesters by post-treatment and recirculation of digestate. Abstract in: Cossu, R.; He, P.; Kjeldsen, P.; Matsufuji, Y.; Reinhart, D.; Stegman, R. (Hrsg.): Symposium proceedings of the 15th International Waste Management and Landfill Symposium. S. 45. Santa Margherita di Pula, Italien – ISBN 9788862650212.

Engler, N.; Schüch, A.; Nelles, M. (2015): Abfallbiomassen aus Lebensmittelindustrie und Landschaftspflege: Biogaserträge und Gasbildungskineten. In: Dornack, C.; Scholwin, F.; Liebetrau, J.; Faßauer, B.; Nelles, M. (Hrsg.) (2015): Tagungsband zur 10. Biogastagung Dresden, Anaerobe Biologische Abfallbehandlung am 29./30. September 2015. S. 147–158. Dresden – ISBN 978-3-934253-90-2.

Engler, N.; Weißbach, F.; Nelles, M. (2015): Erweitertes Auswerteverfahren für Biogas-Batch-Versuche zur quantifizierbaren Darstellung zeitlicher Verläufe. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 291–302. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Fischer, E.; Postel, J.; Ehrendreich, F. (2015): Repowering im Biogasanlagenbestand – Einführung des Nutzungsgrades zur Bewertung von effizienzsteigernden Maßnahmen. In: Biogas in der Landwirtschaft- Stand und Perspektiven. FNR/KTBL-Kongress. Bd. 508. S. 162–171. FNR/KTBL. Darmstadt – ISBN 978-3-945088-07-4.

Fischer, E.; Postel, J.; Stur, M.; Fischer, E.; Liebetrau, J.; Nelles, M. (2015): Repowering im Biogasanlagenbestand – Einführung des Nutzungsgrades zur Bewertung von effizienzsteigernden Maßnahmen. In: Tagungsband Forschungskolloquium Bioenergie 2015. OTTI Regensburg. Straubing.

Glowacki, R.; Mosler, H.; Nelles, M. (2015): Integrierte stoffliche und energetische Wertschöpfung aus Biomasse – Koppelprozesse im BMBF-Spitzencluster BioEconomy. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 29–38. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Gröngröft, A. (2015): Simulating the integration of lignocellulosic ethanol into first generation plants. In: Abstract Book. European Congress of Chemical Engineering – ECCE10. S. 1240. Nizza, Frankreich – ISBN 978-2-910239-82-4.

– (2015): Process simulation and sustainability assessment during conceptual design of biorefinery concepts. In: Abstract Book. European Congress of Chemical Engineering – ECCE10. S. 301. Nizza, Frankreich – ISBN 978-2-910239-82-4.

Grünes, J.; Nelles, M. (2015): Phosphor-Recycling aus organischen Abfällen und Reststoffen – Stand Potenziale und Perspektiven in Mecklenburg-Vorpommern. In: Bockreis, A.; Faulstich, M.; Flamme, S.; Kranert, M.; Mocker, M.; Nelles, M.; Quicker, P.; Rettenberger, G. (Hrsg.) (2015): 5. Wissenschaftskongress Abfall- und Ressourcenwirtschaft der Deutschen Gesellschaft für Abfallwirtschaft am 19./20. März 2015 in Innsbruck. S. 73–77. Innsbruck, Österreich – ISBN 978-3-902936-66-0.

– (2015): Aspects and Potentials of the Phosphorus Recycling from Organic Waste and Residues in Germany. In: Proceeding Book. 2nd Symposium of Asian Regional Branch of International Waste Working Group (iwwg-ARB). S. 208–210. Tongji, China.

– (04/2015): Aspects and Potentials of the Phosphorus Recycling from Organic Waste and Residues in Germany. Abstract in: iwwg-ARB (Ed.) 2nd Symposium of Asian Regional Branch of International Waste Working Group, S. 108. Tongji, China

– (2015): Status, potentials and perspectives of the recycling of phosphorus from organic waste and residues in Mecklenburg-Western Pomerania. In: Akinci, G.; Güven, D.; Bölükbas, A. (Hrsg.): TAKAG 2015. VI. Deutsch-Türkische Abfalltage. S. 178–184. Izmir, Türkei

– (2015): Recycling of phosphorus from organic waste and residues – status, potentials and perspectives in Mecklenburg-Western Pomerania. In: Cossu, R.; He, P.; Kjeldsen, P.; Matsufuji, Y.; Reinhart, D.; Stegman, R. (Hrsg.): Symposium proceedings of the 15th International Waste Management and Landfill Symposium. S. 10. Santa Margherita di Pula, Italien – ISBN 9788862650212.

– (2015): Recycling of phosphorus from organic waste and residues – status, potentials and perspectives in Mecklenburg-Western Pomerania. Abstract in: Cossu, R.; He, P.; Kjeldsen, P.; Matsufuji, Y.; Reinhart, D.; Stegman, R. (Hrsg.): Symposium proceedings of the 15th International Waste Management and Landfill Symposium. S. 394. Santa Margherita di Pula, Italien – ISBN 9788862650212.

Hartmann, I.; Matthes, M. (2015): Emissionsminderung und Effizienzsteigerung an Kaminöfen mittels eines Nachrüstmoduls. In: Nelles, M.; Harmann, H.; Lenz, V. (Hrsg.): Tagungsreader zum 6. Abscheider-Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. S. 138–149. Straubing – ISSN: 2199-9856 (Online).

Hildebrandt, J.; Bezama, A.; Thrän, D. (2015): Identification and evaluation of overriding goals in a sustainability monitoring system for a wood-based bioeconomy region. In: Conference book of abstracts from the Science Day of the CASTLE: Towards a Sustainable Bioeconomy – Innovative Methods and Solutions for the Agriculture and Forest Sectors. Barcelona, Spanien.

– (2015): Cascade use indicators for selected biopolymers: Are we aiming for the right solutions in design for recycling (DfR) of bio-based composites and polymers? In: Proceedings of the 10th Conference on Sustainable Development of Energy, Water and Environment Systems. Dubrovnik, Kroatien.

Hildebrandt, J.; Siebert, A.; Bezama, A.; Majer, S.; Budzinski, M.; Thrän, D. (2015): Assessment tools for Sustainability Monitoring of added-value networks in the bioeconomy. In: Conference Proceedings of the Global Bioeconomy Summit. Berlin.

Hillebrand, K.; Peetz, D.; Witt, J. (2015): Anpassung der Strombereitstellung von Festbrennstoffen an die variierenden Rahmenbedingungen des Marktes. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 83–91. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Hillebrand, K.; Witt, J. (2015): Innovative Concepts for the Integrated Material and Energetic Use of Wood in Central Germany with a Focus on Quality Assurance. In: Conference Proceedings of the 23rd European Biomass Conference and Exhibition. S. 1105–1114. Wien, Österreich. doi: 10.5071/23rdEUBCE2015-3AV.3.32 – ISBN 978-88-89407-516 (Print), ISSN 2282-5819 (Online).

Horschig, T.; Billig, E.; Witt, J.; Wirkner, R.; Thrän, D. (2015): The Biomethane Development in Germany, it's driving Forces and a Forecast – A System Dynamics Modelling Approach. In: Conference Proceedings of the 23rd European Biomass Conference and Exhibition. S. 1384–1392. Wien, Österreich. doi: 10.5071/23rdEUBCE2015-4CO.1.2 – ISBN 978-88-89407-516 (Print), ISSN 2282-5819 (Online).

Horschig, T.; Szarka, N. (2015): The German biomethane market – A policy evaluation approach using System Dynamics. In: Conference Proceedings of the 33rd System Dynamics Conference. Cambridge, USA.

Horschig, T.; Witt, J.; Wirkner, R.; Thrän, D. (2015): Der deutsche Biomethanmarkt und -handel – Ein System Dynamics-Ansatz. In: Tagungsband zum OTTI-Forschungskolloquium Bioenergie

2015. S. 179–183. OTTI Regensburg. Straubing.

Janke, L.; Leite, A. F.; Nikolausz, M.; Radetski, C. M.; Nelles, M.; Stinner, W. (2016): Comparison of start-up strategies and process performance during semi-continuous anaerobic digestion of sugarcane filter cake co-digested with bagasse. In: Cossu, R.; He, P.; Kjeldsen, P.; Matsufuji, Y.; Reinhart, D.; Stegman, R. (Hrsg.): Symposium proceedings of the 15th International Waste Management and Landfill Symposium. Bd. 48. S. 199–208. doi: 10.1016/j.wasman.2015.11.007. 0956-053X.

Ketelsen, K.; Nelles, M. (2015): Status and new trends/perspektives of MBT in Germany. In: Proceedings. Waste-to-Resources 2015 – VI. International Symposium MBT and MRF. S. 165–186. Hannover – ISBN 978-3-95404-980-6.

Klemm, M.; Clemens, A.; Blümel, R.; Kietzmann, F.; Nelles, M. (2015): Hydrothermale Verfahren – sinvolle Ergänzung oder Irrweg? In: Flamme, S.; Gallenkemper, B.; Gellenbeck, K.; Rotter, S.; Kranert, M.; Nelles, M.; Quicker, P. (Hrsg.) (2015): Tagungsband 14. Münsteraner Abfallwirtschaftstage (AWT 2015) am 24./25. Februar 2015. Münsteraner Schriften zur Abfallwirtschaft. 14. Bd. 16. S. 266–271. Münster – ISBN 978-3-98111 42-5-6.

Knauer, T.; Scholwin, F.; Nelles, M. (2015): Analytische Untersuchung der thermischen Optimierung von Biogasanlagen. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 267–276. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Köchermann, J.; Klemm, M.; Clemens, A.; Blümel, R.; Kietzmann, F. (2015): Hydrothermal processes for thermally treated biofuels production. In: Nelles, M. (Hrsg.): Tagungsreader zum Side-Event „Thermally treated biofuels“ im Rahmen der European Biomass Conference and Exhibition 2015 (EUBC&E). S. 59–71. Wien, Österreich – ISSN 2199-9856 (Online).

Kretzschmar, J. (2015): In-line acetate measurement in anaerobic digesters – development of a bioelectrochemical sensor platform. In: Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.): 2nd conference on monitoring and process control of anaerobic digestion plants. Reader des Förderprogramms Energetische Biomassenutzung. S. 33. DBFZ. Leipzig – ISSN 2366-4169

Kretzschmar, J.; Liebetrau, J.; Harnisch, F. (2015): Development of a bioelectrochemical sensor platform for anaerobic digestion processes. In: Proceedings. 14th World Congress on Anaerobic Digestion. Viña del Mar, Chile.

Kretzschmar, J.; Liebetrau, J.; Mertig, M.; Harnisch, F. (2015): Eine bioelektrochemische Sensorplattform zur inline-Messung von Acetat im anaeroben Vergärungsprozess. In: 12. Sensorsymposium. Dresden. doi: 10.5162/12dss2015/P2.10.

Krüger, D.; Ortwein, A. (2015): Motormanagement zur flexiblen Fahrweise von Schwachgas-Kraft-Wärme-Kopplungs-Anlagen am Beispiel der Vergasung von Holzkohle. In: Tagungsband zum Fachkolloquium „Biomass to Power and Heat“. S. 88–93. Zittau – ISBN 978-3-941521-22-3.

– (2015): Betriebsmodi einer Schwachgas-Mikro-Kraft-Wärme-Kopplungsanlage zur flexiblen Stromerzeugung unter Nutzung von Holzkohle. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 75–81. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Lauer, M.; Dotzauer, M. (2015): Optimale Betriebsstrategien für die flexible Strombereitstellung aus Biogasanlagen. In: Tagungsband zur 9. Internationale Energiewirtschaftstagung (IEWT 2015). S. 1–15. Technische Universität Wien. Wien, Österreich.

Lauer, M.; Romberg, T.; Dotzauer, M.; Hennig, C.; Nebel, E.; Postel, J.; Krautz, A.; Lehmann, M. (2015): OptFlex Biogas – Flexibilisierungsstrategien für den Biogasanlagenbestand. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Bioenergie – Mehr als eine sichere Reserve !? 6. Statuskonferenz 11./12. November 2015. Reader des Förderprogramms Energetische Biomassenutzung. S. 50. DBFZ. Leipzig – ISSN 2366-4169

Lemke, A.; Engler, N.; Nelles, M. (2015): Mykotoxine in Biogasanlagen. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 389–396. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Lenz, V. (2015): Rahmenbedingungen für Staubabscheider an Kleinfeuerungsanlagen in Deutschland – Neue Normen, DIN Spec 33999, VDI 3670 und VDI 4207. In: Nelles, M.; Hartmann, H.; Lenz, V. (Hrsg.): Tagungsreader zum 6. Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. S. 7–13. DBFZ. Leipzig – ISSN 2199-9856 (Online).

– (2015): SmartBiomassHeat. In: Tagungsband zum Fachkolloquium „Biomass to Power and Heat“. S. 17–26. Hochschule Zittau/Görlitz. Zittau – ISBN 978-3-941521-22-3.

Liebetrau, J.; Daniel-Gromke, J.; Denysenko, V.; Scheftelowitz, M.; Rensberg, N.; Nelles, M.; (2015): Aktuelle Entwicklungen bei der Erzeugung und Nutzung von Biogas. In: Tagungsband zum 8. Biogas Innovationskongress 2015. S. 11–23. ProFair consult+Project GmbH. Osnabrück – ISBN 978-3-9813776-5-1.

Liebetrau, J.; Stur, M.; Mauky, E.; Dotzauer, M. (2015): Möglichkeiten der flexiblen Strombereitstellung bei Biogasanlagen. In: Tagungsband zum Kongress Biogas in der Landwirtschaft – Stand und Perspektiven. Bd. 508. S. 53–67. FNR/KTBL. Darmstadt – ISBN 978-3-945088-07-4.

Lorenz, H.; Fischer, P.; Pröter, J.; Liebetrau, J. (2015): Einfluss des Biogasprozesses auf die hygienische Qualität von Gärresten. In: Tagungsband der Gülzower Fachgespräche „Pflanzenbauliche Verwertung von Gärrückständen aus Biogasanlagen“. Bd. 51. S. 228–242. Berlin – ISBN 978-3-942147-27-9.

Mameri, A.; Tabet, F.; Hadef, A. (2015): Simulation of Biogas Counter Flow Diffusion Flame Under Several Operation Conditions of Composition and Pressure. In: ICSD 2015 Book of Abstracts. International Conference on Sustainable Development. S. 49. Belgrad, Serbien.

– (2015): Simulation of Biogas Counter Flow Diffusion Flame Under Several Operation Conditions of Composition and Pressure. In: ICSD 2015 Book of Proceedings. International Conference on Sustainable Development. S. 165–172. Belgrad, Serbien – ISBN 978-605-66262-0-3.

Matthes, M.; Hartmann, I. (2015): Einsatz von Nachrüstmodulen an Kaminöfen zur Effizienzsteigerung und Emissionsminderung. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Bioenergie – Mehr als eine sichere Reserve !? 6. Statuskonferenz 11./12. November 2015. Reader des Förderprogramms Energetische Biomassenutzung. S. 20–21. DBFZ. Leipzig – ISSN 2366-4169

Mauky, E. (2015): Development of process optimisation tools for both efficient biogas research and operation 37 of full-scale plants. In: Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.): Reader 2nd conference on Monitoring & process control of anaerobic digestion plants/Special Plants. S. 37. DBFZ. Leipzig – ISSN 2366-4169.

Mauky, E.; Jacobi, H. F.; Weinrich, S.; Nägele, H.-J.; Liebetrau, J.; Nelles, M. (2015): Bedarfsgerechte Biogasproduktion mittels modellprädiktiven Fütterungsmanagement. In: Tagungsband zum 8. Biogas Innovationskongress 2015. S. 91–97. ProFair consult+Project GmbH. Osnabrück – ISBN 978-3-98-13776-5-1.

