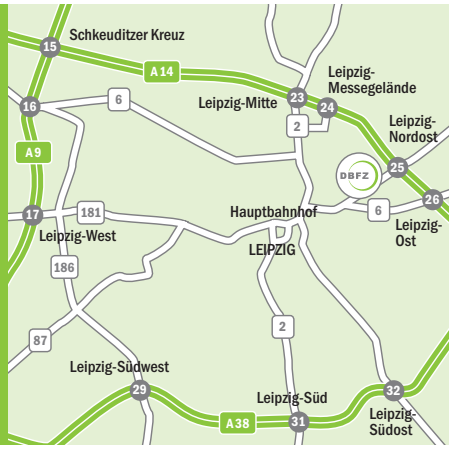
Deutsches Biomasseforschungszentrum
gemeinnützige GmbH

DBFZ

ANNUAL REPORT 2014



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” fi lling station (see “by train”).

... by tram: line 3/3 E towards Taucha/Sommerfeld; Bautzner Strasse stop (see “by train”).

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1 PREFACE

Dear Reader,

the amendment to Germany's Renewable Energy Sources Act ("EEG") caused some turmoil in the bioenergy sector during 2014. The developments had an impact all across the industry, and also left their mark on the DBFZ.

The organisation was nevertheless again able to acquire and launch more than 40 new and exciting research projects from German federal ministries and industrial clients in 2014. Preparations for the major new building works at Torgauer Strasse are also well underway. Moreover, the DBFZ has reorganised operations with its five new research focus areas and portfolio of science-based services. Against this background, we believe that we are very well equipped to fulfil our role as the federal research institution in the field of biomass use as an energy source over the next five to 10 years, and we are looking to the future with confidence.

We would 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: 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 2015. Your support is vital to us.

We hope you will find our 2014 Annual Report interesting and entertaining, and we look forward to welcoming you in person here in Leipzig at the next opportunity.

Prof. Dr. Michael Nelles
(Scient. Managing Director)

Daniel Mayer
(Admin. Managing Director)

2
INTERVIEW WITH THE GENERAL MANAGEMENT

Prof. Nelles: Since being established in 2008, the DBFZ has become widely respected in Germany's scientific research community. How do you personally view the development of the DBFZ?

Michael Nelles (Scientific Managing Director): I believe that in its few years of existence the DBFZ has been very successful not only in establishing a well structured research institution, but also in building up generally acknowledged scientific expertise in the field of biomass use as an energy source – in the face of all the associated organisational and operational challenges of course. After a lengthy phase of strong growth, we are now moving into a consolidation phase, in which it will be important to maintain focus so as to continue the progress we have made to date in conjunction with decision-makers in the political sphere, the scientific community, and in industry. But we still have a lot of work to do.

On the subject of work: Last year the DBFZ was subjected to an appraisal by the German Council of Science and Humanities (the Wissenschaftsrat). Its report praised the good progress made, but also highlighted need for improvement in various areas, including the lack of a clear focus on specific research topics.

Michael Nelles: We were pleased with the appraisal by the Wissenschaftsrat overall, especially in that it primarily assessed the establishment phase of the DBFZ, coming to a highly positive judgement. It was clear all along that, as a relatively recently established organisation, our development is still very much a work in progress, and that we need to improve in some respects. We intensively discussed the Wissenschaftsrat's findings at a number of review meetings, both in-house and together with our international Scientific Advisory Board and the Supervisory Board. The outcome of our joint consultations was the adoption of a research and development plan for the next five to 10 years. Firstly, we will continue to act as the central national scientific point of contact in all matters relating to the use of biomass as an energy source, particularly through our portfolio of science-based research services. Secondly, we will be responding to the Wissenschaftsrat's finding concerning lack of focus primarily by implementing our newly designated research focus areas, as set out in this Annual Report.

Fig. 1 The general management of the DBFZ

What topics and projects kept you busy in 2014?

Michael Nelles: We work on as many as 150 projects a year in a variety of different fields (motor fuels, electric power, heat) and with wide-ranging points of focus. These are primarily third party-funded projects acquired by competitive tender. We additionally work on projects commissioned directly by industrial partners and on behalf of government ministries. Just a few examples of the topics covered include: algae production and conversion in aircraft fuels; the major EU project on torrefication known as "SECTOR"; the integrated use of biorefinery residues as an energy source, as part of the BioEconomy Leadership Sustainability Management Cluster under the auspices of the German Federal Ministry of Education and Research (BMBF); the climate effects of biomethane production and supply; and technical/economic research accompanying the federal "Bioenergy Regions" competition. We also worked on a wide range of studies, concepts and expert advice reports in the past year. Other key aspects of our work in the past year were

our scientific contributions in preparation for the amendment to the Renewable Energy Sources Act in the form of regular monitoring reports on electric power generation from biomass and the production of a detailed background paper for the draft Act.

But the German Federal Government ignored much of the important and accurate advice you contributed in its amendment to the Renewable Energy Sources Act, did it not?

Michael Nelles: That is sadly true, but our primary function as an independent research institution is to conduct well-founded scientific analyses and, on that basis, issue recommendations for action in the field of biomass use as an energy source. I believe that we fulfilled that mission very well. The extent to which our detailed scientific contributions are ultimately incorporated into actual law is something on which we unfortunately have very limited influence. I am optimistic though: There will at some point be a new amendment to the Act, and our scientific policy recommendations will then once again be called upon.

What contribution can – and must – biomass make to the successful transition to a renewables-based energy policy in your view, and where do the current challenges lie?

Michael Nelles: Firstly, it should be pointed out that biomass is by far the most popular renewable energy source in Germany, accounting for over seven percent of total final energy consumption – more than wind, solar, hydro-electric and geothermal energy combined. In future it will be less about quantity than quality however – that is to say, about how the valuable resource biomass can be optimally used. A key to the successful reversal of energy policy and implementation of bioeconomic strategy in Germany is the integrated usage of biomass as base material and as an energy source, in particular in the form of co-production and in cascaded use. Essential factors in attaining that goal are improvements in energy efficiency through interlinked value chains and fulfillment of sustainability criteria in the supply of biomass. That is the only way an effective contribution to climate protection can be made.

What advantage does biomass offer over other renewable energy sources?

Michael Nelles: To date, the various renewables have developed in a highly dynamic way, largely independent of each other. With the facility to store it and its all-weather availability, bioenergy offers two key attributes which will in future be more important factors in balancing the energy system. Bioenergy is, so to speak, the "joker in the pack" in terms of the transition to renewables. It can cover the shortfall in demand for power, heat and mobility remaining after the use of fluctuating renewable sources and application of efficiency technologies. The need in future will be to implement efficient total energy supply systems based on renewables. Against that background, the DBFZ has since January 2015 also been an official member of the renewable energy research alliance FVEE, a network of the leading research institutions in Germany.

Bioenergy is still in the public perception linked to issues such as the food-or-fuel debate, E 10, the take-up of agricultural land for biofuel production, and so forth. How do you as a scientific research institution counter such arguments? Is there a communications problem?

Michael Nelles: The public image of bioenergy has been severely dented in recent years, and also it is not easy to communicate the issues involved in this highly complex subject. On closer investigation, however, much of the criticism is unjustified, or the issues raised can be eliminated by implementing efficient systems for the integrated use of biomass as a material and energy source. It is the task of the DBFZ to develop such solutions. Many of the research projects we work on involve searching for alternatives to the conventional use of energy crops such as maize. Agricultural residues such as straw, organic waste, foliage and liquid and dry manure are just a few examples of innovative alternative energy source materials which the DBFZ is investigating in terms of their usability for energy production. We are of course also responsible for communicating our own R&D results, and we do that through press and public relations activities, the hosting of various scientific conference events, as well as scientific publications disseminated to interested parties in the sector. It is particularly important, however, to provide the general public with all the facts – both positive and negative – relating to bioenergy. That task is fulfilled to a very high standard by the Regrowable Resources Agency FNR.

You yourself have been Scientific Managing Director of the DBFZ since mid-2012, and you are also professor of Waste and Material Flow Management at the University of Rostock. What synergies exist between the DBFZ and the University of Rostock?

Michael Nelles: The Department of Environmental Engineering forms part of the University of Rostock's Faculty of Agricultural and Environmental Sciences, and covers the full scope of scientific topics relating to the avoidance and material and energy source utilisation of waste, as well as the topics of waste incineration, landfilling and remediation of polluted sites. Its research activities focus on the use of biogenic wastes and residual products as a source of energy and materials. It has much in common with the DBFZ, and a large number of cooperation projects are already being run in relation to the recovery of municipal and industrial biowaste, waste wood, sewage sludge, etc. The results are presented, among other channels, at the annual Rostock Bioenergy Forum hosted jointly by the DBFZ, the University of Rostock's Faculty of Agricultural and Environmental Sciences and the Research Institute of the State of Mecklenburg-Western Pomerania at the University of Rostock.

What differentiates the DBFZ fundamentally from other institutions working in the field of biomass and bioenergy?

Michael Nelles: The core mission of the DBFZ according to Article 2 of its Articles of Association is "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". With regard to the facilities of our three technical research departments, in particular, we have built up enormous capacities since being established back in 2008. The facilities are unique of their kind in Germany, and some – such as our biogas pilot plant – are technically state-of-the-art. Moreover, one of our key characteristic features is that we also work intensively on theoretical questions relating to bioenergy, including in the form

of potential analyses, acceptance studies, national and international knowledge transfer, and policy advice. With a current staff of some 200 scientists, technicians and administrators, we are unique in offering a “full package” in the field of bioenergy research in Germany. However, our aim is also to utilise our scientific expertise increasingly on an international scale. There is much need for research work internationally, offering plenty of opportunities for us to deploy our extensive bioenergy know-how.

Mr. Mayer: Despite the difficult political conditions surrounding bioenergy at present, you are building a new facility at your Leipzig location, at a total cost of over 45 million Euros. How do you reconcile that?

Daniel Mayer (Administrative Managing Director): The German Federal Government normally only carries out construction projects on this scale when all the ministries involved are convinced that usage over a period of at least 30 years is assured. So the DBFZ was established by the Federal Government quite purposely as the central research institution providing the necessary independent research and development in the key long-term subject of biomass as an energy source. The political highs and lows do not play a major role in such an undertaking; they will always occur. At the time of going to press (January 2015), the design has been completed, and the first construction schedule is being drawn up. We expect the new building complex to be finished in the late Autumn of 2017, enabling the complex technical facilities to be installed by the end of that year. The first building works will be seen on the DBFZ site from mid-2015 onwards however.

Michael Nelles (supplementary): The new Technical Centre, especially, will take us to a new level in terms of working standards. Its approximately 2,400 square metres of usable area provides space for almost all our existing and new test beds to be housed in one central location. An office block and event centre are also being constructed. We are targeting our capital investment to enhance our medium- to long-term key research focus areas so as to establish and sustain a leading national position as quickly as possible. We intend developing Leipzig and the DBFZ into the national centre for bioenergy research. That is our ambitious goal, and I believe we are well on the way to attaining it.

Fig. 2 Artist’s impression of the new Technical Centre (left), including office block, viewed from Torgauer Strasse, towards the town centre

You currently employ more than 200 people at the Leipzig location – 165 of them as so-called full-time equivalent (FTE) posts (as of 19.01.2015). How do you see your workforce developing over the next five years?

Daniel Mayer: We have increased our workforce year-on-year since being established back in 2008. After six years of sustained growth, 2014 marked the completion of our personnel development programme. Our current workforce is at the targeted level, as stipulated by our shareholder. The aim of our personnel policy, following our successful certification under the “berufundfamilie” work-life balance programme, is to maintain our progress in becoming a family-friendly organisation, and to be an attractive employer for our staff, despite the inflexible structure of the collective pay agreement.

Fig. 3 The DBFZ on the way to becoming a family-friendly organisation: Successful "berufundfamilie" certification in 2014

Back to the subject of research: What long-term prospects do you see for energy from biomass over the next 20 to 30 years?

Michael Nelles: As an alternative energy source material, with numerous potential applications (heat, power, motor fuels), biomass is a vital element of the future energy mix. However, the focus must – and will – in fact shift over the coming years and decades, meaning future bioenergy research must prepare the systemic transition from state-of-the-art to "smart" bioenergy production and supply. In small, precisely controlled plants, it will be a building block of integrated supply systems and be able to contribute to the sustainable energy supply of tomorrow. Innovative techniques, coupled and cascaded operation, precise and flexibly controllable plants and integrated supply concepts are key components in this. Sustainable framework conditions will also become increasingly important. Bioenergy must be the groundbreaker in establishing a bio-based economy.

Another important aspect of your work is Integrating the DBFZ into the regional innovation system, such as through the Bioenergy Innovation Centre established in 2013.

Michael Nelles: With the Innovation Centre we have created a platform to speed up innovation processes located directly on-site at the DBFZ. It serves as an interface to regional, national and international businesses looking to develop new products, techniques or services in the bioenergy sector. The aim is to deploy the know-how created at the DBFZ in applications and markets based on direct interchange. To that end, the Innovation Centre bundles expertise and offerings from the energy research sector in Leipzig into a single focus on integrated bioenergy use.

But you are also offering specific services too?

Michael Nelles: Yes, in addition to office space on the DBFZ site, the Innovation Centre also provides access to the DBFZ's R&D infrastructure as well as to a wide range of innovation-boosting services, such as in relation to patenting and intellectual property rights, submission of applications for funding, and forming of consortia. Our vision is to create an innovation-friendly environment providing a home to lots of start-up and spin-off businesses across the broad span of bio-based energy production and supply, and to translate scientific research results into practical applications. One positive example of this is the first spin-off and location on-site of ETE EmTechEngineering GmbH, a company working in the field of pollution control technologies in which DBFZ staff have a major stake.

Finally, a look at the bigger picture: You have wide-ranging international contacts, especially in China. How do you assess the situation with regard to bioenergy in the international context?

Michael Nelles: In China particularly, accounting for around 20 % of the global population, there has been rapid development in bioenergy. Key features of China in recent times have been its dynamic economic growth and burgeoning population, linked to rising standards of living. But the Chinese are also increasingly con-

cerned about the associated environmental problems, and are attempting to deal with them by various measures. They regard the use of biogenic waste and residual products for the generation of energy as a key pillar of their future national energy supply based on renewables, and are investing accordingly. In many other countries there is major potential which has to date not yet been exploited, or only to an inadequate extent. Serious waste management problems can be remedied, while at the same time making a major contribution to energy supply and climate protection. The DBFZ is already working intensively on a wide range of research projects to those ends based on targeted knowledge and technology transfer.

Thank you for the interview.

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3
THE RESEARCH FOCUS AREAS OF THE DBFZ

Transforming existing energy systems to renewables is one of the great challenge of our time. In that process, biomass – accounting for well over seven percent of total final energy consumption – is in a leading position, far ahead of all other renewable energy sources. However, there remain many challenges and questions regarding the practical 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 must the bioenergy of the future be like? These and other questions are expertly and independently investigated and answered by the 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

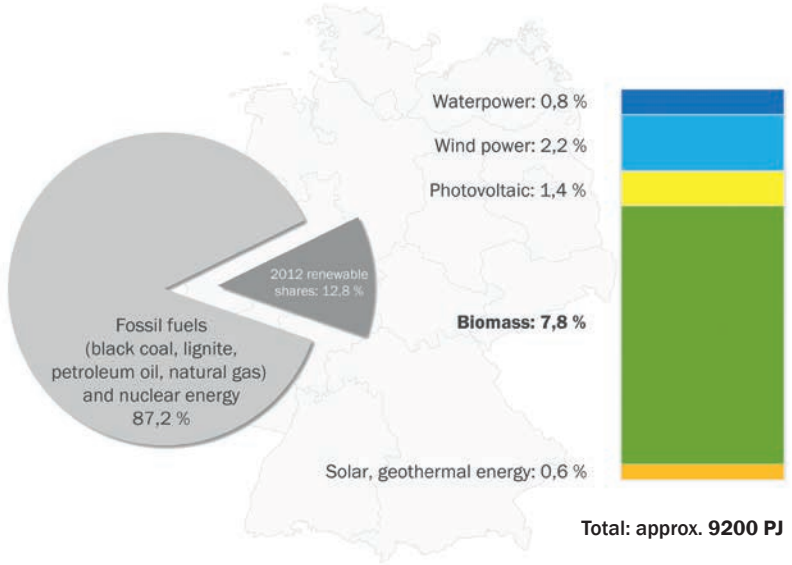

Fig. 4 Biomass share of the overall German energy mix. Source: Trends in renewable energy in Germany in 2014, BMWi/AGEE-Stat 2014. Own depiction.

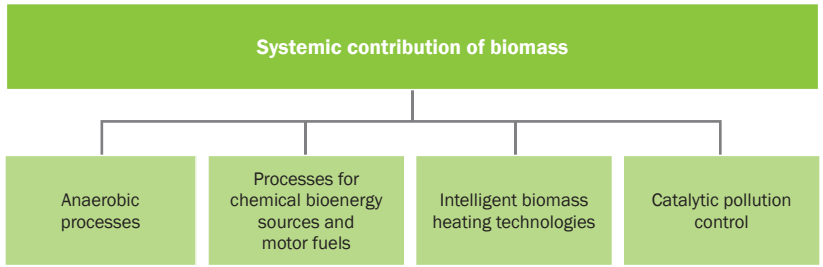

Fig. 5 The five research focus areas of the DBFZ

various goals associated with the development of bioenergy, setting forth plans as to how such conflicts can be avoided and eliminated. The DBFZ seeks to actively shape knowledge in relation to the possibilities and prospects for the use of biomass as an energy source in general terms. It also aims to safeguard the leading position enjoyed by Germany in the sector for the long term.

ESSENTIAL FOCUS FOR EXCELLENCE IN RESEARCH

In order to depict key questions and aspects of bioenergy to the depth essential for excellence in research, in Autumn 2014 the DBFZ established a total of five research focus areas. 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 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, the five research focus areas of the DBFZ are split organisationally across its four research departments: Bioenergy Systems, Biochemical Conversion, Thermo-Chemical Conversion, and Biorefineries.

3.1
RESEARCH FOCUS I: ANAEROBIC PROCESSES

"Biogas 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.-Ing. Jan Liebetrau, Head of the Biochemical Conversion Department)

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.

PROCESS CONTROL FOR FLEXIBLE PLANT OPERATIONS

One of the key challenges for the future will be intelligently integrating highly fluctuating renewables (wind power, photovoltaic) into Germany's energy mix. Biogas plants represent a promising option for the demand-oriented production and supply of energy. However, most biogas plants are designed and built for constant energy output (base load). Accordingly, those plants can only be made more flexible within the existing technical constraints, especially when additional investment is to be minimised.

The potential to introduce greater flexibility into the plants as a whole is in fact determined by the properties of their components. Some potential technical solutions to introduce more flexibility along the production chain are presented in figure 6. One possible way to enhance flexibility is by the targeted regulation of gas production (feed management). This can substantially reduce the necessary gas storage capacity.

This enhanced flexibility of the feed, and thus of biogas production, can only be attained if it does not impact negatively on process stability. A high degree of dynamism with assured process stability has already been proven on a laboratory scale [1]. Figure 7 shows the trend in gas production over a period of four days (black solid line) and the an average of gas production in that period (grey dashed line). The average gas production rate was set as 100 %. This gas production served as the basis for calculating the gas storage demand for three scenarios featuring varying „qualities of flexibility“ – namely 8, 12 and 16 hours' gas utilisation in a CHP plant (blue, red, green dotted lines) and a corresponding 16, 12 and 8 hours respectively of CHP plant down-time and necessary storage duration. In b, c and d the gas storage requirements for flexible and continuous gas production (dashed line) are plotted in relation to each other. It is shown that demand for gas storage capacity can be significantly reduced by flexible feed. This enables a much broader range of flexibility options to be offered without the need for additional investment or structural modification.