Mauky, E.; Jacobi, H.-F.; Weinrich, S.; Liebetrau, J.; Nelles, M.(2015): Development of process optimisation tools for both efficient biogas research and operation of full-scale plants, Abstract in: Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.): 2nd conference on Monitoring & process control of anaerobic digestion plants. Reader des Förderprogramms Energetische Biomassenutzung, Special workshop 19th of March, 2015, S. 37

Morscheck, G.; Nelles, M.; Henneberg, M. (2015): Deponiekultivierung mit gereiftem Nassbaggergut. In: Hochschule für Technik, Wirtschaft und Kultur Leipzig (Hrsg.): Tagungsband zur 11. Leipziger Deponiefachtagung. S. 217–230. Leipzig.

– (2015): Nassbaggergutnutzung bei der Rekultivierung von Deponien und Altlasten. In: Akinci, G.; Güven, D.; Bölükbas, A. (Hrsg.): TAKAG 2015. VI. Deutsch-Türkische Abfalltage. S. 178–184. Izmir, Türkei.

Morscheck, G.; Schüch, A.; Lemke, A.; Nelles, M. (2015): Bio-Waste Recycling in Germany – Further Challenges. In: Proceedings of the 5th International Conference on Solid Waste Management (IconSWM 2015). S. 680–688. Bangalore, India – ISBN 81-86862-57-9.

Morscheck, G.; Schüch, A.; Lemke, A.; Nelles, M. (2015): Bio-Waste Recycling in Germany – Further Challenges. Abstract in: Proceedings of the 5th International Conference on Solid Waste Management (IconSWM 2015). S. 76. Bangalore, India – ISBN 81-86862-56-0.

Müller-Langer, F.; Schröder, J.; Naumann, K. (2015): Beitrag der biogenen Kraftstoffe zur Erreichung der CO_2-Gesetzgebung. In: Beiträge zur 13. FAD-Konferenz: Herausforderung – Abgasnachbehandlung für Dieselmotoren. S. 243–254. Förderkreis Abgasnachbehandlungstechnologien für Dieselmotoren (FAD) e.V.. Dresden – ISSN 2199-8973.

Naumann, K.; Müller-Langer, F. (2015): Treibhausgasquote ab 2015 – Chance oder Risiko? In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 147–154. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Nelles, M.; Daniel-Gromke, J.; Denysenko, V.; Kittler, R.; Scheftelowitz, M.; Rensberg, N.; Stinner, W.; Liebetrau, J. (2015): Recent Development in Biogas Generation and Utilisation in Germany. In: Great Cycle 2015 – Symposium of Bioenergy Science and Technology. S. 14. Peking, China.

Nelles, M.; Glowacki, R.; Liebetrau, J.; Schüch, A.; Thrän, D. (2015): Energetische Biomassenutzung im Energie- und Bioökonomiesystem der Zukunft. In: Wiemer, K.; Kern, M.; Raussen, T. (Hrsg.): Bio- und Sekundärrohstoffverwertung X stofflich – energetisch. 27. Kasseler Abfall- und Bioenergieforum. 1. Aufl. S. 347–366. Witzenhausen-Institut für Abfall, Umwelt und Energie GmbH. Witzenhausen – ISBN 3-9286673-70-X.

Nelles, M.; Gruenes, J.; Rensberg, N.; Schüch, A. (2015): Utilization of Organic Waste and Residues – General Aspects and Innovative Solutions. In: Selected Proceedings of the 9th International Conference on Waste Management and Technology. Materials Science Engineering. Bd. 768. S. 714–721. Peking, China – ISBN 978-3-03835-476-5.

Nelles, M.; Grünes, J. (2015): Recycling of Phosphorus from Organic Waste and Residues – Status, Potentials and Perspectives in Germany. In: Wong, J.; Rajeshwar, D. T.; Nelles, M.; Selvam, A. (Hrsg.): Hong Kong Conference Proceedings Vol. 1. International Conference on Solid Was-

tes 2015 – Knowledge Transfer for Sustainable Resource Management. S. 64–67. Hong Kong, China – ISBN 978-988-19988-9-7.

Nelles, M.; Grünes, J. (05/2015): Recycling of Phosphorus from Organic Waste and Residues – Status, Potentials and Perspectives in Germany. Abstract in: Wong, J.; Rajeshwar, D. T.; Nelles, M.; Selvam, A. (Eds.): International Conference on Solid Waste 2015 – Knowledge Transfer for Sustainable Resource Management. p. 66. Hong Kong, China – ISBN 978-988-19988-8-0.

Nelles, M.; Grünes, J.; Morscheck, G. (2015): Waste Management in Germany – Development to a Sustainable Circular Economy? Abstract in: Proceedings of the 5th International Conference on Solid Waste Management (IconSWM 2015). P. 3. Bangalore, Indien – ISBN 81-86862-56-0.

Nelles, M.; Opphard, K. (2015): RETech – Erschließung internationaler Märkte für die deutsche Abfallwirtschaft. In: Flamme; Gallenkemper; Gellenbeck; Rotter; Kranert; Nelles; Quicker (Hrsg.): Präsentationen der 14. Münsteraner Schriften zur Abfallwirtschaft (AWT 2015). Bd. 16. S. 308–313. Münster – ISBN 978-3-98111 42-5-6

Nelles, M.; Weiland, P.; Liebetrau, J. (2015): Editorial des Wissenschaftlichen Kongress-Beirates. In: Tagungsband zum 8. Biogas Innovationskongress 2015. S. 1–3. ProFair consult+Project GmbH. Osnabrück – ISBN 978-3-98-13776-5-1.

Opphard, K.; Nassour, A.; Nelles, M. (2015): Material-specific waste treatment as an integrated component of RETech export. In: Proceedings. Waste-to-Resources 2015 – VI. International Symposium MBT and MRF. S. 494–507. Hannover – ISBN 978-3-95404-981-3.

Peetz, D.; Hillebrand, K.; Witt, J. (2015): Anteil fester Biomasse am deutschen Energiemix – mit Ausblick auf zukünftige Bereitstellungsstrategien infolge zunehmender Rohstoffknappheit von Holz. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 103–110. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Pfeiffer, D.; Thrän, D.; Hartmann, I.; Hoffstede (2015): Efficient Measures of Bioenergy Powered Heat and CHP. In: KIT (Hrsg.): Book of Abstracts of the conference „Energy, Science and Technology 2015“ (EST). S. 85. Karlsruhe.

Pollex, A. (2015): Overview about thermally treated solid biofuels. In: Nelles, M. (Hrsg.): Tagungsreader zum Side-Event „Thermally treated biofuels“ im Rahmen der European Biomass Conference and Exhibition 2015 (EUBC&E). Bd. 3. S. 6–15. DBFZ. Leipzig – ISSN 2199-9856 (Online).

Ponitka, J.; Thrän, D. (2015): Optionen und Trends der Biomassenutzung – Perspektiven für die Bioenergie 2050. In: Bruhns, H. (Hrsg.): Arbeitskreis Energie in der DPG (AKE). Frühjahrstagung der Deutschen Physikalischen Gesellschaft des Fachverbandes Didaktik der Physik. S. 53–62. Berlin.

Qian, M. Y.; Li, J.; Zhou, H. J.; Liebetrau, J.; Nelles, M. (2015): Commissioning results and recommendations of the first industrial scale garage-type dry fermentation msw biogas plant in China. In: Wong, J. W. C.; Tyagi, R. D.; Nelles, M.; Selvam, A. (Hrsg.): Proceedings of the International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. S. 314–318. Hong Kong, China – ISBN 978-988-19988-9-7.

Qian, M. Y.; Li, J.; Zhou, H. J.; Liebetrau, J.; Nelles, M. (05/2015): Commissioning Results and Suggestions of the First Industrial Scale Garage-Type Dry Fermentation MSW Biogas Plant in China. Abstract in: Wong, J.; Rajeshwar, D. T.; Nelles, M.; Selvam, A. (Eds.): International Conference on Solid Waste 2015 – Knowledge Transfer for Sustainable Resource Management. S. 160. Hong Kong, China – ISBN 978-988-19988-8-0.

Reinelt, T. (2015): Methane emissions from biogas plants – methods and equipment, results, operational states. In: Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.): Reader 2nd conference on Monitoring & process control of anaerobic digestion plants. S. 21–22. DBFZ. Leipzig – ISSN 2366-4169.

Reinelt, T.; Liebetrau, J.; Nelles, M. (2015): Operational Methane Emissions from Pressure Relief Vents on two Agricultural Biogas Plants. In: Wong, J. W. C.; Tyagi, R. D.; Nelles, M.; Selvam, A. (Hrsg.): Proceedings of the International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. S. 260–263. Hong Kong, China – ISBN 978-988-19988-9-7.

Reinelt, T.; Liebetrau, J.; Nelles, M. (05/2015): Operational Methane Emission from Pressure Relief Vents on Two Agricultural Biogas Plants. Abstract in: Wong , J.; Rajeshwar, D. T.; Nelles, M.; Selvam, A. (Hrsg.): Proceedings of the International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. Bd. 1, S. 260–263 – ISBN 978-988-19988-9-7.

Reinelt, T.; Liebetrau, J.; Nelles, M. (05/2015): Operational Methane Emission from Pressure Relief Vents on Two Agricultural Biogas Plants. Abstract in: Wong, J.; Rajeshwar, D. T.; Nelles, M.; Selvam, A. (Eds.): International Conference on Solid Waste 2015 – Knowledge Transfer for Sustainable Resource Management. S. 146. Hong Kong, China – ISBN 978-988-19988-8-0.

Sauer, B.; Ruppert, H.; Rauber, R.; Sträuber, H.; Pröter, J.; Hey, K.; Fahlbusch, W.; Dittrich-Zechendorf, M.; Pasold, T. (2015): Verbundvorhaben: Spurenelemente durch Energiepflanzen – Stoffströme und Handlungsempfehlungen für eine optimierte Prozessbiologie in Biogasanlagen. In: Biogas in der Landwirtschaft: Stand und Perspektiven. FNR/KTBL- Kongress. Bd. 508. S. 354–355. FNR/KTBL. Darmstadt. ISBN 978-3-945088-07-4.

Schäfer, F.; Dittrich-Zechendorf, M.; Leiker, M.; Pröter, J. (2015): Optimierter Einsatz von Eisenpräparaten zur Entschwefelung im Biogasprozess. In: Tagungsband zum 8. Biogas Innovationskongress 2015. S. 67–73. ProFair consult+Project GmbH. Osnabrück. ISBN 978-3-9813776-5-1.

Schaubach, K.; Thrän, D.; Kiel, J.; Carbo, M. (2015): Final results of the SECTOR project: Production of Solid Sustainable Energy Carriers from Biomass by Means of Torrefaction. In: KIT (Hrsg.): Book of Abstracts of the Conference „Energy, Science and Technology 2015“ (EST). S. 86. KIT. Karlsruhe.

– (2015): Final results of the SECTOR project: Production of Solid Sustainable Energy Carriers from Biomass by Means of Torrefaction. In: Book of Abstracts: 3. International Conference of the Cluster of Excellence Tailor-Made Fuels from Biomass 2015. S. 52–53. Florian Kremer. Aachen.

Schüch, A.; Janke, L.; Leite, A.; da Silva, M.; Arantes, N. (2015): Vergärung von Abfällen der Ethanol- und Zuckerindustrie in Brasilien. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 377–382. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Schüch, A.; Janke, L.; Nelles, M. (2015): Vergärung von Reststoffen (Bagasse, Vinasse, Filterkuchen) aus der Ethanolerzeugung. In: Dornack, C.; Scholwin, F.; Liebetrau, J.; Faßauer, B.; Nelles, M. (Hrsg.) (2015): Tagungsband zur 10. Biogastagung Dresden, Anaerobe Biologische Abfallbehandlung am 29./30. September 2015. S. 159–170. Dresden – ISBN 978-3-934253-90-2.

Schüch, A.; Nelles, M. (2015): Abfallbiomasse im Energiesystem und in der Bioökonomie. In: Flamme, S.; Gallenkemper, B.; Gellenbeck, K.; Rotter, S.; Kranert, M.; Nelles, M.; Quicker, P. (Hrsg.) (2015): Tagungsband 14. Münsteraner Abfallwirtschaftstage (AWT 2015) am 24./25. Februar 2015. Münsteraner Schriften zur Abfallwirtschaft. Bd. 16. S. 249–253. Münster – ISBN 978-3-98111-42-5-6.

Schulte, N.; Gellenbeck, K.; Nelles, M. (2015): Qualität in Müllabfuhr und Stadtreinigung: Bedeutung der Messbarkeit. In: Flamme, S.; Gallenkemper, B.; Gellenbeck, K.; Rotter, S.; Kranert, M.; Nelles, M.; Quicker, P. (Hrsg.) (2015): Tagungsband 14. Münsteraner Abfallwirtschaftstage (AWT 2015) am 24./25. Februar 2015. Münsteraner Schriften zur Abfallwirtschaft. Bd. 16. S. 322–328. Münster – ISBN 978-3-98111-42-5-6.

Schumacher, B.; Barchmann, T.; Liebetrau, J. (2015): Disintegration Technologies – Impacts on Biogas Process and Profitability. In: Abstract template for 3rd IBBA Workshop „Pretreatment of lignocellulosic substrates for biogas production“. Energiforsk AB. Malmö, Schweden.

Silva, M. C.; Arantes, N. R. M.; Engler, N.; Schüch, A.; Nelles, M. (2015): Co-Fermentation of bagasse as waste of the ethanol industry in different mixtures and pretreatments to enhance the efficiency of the anaerobic digestion. In: Cossu, R.; He, P.; Kjeldsen, P.; Matsufuji, Y.; Reinhart, D.; Stegman, R. (Hrsg.): Symposium proceedings of the 15th International Waste Management and Landfill Symposium. 13 Seiten. Santa Margherita di Pula, Italy – ISBN 9788862650212.

Silva, M. C.; Arantes, N. R. M.; Engler, N.; Schüch, A.; Nelles, M. (2015): Co-Fermentation of bagasse as waste of the ethanol industry in different mixtures and pretreatments to enhance the efficiency of the anaerobic digestion. Abstract in: Cossu, R.; He, P.; Kjeldsen, P.; Matsufuji, Y.; Reinhart, D.; Stegman, R. (Hrsg.): Symposium proceedings of the 15th International Waste Management and Landfill Symposium. S. 216. Santa Margherita di Pula, Italy – ISBN 9788862650212.

Stur, M. (2015): ManBio – Entwicklung von technischen Maßnahmen zur Verbesserung des Gasmanagements von Biogasanlagen. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Bioenergie – Mehr als eine sichere Reserve !? 6. Statuskonferenz 11./12. November 2015. Reader des Förderprogramms Energetische Biomassenutzung. S. 8. DBFZ. Leipzig – ISSN 2366-4169.

Thrän, D. (2015): Biomasse – Grundlagen und Herausforderungen für die Rohstoffbasis in einer nachhaltigen Bioökonomie. In: 6. Agrarwissenschaftliches Symposium, Innovative Biomasse-Erzeugung. Herausforderungen und Perspektiven. S. 9–13. Hans Eisenmann-Zentrum. München.

Thrän, D.; Fritsche, U. R. (2015): Standards for bio-based fuels and resources – status and need. In: IEA Bioenergy Conference 2015 – Realising the world's sustainable bioenergy potential. IEA Bioenergy Conference 2015. S. 32. Berlin.