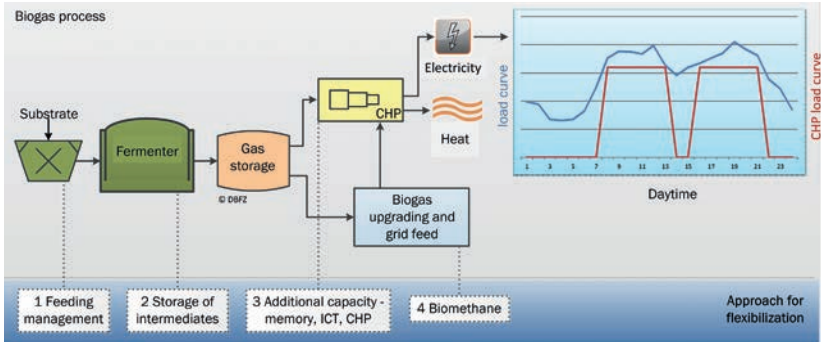

Fig. 6 Options for enhancing the flexibility of biogas plants [3]

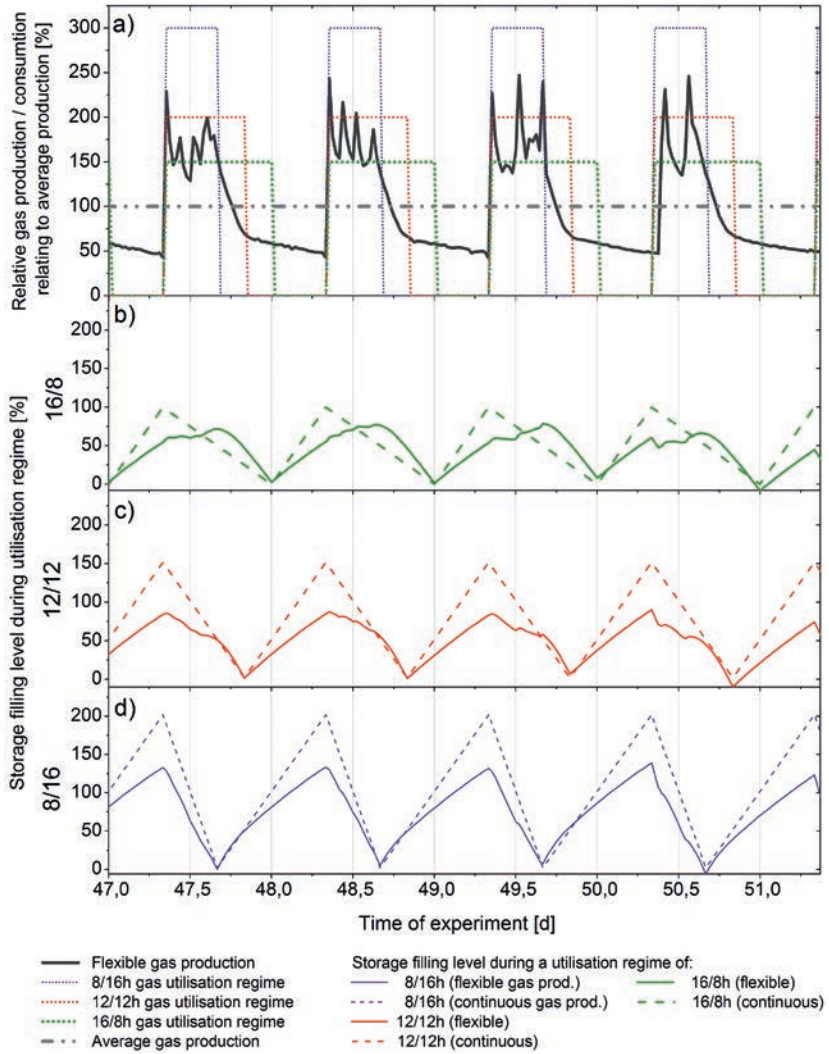

Fig. 7 Effects of flexible gas production on gas storage demand under different consumption regimes compared to continuous production on laboratory scale (average gas production set at 100 % for comparison purposes and assumed as continuous gas production in the period shown) [1]

This potential can only be used if a process control system is implemented to set the appropriate gas production rate. So for practical application a predictive control model was developed which calculates the feed regime in advance dependent on power demand. This means the biogas process can be as constant as possible and as flexible as necessary in order to realise different power generation scenarios within weekly operation. The control system has already been tested on the DBFZ biogas pilot plant (scaled with 180 m³ active volume) and on a practical biogas plant (800 m³ fermenter volume). In this, too, a high degree of potential for enhancing flexibility was demonstrated while maintaining stable process conditions. Biogas production based on predictive control modelling was adapted to grid demand and the necessary gas storage quantities could be reduced by 30 to 50 % while attaining standardised flexibility (over a weekly schedule). The control system is capable of applying different substrates according to their properties (in particular their degradation rate). The computing power needed for the models employed was reduced such that a browser-based application could be implemented, enabling operators and planners to use an online tool to evaluate and optimise plant flexibility. Ultimately, the project results demonstrate that enhancing flexibility by biological means can significantly boost contributions to the production and supply of balancing energy in the plant fleet in qualitative terms.

LOW-EMISSION OPERATION

The main aim in promoting technologies based on renewable energy is to cut greenhouse gas emissions in the energy sector. In order to quantify the effect of renewable energy sources and provide further optimisation of the technologies, the emissions produced must be quantified. Independently of those considerations, as a general rule the safe, efficient, environmentally friendly operation of biogas plants demands that methane emissions be prevented.
To develop suitable prevention strategies, it is first necessary to know the emission sources and their source strengths. The DBFZ investigated two methods of measuring methane emissions with regard to their usability and comparability. The methods were deployed in parallel at three biogas plants, with biogas conditioning for feed into the natural gas grid, as a means of quantifying methane emissions. The tests were conducted, firstly, by identifying and quantifying the individual sources on-site by means of leak detection, housings and open chamber measurements and, secondly, by recording total emissions based on optical remote measurement methods applying Tunable Diode Laser Absorption Spectrometry (TDLAS) and reverse dispersion modelling. In selecting the plants to study, attention was paid to ensuring comparability of the processing technology used (amine scrubbing) and the commissioning period. The three plants differ significantly in terms of their production capacity however. The study results showed that the plants' emissions are not on a comparable level. According to the measurement method and plant, the emissions were between 0.05 % and 2 % of the methane produced by the plant. The causes of the wide variability may be cited as open fermentation residue stores and operational disturbances.
In view of the wide variability of results, it is not possible to transfer the results to plants operating different processing technologies, or even to the entire plant fleet in Germany. Emissions which vary over time, such as on activation of overpressure safety systems, are methodologically difficult to record, so consequently, in addition to the emission measurements at the three biomethane plants and

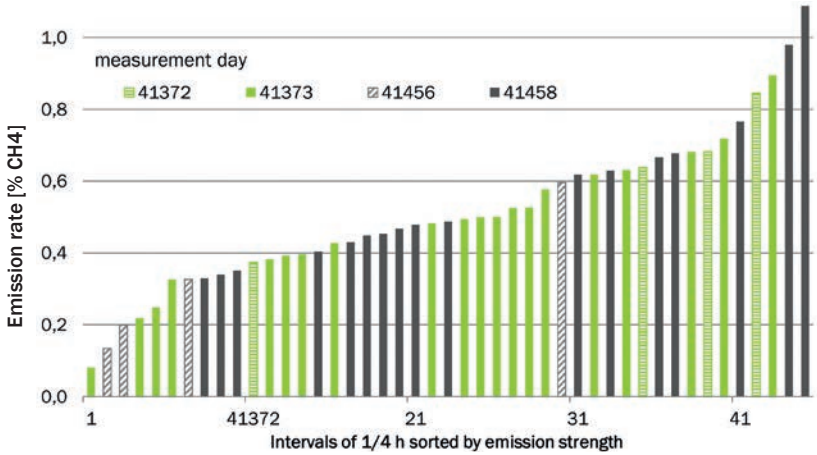

Fig. 8 Emission rates in quarter-hour values sorted by methane emission level [2]

at two agricultural biogas plants, testing of operational methane emissions from overpressure/underpressure safety systems was carried out.
A suitable measurement methodology was developed for the purpose, based on continuous measurement of the biogas volume flow and temperature in the waste gas duct of the overpressure/underpressure safety system. It was found that the overpressure/underpressure safety systems are activated frequently, caused in some cases by CHP plant malfunctions and weather events. Further investigations are required in this respect in order to identify the causes of emissions in operation and establish reduction measures of appropriate efficacy.

REPOWERING – ENHANCING THE EFFICIENCY OF EXISTING PLANTS

Several thousand biogas plants have been connected to the grid in Germany over the last 10 years. The amendments to Germany's Renewable Energies Act in 2012 and 2014 have resulted in a marked slowdown in the construction of new plants. The importance of new construction relative to the existing plant fleet has fallen substantially. The approximately 7,800 plants in operation (DBFZ, 2014) offer major potential for enhancing efficiency. It is generally seen that biogas plants are subject to continual technical modification aimed at optimising processes and saving on operating resources. In recent years this has become known as „repowering". Assessment of repowering, and monitoring of its success, demands differentiated analysis of its efficiency and efficacy. That process must also be differentiated from standard servicing, replacement and maintenance procedures. Repowering refers to medium- to long-term scheduled technical modifications aimed at enhancing efficiency. The main motivation to apply such procedures is thus to enhance the economic viability of plant operations. Three categories were established in differentiating the procedures: Category I targets technical modifications to enhance efficiency. Category II involves organisational measures to improve operational processes, aimed at increasing utilisation of plant capacity. Category III covers repair and maintenance procedures which cannot be understood directly as repowering (see figure 9 left). Assessment of a biogas plant should incorporate both biogas production and conversion processes in equal measure.
A range of base variables can be applied in assessing plants. For subprocesses

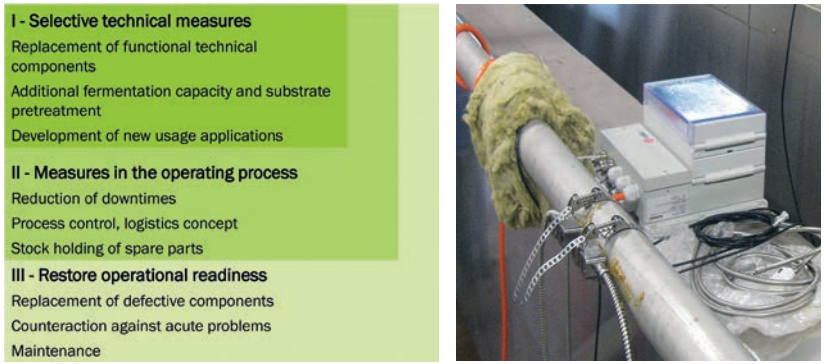

Fig. 9 Schematic view of the categorisation of measures applied to biogas plants (l); layout to measure heat quantities (right)

such as the efficiency of the biological process, a suitable method is mass balancing with reference to the biologically usable components of the substrate [4]. If all energy flows are to be assessed, and the overall process, including the plant's own energy demand, mapped, the appropriate criterion is the fuel efficiency of biogas plants. The energy content of the substrate is depicted in relation to the supplied quantities of power and heat. The fuel efficiency is primarily dependent on the quality of the input materials, the plant operation and the amount of heat used. However, this must take into account the fact it is necessary to analyse the availability of different substrates in order to provide a differentiated assessment. A project sponsored by the Regrowable Resources Agency FNR is currently studying 10 plants to assess their efficiency trends. Alongside the assessment methodology, the project is also developing strategies to enhance efficiency by suitable means.

PROSPECTS FOR 2015

The amendment to Germany's Renewable Energy Sources Act has massively constrained the construction of new biogas plants and substantially reduced the options for the upgrading of existing plants. The new electricity market design ex-

pected in 2015 will be of vital importance in terms of future options in the biogas plant sector. In any event, the technology will move towards the use of varying and difficult substrates allied to enhanced flexibility of operations. This process will be promoted within the research focus area. Additionally, the integration of anaerobic processes for energy production into processes for the use of biomass as a material source may result in synergies which enhance the economic viability of energy production and supply. The development of such integrated concepts and technologies will be advanced within the research focus area.

Sources

[1] 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.

[2] Westerkamp, T.; Reinelt, T.; Oehmichen, K.; Ponitka, J.; Naumann, K. (2014): KlimaCH4 – Klimaeffekte von Biomethan (DBFZ Report Nr. 20). DBFZ, Leipzig. ISSN 2197-4632 (online).

[3] 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. Leipzig. ISSN 2199-2762.

[4] Weinrich, S.; Weißbach, F.; Pröter, J.; Liebetrau, J.; Nelles, M. (06/2014): Massenbilanzierung von Biogasanlagen – Möglichkeiten und Herausforderungen zur Effizienzbewertung von Biogasanlagen. In: Nelles, M. (Hrsg.): Tagungsband zum 8. Rostocker Bioenergieforum, 19.–20.06.2014, S. 369-379. Rostock. ISBN 978-3-86009-412-9.

Key reference projects and publications

Project: Bedarfsgenaue Regelung von Energie aus Biomasse (RegEnFlx), Sächsische Aufbaubank (SAB) (FKZ: 100143221)

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

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

Project: RegioBalance – Bioenergie-Flexibilisierung als regionale Ausgleichsoption im deutschen Stromnetz, Projektträger Jülich/Bundesministerium für Wirtschaft und Energie (FKZ: 03KB087A)

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?!“ 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. (2014): Betriebsbedingte Methanemissionen aus Über-/Unterdrucksicherungen. In: Biogas Journal. S. 78–80.

Publication: Reinelt, T.; Westerkamp, T.; Liebetrau, J. (2014): Klimarelevante Emissionen aus Biogasanlagen mit Biogasaufbereitung und Einspeisung in das Erdgasnetz. In: VDI Berichte. S. 203–213, VDI-Verlag GmbH. Düsseldorf. 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. 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. 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 (online).

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3.2
RESEARCH FOCUS II: PROCESSES FOR CHEMICAL BIOENERGY SOURCES AND MOTOR FUELS

"Key elements in implementing the objectives of the Bioeconomy Strategy are research into and development of innovative technologies to maximise 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.-Ing. Franziska Müller-Langer, Head of the Biorefineries Department)

The research focus area designated "Processes for chemical bioenergy sources and motor fuels" is a key element of the overall process chains, from the raw material biomass 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.

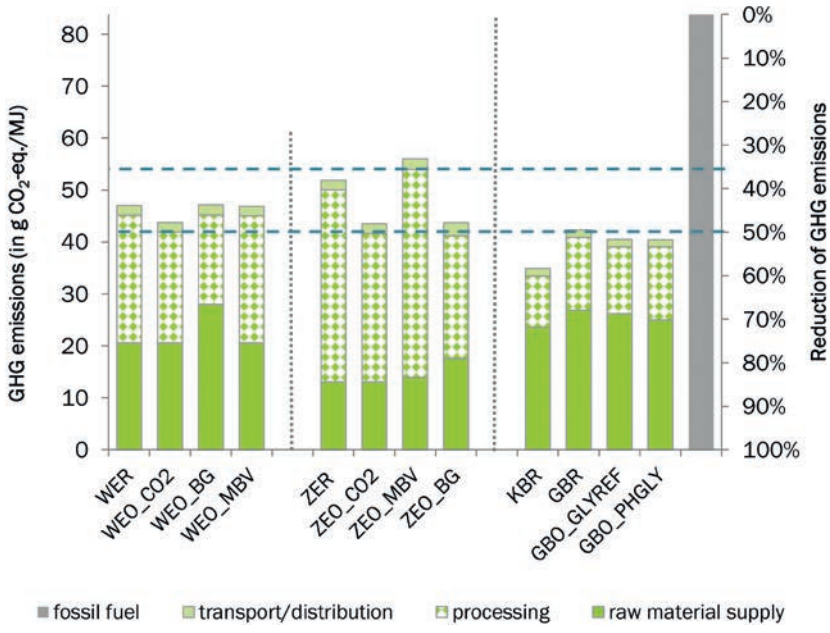
To that end, chemical refinement focused on hydrothermal processes (HTP) will be advanced. The development of fractioning for solid-liquid and liquid-liquid separation plays a key role as a link between the individual areas of research focus (in particular in conjunction with anaerobic processes and 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) prelimi-

nary trials for selected individual processes (e. g. HTP, gasification, methanation to form SNG) and (iii) reparation of an accompanying technical systems assessment (focus: material and energy balancing, cost and economic viability, environmental impact).

For 2014, selected project results from the research focus area can be summarised as follows:

In the field of biofuel and biorefinery technologies, studies were conducted on the optimisation potential of existing plants and on innovative new plant concepts. Among them, the "Optimisation potential of biofuel plant" project sponsored by the FNR was completed. With regard to the greenhouse gas-related biofuel rate in Germany and the associated demands, detailed schematic flow simulations were carried out to depict new process methods for the further improvement of the greenhouse gas balance (figure 10). The methods deliver lesser effects than measures in relation to the cultivation of raw materials or the choice of energy supply, but they can be implemented more quickly and easily if adopted. Innovative concepts for the production of biofuels and base chemicals are being investigated by two joint projects. The "BioEconomy Leadership Cluster" research project under the auspices of the German Federal Ministry of Education and Research (BMBF) is devising concepts for biorefineries, initially based on beechwood. These concepts incorporate the results already obtained from technological developments by the partners in the Leadership Cluster. The concepts developed so far produce ethylene, biomethane, high-grade lignin, and a lignin fuel. Some initial sustainability studies of biorefinery concepts have been compiled. Further modularisation and the integration of updated research results will seek to demonstrate how the technologies within the Leadership Cluster can be interlinked, with the ultimate aim of supporting sustainable marketability.
The EU FP7 "GRAIL" project is likewise developing plant concepts incorporating innovative techniques for the production of biofuels, base chemicals and food additives through the cooperation between its 15 project partners. In this, glycerin from biodiesel production serves as the raw material for biological and thermo-chemical processes for the production of butyl alcohol, 1,3-propanediol or beta-carotin for example. The project also involves assessments of those processes.



WER Wheat ethanol reference
WEO Wheat ethanol optimization
_CO_2 CO_2 recovery and liquefaction
_BG Biogas production from thin stillage/ vinasse and beet pulp
ZER Sugar beet ethanol reference
ZEO Sugar beet ethanol optimization
_MBV Mechanical vapor recompression
KBR Small-scale biodiesel reference
GBR Large-scale biodiesel reference
GBO_GLYREF GBR with MeOH from glycerin reforming
GBO_PHGLY GBR with glycerin treatment to pharma quality

Fig. 10 Potential for reducing the greenhouse gas emissions of biofuels by the optimisation methods investigated compared to reference plants and fossil fuels

The process simulations to calculate the mass and energy balances are currently being completed and discussed within the consortium.
Another important, and universally usable, chemical bioenergy source material is synthetic natural gas made from biomass (bio-SNG). The overall process chain

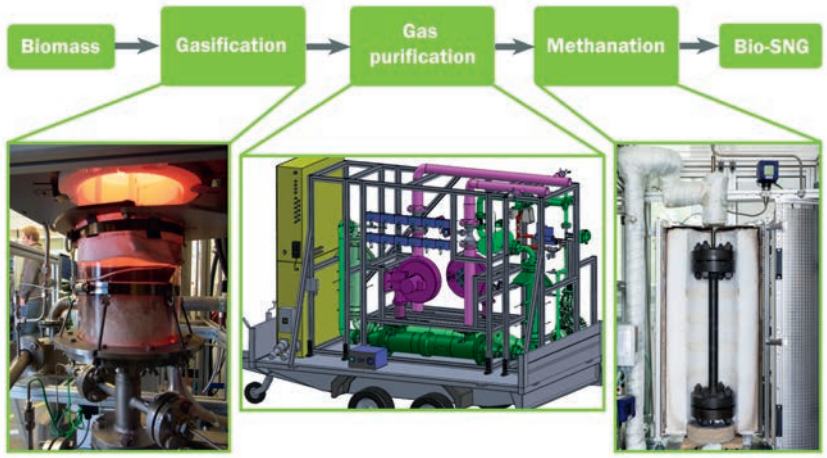


Fig. 11 Process chain for bio-synthetic natural gas (bio-SNG)

from the biomass through to the bio-SNG as well as the various single processes were analysed and enhanced in a number of projects with the aid of simulation tools and laboratory experiments. Figure 11 shows the key points in the bio-SNG process chain.

In the field of gasification, the SNGPro project co-financed by the SAB developed and successfully built an entrained-bed gasifier. Detailed experiments investigated the retention times of various fuels, particle burn-out and tar formation. Gas purification/conditioning was studies in a project co-financed by the SAB (KatASyn) and AiF (AdSynZIM). It focused on catalytic and adsorptive heating gas purification. This involved the implementation of various multi-stage concepts in the form of pilot plants. In relation to methanation, studies were carried out at catalyst and reactor level. These were concentrated particularly on the flexibility of the methanation reactor. Based on these extensive studies, it will be possible to translate the findings obtained to date into marketable products in cooperation with industrial partners.

A number of market projects in the field of hydrothermal processes (HTP) were carried out in 2014. They included analysis of in part exotic biomasses as substrates for hydrothermal carbonisation (HTC) on behalf of an international client.

Extending the range of feedstocks for HTC is also the focus of the research project titled “HTChem – Biorefinery for the integrated hydrothermal production of fuel and of the base chemicals phenol and furan from biomass” which was launched in late 2014 as part of the “BioEconomy Leadership Cluster”.

The BMBF-sponsored joint project “Febio@H_2O – Liquid energy source materials from integrated hydrothermal conversion of biomass” conducted some promising experiments relating to the liquefaction of moist biomasses in 2014. The aim was to produce blends of saturated and aromatic hydrocarbons from various kinds of biomass that can be used as propellants or primary materials for the chemical industry. The production of short-chained organic acids and phenols necessary for catalytic conversion was verified based on model substances (figure 12). In order to process a broader range of feedstocks, the tubular reactor required for the purpose was upgraded and a laboratory-scale two-stage hydrothermal plant was designed which will be built and put into operation in 2015. The HTP conference on “Bio-based hydrothermal processes – Technologies for material and energy use” hosted in November 2014 was a great success. It saw over 60 experts in hydrothermal processes gather to exchange views and ideas. Alongside basic chemistry, numerous new research methods and technical innovations were presented and discussed.