Thrän, D.; Witt, J.; Schaubach, K.; Kiel, J. H. A.; Carbo, M. C.; Koppejan, J. (2015): Final Results of the SECTOR Project: Production of Solid Sustainable Energy Carriers from Biomass by Means of Torrefaction. In: Conference Proceedings of the 23rd European Biomass Conference and Exhibition (EUBC&E). S. 1712–1717. Wien, Österreich. doi: 10.5071/23rdEUBCE2015-IBO.12.5 – ISBN 978-88-89407-516 (Print), ISSN 2282-5819 (Online).

Wang, Y.; Nelles, M.; He, P. J.; Kwok, K.; Morscheck, G. (2015): Biodegradability Testin of Plastic Products under Simulated Composting

Environment in Both Micro and Macro Point of View. In: Wong, J.; Rajeshwar, D. T.; Nelles, M.; Selvam, A. (Hrsg.): Proceedings of the International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. S. 436. Hong Kong, China – ISBN 978-988-19988-9-7.

Wang, Y.; Nelles, M.; He, P. J.; Kwok, K.; Morscheck, G. (05/2015): Biodegradability Testin of Plastic Products under Simulated Composting Environment in Both Micro and Macro Point of View. Abstract in: Wong, J.; Rajeshwar, D. T.; Nelles, M.; Selvam, A. (Eds.): International Conference on Solid Waste 2015 – Knowledge Transfer for Sustainable Resource Management. S. 201. Hong Kong, China – ISBN 978-988-19988-8-0.

Wedwitschka, H.; Jenson, E.; Liebetrau, J. (2015): Optimization of anaerobic percolation processes and method development for substrate characterization. In: Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.): Reader 2nd conference on Monitoring & process control of anaerobic digestion plants/Special Plants. S. 52. DBFZ. Leipzig – ISSN 2366-4169.

Weißbach, G.; Nelles, M. (2015): Organsolv-Aufschluss zur Vorbehandlung lignocellulosehaltiger Reststoffe. In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 365–369. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

– (2015): Rapid delignification of lignocellulosic residues. In: Proceedings. International Bioenergy Exhibition and Asian Bioenergy Conference 2015. S. 86–92. Shanghai, China. doi: http://dx.doi.org/10.5071/IBSCE2015-4A0.2.2. – ISBN 978-88-89407-13-4.

Westerkamp, T. (2015): Moderne Methoden zur Erfassung flüchtiger Methanemissionen aus Biogasanlagen. In: VDI DIN Kommission Reinhaltung der Luft im VDI und DIN-Normenausschuss KRdL (Hrsg.): Diffuse Emissionen: Fachtagung Düsseldorf, 11./12. Juni 2015. VDI-Berichte. S. 131–137. VDI-Verlag. Düsseldorf – ISBN 978-3-18-092253-9.

Witt, J.; Peetz, D. (2015): Altholz im Kontext der Strom- und Wärmebereitstellung aus fester Biomasse – Aktueller Stand und perspektivische Nutzungsmöglichkeiten. In: Tagungsband (online) 15. Internationaler BBE-Fachkongress für Holzenergie. Bundesverband Bioenenergie e. V. (BBE). Augsburg.

Witt, J.; Schaubach, K.; Thrän, D.; Carbo, M. C.; Kiel, J. H. A. (2015): Torrefaction as a thermally treated process technology – State of the art and R&D results. In: Nelles, M. (Hrsg.): Tagungsreader zum Side-Event „Thermally treated biofuels“ im Rahmen der European Biomass Conference and Exhibition 2015 (EUBC&E). S. 27–49. Wien, Österreich – ISSN 2199-9856 (Online).

Wurdinger, K.; Dotzauer, M.; Schaubach, K.; Ziegler, D.; Ortwein, A. (2015): Herausforderungen bei der Modellierung einer IKT-Plattform für Akteure der Energiebranche. In: Tagungsband zur ETG-Fachtagung: Von Smart Grids zu Smart Markets 2015. Bd. 145. S. 1–6. Berlin, Offenbach: VDE-Verlag. Kassel – ISBN 978-3-8007-3897-7.

Xu, A.; Nelles, M. (2015): Ansätze zur Optimierung der Klärschlammentsorgung in China am Beispiel der Provinz Anhui. In: Bockreis, A.; Faulstich, M.; Flamme, S.; Kranert, M.; Mocker, M.; Nelles, M.; Quicker, P.; Rettenberger, G. (Hrsg.) (2015): 5. Wissenschaftskongress Abfall- und Ressourcenwirtschaft der Deutschen Gesellschaft für Abfallwirtschaft am 19./20. März 2015 in Innsbruck. S. 295–298. Innsbruck, Österreich – ISBN 978-3-902936-66-0.

Zeymer, M.; Clemens, A.; Meisel, K.; Müller-Langer, F. (2015): Herstellung von HTC-Kohle aus Grünschnitt und Nutzung im Wärmemarkt – Eine ökologische und ökonomische Bewertung. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Bioenergie – Mehr als eine sichere Reserve !? 6. Statuskonferenz 11./12. November 2015. Reader des Förderprogramms Energetische Biomassenutzung. DBFZ. Leipzig. S. 30–31 – ISSN 2366-4169

Zeymer, M.; Meisel, K.; Clemens, A. (2015): Technisch-ökonomisch-ökologische Analyse der hydrothermalen Carbonisierung (HTC). In: Nelles, M. (Hrsg.) (2015): Tagungsband 9. Rostocker Bioenergieforum. Schriftenreihe Umweltingenieurwesen (ASW-Beiträge). Bd. 52. S. 205–220. Universität Rostock. Rostock – ISBN 978-3-86009-425-9.

Ziegler, D.; Zeng, T.; Döhling, F.; Umbach, T.; Witt, J. (2015): Torrefied wood pellets for the use in small scale combustion appliances. In: Conference Proceedings of the 23rd European Biomass Conference and Exhibition (EUBC&E). S. 1146–1149. Wien, Österreich – ISBN 978-88-89407-516 (Print), ISSN 2282-5819 (Online).

Presentations

Arendt, O. (2015): Milestones 2030: Energy systems research for policy support. Vortrag gehalten: UFZ – Kurs „Science policy interface“ im Rahmen des „Higrade Advanced Courses. Am 11.06.2015 in Leipzig.

Arendt, O.; Ponitka, J.; Thrän, D. (2015): Perspektiven für die Bioenergie 2050 – Ergebnisse und Erfahrungen aus dem Forschungsvorhaben „Meilensteine 2030“. Vortrag gehalten: Internationale Woche 2015 der Universität Halle. Am 05.05.2015 in Halle.

Barchmann, T. (2015): Technisch-ökonomische Optimierung von flexiblen Biogaskonzepten. Vortrag gehalten: Leipziger Biogasforum. Am 14.01.2015 in Leipzig.

– (2015): Technisch-ökonomische Optimierung von flexiblen Biogaskonzepten im Kontext des EEG. Vortrag gehalten: Leipziger Biogasforum. Am 14.01.2015 in Leipzig.

– (2015): Projektüberblick RegioBalance – Technik, Profile, Szenarien. Vortrag gehalten: Stakeholder-Workshop-Biogas als Flexibilitätsoption für Stromverteilernetze. Am 12.05.2015 in Berlin.

Barchmann, T.; Rensberg, N. (2015): Wirtschaftliche Bewertung von Anlagenkonzepten zur Bioabfallvergärung. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 19.06.2015 in Rostock.

Beil, M.; Böckler, H.-B.; Daniel-Gromke, J.; Trommler, M. (2015): Monitoring des Biomethanproduktionsprozesses- Vorstellung des Forschungsprojekts MONA. Vortrag gehalten: FNR/KTBL- Kongress. Am 23.09.2015 in Potsdam.

Billig, E.; Nelles, M.; Qian, M.; Zhou, H. (2015): Biogas and Biomethane in China. Vortrag gehalten: Kraftstoffe der Zukunft. Am 20.01.2015 in Berlin.

Billig, E.; Szarka, N. (2015): Demand-driven bioenergy in Germany. Vortrag gehalten: Sino-German Forum „Distributed Energy Supply Using Renewable Sources in Hebei and Jiangsu“. Am 14.09.2015 in Shanghai, China.

Bindig, R.; Hartmann, I. (2015): Katalytische Emissionsminderung – Erfahrungen aus der Praxis. Vortrag gehalten: 4. ClO Campus „Technische Lösungen für eine Rohstoff- und energieeffiziente Biomassenutzung“. Am 10.12.2015 in Leipzig.

Bloche-Daub, K.; Thrän, D. (2015): Additional Regional Benefit from Bioenergy Projects: Which Can Be the Best Waste Heat Utilization Concept for Biogas Plants? Vortrag gehalten: 23rd European Biomass Conference and Exhibition (EUBC&E). Am 04.06.2015 in Wien, Österreich.

Bohnet, S. (2015): Biomassen identifizieren und effizient nutzen. Vortrag gehalten: Abschlusskongress Bioenergie-Regionen. Am 16.06.2015 in Berlin.

– (2015): Netzwerke Landschaft – Kunst – Energie. Wandel erkennen und vermitteln. Vortrag gehalten: „Kunst & Energie“ Workshop für Pädagogen. Am 20.11.2015 in Naumburg.

Bohnet, S.; Bloche-Daub, K.; Nelles, M. (2015): Großbaustelle Wärmewende. Herausforderungen bei der Umsetzung von Wärmeprojekten in Bioenergie-Regionen. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 19.06.2015 in Rostock.

Braune, M. (2015): The production of biofuels in Germany – State-of-the-art and optimization approaches. Vortrag gehalten: 11th European Bioethanol and Bioconversion Technology Meeting. Am 14.04.2015 in Detmold.

– (2015): Die Biokraftstoffproduktion in Deutschland – Stand der Technik und Optimierungsansätze. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 18.06.2015 in Rostock.

Brosowski, A. (2015): Geographie in der Bioenergieforschung. Vortrag gehalten: Universität Leipzig, Institut für Geographie. Am 27.10.2015 in Leipzig.

– (2015): GIS in der Bioenergieforschung. Vortrag gehalten: Sitzung des BMEL-Geschäftsbereiches zum Thema Geoinformation. Am 17.11.2015 in Bonn.

– (2015): Räumliche Verteilung von Strohpotenzialen und deren Bereitstellungskosten. Vortrag gehalten: 1. bioliq Statuskolloquium am KIT. Am 01.12.2015 in Eggenstein-Leopoldshafen.

Brosowski, A.; Mantau, U.; Mahro, B.; Thrän, D.; Nelles, M.; Erdmann, G.; Stinner, W.; Reinhold, G.; Adler, P.; Hering, T.; Blanke, C. (2015): Biomassepotenziale und Nutzung von Rest- und Abfallstoffen – Status quo in Deutschland (BIOPOT). Vortrag gehalten: Deutsche Umwelthilfe e. V. 70. Treffen „Netzwerk Bioenergie“. Am 25.11.2015 in Berlin.

Brosowski, A.; Scheftelowitz, M.; Denysenko, V.; Stinner, W. (2015): BiogasFaserPlus. Machbarkeitsstudie für Marktprodukte aus Gärresten. Vortrag gehalten: 4. ClO Campus „Technische Lösungen für eine Rohstoff- und energieeffiziente Biomassenutzung“. Am 10.12.2015 in Leipzig.

Büchner, D. (2015): ToxOAb – Entwicklung eines Probenahmesystems zur Extraktion von Stäuben aus Abgasen von Holzfeuerungen zur anschließenden toxikologischen Untersuchung. Vortrag gehalten: 6. Statuskonferenz „Energetische Biomassenutzung“. Am 12.11.2015 in Leipzig.

Büchner, D.; Krüger, D. (2015): Mikro-KWK auf Basis fester Biomasse: Stand der Technik und aktuelle Entwicklungen. Vortrag gehalten: Enertec/TerraTec. Am 29.01.2015 in Leipzig.

Butt, S. (2015): Minderung der Schadstoffemissionen durch katalytisch wirksame Baugruppen in einem neuartigen Kaminofen. Vortrag gehalten: 6. Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. Am 29.02.2015 in Straubing.

Dahlin, J.; Herbes, C.; Nelles, M. (2015): Vermarktung von Biogas-Gärprodukten – die Perspektive der Anbieter. Vortrag gehalten: Fachtagung Pflanzenbauliche Verwertung von Gärrückständen aus Biogasanlagen. Am 10.03.2015 in Berlin.

– (2015): Marketing of biogas fermentation residues – The providers' perspective. Vortrag gehalten: RAMIRAN 2015 – Rural-Urban Symbiosis. Am 08.09.2015 in Hamburg.

Daniel-Gromke, J.; Denysenko, V.; Reinelt, T. (2015): Optimierter Anlagenbetrieb von Biogasanlagen. Vortrag gehalten: Zukunft Biogas – flexibel und optimiert! Biogasfachveranstaltung. Am 09.06.2015 in Oschersleben.

Daniel-Gromke, J.; Liebetrau, J.; Reinelt, T. (2015): Emission Situation of Anaerobic Digestion of Agricultural Residues and Bio-waste. Vortrag gehalten: RAMIRAN 2015 – Rural-Urban Symbiosis. Am 08.09.2015 in Hamburg.

Daniel-Gromke, J.; Reinelt, T.; Liebetrau, J. (2015): Bewertung der Emissionssituation von Biogasanlagen. Vortrag gehalten: FNR/KTBL- Kongress. Am 23.09.2015 in Potsdam.

Daniel-Gromke, J.; Reinelt, T.; Postel, J. (2015): Optimierter Anlagenbetrieb von Biogasanlagen. Vortrag gehalten: Prozessmesstechnik an Biogasanlagen/Workshop „Schaumbildung in Biogasanlagen“. Am 19.03.2015 in Leipzig.

Daniel-Gromke, J.; Stinner, W.; Liebetrau, J.; Nelles, M. (2015): Emission situation of bio-waste digestion. Vortrag gehalten: Waste-to-Resources. Am 05.05.2015 in Hannover.

Dernbecher, A. (2015): Modeling thermochemical conversion of solid biomass in a straw fired furnace. Vortrag gehalten: 3rd OpenFOAM User Conference. Am 19.10.2015 in Stuttgart.

Dotzauer, M. (2015): Flexible Bioenergy – Generation technologies –. Vortrag gehalten: UFZ energy days 2015. Am 24.02.2015 in Leipzig.

Dotzauer, M.; Lauer, M. (2015): Optimale Flexibilisierung von Bestandsanlagen in der Praxis. Vortrag gehalten: BIOGAS 24. Internationale Jahrestagung. Am 28.01.2015 in Leipzig.

– (2015): Modellbeispiele zur Flexibilisierung von Bestandsanlagen. Vortrag gehalten: Biogas – Fachtagung Thüringen. Am 11.06.2015 in Stadtroda.

Elnaas, A.; Nassour, A.; Nelles, M. (2015): Markets for solid waste management in the Arabic countries. Vortrag gehalten: International Recycling and Recovery Congress. Am 10.2015 in Wien, Österreich

Engler, N.; Scholwin, F.; Sutter, R.; Nelles, M. (2015): Performance enhancement of biogas digesters by post-treatment and recirculation of digestate. Vortrag gehalten: 15th International Waste Management and Landfill Symposium. Am 05.10.2015 in Santa Margherita di Pula, Italien

Engler, N.; Weißbach, F.; Nelles, M. (2015): Erweitertes Auswerteverfahren für Biogas-Batch-Versuche zur quantifizierbaren Darstellung zeitlicher Verläufe. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 18.06.2015 in Rostock.