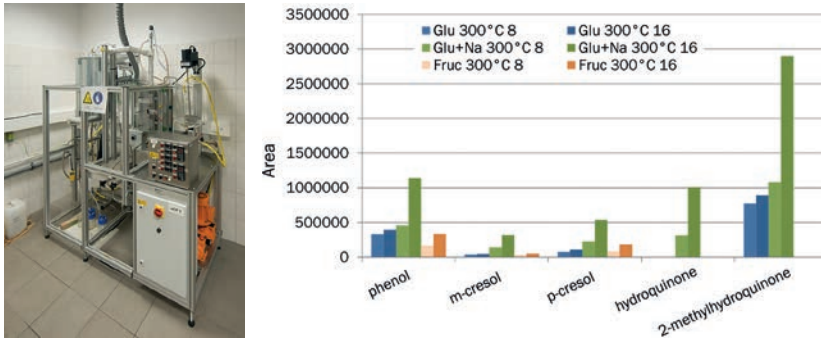


Fig. 12 Hydrothermal tubular reactor and production of phenols using glucose under various reaction conditions

Key reference projects and publications

Project: Entwicklung eines katalytisch-adsoptiven Heißentteerungssystems zur Behandlung biomassestämmiger Synthesegase – KatASyn, Sächsische Aufbaubank (SAB) (FKZ: 100100178)

Project: GRAIL – Glycerol Biorefinery Approach for the Production of High Quality Products of Industrial Value (EU FP7), EU-Projekt (FKZ: GA 613667)

Project: Integrierte Verwertungsanlage und Strategie für kommunale Biomasse „HTC Hallesche Wasser und Stadtwirtschaft“, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich (FKZ: 03KB049A)

Project: Konzeptentwicklung zur marktnahen Produktion von Synthetic Natural Gas – SNGPro, Sächsische Aufbaubank (SAB) (FKZ: 100116093)

Project: Optimierungspotenziale von Biokraftstoffanlagen, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/ Fachagentur Nachwachsende Rohstoffe e.V. (FKZ: 22403111)

Project: Rahmenvertrag zur wissenschaftlichen Begleitung, Unterstützung und Beratung des BMVBS in den Bereichen Verkehr und Mobilität mit besonderem Fokus auf Kraftstoffen und Antriebstechnologien sowie Energie und Klima, DLR/Bundesministerium für Verkehr und digitale Infrastruktur

Publication: Gröngröft, A.; Meisel, K.; Hauschild, S.; Grasemann, E.; Peetz, D.; Meyer, K.; Roth, A.; Riegel, F.; Endres, C. (2014): Wissenschaftliche Untersuchung von Wegen der Biokerosinproduktion aus verschiedenen Biomassetypen. Abschlussbericht zum Vorhaben „BurnFAIR“. Lufthansa.

Publication: Kiendl, I.; Klemm, M.; Clemens, A.; Herrmann, A. (2014): Dilute gas methanation of synthesis gas from biomass gasification. In: Fuel. Bd. 123. ISSN 0016-2361. DOI: 10.1016/j.fuel.2014.01.036.

Publication: Müller-Langer, F.; Kaltschmitt, M. (2014): Biofuels from lignocellulosic biomass – a multicriteria approach for comparing overall concepts. In: Biomass Conversion and Biorefinery. S. 1–19. DOI: 10.1007/s13399-014-0125. ISSN 2190 6815.

Publication: Müller-Langer, F.; Majer, S.; O'Keeffe, S. (2014): Benchmarking biofuels – a comparison of technical, economic and environmental indicators. In: Journal Energy, Sustainability and Society. Bd. 4 (Nr. 1). ISSN 2192-0567. DOI: 10.1186/s13705-014-0020-x.

Publication: Naumann, K.; Oehmichen, K.; Zeymer, M.; Meisel, K.; (2014): Monitoring Biokraftstoffsektor (DBFZ-Report Nr. 11, 2. Auflage). DBFZ, Leipzig. ISSN 2197-4632.

Publication: Rönsch, S.; Matthischke, S.; Müller, M.; Eichler, P. (2014): Dynamische Simulation von Reaktoren zur Festbettmethanisierung. In: Chemie Ingenieur Technik. Bd. 86 (Nr. 8). S. 1198–1204. DOI: 10.1002/cite.201300046. ISSN 1522-2640.

Publication: Rönsch, S.; Zeymer, M.; Majer, S. (2014): Treibhausgasvermeidungskosten von synthetischem Methan und Methanol aus Biomasse und Braunkohle. In: Chemie Ingenieur Technik. Bd. 86 (Nr. 10). S. 1678–1689. DOI: 10.1002/cite.201400047. ISSN 1522-2640.

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3.3 RESEARCH FOCUS III: INTELLIGENT BIOMASS HEATING TECHNOLOGIES

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

(Dr.-Ing. Volker Lenz, Head of the Thermo-Chemical Conversion Department)

The “Intelligent biomass heating technologies” 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 (SmartBiomassHeat). 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).

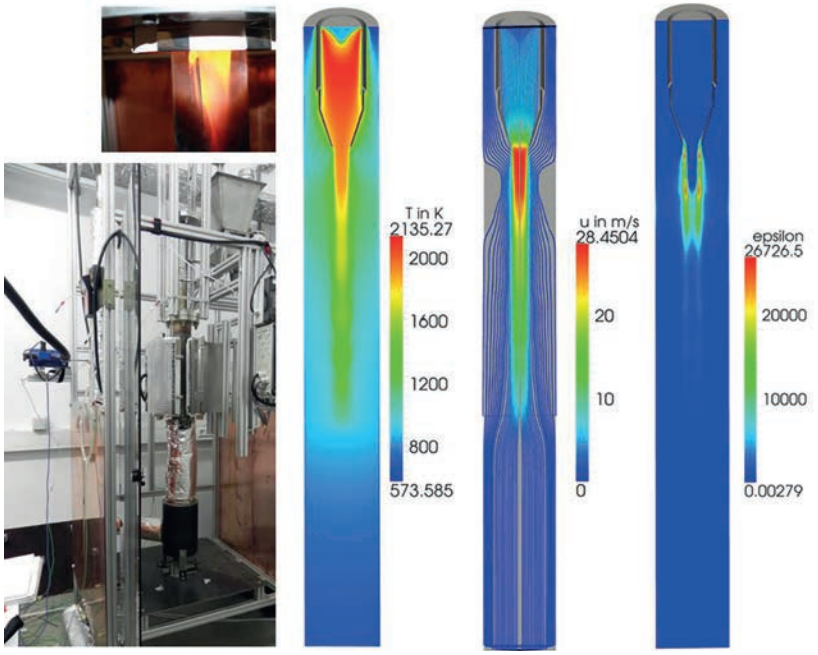

Fig. 13 CFD simulation of temperature distribution in the tubular incineration apparatus of the DBFZ [2]

2014 PROJECT RESULTS

Two contradictory trends characterised events in 2014. On the one hand, the subsidy provisions of the Renewable Energies Act were amended much to the disadvantage of the bioenergy sector. On the other, policy-makers explicitly underlined their commitment to the shift in energy policy and thus to the decarbonisation of energy supply. There is ongoing intensive debate surrounding competing usage and issues of sustainability with regard to the use of biomass as an energy source. These background factors influenced project work, and helped focus research in the Thermo-Chemical Conversion Department.

Fuels

Various research results relating to torrefication demonstrate that the production of torrefied wood with uniform product quality is difficult to control. It was also shown, however, that torrefication is possible on a small scale. In conjunction with findings from initial incineration experiments as part of the "SECTOR" European joint project, which revealed that torrefied wood pellets appear to improve the load cycle behaviour of boilers, the hypothesis can be put forth that torrefication can be employed to produce new solid fuels permitting higher efficiency and lower emissions under rapidly changing load demands. Research into the scrubbing of moist biomasses has shown that the trace materials, such as of foliage, critical for incineration can be substantially reduced. So there is an option in future to also use non-wood biogenic residues and by-products more widely for high-grade applications – as desired by the German Federal Government [1] – and reduce the use of primary crop biomasses.

The DBFZ is also heavily committed to research into the fundamentals of the pelletisation mechanisms of hay and fermentation residues through its joint support of a doctoral programme at the TU Bergakademie Freiberg. Based on the knowledge obtained, key hypotheses have been developed which will be applied to optimise the pelletisation of difficult raw materials.

Conversion

A number of projects relating to the integration of catalytic components into furnaces have demonstrated that it is possible to reduce critical air pollutants even in a wide variety of different load states (refer in this context also to the "Catalytic pollution control" research focus). This has established a basis for much more flexible plant operation than was previously possible even in the low power range. Additionally, an invention relating to the incineration of solid biomasses with a thermal output of below 5 kW has been registered for patent review. The small-scale furnace set up at the DBFZ was used to demonstrate that very low-emission incineration is also possible in this low power range in an extremely wide lambda band.

The CFD team finally established in 2014 was able to accurately simulate the temperature distribution in the invented small-scale furnace (figure 13). This created the basis for further optimisation. A dissertation compiled in conjunction with the

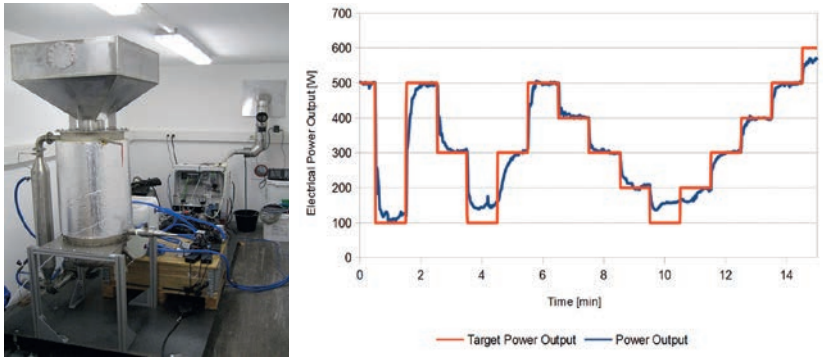

Fig. 14 Micro-CHP plant demonstrator and flexibility test result

University of Chemnitz showed that highly flexible small-scale gasification of charcoal with subsequent utilisation in a moped motor with an electric power output of a few hundred watts is possible (see figure 14) [3]. A fuel cell commissioned into operation in 2014 additionally demonstrated that the gasification can be adjusted very flexibly to changing power requirements with methane [4].
Overall, it was thereby proven that micro-CHP technologies are viable for solid fuels, and that in conjunction with suitable fuels they can deliver high levels of flexibility allied to promising electrical efficiency.

System control

It has been known for some years that some bioenergy systems for the supply of heat deliver annual usage rates of below 70 %, despite the high efficiency of the boilers [5]. The reasons for this lie in a variety of technical challenges within the system for which no optimal solution has yet been found. The BioMaxEff joint European project developed a methodology which makes it easier to determine whether a furnace has efficiency problems in practice. All that is needed are a few items of boiler data which are easily read by the user. No complex and costly measurements or data acquisition processes are required for an initial appraisal. Alongside the question of correct scaling of the plant, efficient control of the overall heat system is particularly essential. The development of models to map residential buildings, boilers, solar plants and buffer storage enabled the creation

of key tools to improve the testing and speed up the optimisation of future developments in control algorithms [6]. In 2014 important findings were also obtained relating to data acquisition in the operation of decentralised power generators such as PV plants, small-scale wind turbines and biogas CHP plants. Corresponding IT protocols were drawn up as a result [7].

Research focus “Intelligent biomass heating technologies”

Based on intensive discussions relating to the expected framework conditions surrounding the shift to renewables and the availability of biomass for the future, in 2014 the DBFZ devised the “Smart Bioenergy” concept. The outcome entails decentralised use of bioenergy through plant concepts with small-scale, regionally obtainable biomass quantities, the use of innovative, highly efficient and environmentally friendly conversion technologies, and much improved interlinking of bioenergy with the various energy and material systems.
As biomass is still by far the most important renewable energy source for heat [6], and policy-makers are looking to refocus more intensively on the issue in 2015, the aforementioned principles are also applicable to the supply of heat from bi-

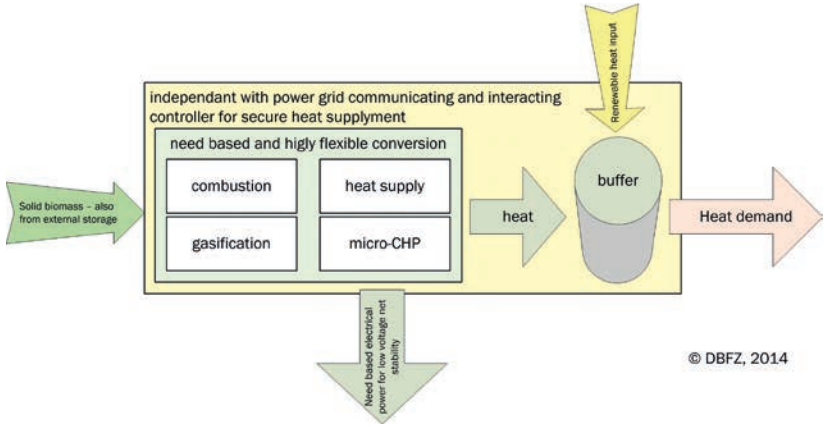

Fig. 15 DBFZ intelligent biomass heating technologies concept (Smart BiomassHeat)

omass. This leads on to the research area relating to the efficient integration of heat supply from biomass into the mix of various renewable source heating options. This demands fuels which enable the conversion plants to run at high levels of flexibility, and which are increasingly recovered from by-products and residues. Moreover, the existing furnaces must be upgraded with a view to achieving greater flexibility and running at lower power, and research is needed into new, highly flexible micro-CHP systems with high levels of electrical efficiency. A substantial upgrading of intelligent control systems is essential to the necessary integration into the energy system and efficient linkage with other renewable heat sources.
Taken together, the aforementioned issues make up the new research focus area designated “Intelligent biomass heating technologies” (SmartBiomassHeat). The medium-term aim in this is to create conversion systems which deliver maximum flexibility in efficiently closing gaps in supply in the renewable heat portfolio, with minimal environmental impact, while at the same time helping to stabilise local power grids.

PROSPECTS FOR 2015

The “Intelligent biomass heating technologies” research focus area incorporates in more detail the findings from the essential fields of innovative fuels, new conversion plants, and control systems, and intensifies the work being done, while assigning related questions to the “Science-based services” function. The aims for 2015 include investigating questions relating to the compacting of charcoal, testing the existing micro-gasifier with torrefied wood fuels, designing small-scale furnaces also for crop-type fuels, and undertaking initial control developments in a model environment.

Sources

[1] CDU Deutschlands, CSU-Landesleitung und SPD: Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD. 18. Legislaturperiode 12/2013.

[2] Haller et al. (2013): Basic studies on the development of micro combustion systems for biomas. 6th European Combustion Meeting.

[3] Krüger, D.; Ortwein, A.; Klemm, M. (2014): Mikro-Kraft-Wärme-Kopplung mit Vergasung fester Biomasse in Form von Holzkohle. In: Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät, ASW-Beiträge. S. 147–153. Universität Rostock. ISBN 978-3-86009-412-9.

[4] Schmidt, S. (2015): Flexibilisierte Strombereitstellung aus biogenen Gasen mit Hilfe von Brennstoffzellen. 3. Sächsisches Forum für Brennstoffzellen und Energiespeicher 2015. Leipzig.

[5] Schraube, C.; Jung, Th., Wilmotte, J.-Y., Mabilat, C., Castagno, F. (2010): Long-term monitoring of small pellet boiler based heating systems in domestic applications. 18th European Biomass Conference Proceedings. Lyon.

[6] Project: BioMaxEff – Cost efficient biomass boiler system with maximum annual efficiency and lowest emissions (BioMaxEff), EU-Projekt (FKZ: GA 268217)

[7] Project: Automatisierte Leistungssicherung in einem Netz tausend dezentraler Energieerzeuger mit Hilfe eines IKT-Cockpitansatzes basierend auf dem Konzept des Lieferkettenmanagements (ECockpit), Sächsische Aufbaubank (SAB) (FKZ: 100127660)

[8] Bundesministerium für Wirtschaft und Energie: Entwicklung der erneuerbaren Energien in Deutschland im Jahr 2013. Grafiken und Diagramme unter Verwendung aktueller Daten der Arbeitsgruppe Erneuerbare Energien-Statistik (AGEE-Stat), Stand August 2014.

Key reference projects and publications

Project: Automatisierte Leistungssicherung in einem Netz tausend dezentraler Energieerzeuger mit Hilfe eines IKT-Cockpitansatzes basierend auf dem Konzept des Lieferkettenmanagements (ECockpit), Sächsische Aufbaubank (SAB) (FKZ: 100127660)

Project: BioMaxEff – Cost efficient biomass boiler system with maximum annual efficiency and lowest emissions (BioMaxEff), EU-Projekt (FKZ: GA 268217)

Project: Emissionsminderungen durch integrierte Maßnahmen in Biomasse-Kleinfeuerungen, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Projektträger Jülich (FKZ: 03KB051A)

Project: Innovatives bedarfsangepasstes Kommunal-Energieträger-Konzept (IbeKet), Projektträger Jülich/Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (FKZ: 03KB088D)

Project: TORBIMA: Torrefizierung – ein Verfahren zur Homogenisierung schwieriger Biomassen für eine energetische Nutzung, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich (FKZ: 03KB057B)

Publication: Döhling, F.; Khalsa, J.; Weller, N. (2014): Influence of the Mineral Composition on the Thermo-Chemical Decomposition Behavior of Different Biomasses. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 711–718. Hamburg. ISBN 978-88-89407-52-3.

Publication: Khalsa, J.; Döhling, F.; Weller, N.; Lenz, V. (2014): Prospects and limitations of solid fuel enhancement through torrefaction, hydrothermal carbonization or mechanical leaching – conclusions from combustion experiments and emission measurements. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Online Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

Publication: Kirsten, C.; Lenz, V.; Schröder, H.-W.; Repke, J.-U. (2014): Additional Analyses for Development and Quality Management of Alternative Fuel Pellets. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Online-Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.
Publication: König, M.; Hartmann, I.; Matthes, M.; Weller, N.; Döhling, F. (2014): Nutzung alternativer biogener Festbrennstoffe in Kleinfeuerungsanlagen – Anlagentechnik und Emissionen. In: Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät. S. 113–121. Universität Rostock. ISBN 978-3-86009-412-9.
Publication: Weller, N. (2014): Combustion of hay pellets – Effects of Kaolin and Limestone addition on the combustion behaviour, ash sintering and emissions. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

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3.4 RESEARCH FOCUS IV: CATALYTIC EMISSION CONTROL

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

(Dr. rer. nat. Ingo Hartmann, Head of the Small-scale Furnace Systems working group)

The primary focus of this work is to develop/investigate catalytic pollution control measures on incinerators for gaseous, liquid and solid bioenergy sources based on solid-state catalysts. The focus is on catalytic reduction of the combustion emissions, namely methane (CH_4), non-methane volatile organic compounds (NMVOC), semi- and non-volatile hydrocarbons such as polycyclic aromatic hydrocarbons (PAHs) and polychlorinated dibenzodioxins/polychlorinated dibenzofurans (PCDD/PCDF), soot particles (black carbon) and nitrogen oxides (NOX). 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.

Two general objectives have been defined on the basis of the aforementioned background factors:

- **Objective 1:** Catalytic pollution control principles for incinerators of gaseous, liquid and solid bioenergy source materials ► Secondary catalytic methods
- **Objective 2:** Integrated catalysts to prevent pollution in combustion processes ► Primary catalytic methods

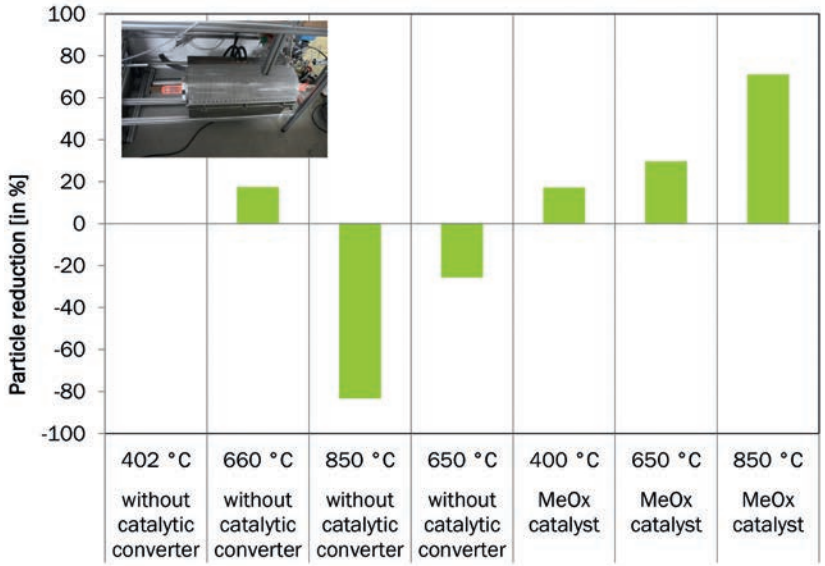

Fig. 16 Reduction of soot particles on a metal oxide catalyst in a reactor under model gas conditions

The objectives and research tasks can be broken down into the characteristics of the energy source material and the pollutants to be controlled. The method of catalytic pollution control to be developed is then derived from that breakdown. There are some overlaps between the research tasks. It can be assumed, for example, that catalysts for motorised biogas combustion are also usable for liquid biofuels with a small amount of adaptation and modification. The same applies to the development of SCR techniques on motorised combustion systems. The catalyst coatings and the required reductant processes are similar. The waste gas conditions are likewise comparable in part. Research objectives have been derived with due consideration to the synergies set out in the following sections.

CATALYTIC EMISSION CONTROL IN BIOGAS CHP PLANTS

Research into catalytic waste gas final treatment in biogas CHP plants focuses on the pollutants formaldehyde, methane and nitrogen oxides. Reduction of other VOCs as well as CO and dust is also investigated. Noble metal/washcoat/metal carrier systems are tested as catalysts. Additionally, intensive research has been – and will be conducted in future into metal oxide catalysts, including various combinations with noble metals.

CATALYTIC EMISSION CONTROL IN THE COMBUSTION OF LIQUID BIOFUELS

The primary aim of research into catalytic pollution control during the combustion of liquid biofuels is to reduce soot particles and nitrogen oxides. Reducing emissions of VOCs and CO also plays a role. This entails researching and developing both mixed metal oxides and combinations of metal oxides and noble metals on metallic or ceramic carriers.

CATALYTIC EMISSION CONTROL IN SINGLE-ROOM FOR FIREWOOD

Research into reducing emissions with the aid of catalysts for firewood furnaces has been successfully initiated on a number of projects. Reducing VOCs was considered to be the primary goal. Transitional metal oxides with a spinel structure delivered promising results when used under high-temperature conditions. Developments in catalyst integration were carried out in a new-style firewood stove as well as in a firewood boiler based on the gasification principle. Work in this area resulted into the registration of a patent.

- **Patent application 10 2013 020 398.8 Germany:** Combustion chamber, system with combustion chamber, process and retrofit kit, submitted on 10.12.2012, date of registration: 10.12.2013

As a final result of the project, sponsored by the German Federal Environmental Foundation (DBU), two prototypes of a low-emission stove were constructed. One prototype participated at the “Next Generation Wood Stove Design Challenge” in Long Island, New York (4th to 7th November 2014) and took second place.
The second prototype was set up as a demonstrator at a private operator’s facility in Coswig near Dresden (see figure 17), so as to verify its functionality under real practical conditions.

Fig. 17 NEKO prototype at the demonstration location in Coswig near Dresden
Catalytic emission control in fully automatic furnaces for pellets and chips (wood and other biogenic residues)

CATALYTIC POLLUTION CONTROL IN FULLY AUTOMATIC FURNACES FOR PELLETS AND CHAFF (WOOD AND OTHER BIOGENIC RESIDUES)

Research, development and integration of catalysts for fully automatic furnaces was initiated by extensive work on a specially developed laboratory incinerator apparatus. Reducing VOCs was researched as the primary aim, with oxidising degradation of soot particles as a further aim. Work in this area resulted in the registration of a patent relating to an ultra-small-scale furnace.

- **Patent application 10 2014 001 785.0 Germany:** Ultra-small-scale furnace for biogenic solid fuels, date of registration: 12.02.2014

Research is also being conducted into the reduction of nitrogen oxides by DeNOx catalysts.

RESEARCH GOALS

Short-term research aims

In the short term, the catalyst systems currently known and in development will be used to substantially reduce the emissions occurring in the combustion of bioenergy sources. This will involve research on the following points:

- Catalytically activated soot particle filters based on mixed-metal oxide catalysts
- Oxidation catalysts to reduce methane and NMVOCs in motorised combustion
- Selective catalytic reduction of nitrogen oxides with new-style catalysts in motorised combustion
- Selective catalytic reduction of nitrogen oxides with combined dust collection on biomass furnaces conforming to 1. BImSchV (German Federal Immission Control Act)
- Catalytic residual methane reduction on biogas plants

Medium-term research aims

In the medium term, the focus will be on research and development of new-style materials and processes for catalytic pollution control in order to ensure improved economic viability and better environmental compatibility. This will cover the following aspects:

- Research into lower-cost catalytic converters based on ash from solid biogenic residues without input of noble metals
- Development of high temperature-stable catalysts with a hierarchical pore system
- Non-conventional initiation of catalytic reactions for pollution control

- Ongoing development and optimisation of catalysts for biomass conversion plants
- Optimised integration of the catalysts into plants

Key reference projects and publications

Project: Emissionsarmer Scheitholzvergaserkessel mit integriertem Katalysator und optimierter Verbrennungsregelung, Bundesministerium für Wirtschaft und Energie/AiF

Project: REMISBIO: Maßnahmen zur Reduzierung von Emissionen von Biogasanlagen – Katalysatortest, Bundesministerium für Bildung und Forschung/Projektträger Jülich (FKZ: 03KB052A)

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

Publication: Bindig, R.; Butt, S.; Dvoracek, D.*; Enke, D; Hartmann, I.; Werner, F (2014): „Manganese oxide catalysts to reduce the emission of small scale stoves". Poster auf der 47. Jahrestagung Deutscher Katalytiker, 12.–14. März 2014, Weimar.

Publication: Bindig, R.; Butt, S.; Dvoracek, D.; Enke, D.; Hartmann, I. (10/2014): Challenges and recent developments for emission control on stationary biomass combustion devices for energy production. Vortrag gehalten: 8th International Conference on Environmental Catalysis. Am 20.10.2014 in Asheville, USA.

Publication: Bindig, R.; Butt, S.; Hartmann, I. (2014): Application of high temperature catalysis to abate emissions from a small scale combustion system. In: Conference Proceedings of the 5th International Conference „Biosystems Engineering 2014". Tartu, Estland.

Publication: Hartmann, I. (10/2014): Wissenschaftliche Einblicke zur Emissionsminderung bei Biomasse-Kleinfeuerungen. Vortrag gehalten: DBFZ Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!" Am 2.10.2014 in Leipzig.

Publication: Hartmann, I.; Billig, E.; Bindig, R.; Carstens, S.; Liebetrau, J. (09/2014): Möglichkeiten, Limitierungen und Entwicklungsbedarf zur katalytischen Emissionsminderung. Vortrag gehalten: VDI-Forum: Emissionen aus Biogasanlagen. Am 25.9.2014 in Frankfurt/Main.

Publication: Hartmann, I.; Lenz, V. (2014): Wissenschaftliche Einblicke zur Emissionsminderung bei Biomasse-Kleinfeuerungen. In: Nelles, M. (Hrsg.): DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!" S. 118–129. Leipzig. ISSN 2199-9384.

Publication: Hartmann, I.; Matthes, M.; Thiel, C.; Kohler, H.; Groll, A.; Riebel, U. (2014): Demonstration von Maßnahmen zur Emissionsminderung an Biomasse-Kleinfeuerungen. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Effizient, umweltverträglich, dezentral. Neue Konzepte für die Nutzung von biogenen Festbrennstoffen. Bd. 17, S. 45–59.

Publication: Matthes, M.; Dobler, U. (2014): Emissionsminderung an Multifuelkesseln. In: Tagungsband der DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!" S. 136–143. Leipzig. ISSN 2199-9384.

Publication: Matthes, M.; Hartmann, I.; König, M. (2014): Investigations at a Micro-Scale Installation Regarding Emission Reduction by Air Staging and Integrated Catalysis; 2014; Chemical Engineering Transaction; Bd. 37; S. 13–18; DOI: 10.3303/CET1437003.

Publication: Matthes, M.; Hartmann, I.; König, M. (10/2014): Investigations at a Micro-Scale Biomass Combustion System Regarding Application of Integrated Catalysis Using Ceramic Foams as Support Material. Vortrag gehalten: Cellular Materials – CellMAT 2014. Am 24.10.2014 in Dresden.

Publication: König, M.; Hartmann, I.; Matthes, M.; Weller, N.; Döhling, F. (2014): Nutzung alternativer biogener Festbrennstoffe in Kleinfeuerungsanlagen – Anlagentechnik und Emissionen. In: Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät. S. 113–121. Universität Rostock. ISBN 978-3-86009-412-9.

Publication: Wittus, N.; Hartmann, I.; Werner, F.; Ulbricht, T.; Günther, S.; Butt, S.; Bindig, R.; Eisinger, K.; König, M.; Matthes, M.; Enke, D.; Dvoracek, D. (11/2014): Collaborative Stove Design Workshop 2014 Stove: NEKO (Team Wittus). Vortrag gehalten: The Collaborative Stove Design Workshop at Brookhaven National Laboratory in Upton. Am 07.11.2014 in Town of Brookhaven, USA.

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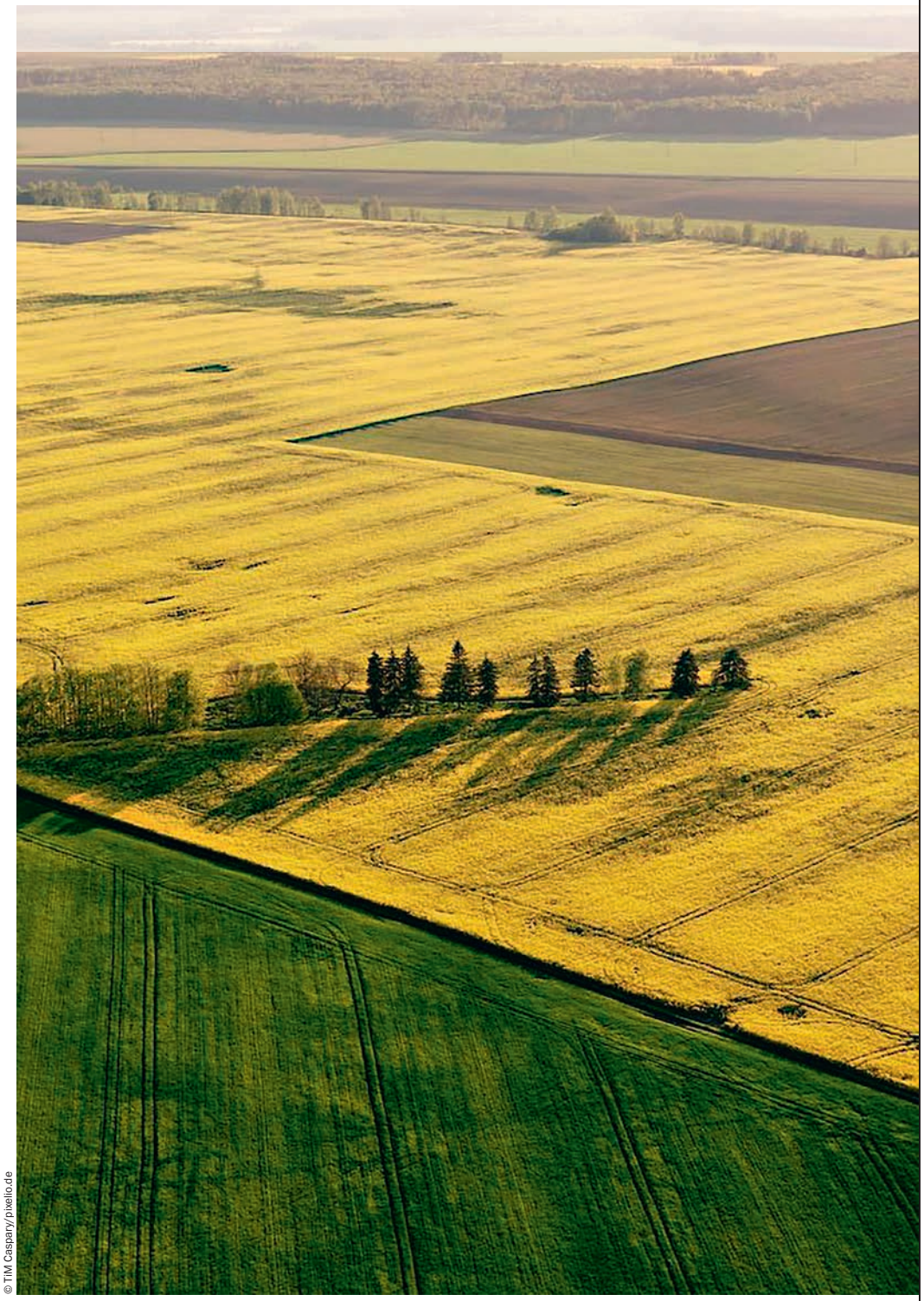

3.5
RESEARCH FOCUS V: SYSTEMIC CONTRIBUTION OF BIOMASS

"Smart bioenergy use in small, very precisely controlled plants will be a building block of integrated supply systems and be able to contribute to the sustainable energy supply of tomorrow."
(Prof. Dr.-Ing. Daniela Thrän, Head of the Bioenergy Systems Department)

The "Systemic contribution of biomass" research focus area 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.

MILESTONES 2030

In the past two years, the joint project "Elements and milestones for the development of a sustainable bioenergy strategy" (Milestones 2030) being run under the auspices of the German Federal Ministry for Economic Affairs and Energy (BMWi) investigated various bioenergy scenarios in preparation for a long-term strategy through to 2050 and in support of environmentally efficient and cost-effective technologies. Under the leadership of Prof. Dr. Daniela Thrän,

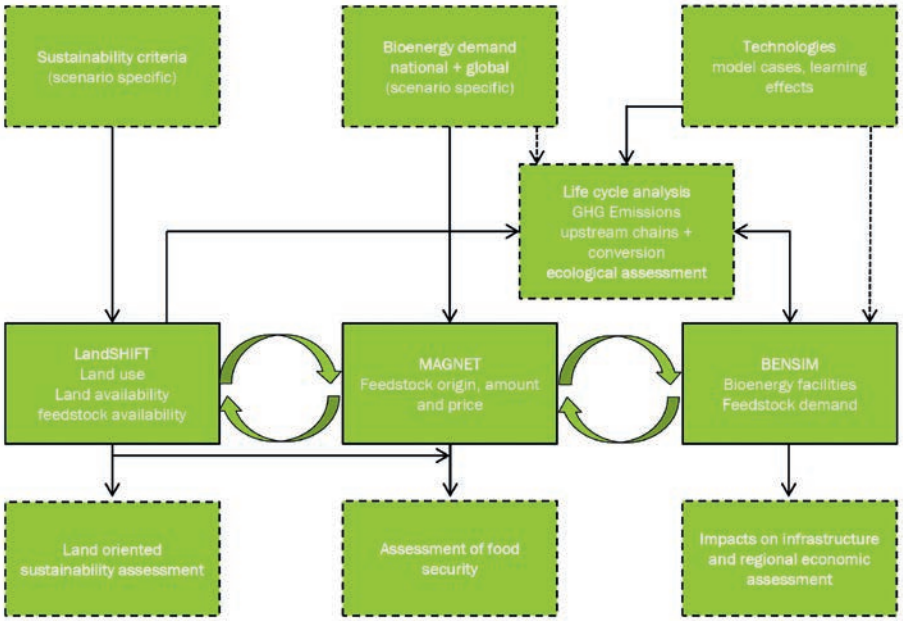

Fig. 18 Graphic of model linkage

interdisciplinary research partners were acquired to work on these highly complex questions (Thünen Institute, CESR – University of Kassel, IFEU, Öko-Institut e. V., IZES gGmbH, IINAS GmbH, UFZ). The consortium was able to produce results relating to raw material markets, land use and plant fleet development based on a new-style linkage of three models, and also analysed and evaluated the effects on various sustainability aspects as well as ecological/economic and regional interactions.

The recommendations derived from this work form the key pillars of a bioenergy strategy oriented to sustainability criteria. The criteria were embodied in 10 milestones to be reached by the year 2030. One of the researchers' findings, for example, is that bioenergy from agricultural raw materials such as biogas or biodiesel will remain relevant under the assumed framework conditions. By contrast, innovative concepts, such as second-generation fuels made from wood for example, will only be able to establish themselves under highly favourable conditions. Furthermore, the influence of German bioenergy demand on global raw material markets will remain low in future, though the land requirement linked to the use of bioenergy may be considerable, in particular due to imports. The associated risks in terms of biodiversity, soil pollution and the safeguarding of food sources are dependent on national bioenergy demand, but are influenced predominantly by global assumptions and trends. At the same time, changes in land use will have a major impact on the environment – in particular the greenhouse gas emissions linked to bioenergy – and may run contrary to climate protection goals.

It was also found that the milestones for future bioenergy use necessitate upgrading of production and supply concepts, but also demand close interlinking with various raw material sectors, market structures and players. The results are available to download from the Internet free of charge.

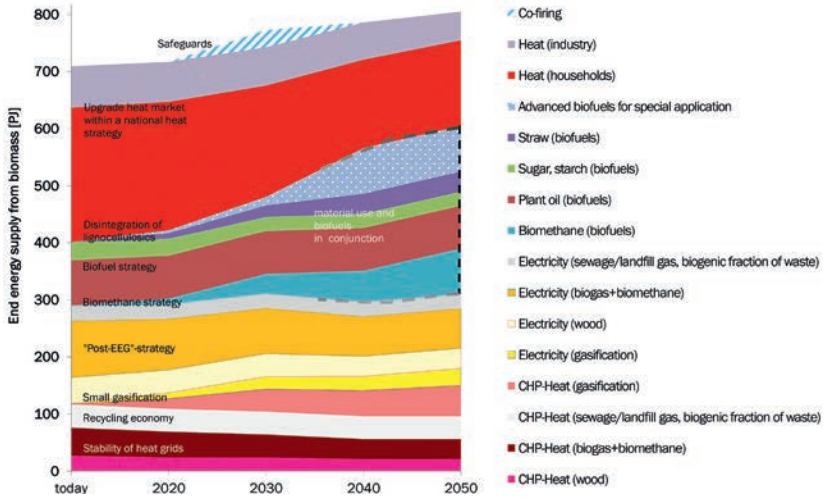

Fig. 19 Trends and milestones in bioenergy

JRC-EU-TIMES MODEL

Another research activity in the Bioenergy Systems department is a current contract on behalf of the JRC (Joint Research Centre) by which the JRC-EU-TIMES model is being furnished with a new, updated data base for all renewable energies. The DBFZ is cooperating on this with the ECN (Energy Research Centre of the Netherlands), DLR (German Aerospace Centre), DTU (Technical University of Denmark), ALTERRA (Wageningen University and Research Centre, Netherlands) and the UFZ. In conjunction with ALTERRA, the DBFZ worked on the biomass-related topics, in particular the potential of numerous biomasses at NUTS-2 level (equivalent to an administrative district) and the downstream production, supply and conversion chains. The biomass production costs, conversion costs, total costs and emissions derived from this will be in turn incorporated as aggregated outputs into cost-supply curves for all EU countries, depicting over 500 raw material technology combinations.

EVALUATION OF NATURE CONSERVATION REGULATIONS RELATING TO THE GENERATION OF POWER FROM BIOMASS

On behalf of the German Federal Nature Conservation Agency BfN, a project was concluded in 2014 involving the evaluation of nature conservation regulations relating to the generation of power from biomass in the framework of the Renewable Energies Act. The research project was run in conjunction with Bosch & Partner GmbH. The aim of the project was to identify the methods of integrating the objectives of nature conservation into the policy framework as a means of promoting power generation from biomass. To that end, various biomasses were analysed and assessed with regard to their environmental impact. Based on the assessments made, particularly nature-friendly biomasses justifying correspondingly greater levels of promotion were identified. In the course of the project, the targeted updating of feedstock remuneration classes set out in the 2012 amendment to the Renewable Energies Act (EEG) was obviated by the 2014 amendment. The EEG 2014 amendment provided for no separate remuneration of the use of regrowable resources in this context, and moreover it substantially cut the level of remuneration. Consequently, the project reviewed what possibilities for funding might exist beyond the EEG, serving as a potential incentive to establish and integrate cultures of value in terms of nature conservation, and thereby also possibly enhancing biodiversity. The possibilities for funding beyond the EEG were identified as greening by way of the first pillar of the agricultural assistance scheme (direct payments) and, primarily, the agricultural eco-programmes of the German Federal States. These can be utilised to compensate for part of the additional cost, depending on the aid measures on offer and the alternative cultivation. This would, however, necessitate adaptation of the agricultural eco-programmes specific to each state.

BIOENERGY REGIONS

The scientific research leadership role of the Bioenergy Systems department includes its contribution to the “Bioenergy Regions” project sponsored by the German Federal Ministry of Food and Agriculture (BMEL). In this, the DBFZ is working in close contact with the participants from the 21 project regions, evaluating regional bioenergy trends and conducting detailed analyses on specific questions. The scientific findings are processed so that they can be utilised directly in the regions concerned, and are easy to re-use. One example is the transparent, user-friendly presentation of technical biomass potential.
Ongoing collaboration with the Bioenergy Regions delivers information on the strategic goals and methods being pursued in relation to the use of bioenergy in the regions. The accompanying research thus provides a practically oriented insight into current trends in biomass use for energy production. Relevant aspects in this include the application of new technical developments, openness to innovation, and the transfer of scientific findings into practice. An example of this is the focused analysis of heat generation from biomass and its (efficient) use at local level. This topic is currently the subject of intensive attention within the regions, and the signs are that bioenergy-based heat concepts will continue to be an important area of activity in future. Local heating grids are a particular point of focus, as they can form part of a collective strategy for replacing fossil fuel-based heat generating technologies in rural areas (see also figure 20).

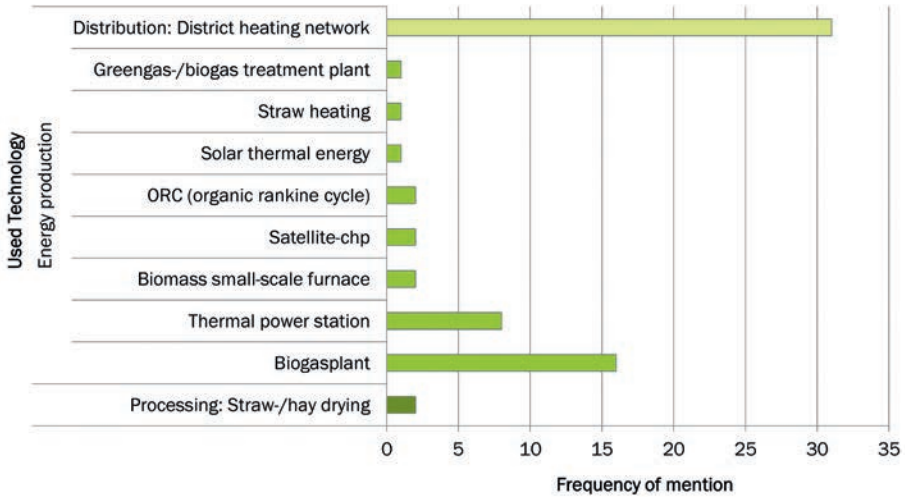

Fig. 20 Classification of projects relating to biogenic heat use in the Bioenergy Regions by technology used. Own depiction. Data basis: Survey as part of the first regional interim report (5/2013). Multiple listings of individual projects possible. 65 listings in this subcategory based on a total of 51 projects evaluated.