Fischer, E.; Postel, J.; Ehrendreich, F. (2015): Repowering im Biogasanlagenbestand- Einführung des Nutzungsgrades zur Bewertung von effizienzsteigernden Maßnahmen. Vortrag gehalten: FNR/KTBL- Kongress. Am 22.09.2015 in Potsdam.

Fischer, E.; Postel, J.; Stur, M.; Fischer, E.; Liebetrau, J.; Nelles, M. (2015): Repowering im Biogasanlagenbestand – Einführung des Nutzungsgrades zur Bewertung von effizienzsteigernden Maßnahmen. Vortrag gehalten: OTTI-Forschungskolloquium Bioenergie 2015. Am 11.02.2015 in Straubing.

Glowacki, R. (2015): Hydrothermale Prozesse – eine Technologie auf dem Weg zum Markt. Vortrag gehalten: 4. CIO Campus „Technische Lösungen für eine Rohstoff- und energieeffiziente Biomassenutzung“. Am 10.12.2015 in Leipzig.

Glowacki, R.; Mosler, H.; Nelles, M. (2015): Integrierte stoffliche und energetische Wertschöpfung aus Biomasse – Koppelprozesse im BMBF-Spitzencluster BioEconomy. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 18.06.2015 in Rostock.

Gröngröft, A. (2015): Energie- und Treibhausgasbilanz von HVO-Kraftstoff – eine vergleichende Analyse. Vortrag gehalten: Mitgliederversammlung VDB. Am 21.05.2015 in Berlin.

– (2015): Process simulation and sustainability assessment during conceptual design of biorefinery concepts. Vortrag gehalten: European Congress of Chemical Engineering – ECCE10. Am 30.09.2015 in Nizza, Frankreich

Grünes, J.; Nelles, M. (2015): Phosphor-Recycling aus organischen Abfällen und Reststoffen – Stand Potenziale und Perspektiven in Mecklenburg-Vorpommern. Vortrag gehalten: 5. Wissenschaftskongress Abfall- und Ressourcenwirtschaft. Am 19.03.2015 in Innsbruck, Österreich

– (2015): Aspects and Potentials of the Phosphorus Recycling from Organic Waste and Residues in Germany. Vortrag gehalten: 2nd Symposium of Asian Regional Branch of International Waste Working Group. Am 04.2015 in Tongji, China.

– (2015): Status, potentials and perspectives of the recycling of phosphorus from organic waste and residues in Mecklenburg-Western Pomerania. Vortrag gehalten: TAKAG 2015, VI. Deutsch-Türkische Abfalltage. Am 05.2015 in Izmir, Türkei

– (2015): Recycling of phosphorus from organic waste and residues – status, potentials and perspectives in Mecklenburg-Western Pomerania. Vortrag gehalten: 15th International Waste Management and Landfill Symposium. Am 05.10.2015 in Santa Margherita di Pula, Italien

Hartmann, I. (2015): Emissionsminderung und Effizienzsteigerung an Kaminöfen mittels eines Nachrüstmoduls. Vortrag gehalten: 6. Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. Am 29.02.2015 in Straubing.

Hartmann, I.; Matthes, M.; König, M.; Friese, C. (2015): Messung der Partikelemissionen mittels SMPS, OPC und PAS sowie gravimetrisch nach VDI 2066 an einer Kleinstfeuerung mit 5 kW Nennleistung für feste Biobrennstoffe. Vortrag gehalten: Am 29.09.2015 in Karlsruhe.

Hillebrand, K.; Peetz, D.; Witt, J. (2015): Strom- und Wärmebereitstellung aus fester Biomasse in Deutschland. Vortrag gehalten: Fachgespräch Feste Biomasse „Brennstoffe und Technologien von Heute & Morgen“ im FORUM enertec dezentral. Am 29.01.2015 in Leipzig.

– (2015): Anpassung der Strombereitstellung von Festbrennstoffen an die variierenden Rahmenbedingungen des Marktes. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 19.06.2015 in Rostock.

Horschig, T. (2015): Biomethan – Praxistaugliche Verfahren für den Wärmemarkt und als Kraftstoff. Vortrag gehalten: 1. Biomethan-Fachtagung – Stand der Technik, Nutzung und Märkte. Am 30.04.2015 in Lüchow.

– (2015): Transferability of a simulation model for the German biomethane market to the case of UK. Vortrag gehalten: SUPERGEN Bioenergy Hub. Am 19.11.2015 in Harpenden, Großbritannien

Horschig, T.; Billig, E.; Witt, J.; Wirkner, R.; Thrän, D. (2015): The Biomethane Development in Germany, its Driving Forces and a Forecast – A System Dynamics Modelling Approach. Vortrag gehalten: 23rd European Biomass Conference & Exhibition. Am 03.06.2015 in Wien, Österreich.

Janke, L. (2015): Characterization of substrates and biogas potential in Brazil. Vortrag gehalten: iNOPA workshop. Am 20.01.2015 in Goiania, Brasilien.

– (2015): Anaerobic digestion of vinasse followed by filter cake during sugarcane offseason: ongoing research. Vortrag gehalten: iNOPA workshop. Am 21.01.2015 in Goiania, Brasilien.

– (2015): Biogas production from sugarcane filter cake: Start-up strategies, co-digestion with bagasse and plant design. Vortrag gehalten: iNOPA workshop. Am 21.01.2015 in Goiania, Brasilien.

Janke, L.; Leite, A.; Nicolausz, M.; Nelles, M.; Stinner, W. (2015): Biogas production from sugarcane filter cake: Start-up strategies, co-digestion with bagasse and plant design. Vortrag gehalten: Waste-to-Resources. Am 05.05.2015 in Hannover.

Kelm, T.; Hochloff, P.; Horst, J.; O'Sullivan, M.; Preiser, K.; Thrän, D.; Wittwer, C. (2015): Geschäftsmodelle für die Wärmewende. Vortrag gehalten: FVEE – Jahrestagung 2015: Forschung für die Wärmewende. Am 03.11.2015 in Berlin.

Ketelsen, K.; Nelles, M. (2015): Status and new trends/perspektives of MBT in Germany. Vortrag gehalten: Waste-to-Resources 2015 – VI. International Symposium MBT and MRF. Am 05.05.2015 in Hannover.

Kittler, R. (2015): Innovationszentrum Bioenergie und SMILE – Das Hochschulgründernetzwerk in Leipzig. Vortrag gehalten: 4. CIO Campus „Technische Lösungen für eine Rohstoff- und energieeffiziente Biomassenutzung“. Am 10.12.2015 in Leipzig.

Kittler, R.; Szarka, N.; Eichhorn, M.; Bezama, A.; Thrän, D. (2015): The role of bioenergy in Germany within long-term energy scenarios. Vortrag gehalten: International Conference on Sustainable Energy & Environmental Protection SEEP2015. Am 11.08.2015 in Paisley, Schottland.

Klemm, M.; Clemens, A.; Blümel, R.; Kietzmann, F.; Nelles, M. (2015): Hydrothermale Verfahren – sinvolle Ergänzung oder Irrweg? Vortrag gehalten: 14. Münsteraner Abfallwirtschaftstage. Am 02.2015 in Münster.

Knauer, T.; Scholwin, F.; Nelles, M. (2015): Analytische Untersuchung der thermischen Optimierung von Biogasanlagen. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 06.2015 in Rostock.

Köchermann, J. (2015): Hydrothermal processes for thermally treated biofuels production. Vortrag gehalten: 23rd European Biomass Conference & Exhibition, Side Event „Thermally treated biofuels“. Am 03.06.2015 in Wien, Österreich.

König, M. (2015): Current status and perspectives of wood utilization for energy purposes. Vortrag gehalten: Bioenergy forum – trends in Germany and Mercosur. Am 13.10.2015 in Montevideo, Uruguay.

Krebs, C. (2015): Herausforderungen im Betrieb einer Forschungsbiogasanlage. Vortrag gehalten: Fachtagung „Dokumentation im Anlagenlebenszyklus“. Am 19.05.2015 in Leipzig.

Kretzschmar, J.; Liebetrau, J.; Harnisch, F. (2015): In-line acetate measurement in anaerobic digesters- development of a bioelectrochemical sensor platform. Vortrag gehalten: 2nd conference on Monitoring & process control of anaerobic digestion plants. Am 18.03.2015 in Leipzig.

Kretzschmar, J.; Rosa, L. F. M.; Liebetrau, J.; Mertig, M.; Harnisch, F. (2015): A microbial electrochemical sensor for anaerobic digestion process control. Vortrag gehalten: Mikrobielle Bioelektrotechnologie: Eine Plattforminitiative für Deutschland. Am 03.11.2015 in Leipzig.

Krüger, D.; Ortwein, A. (2015): Motormanagement zur flexiblen Fahrweise von Schwachgas-KWK-Anlagen am Beispiel der Vergasung von Holzkohle. Vortrag gehalten: Biomass to Power and Heat 2015. Am 06.05.2015 in Zittau.

– (2015): Betriebsmodi einer Schwachgas-Mikro-Kraft-Wärme-Kopplungsanlage zur flexiblen Stromerzeugung unter Nutzung von Holzkohle. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 18.06.2015 in Rostock.

Lauer, M.; Dotzauer, M. (2015): Optimale Betriebsstrategien für die flexible Strombereitstellung aus Biogasanlagen. Vortrag gehalten: 9. Internationale Energiewirtschaftstagung an der TU Wien. Am 13.02.2015 in Wien, Österreich.

– (2015): Flexibilisierung von Bestandsbiogasanlagen in der Praxis – Technische und ökonomische Faktoren für den optimalen Betrieb. Vortrag gehalten: Biogas-Fachgespräch in Nossen (LfULG). Am 24.02.2015 in Nossen.

– (2015): OptFlex Biogas – Flexibilisierungsstrategien für den Biogasanlagenbestand. Vortrag gehalten: 6. Statuskonferenz „Energetische Biomassenutzung“. Am 12.11.2015 in Leipzig.

Lenz, V. (2015): Rahmenbedingungen für Staubabscheider an Kleinfeuerungsanlagen in Deutschland – Neue Normen, DIN Spec 33999, VDI 3670 und VDI 4207. Vortrag gehalten: 6. Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. Am 29.02.2015 in Straubing.

– (2015): Daten und Fakten zum Feinstaub aus Holzfeuerungen. Vortrag gehalten: Infoabend der „naturkraft region“. Am 04.03.2015 in Bad Wildungen.
– (2015): Einfluss der Brennstoffqualität auf Feinstaubemissionen und deren Grenzen – Einschätzung der Forschung. Vortrag gehalten: C.A.R.M.E.N. e.V.: Statusseminar „1.BImSchV – Filtertechnik für Biomasseheizwerke“. Am 23.03.2015 in Nürnberg.
– (2015): Intelligente Biomasseheiztechnologien. Vortrag gehalten: BEE Forum Erneuerbare Energiewirtschaft „Erneuerbare Wärme“. Am 16.04.2015 in Hannover.
– (2015): Stand der Technik der Abscheidertechnologie für Kleinfeuerungen Gründruck VDI 3670 – Marktanalyse – Novellierung MAP. Vortrag gehalten: VDI-Expertenforum: Kleinfeuerungsanlagen für biogene Festbrennstoffe Stufe 2 der 1. BImSchV – Stand der Umsetzung – Auswirkungen auf den Markt. Am 21.04.2015 in Bonn.
– (2015): SmartBiomassHeat. Vortrag gehalten: Fachkolloquium „Biomass to Power and Heat“. Am 06.05.2015 in Zittau.
– (2015): Weiterentwicklung von staubarmen Biomasseheizkesseln. Vortrag gehalten: FNR (Lenkungsausschuss): Biomasseheizkessel mit Zukunft: Hinweise für Planung und Betrieb vor dem Hintergrund strengerer Emissionsanforderungen. Am 12.05.2015 in Hannover.
– (2015): Grundlagen der Verbrennung: Reaktionsprozesse, Emissionen und Einflussfaktoren. Vortrag gehalten: ZVSHK: Sachverständigenseminar Ofen- und Luftheizungsbau. Am 12.06.2015 in Potsdam.
– (2015): Wärme aus Biomasse – Stand und Perspektiven. Vortrag gehalten: AEE-Journalistenworkshop. Am 30.09.2015 in Berlin.
– (2015): Bioenergie als Baustein der Wärmewende – Optionen und Herausforderungen. Vortrag gehalten: Expertengespräch „Regenerative Wärme – wichtiger Baustein für die Energiewende im Gebäudesektor?“ Am 22.10.2015 in Berlin.
– (2015): Wärme als anwendungsnaher Teil der Energiewende. Vortrag gehalten: Energy Saxony MUT-Workshop. Am 29.10.2015 in Leipzig.
– (2015): Effiziente Wärme aus Biomasse – Stand, Herausforderungen und Perspektiven. Vortrag gehalten: FVEE – Jahrestagung 2015: Forschung für die Wärmewende. Am 04.11.2015 in Berlin.
– (2015): Stand der Technik bei Staubfiltern und -abscheidern für Biomassekessel – neue VDI Norm 3670. Vortrag gehalten: Agritechnica 2015 – Biomasseheizungen 2015: Holzbrennstoffe und Feuerungstechnik vor dem Hintergrund strengerer Emissionsanforderungen. Am 11.11.2015 in Hannover.

Liebetrau, J.; Daniel-Gromke, J.; Denysenko, V.; Scheftelowitz, M.; Rensberg, N.; Nelles, M.; (2015): Aktuelle Entwicklungen bei der Erzeugung und Nutzung von Biogas. Vortrag gehalten: 8. Biogas Innovationskongress 2015. Am 03.06.2015 in Osnabrück.

Liebetrau, J.; Stur, M.; Mauky, E.; Dotzauer, M. (2015): Möglichkeiten der flexiblen Strombereitstellung bei Biogasanlagen. Vortrag gehalten: FNR/KTBL- Kongress. Am 22.09.2015 in Potsdam.

Liebetrau, J.; Westerkamp, T.; Reinelt, T. (2015): Analyse von Emissionen aus Biogasanlagen und daraus ergebende Handlungsoptionen. Vortrag gehalten: Biogas 24. internationale Jahrestagung und Fachmesse. Am 29.01.2015 in Bremen.

– (2015): Analyse von Emissionen aus Biogasanlagen. Vortrag gehalten: DWA- Energietage. Am 09.09.2015 in Wuppertal.

Lorenz, H.; Fischer, P.; Pröter, J.; Liebetrau, J. (2015): Einfluss des Biogasprozesses auf die hygienische Qualität von Gärresten. Vortrag gehalten: 2. FNR- Fachtagung Pflanzenbauliche Verwertung von Gärrückständen aus Biogasanlagen. Am 11.03.2015 in Berlin.

Majer, S.; Brosowski, A.; Thrän, D. (2015): Biomassepotenziale für die Deutsche Energiewende – aktueller Stand, Potenziale und Treiber. Vortrag gehalten: Agora Energiewende. Am 09.06.2015 in Berlin.

Majer, S.; Budzinski, M.; Oehmichen, K. (2015): Wann liefern Bioraffinerien einen Beitrag zur nachhaltigen Entwicklung. Vortrag gehalten: DBU-Sommerakademie Nachhaltigkeitsbewertung. Am 28.06.2015 in Ostritz.

Majer, S.; Hennig, C.; Gawor, M. (2015): Bioenergy in Germany – current status and future perspectives. Vortrag gehalten: Bioenergy Symposium: Waste to Energy. Am 02.12.2015 in Kuching, Malaysia.

Majer, S.; Oehmichen, K.; Gröngröft, A.; Meisel, K.; Braune, M.; Naumann, K. (2015): Handreichungen zur Überprüfung von THG-Bilanzen von Biokraftstoffen. Vortrag gehalten: 4. BBE/UFOP-Fachseminar „Nachhaltigkeit von Biokraftstoffen“. Am 05.11.2015 in Berlin.