Regions (in this context referring to one or more “Landkreis” districts) play a key role in the strategic implementation of the shift to renewables and the interlinking of various players. High demand for research and co-ordination is still being seen in this regard owing to the multiplicity of small objects of analysis at this level and the widely varying regional conditions.

The research results and the accompanying technical/economic research activities provide for know-how transfer throughout Germany. The DBFZ makes its scientific findings available within the Bioenergy Regions by means of practically oriented publications and by holding a range of workshops, thereby organising knowledge transfer even between different funding programmes.

Additional information (german)

www.energetische-biomassenutzung.de/de/meilensteine-2030/meilensteine-2030.html
http://publications.jrc.ec.europa.eu/repository/handle/JRC85804
www.dbfz.de/forschung/referenzprojekte/bioenergieregionen.html

Key reference projects and publications

Project: Meilensteine 2030 – Elemente und Meilensteine für die Entwicklung einer tragfähigen nachhaltigen Bioenergiestrategie, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich. (FKZ: 03MAP230)

Project: Framework contract for the provision of Renewable Energy Potential Data Sets for the JRC-EU-TIMES model 2013/S 150-260084, EU JRC Institute for Energy and Transport (FKZ: 2013/S 150-260084)

Project: Evaluierung und Untersetzung der relevanten Regelungen zu Naturschutzanliegen bei der Stromerzeugung aus Biomasse im aktuell verabschiedeten Erneuerbare-Energien-Gesetz, Bundesamt für Naturschutz (BfN)

Project: Technisch-ökonomische Begleitforschung „Bioenergie-Regionen 2.0“, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V. (FKZ: 22020412)

Publication: Arendt, O.; Braun, J.; Ponitka, J.; Thrän, D.; Millinger, M.; Wolf, V.; Banse, M.; Gärtner, S.; Rettenmaier, N.; Hünecke, K.; Hennenberg, K.; Baur, F.; Wern, B.; Noll, F.; Fritsche, U.; Greß, H.-W.; Eppler, U. (2014): Modelle, Schnittstellen und Daten im Modellverbund „Meilensteine 2030“. DBFZ Leipzig.

Publication: Barchmann, T.; Lauer, M. (2014): Technisch-ökonomische Optimierung von flexiblen Biogaskonzepten im Kontext des EEG. In: Nelles, M. (Hrsg.): Tagungsband 8. Rostocker Bioenergieforum, Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät. S. 295–306. Rostock. ISBN 978-3-86009-412-9.

Publication: Bienert, K.; Thrän, D.; Kiel, J.; Carbo, M.; Wolfesberger-Schwabel, U. (2014): New results of the SECTOR project: production of solid sustainable energy carriers from biomass by means of torrefaction. In: Conference Proceedings of the Bioenergy from Forest, S. 13–19. Helsinki, Finnland.

Publication: Billig, E.; Devriendt, N.; Thrän, D.; Persson, T.; Kranzl, L.; Baldwin, J.; Ponitka, J.; Seiffert, M.; Svensson, M.; Matzenberger, J.; Pelkmans, L.; Van Dael, M. (2014): Market Deployment of Biomethane in IEA Member Countries – Focus on Stakeholder Questionnaire. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 1688–1691. Hamburg. ISBN: 978-88-89407-52-3.

Publication: Bloche-Daub, K.; Witt, J.; Kaltschmitt, M.; Janczik, S. (2014): Erneuerbare Energien. In: BWK – Das Energie Fachmagazin. Nr. 66. S. 5–21. ISSN 1618-193x.

Publication: Braun, T.; Dotzauer, M.; Goldbrunner, M.; Häring, G.; Hanby, V.; Krautz, A.; Pfeiffer, D.; Sonnleitner, M.; Zörner, W. (2014): Optimized operation of flexible biogas plants. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 9. Hamburg. ISBN: 978-88-89407-52-3. DOI: 10.1016/j.energy.2014.04.094.

Publication: Brosowski, A. (2014): Räumliche Verteilung von Reststoffpotenzialen zur energetischen Nutzung – GIS-gestützte Identifikation von Mindestmengen und Standortplanung. In: Bill, R.; Zehner, M. L.; Golnik, A.; Lerche, T.; Seip, S. (Hrsg.): GeoForum MV 2014 – Mehrwerte durch Geoinformation. S. 97–99. GITO-Verlag. Berlin. ISBN 978-3-95545-059-5.

Publication: Brosowski, A.; Majer, S. (2014): Biomassepotenziale und zukünftige Anforderungen an die Rohstoffbereitstellung. In: Nelles, M. (Hrsg.): Tagungsband zur DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ S. 69–78. Leipzig. ISSN 2199-9384.

Publication: Kapsa, K.; Oehmichen, K. (2014): Biokraftstoffe in Deutschland und der EU : Erfahrungen mit der Nachhaltigkeitszertifizierung. In: Ew-Spezial. Bd. 3. S. 32–37. ISSN 1619-5795-D 9785 D.

Publication: Krautz, A.; Lauer, M.; Dotzauer, M. (2014): Entwicklung und Praxiserfahrung der bedarfsgerechten Strombereitstellung aus Biogas. In: Festschrift Konferenz 5 Jahre Förderprogramm „Energetische Biomassenutzung“: Wege zur effizienten Bioenergie. S. 248–259. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. Leipzig. ISSN 2199-2792.

Publication: Schmidt-Baum, T.; Viehmann, C.; Witt, J. (2014): Analysis of the Population of Small-scale Furnaces on the Example of Germany. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88- 89407-52-3.
Publication: Tafarte, P.; Das, S.; Eichhorn, M.; Thrän, D. (2014): Small adaptations, big impacts: Options for an optimized mix of variable renewable energy sources. In: Energy. Bd. 72, S. 80–92.
Publication: Thrän, D.; Krautz, A.; Schefelowitz, M.; Lenz, V.; Liebetrau, J.; Daniel-Gromke, J.; Zeymer, M.; Nelles, M. (05/2014): Auswirkungen der gegenwärtig diskutierten Novellierungsvorschläge für das EEG-2014. In: ProFair Consult + Project GmbH (Hrsg.): Tagungsband zum 7. Biogas Innovationskongress, 22.–23.05.2014, S. 11-22. Osnabrück. ISBN 978-3-9813776-4-4.
Publication: Thrän, D.; Pfeiffer, D. (2014): Transparency and harmonization amongst evaluation methods. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.
Publication: Thrän, D.; Ponitka, J. (03/2014): Die Rolle der Bioenergie in einer zukunftsfähigen Energieversorgung. Vortrag gehalten: 78. DPG-Jahrestagung der DPG Deutsche Physikalische Gesellschaft e. V. Am 17.3.2014 in Berlin.
Publication: Weiser, C.; Zeller, V.; Reinicke, F.; Wagner, B.; Majer, S.; Vetter, A.; Thrän, D. (2014): Integrated assessment of sustainable cereal straw potential and different straw-based energy applications in Germany. In: Applied Energy, Special Energy Solutions in Agriculture. Bd. 114.
Publication: Ziegler, D.; Witt, J.; Bienert, K.; Schaubach, K. (2014): Torrefizierte Bioenergieträger: Auch für Deutschland interessant? In: Nelles, M. (Hrsg.): Tagungsband 8. Rostocker Bioenergieforum, Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät. S. 87–94. Rostock. ISBN 978-3-86009-412-9.

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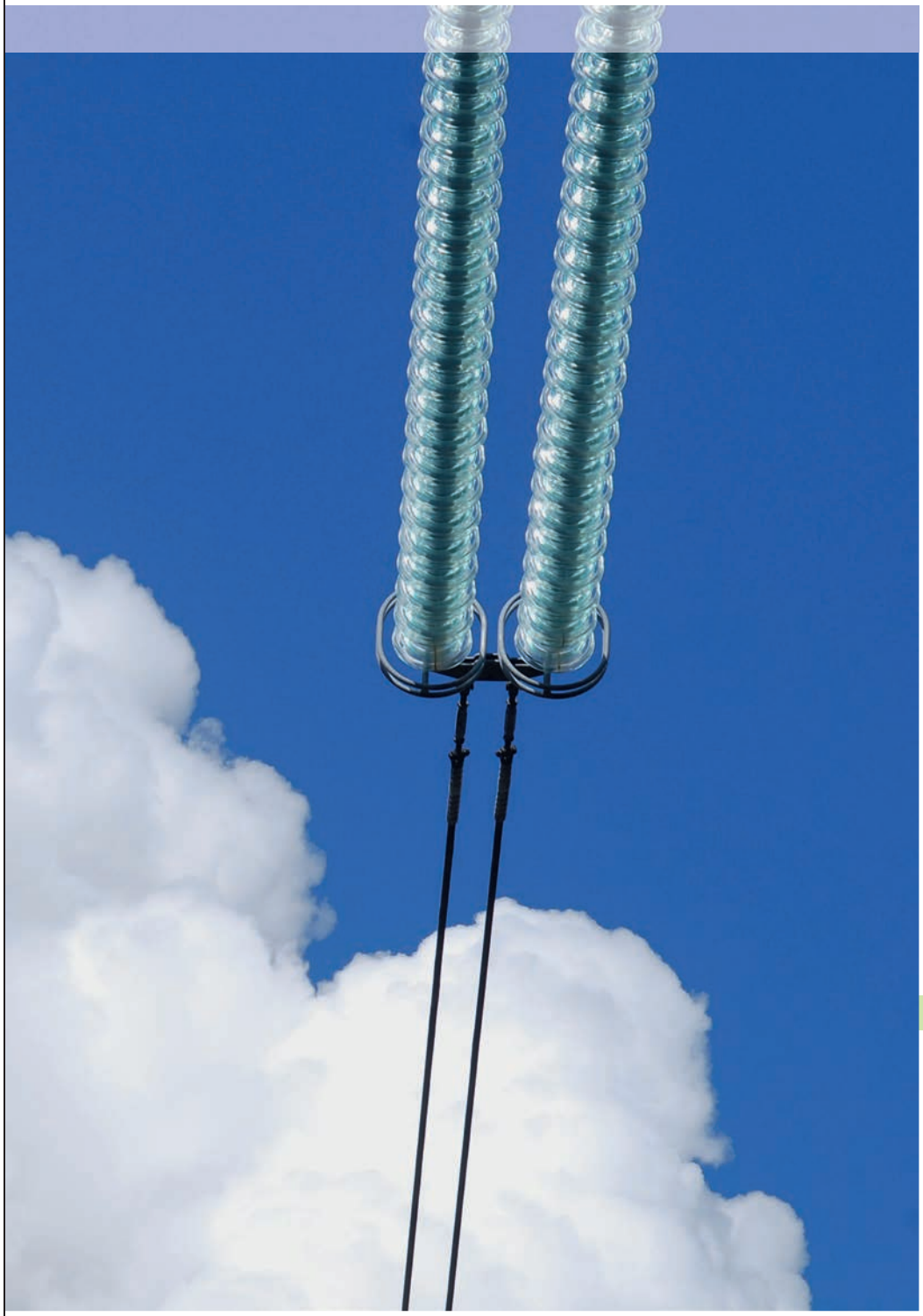

4 COOPERATION, NETWORKING AND INNOVATION

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). Many 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

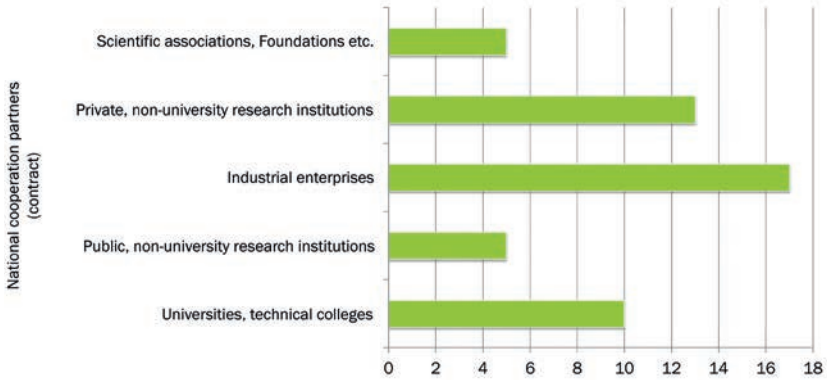

Fig. 21 Institutional and personal cooperation agreements of the DBFZ in the field of research and development (cooperation contracts) National cooperation partners

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 Department works closely with the UFZ's Bioenergy Department. And the DBFZ's Biochemical Conversion Department works closely with the UFZ's Microbiology Department. An intensive cooperation between the DBFZ's research departments and the Department of Waste and Material Flow Management of the University of Rostock relating to the recovery of organic wastes and residues for energy use is currently also being established.

The applied research and development work of the DBFZ is 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 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.

The DBFZ is also committed to establishing and developing sector-specific networks in order to make its research infrastructure and extensive scientific expertise available to small and medium-sized enterprises which previously did not have access to such R&D resources. This has the additional benefit of making the DBFZ and its work more widely known. In doing so, the DBFZ utilises existing structures, linking with major research associations and cooperating closely with multipliers.

In addition to its outstanding regional networking links at the location within the Energy and Environment Cluster in Leipzig, the DBFZ is also actively involved in research clusters such as the BMBF Leadership Cluster "BioEconomy", in which it coordinates entire research fields. The DBFZ is additionally seeking to participate in other research clusters, such as the Twenty20 Initiative, as well as to

Fig. 22 Networking at the "enertec/TerraTec" energy fair

cover specific subject areas as part of state-wide multiplier networks. The DBFZ actively interlinks industrial and scientific players in the course of specially funded subject-specific innovation forums aimed at creating institutionalised innovation networks.

A particularly noteworthy institution is the Bioenergy Innovation Centre, founded in 2013 together with other sector players in the Leipzig area. It aims to fulfill an incubator function for businesses spun off from the DBFZ and to promote the relocation of companies conducting R&D to its immediate vicinity. It also offers consulting and other services tailored to the needs of SMEs as a means of speeding up innovation processes. These measures form part of the DBFZ's innovation strategy. Responsibility for it lies with the scientific administration department of the Innovation Coordinator.

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)

In mid-2012 the DBFZ established three administration departments (Executive Support Team) reporting directly to the scientific management. 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. 23 The heads of the scientific administration departments: Dr. Sven Schaller, Dr. Elena Angelova and Dipl.-Holzwirt Romann Glowacki (from left to right)

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. The networks are created in close cooperation with regional and trans-regional cluster structures within the energy and environmental sectors. The DBFZ's research infrastructure is integrated into those networks. The innovation structures are converged in the Bioenergy Innovation Centre, opened in 2013.

THE KEY TASK OF THE INNOVATION COORDINATOR IS TO BUILD INNOVATION STRUCTURES

- Interlinking research establishments, businesses in the bioenergy sector and other key players
- Building, demonstrating and institutionalising such network structures
- Regular network meetings
- Coordinating procedures to establish and exercise intellectual property rights
- International networking in innovation management
- Supporting hive-offs and new business start-ups as well as company relocation
- Integration into other clusters, such as the "BioEconomy" Leadership Cluster
- Realisation of financing options for innovation processes

Fig. 24 First successful spin-off from the DBFZ: ETE EmTechEngineering GmbH

Its development will be driven from within the environment of the DBFZ. Principal components are the bioenergy network comprising businesses and research establishments around the region; nascent trans-regional networking; the establishment of fruitful links and trust-based collaboration with the municipal authorities; economic promotion through the Energy & Environment Network; as well as international components such as through the TREC (Transregional Renewable Energy Cluster) project.

BIOENERGY INNOVATION CENTRE, DBFZ SPIN-OFF, CLUSTERS IN THE DANUBE REGION

Bioenergy market conditions were tough in 2014 owing to the amendment to Germany's Renewable Energies Act (EEG) and the uncertainty it brought. This generally hampered the development of the Bioenergy Innovation Centre founded in 2013. Nevertheless, the first spin-off company was launched at the Innovation Centre in October 2014. Scientists from the DBFZ's Thermo-Chemical Conversion research department became co-shareholders in the newly founded company ETE EmTechEngineering GmbH. The engineering consultancy works on the optimisation of combustion chambers, incineration control, and the integration of secondary pollution control measures into biomass furnaces. ETE seeks to exercise intellectual property rights in cooperation with industrial partners and the DBFZ. The aim is to develop low-cost catalysts through to production maturity and market them.
The Innovation Centre was also able to expand its portfolio in start-up consulting in matters relating to choice of legal form, accounting and commercial start-up strategies. An additional experienced partner organisation was acquired through

the cooperation agreement with accounting and auditing firm Bernhard Decker. In 2014 two patent applications based on employees' inventions were submitted through the Bioenergy Innovation Centre. The exercising of rights pertaining to another patent was begun.
The DBFZ and the Innovation Centre have also joined the regional start-ups network "SMILE". This has substantially increased the package of support on offer to start-ups. This step will also enhance the entrepreneurial and innovative culture of the DBFZ. The start phase is scheduled for 2015. The Innovation Coordinator is the central interface in this context too.
On the international stage, the TREC-Donau project provided the DBFZ with links to similar innovation-oriented networks and clusters in the Danube region. This marked the expansion of the DBFZ's networking to Central and South Eastern Europe. The aims are to help find partners for EU projects and to enhance opportunities within the "Horizon2020" research and Innovation framework programme. The project led by the DBFZ comprises partners from Slovakia, Poland, the Czech Republic, Hungary, Bulgaria and Romania. Of particular interest are networks in Ukraine, Serbia and the Republic of Moldova. As states neighbouring the EU, they are also entitled to make submissions in some cases. TREC-Donau is sponsored by the German Federal Ministry of Education and Research (BMBF).

Additional information (german)

http://www.dbfz.de/web/forschung/kooperationen.html
http://www.innovationszentrum-bioenergie.de/
http://www.energiemetropole-leipzig.de/index.php/bioenergie.html
http://www.trec-network.eu

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5.2
RESEARCH COORDINATOR

The Research Coordinator's administration department supports links among scientists between the disciplines and research departments, and so helps to utilise synergies and promote expertise in-house. The main duties of the Research Coordinator, Dr. rer. nat. Elena H. Angelova, include:

- Implementing the doctoral programme and supporting the DBFZ's doctoral candidates.
- Monitoring of medium- and long-term research planning
- Optimising the DBFZ's scientific management and quality assurance based on good scientific practice
- Evaluating national and international invitations to tender for sponsorship programmes and contract research information conforming substantively and methodologically to the research topics and approaches identified and documented in advance within the DBFZ. The Research Coordinator also advises and supports the scientist across all departments in devising and implementing application submissions.
- Preparing, organising and supervising internal and external evaluations and supporting the Research Advisory Council
- Coordination of information exchange and reporting on the research activities of the DBFZ to its institutional sponsor, the BMEL, the Research Advisory Council and the public at large (in cooperation with the Press and Public Relations department)

The department is also responsible for collating and evaluating the DBFZ's scientific data; supporting the management in conducting in-house conferences;

Fig. 25 The international Research Advisory Council (RAC) visiting the DBFZ on November 11th, 2014

evaluating the work of the departments and their research success, including by external comparison with similar research establishments.

RESEARCH AND DEVELOPMENT STRATEGY, HORIZON 2020, DOCTORAL PROGRAMME

The principal task in 2014 was to devise the new research and development strategy of the DBFZ. In order to deal with future developments and as well as research policy challenges and framework conditions in relation to the use of biomass as a base material and an energy source, the research focus areas of the DBFZ as previously described were focused and redefined. Other cornerstones in devising the research and development strategy were the recommendations of the German Council of Science and Humanities (Wissenschaftsrat) and of the DBFZ's Research Advisory Council, the organisation's unique selling points within the research landscape, and its already established sound infrastructure. An abridged version of the research and development strategy can be downloaded from the Internet in PDF format, or a printed format can be requested by emailing **info@dbfz.de**. In terms of research financing, the main area of focus was on instructing and supporting DBFZ scientists in preparing more than 10 Horizon

Download

www.dbfz.de/das-dbfz/zielsetzungen.html

Fig. 26 Second doctoral candidates' seminar at the DBFZ (March 13/14, 2014)

2020 project submissions. Grant agreements with the European commission have already been signed in respect of two projects; two others have been invited to participate in the second phase of submissions (in a two-stage procedure); two project submissions are still at the evaluation stage. So the DBFZ's success rate in Horizon 2020 submissions is currently around 30 percent.

On March 13th and 14th, 2014, some 40 participants attended the second doctoral candidates' seminar to be held at the DBFZ. After the success of the first event in 2013, last year the internal and external supervisors were invited to attend along with the doctoral candidates themselves. At the seminar, 19 candidates presented their interim reports on the status of the doctoral programme, and engaged in intensive discussions with their supervisors and guests. The discussions between the DBFZ scientists and partner academics also resulted in new research ideas emerging.

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.

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5.3 INTERNATIONAL ACTIVITIES

In view of the changing political framework conditions in Germany, and in order to enhance the DBFZ's international visibility, European and overseas cooperation will play an increasingly important role in the future. Its joint acquisition of (research) projects with partners – which as reference projects raise the national and international reputation of the DBFZ have an effect which should not be underestimated – the cooperation with international universities and research institutes will be extended. In this way, the areas of research focus already detailed can be backed by the aim of engaging in top-level international research and attaining a leading international position in the research sphere. Current international activities are set out in Figure 27.

The DBFZ's third-party funded international knowledge and technology transfer is currently focused on three main regions: Eastern Europe (Ukraine, Russia), East Asia (China, Japan) and Latin America (Mexico, Brazil, Chile). The DBFZ has established stable networks and conducted a number of studies in those regions in recent years. The networks will be maintained and continuously expanded. However, cooperation may be extended at any time to other countries and regions if it provides the DBFZ with a substantial boost to research activities, or enhances the organisation's international reputation, or if so dictated by a regional realignment of scientific and technical cooperation programmes.