Majer, S.; Oehmichen, K.; Thrän, D. (2015): Ökobilanz der stofflichen Nutzung nachwachsender Rohstoffe – Herausforderungen und wesentliche Einflussfaktoren. Vortrag gehalten: GDCh-Wissenschaftsforum Chemie. Am 02.09.2015 in Dresden.

Majer, S.; Ponitka, J.; Thrän, D. (2015): Impuls: „Meilensteine 2030“ – Elemente für eine nachhaltige Bioenergiestrategie. Vortrag gehalten: Biomass Policies Workshop. Am 09.12.2015 in Berlin.

Majer, S.; Thrän, D.; Millinger, M. (2015): First and second generation biofuels: How to assess their potential for sustainable transportation. Vortrag gehalten: International Conference & Expo on Biofuels and Bioenergy. Am 25.09.2015 in Valencia, Spanien.

Matthes, M. (2015): Einsatz von Nachrüstmodulen an Kaminöfen zur Effizienzsteigerung und Emissionsminderung. Vortrag gehalten: 6. Statuskonferenz „Energetische Biomassenutzung“. Am 12.11.2015 in Leipzig.

– (2015): Untersuchungen zur Entwicklung eines Miscanthusbrenners im kleinen Leistungsbereich. Vortrag gehalten: Fachgespräch Feste Biomasse – Miscanthus – Rohstoff für eine innovative Bioökonomie? Am 02.12.2015 in Leipzig.

Matthes, M.; Hartmann, I.; König, M. (2015): Emissionsarme und effiziente Energieerzeugung im kleinen Leistungsbereich (< 5 kW) mittels einer Biomassekleinstfeuerung. Vortrag gehalten: 6. Fachkolloquium – Effiziente und schadstoffarme Verbrennungstechnologien für Biomasse. Am 12.05.2015 in Stuttgart.

Matthischke, S. (2015): Instationärer Betrieb der Methanisierung in Festbettreaktoren. Vortrag gehalten: Jahrestreffen der Fachgruppe Energieverfahrenstechnik. Am 24.02.2015 in Bonn.

Mauky, E.; Jacobi, H. F.; Weinrich, S.; Nägele, H.-J.; Liebetrau, J.; Nelles, M. (2015): Bedarfsgerechte Biogasproduktion mittels modellprädiktiven Fütterungsmanagement. Vortrag gehalten: 8. Biogas Innovationskongress. Am 03.06.2015 in Osnabrück.

Meisel, K.; Budzinski, M. (2015): Comparative LCA of multi-functional glycerol-based biorefineries. Vortrag gehalten: The 2nd European Life Cycle Assessment Workshop 3. Am 30.04.2015 in Nizza, Frankreich.

– (2015): Comparative LCA of multi-functional systems: A semi-consequential approach. Vortrag gehalten: The 2nd European Life Cycle Assessment Workshop 2. Am 30.04.2015 in Nizza, Frankreich.

Morscheck, G.; Nelles, M.; Henneberg, M. (2015): Deponiekultivierung mit gereiftem Nassbaggergut. Vortrag gehalten: 11. Leipziger Deponiefachtagung. Am 03.03.2015 in Leipzig.

– (2015): Nassbaggergutnutzung bei der Rekultivierung von Deponien und Altlasten. Vortrag gehalten: TAKAG 2015, VI. Deutsch-Türkische Abfalltage. Am 05.2015 in Izmir, Türkei

Morscheck, G.; Schüch, A.; Lemke, A.; Nelles, M. (2015): Bio-Waste Recycling in Germany – Further Challenges. Vortrag gehalten: 5th IconSWM 2015, International Conference on Solid Waste Management. Am 24.11.2015 in Bangalore, Indien

Müller-Langer, F. (2015): Environmental and economic assessment of a lignocellulose based bioethanol plant with Inbicon technology. Vortrag gehalten: 21st International Symposium on Alcohol Fuels. Am 11.03.2015 in Gwangju, Südkorea.

– (2015): Alternative Fuels for Aviation – Status quo and Perspectives of Different Options. Vortrag gehalten: CORE JetFuel workshop „Sustainable alternative aviation fuels – Innovative conversion technologies and deployment“. Am 01.06.2015 in Wien, Österreich.
– (2015): Alternative Kraftstoffe für den Luftverkehr. Vortrag gehalten: Cargo Climate Care Conference 2015. Am 10.06.2015 in Frankfurt/Main.
– (2015): Nachhaltigkeitsbewertung von Bioraffinerien – Methoden und Besonderheiten. Vortrag gehalten: DBU Sommerakademie. Am 30.06.2015 in Ostritz.
– (2015): Biokraftstoffe für die Mobilität heute und morgen – Stand und Perspektiven. Vortrag gehalten: 1. Hammer Bioenergietage. Am 21.07.2015 in Hamm.
– (2015): Beitrag der biogenen Kraftstoffe zur Erreichung der CO_2-Gesetzgebung. Vortrag gehalten: 13. FAD-Konferenz: Herausforderung – Abgasnachbehandlung für Dieselmotoren. Am 05.11.2015 in Dresden.

Naumann, K. (2015): Treibhausgasquote ab 2015 – Chance oder Risiko? Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 18.06.2015 in Rostock.

Nelles, M. (2015): Bioenergy in Germany – Technical Challenges for Biogas Production. Vortrag gehalten: University of Hefei (UH). Am 30.03.2015 in Hefei, China.

– (2015): Waste Management in Germany – Development to a sustainable Circular Economy?. Vortrag gehalten: University of Hefei (UH). Am 30.03.2015 in Hefei, China.
– (2015): Bioenergy in Germany – Technical Challenges for Biogas Production. Vortrag gehalten: Chengdu Institute of Biology (CIB). Am 01.04.2015 in Chengdu, China.
– (2015): Bioenergy in Germany – Technical Challenges for Biogas Production. Vortrag gehalten: DeTao Masters Academy. Am 09.04.2015 in Shanghai, China.
– (2015): Waste Management in Germany – Development to a sustainable Circular Economy? Vortrag gehalten: DeTao Masters Academy. Am 09.04.2015 in Shanghai, China.
– (2015): Waste Management in Germany – Development to a sustainable Circular Economy. Vortrag gehalten: RETech-Workshop mit einer Expertendelegation aus Qingdao, China. Am 07.09.2015 in Berlin.
– (2015): Smart Bioenergy – Innovationen für eine nachhaltige Zukunft. Vortrag gehalten: Ver-

anstaltungsreihe „Bioökonomie. Die Zukunft in unseren Händen“. Am 10.2015 in Leipzig.
– (2015): Recent Development in Biogas Generation and Utilisation in Germany. Vortrag gehalten: Nationale Energieagentur der VR China. Am 20.10.2015 in Peking China.
– (2015): Energy recovery and material utilization of biogenic waste and residues in Germany. Vortrag gehalten: China Petroleum University (CUP). Am 21.10.2015 in Peking, China.

Nelles, M.; Brosowski, A.; Grünes, J.; Morscheck, G. (2015): Waste Management in Germany – Development to a sustainable Circular Economy? Vortrag gehalten: 5th International Conference on Solid Waste Management Indian Institute of Science. Am 27.11.2015 in Bengaluru, Indien.

Nelles, M.; Daniel-Gromke, J.; Denysenko, V.; Kittler, R.; Scheftelowitz, M.; Rensberg, N.; Stinner, W.; Liebetrau, J. (2015): Recent Development in Biogas Generation and Utilization in Germany. Vortrag gehalten: Great Cycle 2015 – Symposium of Bioenergy Science and Technology. Am 09.08.2015 in Peking, China.

Nelles, M.; Glowacki, R.; Liebetrau, J.; Schüch, A.; Thrän, D. (2015): Bioenergie als Baustein im künftigen Energiesystem und der biobasierten Wirtschaft. Vortrag gehalten: 27. Kasseler Abfall- und Bioenergieforum. Am 29.04.2015 in Kassel.

Nelles, M.; Glowacki, R.; Liebetrau, J.; Schüch, A.; Thrän, D. (2015): Energetische Biomassenutzung im Energie- und Bioökonomiesystem der Zukunft. Vortrag gehalten: 27. Kasseler Abfall- und Bioenergieforum. Am 29.04.2015 in Kassel.

Nelles, M.; Grünes, J. (2015): Recycling of Phosphorus from Organic Waste and Residues – Status, Potentials and Perspectives in Germany. Vortrag gehalten: International Conference on Solid Wastes 2015 – Knowledge Transfer for Sustainable Resource Management. Am 22.05.2015 in Hong Kong, China.

Nelles, M.; Grünes, J.; Morscheck, G.; Rensberg, N.; Schüch, A. (2015): Utilization of Organic Waste and Residues in Germany. Vortrag gehalten: International Conference on Sustainable Waste Management. Am 01.09.2015 in Quito, Ecuador.
– (2015): Overview: energy recovery and material utilisation of organic waste and residues in Germany. Vortrag gehalten: Sino-German Summer School: „Energy Recovery and Material Utilisation of Biogenic Waste and Residues“. Am 11.10.2015 in Leipzig.

Nelles, M.; Lenz, V.; Thrän, D. (2015): Die künftige Rolle der Bioenergie – Einsatz im Wärmesektor der Zukunft. Vortrag gehalten: 60. Direktoriumssitzung des ForschungsVerbundes Erneuerbare Energien (FVEE). Am 16.04.2015 in Kassel.

Nelles, M.; Liebetrau, J.; Oos, M.; Raninger, B.†; Retzer, S. (2015): Sino-German Biogas Cooperation Projects. Vortrag gehalten: 3. Tagung der Sino-German Biogas Working Group. Am 08.02.2015 in Hainan, China.

Nelles, M.; Morscheck, G.; Xu, A. (2015): Auslandsmärkte – aktuelle Entwicklungen in der Abfallwirtschaft in der VR China. Vortrag gehalten: 14. Münsteraner Abfallwirtschaftstage. Am 02.2015 in Münster.

Nelles, M.; Opphard, K. (2015): RETech – Erschließung internationaler Märkte für die deutsche Abfallwirtschaft. Vortrag gehalten: 14. Münsteraner Abfallwirtschaftstage. Am 02.2015 in Münster.

Nelles, M.; Thrän, D.; Mantau, U.; Mahro, B.; Erdmann, G.; Stinner, W.; Reinhold, G.; Adler, P.; Hering, T.; Blanke, C.; Brosowski, A. (2015): Biomassepotenziale und Nutzung von Rest- und Abfallstoffen – Status quo in Deutschland (BIOPOT). Vortrag gehalten: Parlamentarisches Mittagessen. Am 09.09.2015 in Berlin.

Nitzsche, R. (2015): A methodological approach for the assessment and optimization of wood based biorefinery concepts. Vortrag gehalten: BioConSept Exploitation Event. Am 10.11.2015 in Merseburg.

Opphard, K.; Nassour, A.; Nelles, M. (2015): Material-specific waste treatment as an integrated component of RETech export. Vortrag gehalten: Waste-to-Resources 2015 – VI International Symposium MBT and MRF. Am 06.05.2015 in Hannover.

Ortwein, A. (2015): Wie (de)zentral ist die Energie von Morgen?“. Vortrag gehalten: enertec/Terratec. Am 27.01.2015 in Leipzig.
– (2015): Overview on Biomass Co-Firing Technologies. Vortrag gehalten: Co-Firing Of Biomas 2015 – VDI-Wissensforum. Am 17.03.2015 in Düsseldorf.
– (2015): Technical Challenges in Biomass Co-Firing. Vortrag gehalten: Co-Firing Of Biomas 2015 – VDI-Wissensforum. Am 17.03.2015 in Düsseldorf.
– (2015): Legislative Framework in Biomass Co-Firing. Vortrag gehalten: Co-Firing Of Biomas 2015 – VDI-Wissensforum. Am 18.03.2015 in Düsseldorf.
– (2015): Combined Heat, Power and Cooling for Buildings from Solid Biomass. Vortrag gehalten: Deutsch-Spanische Fachtagung – Biomasse-Nahwärme und Kältenetze. Am 23.06.2015 in Valladolid, Spanien.
– (2015): Was sind die neuen Rohstoffe für die energetische Nutzung? Vortrag gehalten: Veranstaltungsreihe „Bioökonomie. Die Zukunft in unseren Händen?“ Am 27.10.2015 in Leipzig.
– (2015): Dezentrale Kraft-Wärme-Kopplung mit Biomasse – Stand der Technik und aktuelle Forschungsansätze. Vortrag gehalten: 10. Kolloquium „Regenerative Energien – Entwicklungstrends und Innovationen“ der HTWK Leipzig. Am 03.11.2015 in Leipzig.

– (2015): Steuerung der Wärmegewinnung aus Biomasse und Solarthermie in Gebäuden. Vortrag gehalten: Expertenworkshop Fokus Umweltenergierecht „Brauchen wir einen neuen Rechtsrahmen für die Wärmewende?“ Am 19.11.2015 in Würzburg.

Ortwein, A.; Brosowski, A.; Khalsa, J.; Kirsten, C.; Pollex, A.; Pilz, A.; Weller, N. (2015): Biomass as a Fuel for Thermo-chemical Conversion. Vortrag gehalten: Co-Firing Of Biomas 2015 – VDI-Wissensforum. Am 17.03.2015 in Düsseldorf.

Ortwein, A.; Westerkamp, T. (2015): Economic Aspects in Biomass Co-Firing. Vortrag gehalten: Co-Firing Of Biomas 2015 – VDI-Wissensforum. Am 18.03.2015 in Düsseldorf.

Peetz, D.; Hillebrand, K.; Witt, J.; Nelles, M. (2015): Anteil fester Biomasse am deutschen Energiemix – mit Ausblick auf zukünftige Bereitstellungsstrategien infolge zunehmender Rohstoffknappheit von Holz. Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 19.06.2015 in Rostock.

Pfeiffer, D.; Thrän, D. (2015): Efficiency of biomass energy use – An adopted approach for the determination of the efficiency of different bioenergy technologies. Vortrag gehalten: Biofuels & Bioenergy 2015. Am 27.08.2015 in Valencia, Spanien.

Pfeiffer, D.; Thrän, D.; Hartmann, I.; Hoffstede, U. (2015): Efficient Measures of Bioenergy Powered Heat and CHP. Vortrag gehalten: EST Energy Science Technology Conference 2015. Am 22.05.2015 in Karlsruhe.

Pollex, A. (2015): Overview about thermally treated solid biofuels. Vortrag gehalten: 23rd European Biomass Conference and Exhibition (EUBC&E). Side-Event: „Thermally treated biofuels“. Am 03.06.2015 in Wien, Österreich.

Pollex, A. (2015): Betrachtungen zur ganzheitlichen Reststoffverwertung aus dem Organosolvprozess. Vortrag gehalten: Bioraffiniert VIII 2015. Am 25.02.2015 in Oberhausen.

Pollex, A. (2015): Integrated utilisation concepts for biogenic residues of the Organosolv process. Vortrag gehalten: 23rd European Biomass Conference and Exhibition. Am 02.06.2015 in Wien, Österreich.

Ponitka, J.; Thrän, D. (2015): Optionen und Trends der Biomassenutzung: Perspektiven für die Bioenergie 2050. Vortrag gehalten: DPG-Tagung der Deutschen physikalischen Gesellschaft. Am 17.03.2015 in Berlin.

Pröter, J.; Lorenz, H.; Sträuber, H. (2015): Herausforderungen in der mikrobiellen biochemischen Konversion – welche Innovationen brauchen wir? Vortrag gehalten: Symposium: Mikroorganismen und Wirbellose – entscheidende Dienstleister für Landwirtschaft und Ernährung. Am 26.11.2015 in Berlin.

Qian, M. Y.; Li, J.; Zhou, H. J.; Liebetrau, J.; Nelles, M. (2015): Commissioning Results and Suggestions of the First Industrial Scale Garage-Type Dry Fermentation MSW Biogas Plant in China. Vortrag gehalten: International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. Am 05.2015 in Hong Kong, China.

Reinelt, T. (2015): Methane emissions from biogas plants – methods and equipment, results, operational states. Vortrag gehalten: 2nd conference on Monitoring & process control of anaerobic digestion plants. Am 17.03.2015 in Leipzig.

Reinelt, T.; Liebetrau, J.; Nelles, M. (2015): Operational Methane Emissions from Pressure Relief Vents on two Agricultural Biogas Plants. Vortrag gehalten: International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. Am 20.05.2015 in Hong Kong, China.

Rönsch, S. (2015): Festbettmethanisierung – Simulation und Versuche zum lastflexiblen Verhalten. Vortrag gehalten: Jahrestreffen der ProcessNet Fachgruppe Hochtemperaturtechnik. Am 19.02.2015 in Rheinfelden.
– (2015): Syntheseforschung am DBFZ. Vortrag gehalten: Treffen des EnergieRohstoff-Netzwerks. Am 30.11.2015 in Leipzig.

Schäfer, F.; Dittrich-Zechendorf, M.; Leiker, M.; Pröter, J. (2015): Optimierter Einsatz von Eisenpräparaten zur Entschwefelung im Biogasprozess. Vortrag gehalten: 8. Biogas Innovationskongress. Am 02.06.2015 in Osnabrück.

Schaubach, K. (2015): Bioenergy Assessment for Project Implementation in CARICOM and the Dominican Republic. Vortrag gehalten: IRENA: Island Energy Transitions: Pathways for Accelerated Uptake of Renewables. Am 24.06.2015 in Martinique, Frankreich

Schaubach, K.; Thrän, D.; Carbo, M.; Kiel, J. (2015): Final Results of the Sector Project: Production of Solid Sustainable Energy Carriers from Biomass by Means of Torrefaction. Vortrag gehalten: EST Energy Science Technology Conference 2015. Am 21.05.2015 in Karlsruhe.

Scheftelowitz, M.; Thrän, D.; Lauer, M. (2015): Ausschreibungen für die Bioenergie – Positionen der Wissenschaft. Vortrag gehalten: 23. Sitzung des BBE-Politischen/Wissenschaftlichen Beirates. Am 23.09.2015 in Berlin.

Schmidt, S. (2015): Flexibilisierte Strombereitstellung aus biogenen Gasen mit Hilfe von Brennstoffzellen. Vortrag gehalten: 3. Sächsisches Forum für Brennstoffzellen und Energiespeicher 2015. Am 28.01.2015 in Leipzig.
– (2015): Flexibilisierte Strombereitstellung aus biogenen Gasen mit Hilfe von Brennstoffzellen. Vortrag gehalten: 13. Riesaer Brennstoffzellen – Workshop. Am 17.06.2015 in Riesa.

Schneider, J. (2015): Simulation und Versuche zum Biomasseumsatz in einem atmosphärischen Flugstromvergaser. Vortrag gehalten: Forschungskolloquium Bioenergie. Am 11.02.2015 in Straubing.

Schüch, A.; Nelles, M. (2015): Abfallbiomasse im Energiesystem und in der Bioökonomie. Vortrag gehalten: 14. Münsteraner Abfallwirtschaftstage. Am 02.2015 in Münster.

Schulte, N.; Gellenbeck, K.; Nelles, M. (2015): Abfallbiomasse im Energiesystem und in der Bioökonomie. Vortrag gehalten: 14. Münsteraner Abfallwirtschaftstage. Am 02.2015 in Münster.

Schumacher, B.; Barchmann, T.; Liebetrau, J. (2015): Disintegration Technologies – Impacts on Biogas Process and Profitability. Vortrag gehalten: IBBA-Workshop „Pretreatment of lignocellulosic substrates for biogas production". Am 10.09.2015 in Malmö, Schweden.

Silva, M. C.; Arantes, N. R. M.; Engler, N.; Schüch, A.; Nelles, M. (2015): Co-Fermentation of bagasse as waste of the ethanol industry in different mixtures and pretreatments to enhance the efficiency of the anaerobic digestion. Vortrag gehalten: 15th International Waste Management and Landfill Symposium. Am 05.10.2015 in Santa Margherita di Pula, Italien

Stinner, W. (2015): Vergärung landwirtschaftlicher und gewerblicher Abfälle – Potenziale, Effekte und verfahrenstechnische Konzepte. Vortrag gehalten: AHK-Fachtagung, Waste to Energy. Am 16.06.2015 in Bukarest, Rumänien.

– (2015): Biogas from manure and organic wastes. Vortrag gehalten: US-Delegation. Am 09.07.2015 in Leipzig,

Stinner, W.; Janke, L. (2015): Biogas potentials in Brazil. Vortrag gehalten: Biogas: Energetische Nutzung von Abfällen und Abwässern in Brasilien. Am 01.10.2015 in München.

Sträuber, H.; Bühlingen, F.; Dittrich-Zechendorf, M.; Kleinsteuber, S. (2015): Effect of Trace Element Addition and pH-Value on the Production of Carboxylate Platform Chemicals. Vortrag gehalten: 11th International Conference on Renewable Resources & Biorefineries (RRB-11). Am 03.06.2015 in York, Großbritannien.

Stryi-Hipp, G.; Lenz, V.; Thrän, D.; Sperber, E.; Kastner, O.; Erhorn, H.; Rockendorf, G.; Horst, J.; Schüwer, D. (2015): Besonderheiten des Wärmemarktes und Konsequenzen für eine erfolgreiche Wärmewende. Vortrag gehalten: FVEE – Jahrestagung 2015 : Forschung für die Wärmewende. Am 03.11.2015 in Berlin.

Thrän, D. (2015): Der Weg in eine nachhaltige Bioökonomie – eine realistische Option? Vortrag gehalten: Umweltringvorlesung Biotechnologie, TU Dresden. Am 14.01.2015 in Dresden.

– (2015): Zukünftige Wege der Bioenergienutzung. Vortrag gehalten: Workshop zur strategischen und fachlichen Planung der Forschungslinie „Erneuerbare Energien in der Landschaft der Zukunft" am Bundesamt für Naturschutz. Am 15.04.2015 in Bonn.

– (2015): Bioökonomie – Kann Wachstum nachhaltig sein? Vortrag gehalten: Ringvorlesung: „Bioökonomie" der Universität Halle. Am 03.06.2015 in Halle.

– (2015): Bioökonomie und Bioökonomierat. Vortrag gehalten: Sitzung Sächsische Akademie der Wissenschaften AG Bioökonomie. Am 12.06.2015 in Leipzig.

– (2015): Perspectives for advanced Bioenergy Carriers. Vortrag gehalten: Policy Workshop on improved bioenergy carriers of the EC-projects BioBoost and SECTOR. Am 16.06.2015 in Brüssel, Belgien.

– (2015): Die Rolle der Bioenergie in der künftigen Energieversorgung – das Smart Bioenergy Konzept. Vortrag gehalten: 1. Hammer Bioenergietage. Am 20.06.2015 in Hamm-Lippstadt.

– (2015): Bioenergy and social challenges in Germany. Vortrag gehalten: US Bioeconomy meets German Bioeconomy: Innovations for a Sustainable Bioeconomy. Workshop: USDA, Bioökonomierat. Am 22.09.2015 in Berlin.

– (2015): Aktuelle und künftige Bedeutung der Rolle der Bioenergie für den Klimaschutz – Position der Wissenschaft. Vortrag gehalten: 23. Sitzung des BBE-Politischen/Wissenschaftlichen Beirates. Am 23.09.2015 in Berlin.

– (2015): Biomasse – Grundlagen und Herausforderungen für die Rohstoffbasis in einer nachhaltigen Bioökonomie. Vortrag gehalten: 6. Agrarwissenschaftliches Symposium. Am 24.09.2015 in München.

– (2015): Chancen und Hemmnisse der Erschließung nachhaltiger Potentiale. Vortrag gehalten: Konferenz: „Biomethan als Kraftstoff". Am 29.09.2015 in Berlin.

– (2015): Nachwachsende Rohstoffe für neue Wertschöpfungsoptionen im Kontext von Potenzialen und Nachhaltigkeit. Vortrag gehalten: Jahrestagung des DAF (Dachverband Agrarforschung). Am 21.10.2015 in Berlin.

– (2015): Kernbotschaften Waldökosysteme. Vortrag gehalten: Gemeinsam mit dem Wald statt auf dem Holzweg – Waldökosysteme in ihrer Vielfalt wertschätzen und nutzen. Am 02.11.2015 in Berlin.

– (2015): Bioenergiesysteme. Vortrag gehalten: Festakt zur Feier des 10jährigen Bestehens des IIRM der Universität Leipzig. Am 16.12.2015 in Leipzig.

Thrän, D.; Fritsche, U. R. (2015): Standards for bio-based fuels and resources – status and need. Vortrag gehalten: IEA Bioenergy Conference. Am 27.10.2015 in Berlin.

Thrän, D.; O'Keeffe, S.; Purkus, A. (2012): Der Nexus von Nahrung, Futtermittel und Energie und natürliche Ressourcen – Modelle, Szenarien und Steuerungsansätze für die künfigen Stoffströme der Bioökonomie. Vortrag gehalten: Helmholtz Querschnittsverbund Sustainable Bioeconomy. Am 01.12.2012 in Karlsruhe

Thrän, D.; Pfeiffer, D. (2015): Der Beitrag des BMWi-Förderprogramms „Energetische Biomassenutzung" zur künftigen Bioenergienutzung. Vortrag gehalten: 6. Statuskonferenz „Energetische Biomassenutzung". Am 11.11.2015 in Leipzig.

Thrän, D.; Scheftelowitz, M. (2015): EEG 3.0 – Ausschreibungen für die Bioenergie Position der Wissenschaft. Vortrag gehalten: Bundesministerium für Ernährung und Landwirtschaft (BMEL) Workshop „Ausschreibung EEG – Bioenergie". Am 08.05.2015 in Berlin.

Thrän, D.; Stryi-Hipp, G.; Rockendorf, G.; Martin, N. (2015): Erneuerbare Energien im Wärmesektor – Aufgaben, Empfehlungen und Perspektiven. Vortrag gehalten: Hintergrundgespräch zur Vorstellung des FVEE-Positionspapiers im Fraunhofer Forum. Am 25.09.2015 in Berlin.

Thrän, D.; Wolfesberger-Schwabl, U.; Khalsa, J.; Ndibe, C. (2015): Exemplary Results of the SECTOR-project. Vortrag gehalten: ISO 238 – WG2 – Meeting. Am 09.06.2015 in York, Großbritannien.

– (2015): Exemplary Results of the SECTOR-project. Vortrag gehalten: ISO 238 – WG4 -Meeting. Am 10.06.2015 in York, Großbritannien.

Trommler, M. (2015): Biogas als Multitalent: Flexibilisierung und Wärmenutzungskonzepte. Vortrag gehalten: 10. Biogastagung. Am 30.09.2015 in Dresden.

– (2015): Increasing efficiency and reducing costs. Vortrag gehalten: European Biomethane Conference. Am 12.10.2015 in Berlin.

Trommler, M.; Dotzauer, M.; Barchmann, T.; Brosowski, A. (2015): Flexible Bioenergie als regionale Ausgleichsoption in Stromverteilernetzen – netztechnische und ökonomische Bewertung. Vortrag gehalten: 6. Statuskonferenz „Energetische Biomassenutzung". Am 12.11.2015 in Leipzig.

Ulbricht, T. (2015): Marktüberwachung von Biomassekleinfeuerungsanlagen und Abscheidern. Vortrag gehalten: VDI-Expertenforum: Kleinfeuerungsanlagen für biogene Festbrennstoffe Stufe 2 der 1. BImSchV – Stand der Umsetzung – Auswirkungen auf den Markt. Am 21.04.2015 in Bonn.

Ulbricht, T.; Hartmann, I. (2015): Stand der Abgasnachbehandlungstechnik bei Kleinfeuerungsanlagen. Vortrag gehalten: Infotag zu den neuen gesetzlichen Anforderungen an Heizanlagen ab 2015 gemäß der 2. Stufe der 1. BImSchV am BioWärmeZentrum Rheinland-Pfalz. Am 22.01.2015 in Simmern-Ohlweiler.

Ulbricht, T.; Lenz, V. (2015): Übersicht über die Förderung des Marktanreizprogramms für Biomassefeuerungen und Nachweise des Schornsteinfegers. Vortrag gehalten: 4. Fachkongresses des Bayerischen Kaminkehrerhandwerks. Am 26.10.2015 in Mühlbach.

Wang, Y.; Nelles, M.; He, P. J.; Kwok, K.; Morscheck, G. (2015): Biodegradability Testin of Plastic Products under Simulated Composting Environment in Both Micro and Macro Point of View. Vortrag gehalten: International Conference on Solid Wastes 2015: Knowledge Transfer for Sustainable Resource Management. Am 05.2015 in Hong Kong, China.

Weißbach, G.; Nelles, M. (2015): Rapid delignification of lignocellulosic residues. Vortrag gehalten: International Bioenergy Exhibition and Asian Bioenergy Conference 2015. Am 21.10.2015 in Shanghai, China.

Westerkamp, T. (2015): Moderne Methoden zur Erfassung flüchtiger Methanemissionen aus Biogasanlagen. Vortrag gehalten: VDI Wissensforum GmbH: Diffuse Emissionen 2015. Am 12.06.2015 in Düsseldorf.

– (2015): Quantifizierung diffuser Emissionen aus Biogasanlagen – Moderne Messmethoden -. Vortrag gehalten: VDI Wissensforum GmbH: Diffuse Emissionen 2015. Am 12.06.2015 in Düsseldorf.

Wirkner, R. (2015): Schnellwachsende Baumarten in Deutschland und deren Einsatz zur Wärmebereitstellung. Vortrag gehalten: Anwenderseminar/Fachgespräche Feste Biomasse: Ernte und Verwertung von Holz aus Kurzumtriebsplantagen. Am 15.01.2015 in Köllitsch.

Witt, J. (2015): DIN-Arbeitsausschuss „Feste Biomasse", NA 062-05-82 AA. Vortrag gehalten: Arbeitskreistreffen „Biomassekarbonisate" der VDI-Kommission Reinhaltung der Luft. Am 29.06.2015 in Leipzig.

Witt, J.; Peetz, D. (2015): Markt der Erneuerbaren – Strom- und Wärmebereitstellung aus Biomasse. Vortrag gehalten: Fachtagung „Energetische Holzverwertung" des Bundesverbandes der Altholzaufbereiter und -verwerter e.V. im Rahmen der LIGNA. Am 12.05.2015 in Hannover.

– (2015): Altholz im Kontext der Strom- und Wärmebereitstellung aus fester Biomasse – Aktueller Stand und perspektivische Nutzungsmöglichkeiten. Vortrag gehalten: 15. Internationaler BBE-Fachkongress für Holzenergie. Am 02.10.2015 in Augsburg.

Witt, J.; Schaubach, K.; Thrän, D.; Carbo, M. C.; Kiel, J. H. A. (2015): Torrefaction as a thermally treated process technology – State of the art and R&D results. Vortrag gehalten: Side-Event „Thermally treated biofuels", 23rd European Biomass Conference and Exhibition. Am 03.07.2015 in Wien, Österreich.