There are also plans to integrate North America more closely into the DBFZ's international activities as its fourth keynote region. This is related to increased project acquisition (in Canada) and to more intensive scientific cooperation with research establishments (in the USA). Alongside project acquisition, the international exchange of doctoral candidates will be advanced as the main driver of this initiative. This will strengthen the DBFZ's worldwide networks and contacts in the

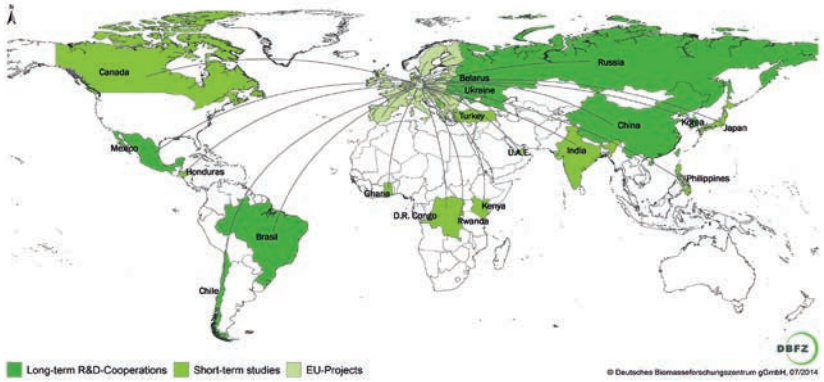

Fig. 27 International activities of the DBFZ

industrial and scientific communities for the long term. The exchange of doctoral candidates will also open up opportunities for cooperation with international universities focused on specific research topics.
Another important aspect in terms of international visibility is the involvement in international professional bodies. A number of DBFZ colleagues are currently members of bodies such as the International Energy Agency (IEA), the European Standardization Committee (CEN) and the International Organization for Standardization (ISO). Noteworthy examples also include appointments to scientific and technical boards as well as guest professorships in China. One of the aims for the future is to intensify the work in international bodies.

BIOGASWORLD, GERMAN-RUSSIAN COOPERATION, INTERNATIONAL VISITORS

A key milestone in the DBFZ's international activities was the "BioGasWorld" conference held on April 1st and 2nd, 2014 in Berlin. Under the motto "Biogas goes (far) East", scientists, politicians and business representatives gathered to find out about biogas potential and possibilities under the various political conditions in China and Eastern Europe. New technological developments were discussed, and scenarios and already successfully established projects in China, Russia, Ukraine, Poland, Bulgaria and Hungary were presented. Moreover, the signing of framework contracts reinforced cooperation with long-standing international partners and placed the agreements on a new footing. In April 2014, on the occasion of a visit to Moscow by a delegation headed by the Mayor of Leipzig, Burkhard Jung, a framework contract was signed with the Russian state energy service FESCO.

The focus of the cooperation, alongside identifying the potential for bioenergy, will primarily be on the provision of scientific assistance in initiating specific bioenergy projects. On the other side of the world, a Memorandum of Understanding was signed in September with the Technological Institute in Durango, Mexico. Its aim is to promote knowledge transfer, specifically in relation to the use of wood residues as an energy source material.
New contacts were also established with Argentina (the National Institute for Agricultural Technology INTA) in order to utilise the enormous potential offered by the South American country's agricultural residues, as part of the German Federal Government's Bioeconomy Strategy. In China, a Letter of Intent was signed in relation to biogas use in the province of Hebei. This is a major topic in China and, reflecting those concerns, negotiations are currently being conducted on a new framework agreement with the China Agricultural University which is scheduled to be signed in early 2015.
Close cooperation with national partners is also vital to international cooperation. In particular, the coordinated joint approach in conjunction with the German

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Fig. 28 Dr. Sven Schaller and a representative of FESCO on April 24th, 2014 in Moscow

Society for International Cooperation GIZ has become a key pillar of the DBFZ's international activities. This is reflected, not least, in the successful acquisition and execution of international projects. The most significant among them is an extensive study being conducted in the Caribbean on behalf of CARICOM.
The increasing international reputation of the DBFZ was also reflected in a large number of requests for visits in 2014. In addition to a wide range of national delegations from the fields of scientific research, industry and the political world, groups from Africa, France, China, Japan, Poland, Estonia, Vietnam, the USA, Brazil, Colombia, Chile, Argentina and Italy visited the DBFZ to learn about specific technical matters on-site and to tour the laboratories, the test beds and the biogas pilot plant. All the visitors were impressed by the intensive research work being carried out, and by the wide range of technical equipment and systems on the DBFZ site.

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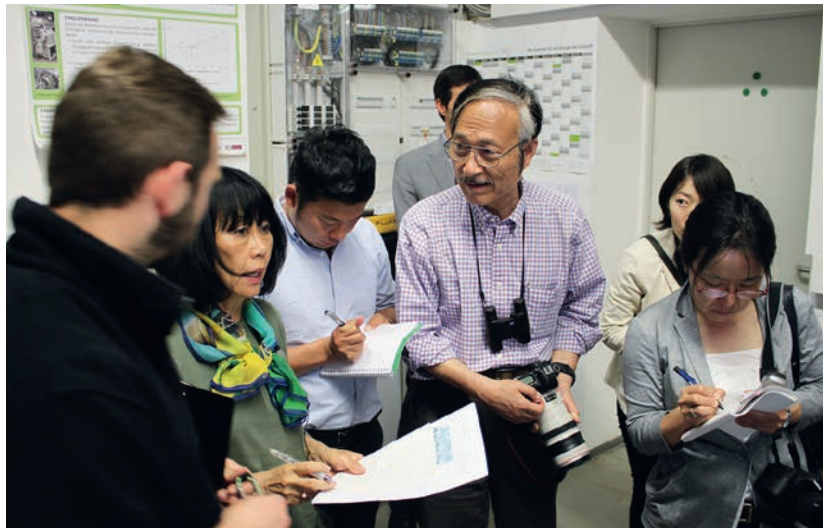

Fig. 29 Guests from all over the world visited the DBFZ in 2014

6
PRESS AND PUBLIC RELATIONS ACTIVITIES

The main focus of the DBFZ's press and public relations work was on hosting and participating in scientific conferences and seminars, alongside a wide range of other activities. In addition to a an intensive visitor programme, the DBFZ once again produced numerous scientific publications. As in previous years, DBFZ-related topics featured in a wide variety of different media and in scientific journals in 2014.

From January 17th to 26th, 2014 the DBFZ was represented for the fourth time in its history with its own stand at the International Green Week (IGW) fair as well as at the "Fuels of the future" conference held at the International Congress Centre (ICC) in Berlin. At the IGW, the DBFZ's Bioenergy Systems Department exhibited a wide range of fascinating hands-on experiments, including a bioenergy ergometer, a spin-the-wheel game, and other exciting features providing a fun insight into the research work of the DBFZ for the many energy experts, young and old alike, who came to visit. After four years, the 2014 event marked the DBFZ's last showing at the IGW in Berlin.

The highlight event of 2014 was the DBFZ annual conference held on October 1st and 2nd. It attracted some 200 scientists, business people and politicians to the

Fig. 30 Lots of young visitors showed an interest in bioenergy at the IGW fair

Fig. 31 Politicians, business people and scientists attended the DBFZ's annual conference at the Villa Ida media campus in Leipzig in October 2014

media campus in Leipzig. Under the motto "Bioenergy: versatile, safe, economical, clean?!", contributors from 26 partner institutions presented papers detailing the latest findings from bioenergy research, set forth concrete ideas and solutions for practical applications, and instigated new projects. The conclusion reached at the end of the event was: Sustainable integration of biomass as an energy source is a key to success in implementing the energy system of the future and creating a bio-based economy. However, the policy framework conditions must be improved if the ambitious goals of the German Federal Government and the European Union are not to be missed. The digital reader featuring detailed conference papers can be downloaded free of charge in PDF format from www.dbfz.de. The next DBFZ annual conference will take place in 2016.

With the first-time hosting of its forum on "Bio-based hydrothermal processes – Technologies for use as material and energy sources" on November 11th and 12th, 2014, the DBFZ established a sound position for itself in the still relatively underpopulated field of events relating to the hydrothermal processes (HTP). The forum spotlighted the major potential offered by residual and waste materials through numerous presentations along with an excursion to the HTC demonstrator at the Halle/Lochau waste recycling plant operated by the Halle municipal utility. Thanks to the positive response, the HTP forum will be held again in 2016, and will become a permanent part of the events calendar. In 2015, an "Innovation Forum" sponsored by the German Federal Ministry of Education and Research (BMBF)

Fig. 32 New publications in 2014 (selection)

will be taking up the focus topic of HTP and promoting the building of a network of future-oriented businesses, applied research specialists and targeted investors, aimed at establishing HTP technology on markets.

As part of the DBFZ's event hosting activities, in the late Autumn of 2014 three issues of the new series of papers entitled "Tagungsband und Tagungsreader" (Conference papers and conference reader) were published, coinciding with the annual conference and the HTP forum, together with a publication in English accompanying the workshop on "Computational Fluid Dynamics (CFD) and biomass thermo-chemical conversion". A total of four new publications were also added to the existing "DBFZ-Report" series. They include a revised and updated new edition of "Monitoring Biokraftstoffsektor" (Biofuel sector monitor; report 11); the concluding report on the project "Hy-NOW: Evaluation of the processes and technologies for producing hydrogen based on biomass" (report 19); the concluding report on the project "KlimaCH4 – Climate effects of biomethane" (report 20); and issue number 21 on the subject of "Trends in grant aid for the generation of power from biomass in the framework of the EEG". The in-house section working on research accompanying the BMWi-sponsored programme "Biomass Energy Use" also once again issued numerous new publications as part of series of scientific papers in 2014. All publications are available to download free of charge in PDF format from the following website.

Downloads (german)

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

7 CONTRACT RESEARCH AND SCIENCE-BASED SERVICES

As an institution primarily conducting applied research, the DBFZ has always sought to engage in close cooperation with 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. 33 Applied research at the DBFZ's fuel conditioning and combustion lab

7.1
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 (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 recent 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).

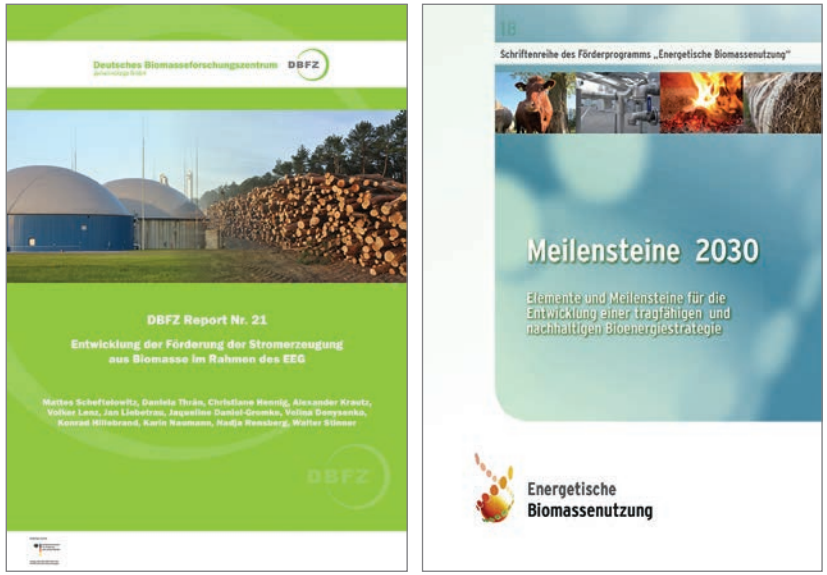

Fig. 34 rends in grant aid for the generation of power from biomass in the framework of the EEG (DBFZ report no. 21)/Concluding report to Milestones 2030

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.

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7.2 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 material source, the number of players on the market battling 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.

Fig. 35 Example views of the DBFZ data pool

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 demand-oriented 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.

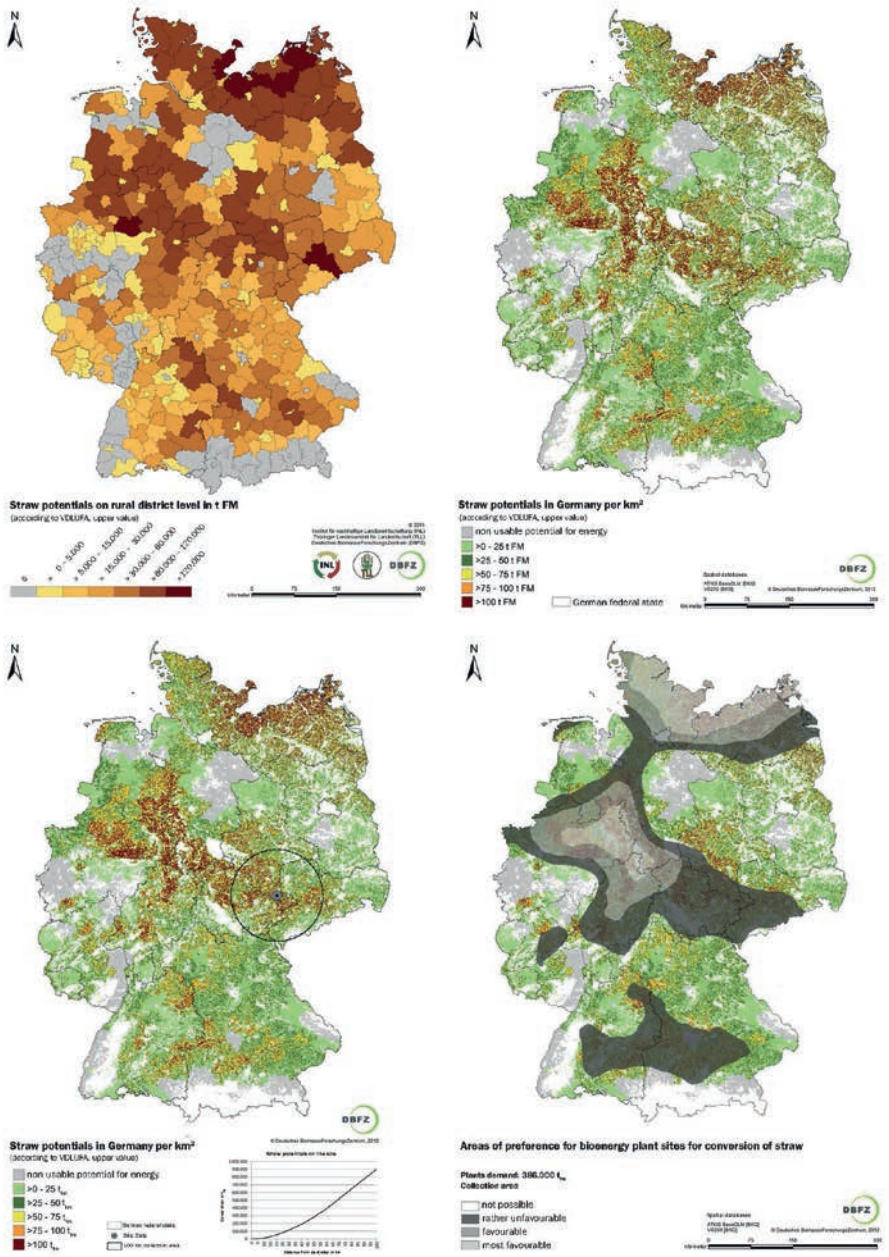


Fig. 36 Example presentations of regional analyses of biomass potential

7.3
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)

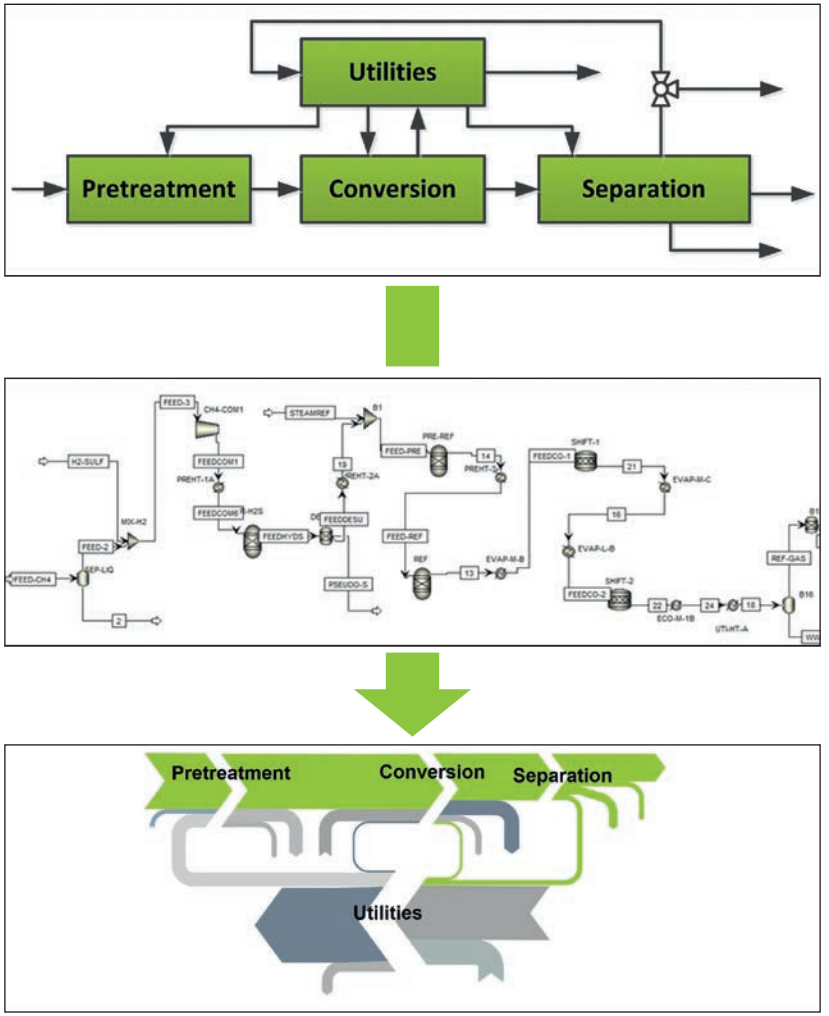


Fig. 37 From the plant design concept, through process simulation, to technical assessment

- 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

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

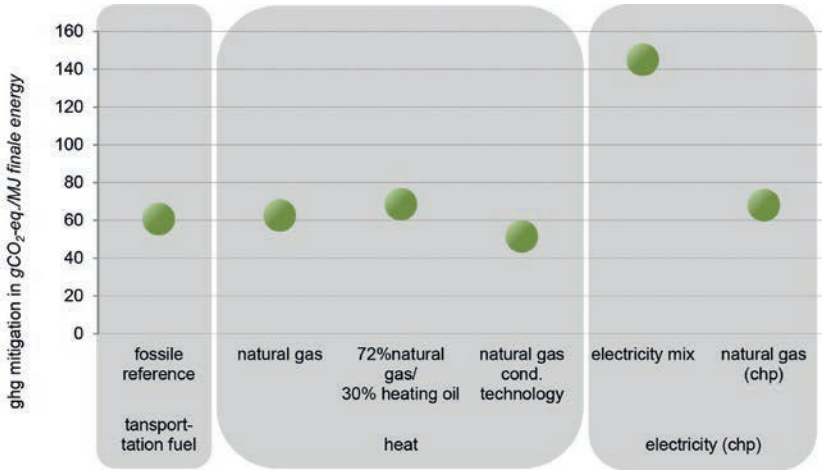


Fig. 38 Potential for greenhouse gas reduction through the use of biomethane in various options

7.4 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

7.5
SCIENTIFIC SUPPORT TO R&D PROJECTS

Fig. 39 Scientific research accompanying the BMWi-sponsored "Biomass Energy Use" programme

The DBFZ has been providing scientific support to the "Biomass Energy Use" programme sponsored by the German Federal Ministry for Economic Affairs and Energy for the last seven years, functioning as an instrument of linkage and knowledge transfer. In the course of events such as scientific conferences and workshops, 103 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 research, practical application and policy-making). To this end, a series of scientific papers was developed specially for the grant aid programme, to date comprising 18 volumes 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 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
- 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

7.6 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). 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

7.7 TECHNICAL-SCIENTIFIC SERVICE (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.

Fig. 40 The DBFZ offers a wide range of technical-scientific services

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 biogas pilot 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, demand-oriented 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

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

Fig. 41 Gravimetric measurement of dust load in the analytical lab

ANALYTICAL LAB

The DBFZ's central 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. The lab is equipped with: a Karl Fischer headspace titrator; a bomb calorimeter; a Stabinger viscometer; ion chromatography; a voltammetric measuring station; elementary analysis; EC/OC; ICPOES; an ignition point analyser; a copper corrosion tester; microwave digestion systems; a freeze dryer;

and distillation monitors. 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 and voltammetry, 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: Distillation process, flash point according to Pensky-Martens, density, kinematic and dynamic viscosity, viscosity index, Ester content, acid number, saponification number, iodine number, total contamination, corrosive effect on copper, 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, Dipl.-Holzwirt Romann Glowacki.

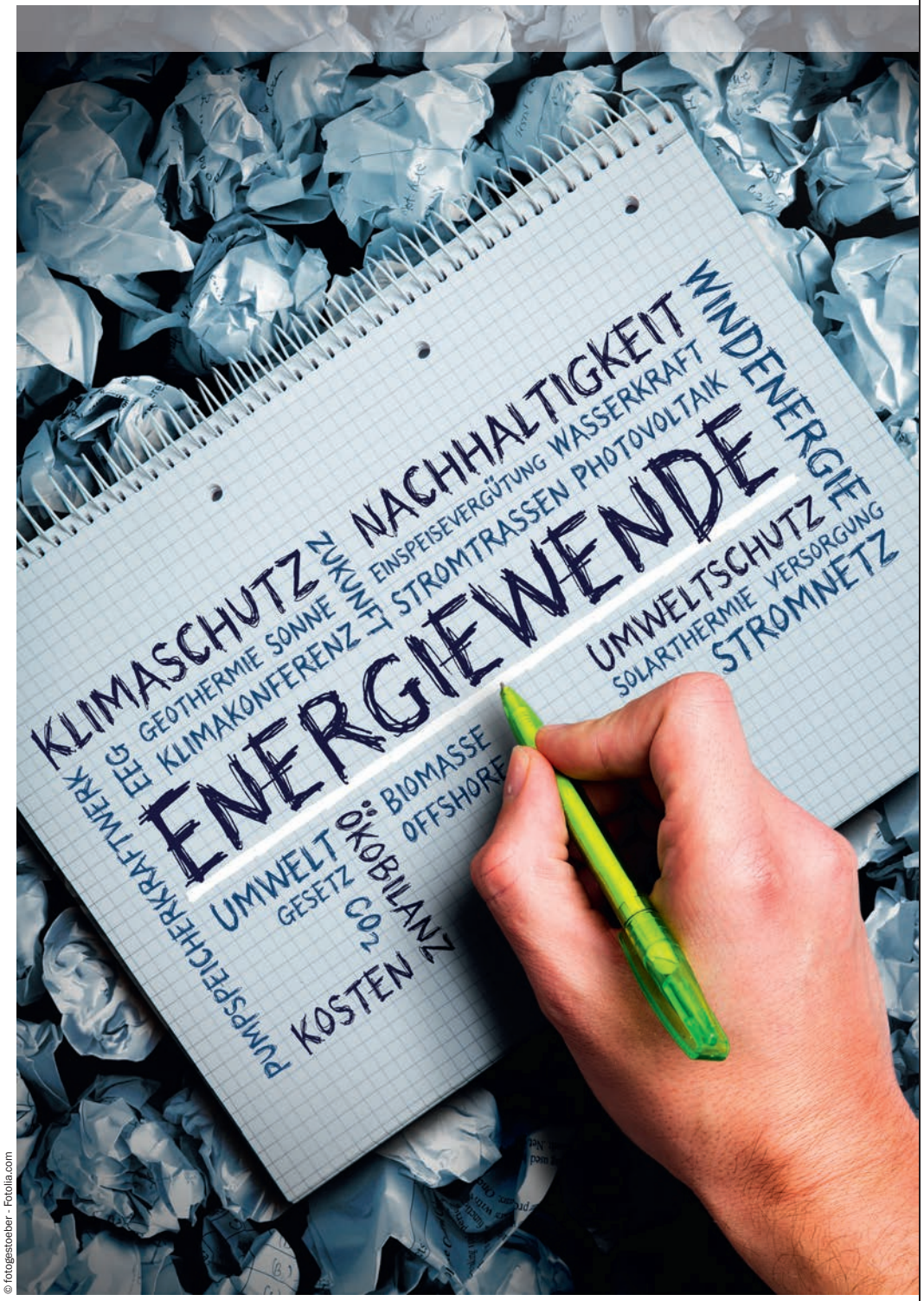
Contact

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

8 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 organisation, ownership and decision-making structure, scientific mission, controlling bodies, legal form, financing, trends in workforce development and other aspects of the DBFZ are set out briefly in the following sections.

Fig. 42 The DBFZ main building in January 2015



8.1
OUR MISSION

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.

8.2 THE FOUR RESEARCH DEPARTMENTS

In late 2010, to provide the organisational framework for its wide-ranging scientific research activities the DBFZ established four closely cooperating departments: Bioenergy Systems, Biochemical Conversion, Thermo-Chemical Conversion and Biorefineries.

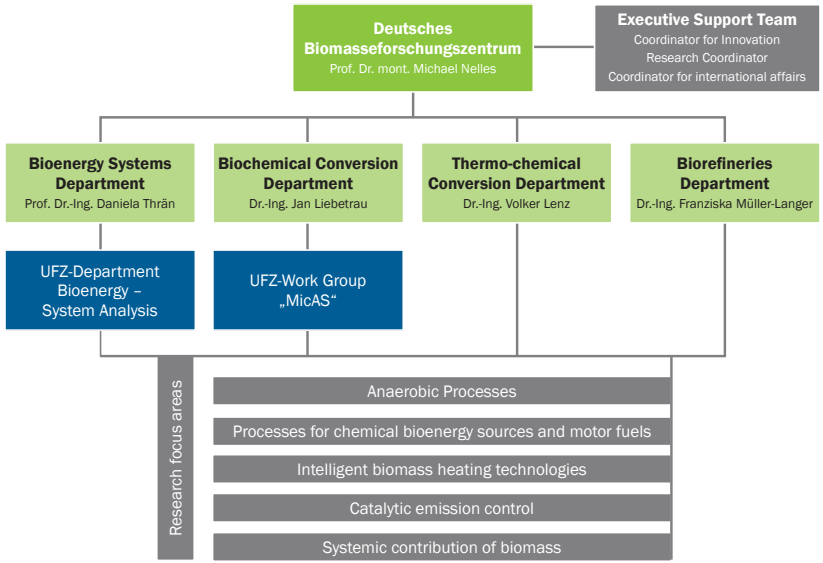


Fig. 43 The four research departments of the DBFZ and the research focus areas created in 2014

8.3 OWNERSHIP AND DECISION-MAKING STRUCTURE

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 seven national and seven international biomass scientists of high repute. The members of the Research Advisory Council are appointed by the Supervisory Board (Figure 44).

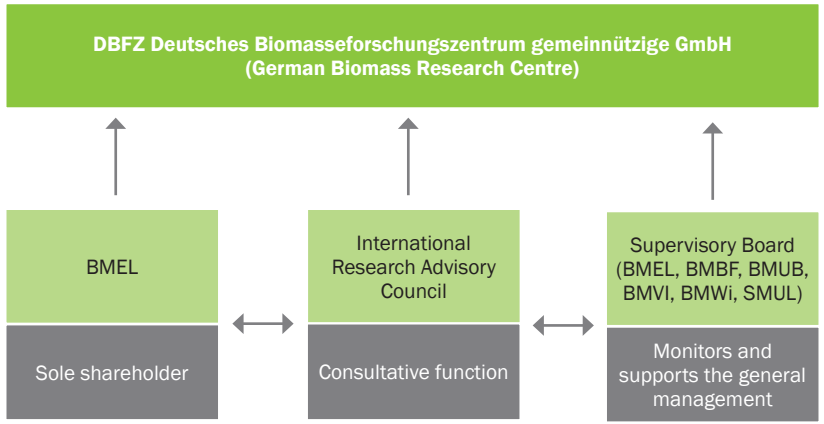


Fig. 44 The decision-making structure of the DBFZ

8.4 CONTROLLING BODIES: SUPERVISORY BOARD/ RESEARCH ADVISORY COUNCIL

THE 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 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 2015)

Bernt Farcke (Chairman)
Head of Directorate 52 “Sustainable and Renewable Resources”,
Federal Ministry of Food and Agriculture (BMEL)

Berthold Goeke (Deputy Chairman)
Deputy Director General, Climate Policy Department,
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Anita Domschke
Subdepartment head “Agriculture and Forestry”,
Saxon State Ministry of the Environment and Agriculture (SMUL)

Fig. 45 Meeting of the DBFZ Research Advisory Council on November 11th, 2014

Dirk Inger (Until 31 May 2014)
Director Climate Change, Energy and Environment Policy, Electric Vehicles,
Federal Ministry of Transport and Digital Infrastructure (BMVI)

Dr. Dorothee Mühl
Deputy Director General, Energy Department,
Federal Ministry of Economics and Energy (BMWi)

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

THE RESEARCH ADVISORY COUNCIL

The Research Advisory Council advises 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 2014. It comprises seven national and seven international experts from the bioenergy sector.

Research Advisory Council members:
(as per: 31 January 2015)

Board member	Organization	Place and Country
Bauen, Dr. Ausilio	Imperial College London	London UK
Bill, Prof. Dr. Ralf	University of Rostock – Faculty of Agricultural and Environmental Sciences	Rostock, Germany
Brown, Prof. Dr. Robert C.	Bioeconomy Institute	Ames, USA
Chiaramonti, Prof. Dr. David (Chairman)	Renewable Energy Consortium R&D, University of Florence	Florenz, Italy
Christen, Prof. Dr. Olaf	Martin-Luther-University Halle-Wittenberg	Halle (Saale), Germany
Dach, Prof. Dr. Jacek	Poznan University of Life Sciences	Poznań, Poland
Dong, Prof. Dr. Renjie	China Agricultural University	Peking, China
Hartmann, Dr. Hans	Technology and Support Centre (TFZ) within the Centre of Excellence for Renewable Resources	Straubing, Germany
Hirth, Prof. Dr. Thomas	Fraunhofer Center for Chemical-Biotechnological Processes CBP	Stuttgart, Germany
Kranert, Prof. Dr. Martin	Institute for Sanitary Engineering, Water Quality and Waste Management, University of Stuttgart	Stuttgart, Germany
Meyer, Prof. Dr. Bernd	IEC – Department of Energy Process Engineering, and chemical Engineering, Technical University BA Freiberg	Freiberg, Germany
Moreira, Dr. José Roberto	Instituto de Eletrotécnica e Energia (IEE/USP)	São Paulo, Brazil
Serrano, Prof. Dr. David	IMDEA Energy Institute	Madrid, Spain
Teutsch, Prof. Dr. Georg	Helmholtz-Centre for Environmental Research – UFZ	Leipzig, Germany

8.5
LEGAL FORM AND FINANCING

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.

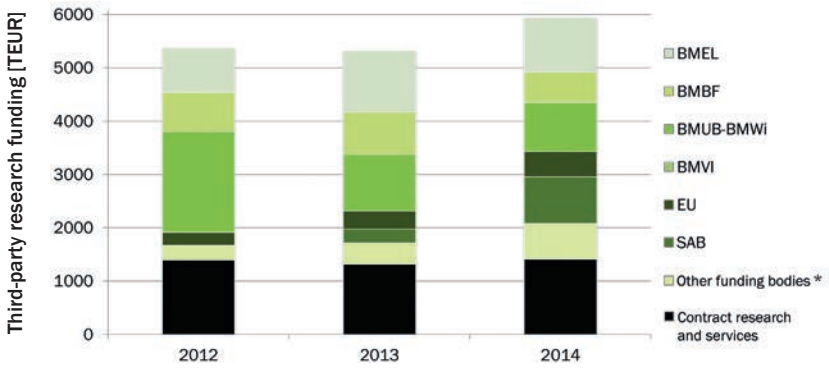


Fig. 46 Overview of third-party funding revenues from 2012 to 2014 (* Private and public-sector sponsors)

The BMEL provided the DBFZ with funding of approximately € 8.5 million in 2014, of which some € 2.5 million was allotted to capital investment. Despite the uncertainty regarding bioenergy policy, more than € 5.9 million in third-party funding was again procured in 2014. The value of projects handled stabilised around 2013 levels at € 5.9 million. The proportion of total revenue from contract research and services totalled around € 1.4 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 2014, the principal expenditure of the DBFZ was its personnel cost, which accounted for some 63 % of total expenditure, followed by operating expenses (17 %) and capital investments (20 %).

8.6
PERSONNEL DEVELOPMENT

The DBFZ's workforce stabilised at a total of 201 people in 2014. Including the executive support team and the press and public relations staff, 154 people were employed in scientific posts and 47 in administration/central services. Figure 47 shows the percentage of total employee in the various departments in 2014.

Workforce by department [number of people]

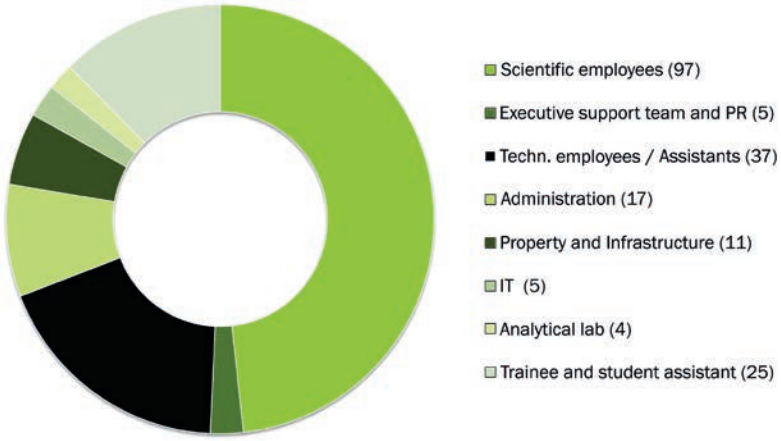


Fig. 47 Breakdown of the DBFZ workforce by department (as per: 19 January 2015)

In 2014 the DBFZ supervised 30 practical training and study projects as well as a total of 58 bachelors, masters degree and diploma dissertations. 40 guest scientists, non-German practical trainees and grant-funded students also worked at the DBFZ.

Supervised practical training and study projects in 2014

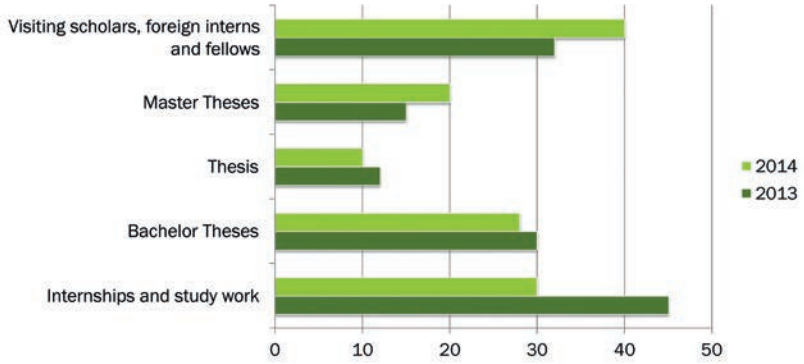


Fig. 48 Overview of study projects supervised at the DBFZ in 2014 compared to the previous year (as per: 19.01.2015)

8.7 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 (SELECTION)

- AgroForNet
- aireg Aviation Initiative for Renewable Energy in Germany e. V.
- Arbeitsgemeinschaft Stoffspezifische Abfallbehandlung, ASA e. V. (Working group on material-specific waste treatment)
- Biodiversität und Energieholz (Naturstiftung David)/Biodiversity and Fuel Wood for Energy (Naturstiftung David nature foundation)
- BioFuelNet Canada Inc.
- BioEconomy e. V., BMBF Excellence Cluster Bioeconomy
- Bioeconomy Council of the Federal Republic of Germany
- 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 member, Energy and Environmental Foundation Leipzig
- Deutsche Gesellschaft für Abfallwirtschaft (DGAW)/German Society for Waste Management

Fig. 49 Prof. Dr. Daniela Thrän (UFZ, DBFZ, University of Leipzig)

- Energy Advisory Board Saxony
- European Biomass Conference and Exhibition (EUBC&E) – Programme Committee
- Export Initiative RETech "Recycling & Waste Management in Germany" of the German Federal Government (BMUB, BMWi, BMZ)
- Forschungsverbund Erneuerbare Energien (FVEE)/ Renewable Energy Research Alliance (from 01/2015)
- 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
- Institute of Non-Conventional Chemistry at the University of Leipzig
- Renewable Energy Initiative Saxony (EESA)
- Scientific journal "Müll & Abfall" (Waste & refuse), Berlin

WORKING GROUPS/COMMITTEES (SELECTION)

- "Chemistry and Energy" working group, Society of German Chemists (GDCh)
- Cultural landscapes working group of the Landesheimatbund
- Sachsen-Anhalt e. V. (State of Saxony-Anhalt heritage association)
- Eco-balancing working group of the "Biomass Energy Use" programme
- European Biofuels Technology Platform (EBTP), WG1 European Technology
- European Biofuels Technology Platform (EBTP), WG4 Policy and Sustainability

- German-Polish working group on the use of regrowable resources (BMEL)
- 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 (BMEL)
- 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
- Research leadership group of the German Federal Ministry of Food and Agriculture (BMEL)
- Senate working group on reduction of greenhouse gas emissions (BMEL)
- Senate working group on regrowable resources (BMEL)
- Think Tank Helmholtz-Gemeinschaft UFZ

DIN/ISO STANDARDISATION COMMITTEES (SELECTION)

- CEN Technical Committee "Solid Biofuels" (CEN TC 335)
- 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"
- 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 (SELECTION)

- 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)

- Biofuels Research Network (ForNeBIK)
- Bioenergy network within the Energy and Environment Network (Netzwerk Energie und Umwelt e. V.)
- Combustion Institute (German section)
- DECHEMA, regrowable resources working group
- Dena Biogaspartner (German Energy Agency)
- Energy Raw Materials Network (ERN)
- Environmental technology advisor to the Chinese state government and provincial governments centred on the province of Anhui, China
- European Technology Platform on Renewable Heating and Cooling (RHC-Platform)
- KUP network
- RAL-Bundesgütegemeinschaft Brennholz (Federal fuel wood quality control group)
- VGB PowerTech e. V.

8.8
LOCATION AND SITE DEVELOPMENT

The DBFZ is located in the district of Schönefeld in the north-western part of Leipzig. It is about 15 minutes from the main railway station by public transport (tram 3/3E heading towards Taucha/Sommerfeld). We are also conveniently located for the A 14 motorway, being close to the “Leipzig Nord-Ost” exit. The site owned by the DBFZ covers an area of some 35,000 m^2.

Fig. 50 The renovated main building of the DBFZ in Summer 2014

Fig. 51 The DBFZ main building with attached children's day nursery (right)

After the buildings on the DBFZ site had undergone extensive upgrading in 2011 and 2012 as part of the second round of the government's economic stimulus programme, mainly to improve its energy efficiency, in 2013 attention turned to the planning and installation of an on-site children's day nursery as well as preparations for the major redevelopment featuring a large-scale technical centre and a timber-framed combined event centre and office block. The DBFZ's children's day nursery was completed in July 2013. It provides 10 fully staffed places for children aged from 1 to 3, with 16 office workstations on the upper floor. In conjunction with a wide range of other family-friendly provisions, this enabled the DBFZ to acquire a "berufundfamilie" certificate in 2014 documenting its visible and tangible attainment of a healthy work-life balance.

The interdisciplinary competition to design the new technical centre and the combined office block and event centre was completed successfully in 2013. From a field of 25 competing architects and designers, the award ultimately went to Leipzig architects Schulz + Schulz Architekten GmbH. The new complex is the most extensive construction project to have been undertaken since the founding of the DBFZ. The total approved area is approximately 7,050 m^2, with 14,710 m^2 of gross floor space. The building cost will be approximately € 28 million, plus the cost of the exterior facilities, services, planning and first-fitting. The project is being financed entirely by funding from the organisation's sole shareholder, the German Federal Ministry of Food and Agriculture (BMEL). To make space for the new construction, some of the existing buildings are scheduled for demolition during 2015. According to current planning, the extensive building works will be completed in the late Autumn of 2017, and the facilities ready to occupy by Spring 2018.

Fig. 52 Planned DBFZ redevelopment (source: Schulz + Schulz Architekten GmbH)

9 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.

BIOGAS PILOT PLANT

The biogas pilot 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

Fig. 53 The DBFZ's biogas pilot plant

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. A post-digester with a gas reservoir 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 biogas pilot 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.

Fig. 54 Fully-mixed stirred-tank reactors in the DBFZ biogas lab (left)

Fig. 55 Emissions measurements in the field

EMISSION MEASUREMENTS

The Biochemical Conversion Department has an extensive range of measuring instruments for the identification of diffuse methane leakage. The portfolio includes 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.

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 dusts and waste water in order to assess the possibilities for use of the various biomasses. The lab is equipped with: a Karl Fischer headspace titrator; a bomb calorimeter; a Stabinger viscometer; ion chromatography; a voltammetric measuring station; elementary analysis; EC/OC; ICPOES; an ignition point analyser; a copper corrosion tester; microwave digestion systems; a freeze dryer; and distillation monitors. Analysis is carried out in accordance with commonly applied standards and based on a problem-oriented methodology. The lab offers the following services: Fuel analytics and analysis of biogas substrates/nutrients.

FUEL TECHNICAL CENTRE

The Biorefineries Department conducts extensive simulations including to enhance the SNG production chain. To validate those simulations, the complete production chain – comprising biomass gasification, gas purification and methanation – is mapped in the fuel technical centre.

Fig. 56 The DBFZ's fuel technical centre

For the purpose, it provides the methanation reactors themselves as well as other equipment including a dust gasifier and a reactor for adsorptive gas purification. The dust gasifier can be operated at temperatures up to 1,100 °C with air and oxygen as the gasifying agents. A test bed to obtain characteristic data for fixed-bed gasification is also under construction. 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.

A fixed-bed tubular reactor and plate reactor and two kinetics measuring stations are currently installed in the pilot plant to research into the catalyst-supported methanation of synthesis gases. Subjects investigated include reaction kinetics, response to unusual and fluctuating synthesis gas qualities, data collection for reactor upgrading, as well as endurance tests with commercial and innovative catalytic converters, such as in relation to toxicity and coking. A unique feature is the broad temperature and pressure window (max. 850 °C, 60 bar) in which the reactors can be operated.