Witt, J.; Thrän, D.; Schaubach, K.; Kiel, J. H. A.; Carbo, M. C.; Koppejan, J. (2015): Final Results of the Sector Project: Production of Solid Sustainable Energy Carriers from Biomass by Means of Torrefaction. Vortrag gehalten: 23rd European Biomass Conference and Exhibition (EUBC&E). Am 02.06.2015 in Wien, Österreich.

Witt, J.; Weller, N.; Khalsa, J. (2015): Was sind thermisch modifizierte Festbrennstoffe? Vortrag gehalten: Fachgespräche Feste Biomasse „Brenn-

stoffe und Technologien von Heute & Morgen“ im FORUM enertec dezentral. Am 29.01.2015 in Leipzig.

Xu, A.; Nelles, M. (2015): Ansätze zur Optimierung der Klärschlammentsorgung in China am Beispiel der Provinz Anhui. Vortrag gehalten: 5. Wissenschaftskongress Abfall- und Ressourcenwirtschaft. Am 03.2015 in Innsbruck, Österreich.

Zechendorf, M.; Sträuber, H. (2015): Spurenelemente in Abfallbiogasanlagen. Vortrag gehalten: 6. Statuskonferenz „Energetische Biomassenutzung“. Am 12.11.2015 in Leipzig.

Zeymer, M.; Meisel, K.; Clemes, A.; Nelles, M. (2015): Technisch-ökonomisch-ökologische Analyse der hydrothermalen Carbonisierung (HTC). Vortrag gehalten: 9. Rostocker Bioenergieforum. Am 19.06.2015 in Rostock.

Projects (Selection)

Federal Ministry of Food and Agriculture (BMEL)

Aquatische Makrophyten – ökologisch und ökonomisch optimierte Nutzung – Teilvorhaben 3: Konservierung aquatischer Makrophyten zur ganzjährigen Nutzung für die anaerobe Vergärung, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.10.2014–30.09.2017 (FKZ: 22401914)

AUFWIND – Algenproduktion und Umwandlung in Flugzeugtreibstoffe: Wirtschaftlichkeit, Nachhaltigkeit, Demonstration; Teilvorhaben 3: Systemanalyse, Ökonomie und Ökologie – Technische und ökonomische Gesamtbewertung, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.06.2013–31.08.2016 (FKZ: 22408812)

Betriebsbedingte Emissionen an Biogasanlagen, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.02.2015–31.01.2018 (FKZ: 22020313)

Biogas-Messprogramm III – Faktoren für einen effizienten Betrieb von Biogasanlagen – TV 1: Energiebilanzierung, Flexibilisierung, Ökonomie, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.12.2015–30.11.2017 (FKZ: 22403515)

BioPOT – Biomassepotenziale und deren Nutzung unter besonderer Berücksichtigung der Rest- und Abfallstoffe – Status quo in Deutschland, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.10.2014–31.03.2015 (FKZ: 22020114)

BIOGAS-SANITATION – Einfluss der landwirtschaftlichen Biogaserzeugung auf die Qualität von Gärresten: Bewertung des Einflusses des Biogasprozesses auf die Inaktivierung von Erregern von Bestandserkrankungen, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.05.2013–31.07.2015 (FKZ: 22016512)

Einsatz der Hydrothermalen Carbonisierung (HTC) für die nachhaltige Behandlung und Verwertung von Fraktionen des Sanitärsektors im Sinne eines Biochar/Swechar-Konzeptes, Bundesministerium für Ernährung und Landwirtschaft/Bundesanstalt für Landwirtschaft und Ernährung, 01.10.2013–30.04.2017 (FKZ: 2815600211)

eMikroBGAA – Effiziente Mikro-Biogasaufbereitung; Teilvorhaben 2: Potenzialabschätzung und betriebswirtschaftliche Bewertung für MikroBGAA, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.11.2015–31.10.2017 (FKZ: 22401615)

Energieerzeugung aus aquatischen Biomassen am Beispiel der Co-Kultivierung von Wasserlinsen und Cyanobakterien; Teilvorhaben 2: Konservierung und Konversion der aquatischen Biomassen zu Biogas, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.08.2014–31.07.2017 (FKZ: 22401514)

Entwicklung und Validierung neuer Online-Messmethoden zur Bewertung und Optimierung der anaeroben Fermentation in Biogasanlagen; Teilvorhaben 2, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 15.03.2013–15.09.2015 (FKZ: 22002213)

Entwicklung von Empfehlungen zur Vorbereitung der wiederkehrenden Emissionsprüfungen nach 1. BImSchV, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.08.2015–31.07.2016 (FKZ: 22002015)

Entwicklung der BM-Verstromung bei Fortschreibung der aktuellen EEG-Vergütung, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.09.2015–30.11.2015 (FKZ: 22400815)

Entwicklung von Handreichungen zur Überprüfung von THG-Bilanzen von Biokraftstoffen (Handout), Fachagentur Nachwachsende Rohstoffe e. V. (FNR), 01.12.2014–30.09.2015 (FKZ: 22031014)

Flexible Steuerung der Biogasproduktion mittels bioinformatischer Populationsanalyse, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.02.2015–31.01.2018 (FKZ: 22009114)

Klein aber effizient – Kosten- und energieeffiziente Biomethanproduktion (ERANET Bioenergy – SE.Biomethan), Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.02.2013–30.04.2016 (FKZ: 22028412)

KOMBIOPT – Energiemanagementsystem zur kombinierten Nutzung erneuerbarer Energien, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.02.2015–31.07.2017 (FKZ: 22403113)

MONA – Monitoring des Biomethanproduktionsprozesses, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.05.2011–31.08.2015 (FKZ: 22003511)

Potenziale zur Steigerung der Leistungsfähigkeit von Biogasanlagen – Energetische Effizienz von Repoweringmaßnahmen, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.01.2014–30.04.2016 (FKZ: 22400912)

Schnelltest zur Alterungsnachstellung von Dieselkatalysatoren im Betrieb mit Biokraftstoffen, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V./Forschungsvereinigung Verbrennungskraftmaschinen, 01.10.2014–30.09.2017 (FKZ: 22014514)

Sensorgestützte Verbrennungsluftregelung zur Minimierung der Emissionen von Biomasseheizkesseln, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.05.2015–31.05.2017 (FKZ: 22037314)

Spurenelemente durch Energiepflanzen – Stoffströme und Handlungsempfehlungen für eine optimierte Prozessbiologie in Biogasanlagen, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.12.2014–30.11.2017 (FKZ: 22019114)

Technisch-ökonomische Begleitforschung „Bioenergie-Regionen 2.0“, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.03.2013–31.03.2016 (FKZ: 22020412)

Untersuchung und Screening erweiterter Qualitätsparameter zur Verbesserung der emissionsrelevanten Holzpelletqualität in der Praxis, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.03.2015–30.09.2015 (FKZ: 22017914)

Überwachung von Biogasanlagen mittels der Analyse von Verhältnissen stabiler Isotope; Teilvorhaben 3: Referenzversuche zur Verifizierung des Isotopenuntersuchungskonzeptes und Entwicklung einer Zustandsklassifizierung, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.09.2014–31.08.2017 (FKZ: 22013113)

Untersuchungen zur Ausgestaltung und möglichen Vereinfachung des Zulassungsprozesses für Kessel und Brennstoffe nach §3 Gruppe 8 der 1. BImSchV, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.11.2012–31.03.2015 (FKZ: 22403112)

Verbundvorhaben: QualiS – Brennstoff-Qualifizierung und Qualitätsmanagement in der Hackschnitzelproduktion; Teilvorhaben 3: Marktanalyse und experimentelle Unterstützung, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.06.2015–30.11.2016 (FKZ: 22035814)

Verbundvorhaben: Bewertung von Substraten hinsichtlich des Gasertrags – vom Labor zur großtechnischen Anlage; Teilvorhaben 1: Durchführung der Labor- und Praxisversuche, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.10.2015–30.09.2018 (FKZ: 22034614)

Federal Ministry of Education and Research (BMBF)

Demonstrationsvorhaben KomBiChemPro – Fein- und Plattformchemikalien aus Holz durch kombinierte chemisch-biologische Prozesse – Teilvorhaben B“, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 15.11.2015–14.05.2018 (FKZ: 031B0083B)

Dezentrale Biomassekonversion durch Kombination innovativer thermomechanischer und biochemischer Technologien zur Gewinnung von fermentierbaren Zuckern und BioEnergie, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.03.2015–31.08.2016 (FKZ: 031A438C)

Energetische Verwertung und Optimierung im Gesamtzusammenhang mit der Kaskadennutzung (Spitzencluster-BioEconomy TG4), Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.07.2012–30.06.2015 (FKZ: 031A077A)

Spitzencluster BioEconomy, TG 4, Bioraffinerie zur integrierten hydrothermalen Produktion von Brennstoff sowie der Grundchemikalien Phenol und Furan aus Biomasse, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.11.2014–30.09.2017 (FKZ: 031A445A)

Spitzencluster-BioEconomy, Energetische Nutzung und Optimierung im Gesamtzusammenhang der Kaskadennutzung, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.03.2015–31.08.2016 (FKZ: 031A443A)

Innovationsforum Hydrothermale Prozesse, Deutsches Zentrum für Luft- und Raumfahrt (DLR)/Bundesministerium für Bildung und Forschung, 01.01.2015–30.06.2015 (FKZ: 01HI1407)

REMISBIO – Maßnahmen zur Reduzierung von Emissionen von Biogasanlagen – Katalysatortest, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.01.2011–31.12.2015 (FKZ: 03KB052A)

Sachstandsbericht Grundlagen Monitoring Bioökonomie, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 14.01.2015–30.04.2015 (FKZ: 03D015B0E/MoRes)

Spitzencluster-BioEconomy: „TG 5, Begleitforschung: Nachhaltige wettbewerbsstrategische Handlungskonzepte und Steuerungsinstrumente des BioEconomy-Cluster in Mitteldeutschland, TP 5.1.1“, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.07.2012–30.06.2017 (FKZ: 031A078B)

stadtPARTHEland, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.09.2014–31.08.2019 (FKZ: 033L119E)

TREC-Donau – Transnational Renewable Energy Cluster – Donau; Thematische Fokussierung Bioenergie, Koordination, DLR/Bundesministerium für Bildung und Forschung, 01.06.2014–31.07.2015 (FKZ: 01DS14010A)

Verbundvorhaben FEBio@H2O Flüssige Energieträger aus einer integrierten hydrothermalen Umwandlung von Biomasse, Teilprojekt „Biomasseabbau und Gesamtprozess“, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.01.2013–31.12.2015 (FKZ: 03EK3508A)

Federal Ministry of Transport and Digital Infrastructure (BMVI)

Rahmenvertrag zur wissenschaftlichen Begleitung, Unterstützung und Beratung des BMVI in den Bereichen Verkehr und Mobilität mit besonderem Fokus auf Kraftstoffen und Antriebstechnologien sowie Energie und Klima, Bundesministerium für Verkehr und digitale Infrastruktur/Deutsches Zentrum für Luft- und Raumfahrt, 01.04.2012–31.12.2015

Federal Ministry for Economic Affairs and Energy (BMWi)/Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Abscheider-Monitoring für Holzkessel kleiner Leistung mit Hersteller-Hersteller-Begleitkreis, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.05.2014–31.08.2015 (FKZ: 03MAP312)

BalanceE – Synergien, Wechselwirkungen und Konkurrenzen beim Ausgleich fluktuierender erneuerbarer Energien im Stromsektor durch erneuerbare Optionen, Teilvorhaben: Bedarfsgerechte Bioenergie – Potenziale und Optionen, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.10.2014–30.09.2016 (FKZ: 0325705B)

CLEANPELLET – Entwicklung eines Verfahrens für die Erzeugung emissionsarm verbrennbarer Gärrestpellets zur Nutzung als Brennstoff für Haus- und Kleinfeuerungsanlagen, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.09.2014–31.08.2017 (FKZ: 03KB099D)

Demonstration von Verfahren zur kombinierten Reduktion von Stickoxiden und Feinstaub aus Biomassefeuerungen, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.09.2014–31.08.2016 (FKZ: 03KB096A)

Elektrisch leitfähige Emaillierung ohne Edelmetall, Bundesministerium für Wirtschaft und Energie/AiF, 01.03.2015–28.02.2017 (FKZ: KF2028018AG4)

ELIRAS – Entwicklung eines Leitfadens zur Auswahl von standortspezifisch angepassten Rühr- und Substrataufschlussverfahren für Biogasanlagen, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.01.2015–31.12.2017 (FKZ: 03KB106A)

Entwicklung eines emissionsarmen Holzpellet Vergaserkessels mit einer kombinierten Scheitholznotfeuerung, Bundesministerium für Wirtschaft und Energie/AiF, 01.07.2014–01.02.2017

Entwicklung eines Gasreinigungskonzeptes zur Nutzung von Synthesegas aus der Biomassevergasung für die Herstellung von Methan – AdSynZIM, Bundesministerium für Wirtschaft und Energie/AiF, 01.07.2013–30.06.2016 (FKZ: KF2028007CL3)

Entwicklung eines Verfahrens zur Vergasung von asche- und chlorhaltiger Biomasse am Beispiel Stroh, Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit/Projektträger Jülich, 01.08.2013–30.04.2018 (FKZ: 03KB085B)

Entwicklung einer innovativen Abgasnachbehandlungsanlage für Biomasse-Kleinfeuerungsanlagen unter Nutzung neuartiger Katalysatoren und dielektrischer Erwärmung, Bundesministerium für Wirtschaft und Energie/VDI/VDE IT, 01.07.2015–31.12.2017 (FKZ: 16KN041428)

FermKomp – Abgestimmte Effizienzsteigerung und Emissionsminderung der Feststofffermentation mit nachfolgender Kompostierung, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.10.2014–30.09.2017 (FKZ: 03KB100A)

FlexiTorr – Flexibilisierung der Energiebereitstellung in Bioenergiekleinanlagen durch den Einsatz torrefizierter Brennstoffe, Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit/Projektträger Jülich, 01.09.2013–31.12.2016 (FKZ: 03KB091A)

GASKAT – Emissionsarmer Scheitholzvergaserkessel mit integriertem Katalysator und optimierter Verbrennungsregelung, Bundesministerium für Wirtschaft und Energie/AiF, 01.01.2013–30.11.2015 (FKZ: KF2028006ST2)

Gewinnung von Biogas aus Hühnertrockenkot durch psychrophile Mono-Vergärung, Bundesministerium für Wirtschaft und Energie/AiF, 01.07.2015–30.06.2017 (FKZ: KF2028021SB4)

Herstellung hochwertiger poröser Silikate und Wassergläser durch kombinierte stoffliche und energetische Verwertung verschiedener SiO2-angereicherter Agrarreststoffe, Bundesministerium für Wirtschaft und Energie/AiF, 01.04.2015–31.03.2018 (FKZ: KF2028019ST4)

IbeKET – Innovatives bedarfsangepasstes Kommunal-Energieträger-Konzept, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 15.09.2013–31.01.2016 (FKZ: 03KB088D)

KoSePo – Kostensenkungspotenziale von Biogasanlagen im bestehenden EEG, Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit/Projektträger Jülich, 01.11.2013–14.10.2016 (FKZ: 03KB091A)

ManBio – Entwicklung von technischen Maßnahmen zur Verbesserung des Gasmanagements von Biogasanlagen, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.09.2014–28.02.2017 (FKZ: 03KB094A)

MiscPellTherm – Miscanthus-Mischpellet Brenner mit kleiner Wärmeleistung; Experimentelle Brennerentwicklung auf dem Prüfstand, Bundesministerium für Wirtschaft und Energie/AiF, 01.07.2014–30.06.2017 (FKZ: KF2028012ST4)

OptFlex Biogas – Ermittlung eines technisch-ökonomisch optimierten Betriebs von flexiblen Biogasanlagen, Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit/Projektträger Jülich, 01.09.2012–31.03.2015 (FKZ: 03LB073A)

Programmbegleitung für das Förderprogramm zur Optimierung der energetischen Biomassenutzung, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.01.2014–30.06.2016 (FKZ: 03KB001A)

Prognose zur Stromerzeugung aus Biomasse, Bundesministerium für Wirtschaft und Energie/Zentrum für Sonnenenergie- und Wasserstoff-Forschung (ZSW), 01.09.2013–15.09.2015

RegioBalance – Bioenergie-Flexibilisierung als regionale Ausgleichsoption im deutschen Stromnetz, Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit/Projektträger Jülich, 01.08.2013–31.12.2015 (FKZ: 03KB087A)

Spitzencluster-BioEconomy, TG4, Entwicklung eines Demonstrators zur emissionsarmen Bereitstellung von Prozessenergie und Elektrizität aus Reststoffen der Bioökonomie, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.03.2015–30.09.2017 (FKZ: 031A598A)

ToxOAb – Optimierung der Feinstaubminderung von Abscheidern für Biomassefeuerungen unter Berücksichtigung der toxikologischen Relevanz mittels mikrobieller Testsysteme, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.09.2013–31.08.2016 (FKZ: 03KB090A)Wissenschaftliche Vorbereitung und Begleitung der EEG-Monitoringberichte und des EEG-Erfahrungsberichts für die Stromerzeugung aus Biomasse (Vorhaben II a Biomasse), Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit/Projektträger Jülich, 01.06.2012–31.10.2015

XEFOK – Entwicklung eines neuartigen Adsorbers auf der Basis von Xerogelformkörpern und Einsatz zur Reinigung von biogenen Gasen, Bundesministerium für Wirtschaft und Energie/AiF-ZIM, 01.05.2014–30.04.2017 (FKZ: KF2028020ST4)

EU projects

Construction of cogeneration system with small to medium size biomass boilers, KIC InnoEnergy, EU-Projekt, 01.01.2015–31.03.2017 (FKZ: 13_2014_IP92_BioOrc)

GRAIL – Glycerol Biorefinery Approach for the Production of High Quality Products of Industrial Value, EU-Projekt, 01.11.2013–31.10.2017 (GA 613667)

KIC Inno Energy Construction of small-to-medium capacity boilers for clean an efficient combustion of biomass for heating, KIC Inn Energy, EU-Projekt, 05.04.2012–31.03.2016

Unterstützung der Marktimplementierung von Biomethan, EU-Projekt/Horizon2020, 01.01.2015–31.12.2017 (GA 646533)

SafePellets – Safety and quality assurance measures along the pellets supply chain, DEPV + Pusch AG, 01.01.2011–01.01.2015

SECTOR – Production of Solid Sustainable Energy Carriers from Biomass by Means of Torrefaction, EU-Projekt, 01.01.2012–31.12.2015 (GA 282826)

Uptake of solid bioenergy in European commercial sectors (industry, trade, agricultural and service sectors) – Bioenergy for business, EU-Projekt/Horizon2020, 01.01.2015–31.08.2017 (GA 646495)

Services/Contract research

Begutachtung von Biowärme aus Mitverbrennung von Biomasse in konventionellen Heizkraftwerken, Vattenfall Europe Wärme AG, 01.01.2014–31.08.2019

Caricom – Unterstützung institutioneller Strukturen für die Förderung erneuerbarer Energien und Energieeffizienz in der Karibik, GIZ GmbH, 01.11.2014–30.04.2015

Comparison and evaluation of measurement methods to determine methane emissions from biogas plant, Swedish Gas Technology Centre, 01.02.2014–31.05.2015 (FKZ: GERG 1.73)

Consulting Services for Biogas Project Hebei, BZINE – Beijing Zhongshida Institute of New Energy Co., 01.08.2015–31.12.2019

Entwicklung eines nachhaltigen Energiemarktes in Serbien, GIZ GmbH, 01.11.2013–30.04.2015

Entwicklung eines Verfahrens für die anaerobe Vergärung von Reststoffen aus einem Biomas-

seaufschluss, Vattenfall Europe New Energy GmbH, 01.11.2012–30.06.2015

Erstellung einer Benchmarking-Betrachtung: „Sorghum vs. Maissilage zur Erzeugung und Bereitstellung von Biomethan“, KWS Saat AG, 01.12.2012–30.06.2016

Fortschreibung der Daten zur Stromerzeugung aus Biomasse, ZSW, 01.02.2010–31.12.2015

Gärversuche mit Grünroggensilage, BioChem agrar GmbH, 15.07.2015–15.12.2015

iNOPA – Biogas from waste substrates of Brazilian bioethanol industry, Universität Rostock, 01.01.2014–28.02.2015

Innovationsforum FerroKat, DBI – Gastechnologisches Institut gGmbH, 14.10.2015–29.02.2016

Katalysatortestung am BHKW Löberitz mit mobiler Katalysatortestanlage MoKaTa, Caterpillar Energy Solutions GmbH, 20.08.2015–31.03.2016

Literaturstudie Biomassepotenziale, GIZ GmbH, 06.10.2014–16.01.2015

Machbarkeitsstudie zur mechano-chemischen Synthese von Metalloxiden in einer Kugelmühle zur Erzeugung von Vollkatalysatoren zur Emissionsminderung bei Verbrennungsprozessen. IHK Leipzig, 01.06.2015–30.11.2015

Nachhaltige Bioökonomie, Helmholtz-Zentrum für Umweltforschung – UFZ, 01.12.2011–30.11.2015

Perspektiven der Biogaseinspeisung und instrumentelle Weiterentwicklung des Förderrahmens, Universität Rostock, 01.09.2013–28.02.2015

Rahmenvertrag zu Untersuchungen in BGA Westewitz, BGA Westewitz, 01.08.2012 – 01.01.2015

THG-Bilanzierung eines Verfahrens zur Aufbereitung halmgutartiger Biomasse, florafuel AG, 31.01.2013–31.03.2015

Unterstützung von AKUT/Rotaria do Brasil bei der Baselinestudie Biogas im Rahmen der DKTI Brasilien (AKUTBras), ARGE AKUT/Rotaria, 01.11.2015–31.10.2016

Vergleich eines gravimetrischen Staubmessverfahrens mit dem Referenzverfahren DIN EN 13284-1, Dr. Födisch Umweltmesstechnik AG, 20.01.2015–31.03.2015

Zuarbeit zur Errichtung eines Abfallwirtschaftszentrums in Jundiai, Universität Braunschweig, Leichtweiß-Institut, 01.07.2014–15.03.2015

Other funding bodies (donations, foundations, country)

Fully Cardboard based microbial Fuel Cell, Electochemical Society/Helmholtz-Zentrum für Umweltforschung – UFZ, 01.09.2015–31.12.2015 (FKZ: RA-295/15)

Biogaskonferenz „Small Scale Biogas Produktion“ in Podlassien, Bundesverwaltungsamt (Auswärtiges Amt), 01.11.2014–01.01.2015 (FKZ: 2514AA0641)

CDZ Summer School zur „Energetischen und stofflichen Nutzung von biogenem Abfall und Reststoffen“, Chinesisch-Deutsche Zentrum für Wissenschaftsförderung (CDZ), Peking/China, 10.10.2015–17.10.2015 (GZ 1220)

Development of Feed-stock Suitability Assessment Methods for Batch Dry Anaerobic Digestion, Alberta Innovates, 01.01.2015–31.03.2015 (FKZ: C2014000761)

Ermittlung des H2S-Gehaltes in Behältern von Biogasanlagen an Praxisanlagen, Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie, 19.11.2015–31.10.2016

Flottenaufbau mit Multiplikatoren und wissenschaftlicher Begleitung – Multi-Flottenaufbau, VDI/VDE-IT, 01.12.2012–30.06.2016 (FKZ: 16SBS005B)

Nachrüstung zum katalytischen Abbau von gasförmigen organischen Emissionen aus Kaminöfen, Deutsche Bundesstiftung Umwelt, 01.08.2013–31.01.2015 (FKZ: 31032)

Naturschutzfachliches Monitoring des Ausbaus der erneuerbaren Energien im Strombereich und -entwicklung von Instrumenten zur Verminderung der Beeinträchtigung von Natur und Landschaft, Bundesamt für Naturschutz, 01.08.2015–31.07.2018 (FKZ: 351582270A)

Selbstmanagement Initiative Leipzig – DBFZ Gründernetzwerk, Sächsische Aufbaubank/Universität Leipzig, 02.01.2015–30.09.2017 (FKZ: 1425903374614)

Untersuchung innovativer Ansätze zur Minderung der Schadstoffemissionen von Kaminöfen durch katalytisch wirksame Baugruppen – Hauptphase „NEKO – Neuartiger emissionsarmer Kaminofen“, Deutsche Bundesstiftung Umwelt/Specht, 01.04.2013–31.03.2015

Unterstützung eines EU-Antrages: Valorisation of agricultural residues and by-products, Deutsches Zentrum für Luft- und Raumfahrt, 01.08.2015–31.12.2016 (FKZ: 01DS15009)

DBFZ in the press (selection)

Biogas „Made in Germany“ in Fernost, Biogasjournal, Januar 2015

Ressourcenschonend heizen und Feinstaub verringern, Haustechnikdialog, Januar 2015

Oxikat für schadstoffarme Kaminöfen, VDI Nachrichten, Januar 2015

Bioenergie-Forscher schließen sich FVEE an, IWR, Januar 2015

Torefied biomass for enerfy production and bioeconomy, sector-project, Januar 2015

Meilenstudie: Bioenergienutzung soll erst nach 2013 moderat steigen, EUWID Januar 2015

Biogas-Fachgespräch zu Energiewirtschaft und Direktvermarktung, AGRA-Europe, Januar 2015

© mitrija – Fotolia.com

Wege zur „smarten Bioenergie“, Biogas-Journal, Januar 2015

In der Torgauer Straße entsteht ein Technikum – Baustart 2016, Leipziger Volkszeitung, März 2015

Biogas-Experte: „Ohne Perspektiven gibt es auch kein Repowering mehr!“, top agrar online, Juni 2015

Die Energiebereitstellungseinheiten werden sich verkleinern, Öko-Institut (Im Fokus Interview), Juli 2015

Dem Wagner Helmut stinkt's: „Mit Scheiße lässt sich viel Geld verdienen“, da hogn (Online-Magazin), August 2015

Wind, Wasser, Sonne ... Raps, Leipziger Zeitung, August 2015

EEG drängt Biomasseanlagen zurück, top agrar online, August 2015

DBFZ nimmt neues Technikum in Betrieb, EUWID neue Energie 2015

Strom aus Bioenergie: DBFZ zeichnet düsteres Zukunfts-Bild, IWR News, August 2015

Neue FNR-Projekte sollen Emissionen von Holzheizungen senken, EUWID August 2015

Weltbank beteiligt sich am Bau von sechs Biogasanlagen in China, EUWID Neue Energie, August 2015

Stromerzeugung aus Biomasse: Monitoring-Bericht zeigt deutliche Bremsspuren, EUWID, August 2015

Zubau „praktisch zu vernachlässigen“, Holz-Zentralblatt, August 2015

Biomasse-Zentrum an Großvorhaben in China beteiligt, Leipziger Volkszeitung, August 2015

Heiße Visite beim Biomasse-Forschungszentrum, Leipziger Volkszeitung, August 2015

DBFZ nimmt neue Synthesereaktoren in Betrieb, laborpraxis.vogel, August 2015

Reststoffe: Noch 50 Prozent mehr Bioenergie, Erneuerbare Energien, September 2015

Chile evalua el desarollo de biocarbon y bioplastico como alternativas ecologicas, el mercurio, September 2015

Die Novellierung des EEG und die Auswirkungen auf den Anlagenbestand, process.vogel, September 2015

A market maker, international innovation, September 2015

Thermische Modifizierung von Festbrennstoffen, Holz-Zentralblatt, September 2015

Biogene Rest- und Abfallstoffe können mehr genutzt werden, Erneuerbare Energien, September 2015

Experten-Interview Mirjam Matthes: „Für einen emissionsarmen Anlagenbetrieb ist eine kontinuierliche Brennstoffzufuhr entscheident“, Pelletshome.com, September 2015

Neues Technikum für Synthesegas, process, September 2015

DBFZ: Fast ein Drittel des Potenzials biogener Abfall- und Reststoffe wird nicht genutzt, EUWID Neue Energie, September 2015

Energieforscher fordern Technologiemix für die Wärmewende, IWR, September 2015

Herausforderung Wärmewende, Erneuerbare Energien, September 2015
Wohin mit dem Müll? Potentiale für ungenutzten biogenen Abfall, Energie News, September 2015
In den Resten steckt noch viel Kraft, agrarzeitung, September 2015
Projekt soll Spurenelemente in Biogasanlagen reduzieren EUWID, September 2015
Forscher für Flexibilisierung von Biogasanlagen geehrt, EUWID, September 2015
Energie für die Regionen, Erneuerbare Energien, September 2015
Abfallverwertung in Deutschland – Einiges erreicht, aber noch viel zu tun! Müll und Abfall, Oktober 2015
Der Biogas Boom ist vorbei, SN-Online, Oktober 2015
Biogas Neue Herausforderungen, DLG Mitteilungen, Oktober 2015
Biogas Wege aus der Krise, VDI-Nachrichten, Oktober 2015
Eine Biogasanlage als Rettung, Der Tagesspiegel, November 2015
Neue Konzepte für ungenutzte biogene Reststoffe, Stefan Schroeter, November 2015
Forscher diskutieren: Wohin geht die Bioenergie-Reise, IWR, November 2015
„Holz ist der wichtigste Energieträger“, Abi, November 2015
Latrinen zum Selbstbauen, Deutschlandfunk, November 2015
Öko-Klo als Minikraftwerk, Leipziger Volkszeitung, Dezember 2015

IMPRINT

Published by:
DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH, Leipzig, an enterprise of the German Governement with funding from the Federal Ministry of Food and Agriculture pursuant to a resolution by the German Bundestag.

Contact:
DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH
Torgauer Str. 116
D-04347 Leipzig
Phone: +49 (0)341 2434-112
Fax: +49 (0)341 2434-133
E-Mail: info@dbfz.de

General Management:
Prof. Dr. Michael Nelles (Scientific Managing Director)
Daniel Mayer (Administrative Managing Director)

Editing/V.i.S.d.P.: Paul Trainer
Responsibility for the content of the brochure lies with the publishers.
ISBN: 978-3-9817707-6-6

Printed by: Druckerei Billig OHG

Pictures: if not indicated on the image: DBFZ, Jan Gutzeit, Kai und Kristin Fotografie, European Research Council (ERC), DFBEE. Frontpage: TiM Caspary/pixelio.de (2nd row center).

Design/DTP: Stefanie Bader

With support from
Federal Ministry of Food and Agriculture
by decision of the German Bundestag

DBFZ ANNUAL CONFERENCE 2016
Smart Bioenergy – What is the future of bioenergy?
Innovative Concepts for a sustainable energy transition

8/9 September 2016 in the conference centre of the Leipziger Foren complex
For more information visit: **www.dbfz.de/jahrestagung**

DBFZ Deutsches Biomasseforschungszentrum
gemeinnützige GmbH
Torgauer Straße 116
04347 Leipzig
Phone: +49 (0)341 2434-112
Fax: +49 (0)341 2434-133
E-Mail: info@dbfz.de

www.dbfz.de