A stirred-tank reactor (max. 300 °C, 200 bar) and a tubular reactor (max. 400 °C, 200 bar) are operated to investigate hydrothermal processes. Research subjects are carbonisation and multi-stage liquefaction. Other apparatus is operated to complement and validate plant simulations.

The facilities for researching the production of fuels and base chemicals are being expanded. The aim is to investigate different fermentation substrates as well as micro-organisms and associated processing technologies on flexible apparatus.

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

Fig. 57 Determination of the boiling characteristics of biodiesel (right)

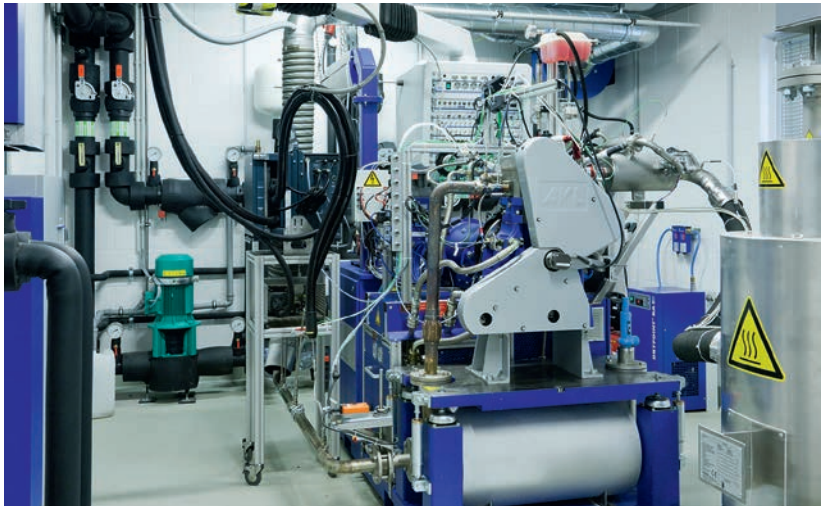


Fig. 58 Engine test bed at the DBFZ

Fig. 59 The DBFZ combustion lab

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

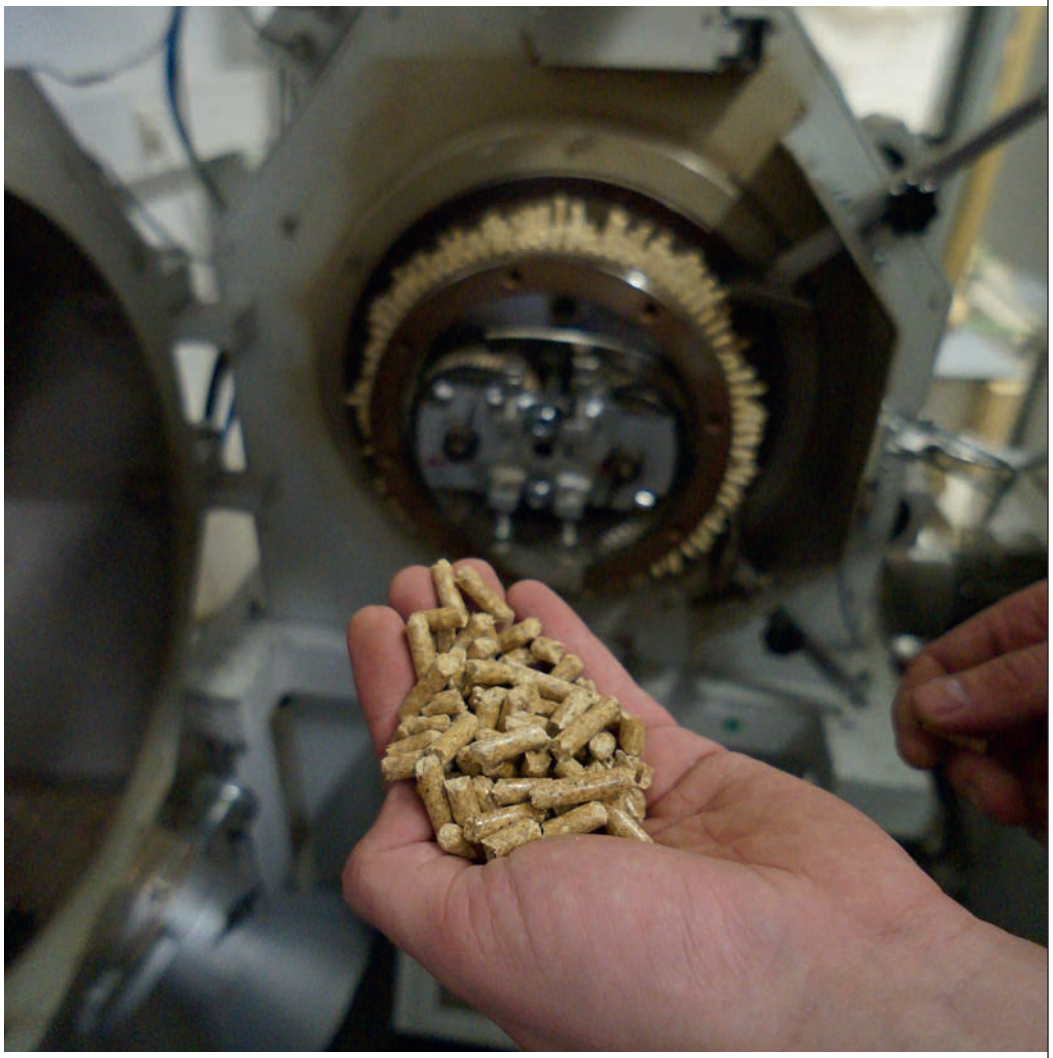


Fig. 60 Pellet production at the DBFZ's fuel conditioning and combustion lab

area of over 800 m² currently holds more than 250 different fuel variants. The fuel conditioning and combustion lab has dedicated conditioning systems and a 20 kW ring-matrix press with which it conducts experiments in the production of new-style biogenic solid fuels, particularly including fuel mixes. The pellets produced can be fully characterised in accordance with European standards governing solid biofuels.

DATABASES

The Bioenergy Systems Department 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.

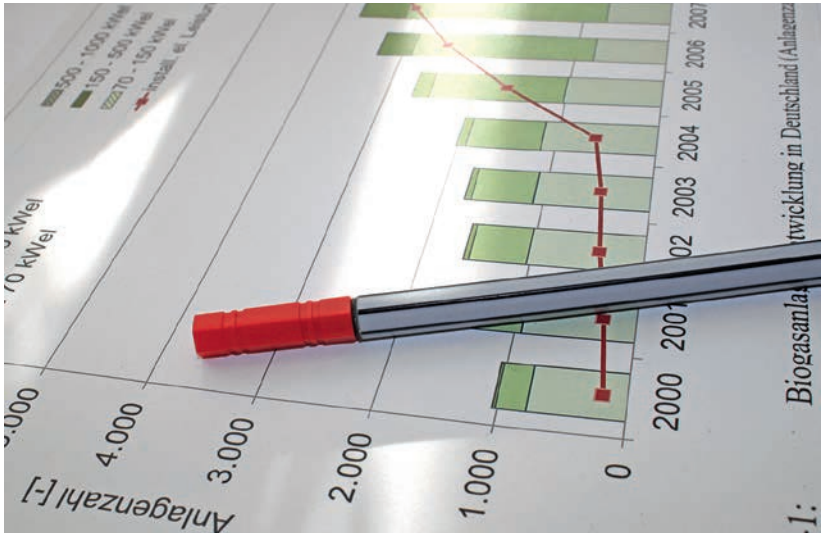


Fig. 61 Data monitoring at the DBFZ

Fig. 62 Regional bioenergy development

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 Bioenergy Systems Department 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.

REGIONAL BIOENERGY DEVELOPMENT INDICATOR TOOL

As part of the technical and economic research activities supporting the federal "Bioenergy Regions" competition, the DBFZ created an online tool to document and evaluate regional bioenergy development trends. The over 50 indicators map the "hard facts" such as regional bioenergy use or the development of the regional (bioenergy) economy, but also incorporate "soft" factors such as infrastructure and public relations work. It is also possible to draw comparisons with national averages across Germany. Additional information: **http://bioenergie-regionen.dbfz.de**.

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.

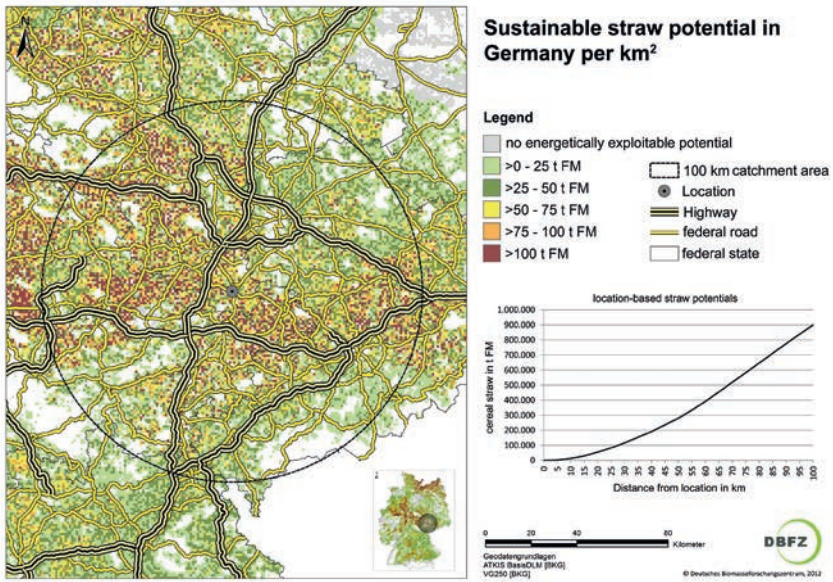


Fig. 63 Presentation of sustainable straw potential in Germany

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WORK AND PROJECT RESULTS

Below the most important publications from 2014 are listed to show the current working areas of the DBFZ. The language of the title reflects the language of the publication.

Book publications and editorship

Alakangas, E.; Asikainen, A.; Grammelis, P.; Hämäläinen, J.; Haslinger, W.; Janssen, R.; Kallner, P.; Lehto, J.; Mutka, K.; Rutz, D.; Tullin, C.; Wahlung, B.; Weissinger, A.; Witt, J. (2014): Biomass Technology Roadmap – European Technology Platform on Renewable Heating and Cooling. In: Mertens, L.; Goodwin, N. (Hrsg.): AEBIOM European Biomass Association. Brüssel, Belgien.

Bockreis, A.; Faulstich, M.; Flamme, S.; Kranert, M.; Nelles, M.; Rettenberger G.; Rotter, V. S. (Hrsg.) (2014): 4. Wissenschaftskongress Abfall- und Ressourcenwirtschaft der Deutschen Gesellschaft für Abfallwirtschaft am 27. und 28. März 2014, S. 109–112. Münster. ISBN 978-3-9811142-4-9.

Henneberg, M.; Nelles, M. (Hrsg.) (09/2014): Tagungsband zum 8. Rostocker Baggergutseminar, Schriftenreihe UIW, Band 47, 109 Seiten. Rostock. ISBN 978-3-86009-414-3.

Lenz, V.; Thrän, D.; Pfeiffer, D. (Hrsg.): Messmethodensammlung Feinstaub – Methodenvorschlag zur Feinstauberfassung an Feuerungsanlagen für feste biogene Brennstoffe. Schriftenreihe des BMU-Förderprogramms „Energetische Biomassenutzung“. Leipzig. ISSN 2192-1806

Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.) (2014): Tagungsreader zur Fachtagung Prozessmesstechnik in Biogasanlagen, 25.–26.03.2014. Leipzig.

Naumann, K.; Oehmichen, K.; Zeymer, M.; Meisel, K.; (2014): Monitoring Biokraftstoffsektor (DBFZ-Report Nr. 11, 2. Auflage). Nelles, M. (Hrsg.). DBFZ, Leipzig. ISSN 2197-4632.

Nelles, M. (Hrsg.) (04/2014): Tagungsband zum 16. DIALOG Abfallwirtschaft MV – Aktuelle Entwicklungen in der Abfallwirtschaft, 3. April 2014, Schriftenreihe UIW, Bd. 44, 226 Seiten. Rostock. ISBN 978-3-86009-410-5.

Nelles, M. (Hrsg.) (06/2014): Tagungsband zum 8. Rostocker Bioenergieforum, 19.–20.06.2014, Schriftenreihe UIW, Band 45, 522 Seiten. ISBN 978-3-86009-412-9.

Nelles, M. (Hrsg.) (10/2014): Tagungsband zur DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ Leipzig. ISSN 2199-9384 (online).

Nelles, M.; Cai, J.; Wu, K. (Hrsg.) (11/2014): Proceedings of the 5th International Conference on Environmental Technology and Knowledge Transfer (ICET), Tagungsband zur ICET, 15.-16. May 2014. Hefei, Anhui, P. R. China. 332 Pages. ISBN 978-3-86009-411-2.

Nelles, M. (Hrsg.) (12/2014): Online-Proceedings of the CFD-Workshop “Computational Fluid Dynamics (CFD) and biomass thermochemical Conversion”. Leipzig. ISSN 2199-9384 (online).

Nelles, M. (Hrsg.) (12/2014): Tagungsreader zur HTP-Fachtagung "Biobasierte hydrothermale Prozesse – Technologien zur stofflichen und energetischen Nutzung". Leipzig. ISSN 2199-9856 (online).

Ortwein, A.; Krautz, A.; Szarka, N.; Braun, J.; Dotzauer, M.; Wurdinger, K.; Rönsch, S.; Matthischke, S.; Lenz, V.; Trommler, M.; Postel, J.; Jacobi, F. (2014): Kurzstudie zum Einsatz von Biomasse zur bedarfsgerechten Energieerzeugung. Fachagentur Nachwachsende Rohstoffe e.V. (FNR). Gülzow-Prüzen. ISBN 978-3-942147-16-3.

Pelkmans, L.; Goh, S. H.; Junginger, M.; Bianco, E.; Pellini, A.; Gawor, M.; Majer, S.; Thrän, D.; Iriarte, L.; Fritsche, U. R. (08/2014): Impact of promotion mechanisms for advanced and low-iLUC biofuels on biomass markets: Straw for bioenergy. Summary report. IEA Bioenergy Task 40 Sustainable International Bioenergy Trade. Leipzig.

Persson, T.; Murphy, J.; Jannasch, A.-K.; Ahern, E.; Liebetrau, J.; Trommler, M.; Toyama, J. (2014): A perspective on the potential role of biogas in smart energy grids. IEA Bioenergy. ISBN 978-1-910154-12-0.

Scheftelowitz, M.; Thrän, D.; Hennig, C.; Krautz, A.; Lenz, V.; Liebetrau, J.; Daniel-Gromke, J.; Denysenko, V.; Hillebrand, K.; Naumann, K.; Rensberg, N.; Stinner, W. (2014): Entwicklung der Förderung der Stromerzeugung aus Biomasse im Rahmen des EEG. DBFZ Report Nr. 21. DBFZ. Leipzig. ISSN 2197-4632 (online)/ISSN 2190-7943 (Print).

Thrän, D.; Billig, E.; Persson, T.; Svensson, M.; Daniel-Gromke, J.; Ponitka, J.; Seiffert, M.; Baldwin, J.; Kranzl, L.; Schipfer, F.; Matzenberger, J.; Devriendt, N.; Dumont, M.; Dahl, J.; Bochmann, G. (09/2014): Biomethane – status and factors affecting market development and trade. IEA Task 40 and Task 37 Joint Study. Junginger, M.; Baxter, D. (Hrsg.): ISBN 978-1-910154-10-6.

Thrän, D.; Pfeiffer, D. (Hrsg.) (2014): Festschrift – Konferenz 5 Jahre Förderprogramm „Energetische Biomassenutzung“. Wege zur effizienten Bioenergie. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“ Band 15. DBFZ. Leipzig. ISSN 2199-2762.

Thrän, D.; Pfeiffer, D. (Hrsg.) (2014): Effizient, umweltverträglich, dezentral. Neue Konzepte für die Nutzung von biogenen Festbrennstoffen. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. Teil 2, Band 17. DBFZ. Leipzig. ISSN 2199-2762.

Thrän, D.; Pfeiffer, D. (Hrsg.) (2014): Neue Wege zur Prozessoptimierung in Biogasanlagen. Abgeschlossene Vorhaben im Förderprogramm. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. Band 16, Teil II. DBFZ. Leipzig. ISSN 2199-2762.

Thrän, D.; Pfeiffer, D. (Hrsg.) (2014): Steckbriefe Biogas – Effiziente und bedarfsgerechte Biogasproduktion. Leipzig.

Westerkamp, T.; Reinelt, T.; Oehmichen, K.; Ponitka, J.; Naumann, K. (2014): KlimaCH_4 – Klimaeffekte von Biomethan (DBFZ Report Nr. 20). DBFZ, Leipzig. ISSN 2197-4632 (online).

Book contributions

Billig, E.; Grope, J.; Urban, W. (2014): Biogaseinspeisung. In: Leitfaden Biogasaufbereitung und -einspeisung. S. 38–61, Kapitel 3. Bestell-Nr. 211, 5. vollständig überarbeitete Auflage. Fachagentur Nachwachsende Rohstoffe e. V. (FNR). Gülzow-Prüzen. ISBN 3-00-018346-9.

Billig, E.; Postel, J. (2014): Biogasbereitstellung und -aufbereitung. In: Fachagentur Nachwachsende Rohstoffe e. V. (FNR) (Hrsg.): Leitfaden Biogasaufbereitung und -einspeisung. S. 8–37, Kapitel 2. Bestell-Nr. 211, 5. vollständig überarbeitete Auflage. Gülzow-Prüzen. ISBN 3-00-018346-9.

Brosowski, A. (2014): Räumliche Verteilung von Reststoffpotenzialen zur energetischen Nutzung – GIS-gestützte Identifikation von Mindestmengen und Standortplanung. In: Bill, R.; Zehner, M. L.; Golnik, A.; Lerche, T.; Seip, S. (Hrsg.): GeoForum MV 2014 – Mehrwerte durch Geoinformation. S. 97–99. GITO-Verlag. Berlin. ISBN 978-3-95545-059-5.

Brosowski, A.; Stecher, K.; Adler, P. (2014): Technische Biogaspotenziale. In: Leitfaden Biogasaufbereitung und -einspeisung. S. 62–74. 5. Auflage. Fachagentur Nachwachsende Rohstoffe e. V. (FNR). Gülzow- Prützen. ISBN 3-00-018346-9.

Daniel-Gromke, J.; Denysenko, V.; Barchmann, T.; Reinelt, T.; Trommler, M. (2014): Aufbereitung von Biogas zu Biomethan und dessen Nutzung – Status quo und Perspektiven. In: Immissionsschutz Recht-Anlagenbetrieb und -optimierung. S. 133–149. TK-Verlag, K. J. Thomé-Kozmiensky. ISBN 978-3-944310-16-9.

Doyle, U.; Vohland, K.; Albert, C.; Bonn, A.; Brenck, M.; Burkhard, B.; Förster, J.; Freudenberger, L.; Fuchs, E.; Galler, K.; Glemnitz, M.; von Haaren, C.; L. Ibisch, P.; Klenke, R.; Klotz, S.; Koellner, T.; Kreft, S.; Kühn, I.; Marquard, E.; Mehl, D.; Müller, C. M.; Naumann, K.; Kaphengst, T.; Klassert, C.; Meinke, I.; Reckermann, M.; Rüter, S.; Saathof, W.; Scholz, M.; Schröder, U.; Seppelt, R.; Sauermann, J.; Thrän, D.; Witing, F.; Winkel, G. (2014): Kapitel 3: Ökosystemleistungen, Biodiversität und Klimawandel: Grundlagen. In: Naturkapital Deutschland – TEEB DE: Naturkapital und Klimapolitik – Synergien und Konflikte. Wüstemann, H., Bonn, A. Leipzig. ISBN 978-3-944280-10-3.

Fischer, E. (2014): Umsetzung eines Projektes. In: Leitfaden Biogasaufbereitung und -einspeisung. S. 136–151, Kapitel 8. Bestell-Nr. 211, 5. vollständig überarbeitete Auflage. Fachagentur Nachwachsende Rohstoffe e. V. (FNR). Gülzow-Prüzen. ISBN 3-00-018346-9.

Grope, J.; Daniel-Gromke, J.; Holzhammer, U. (2014): Vermarktung von Biomethan. In: Leitfaden Biogasaufbereitung und -einspeisung. S. 114–135, Kapitel 7. Bestell-Nr. 211, 5. vollständig überarbeitete Auflage. Fachagentur Nachwachsende Rohstoffe e. V. (FNR). Gülzow-Prüzen. ISBN 3-00-018346-9.

Hartmann, I.; Matthes, M.; Thiel, C.; Kohler, H.; Groll, A.; Riebel, U. (2014): Demonstration von Maßnahmen zur Emissionsminderung an Biomasse-Kleinfeuerungen. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Effizient, umweltverträglich, dezentral. Neue Konzepte für die Nutzung von biogenen Festbrennstoffen. Bd. 17, S. 45–59.

Krassowski, J.; Gomez, J. S.; Fischer, E. (2014): Bioabfallvergärung- Beiträge zur Prozessoptimierung und zur verbesserten Gasnutzung. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Neue Wege zur Prozessoptimierung in Biogasanlagen. Abgeschlossene Vorhaben BMU-Förderprogramm Teil I. S. 62–72. ISSN 2192-1806.

Krautz, A.; Lauer, M.; Dotzauer, M. (2014): Entwicklung und Praxiserfahrung der bedarfsgerechten Strombereitstellung aus Biogas. In: Festschrift Konferenz 5 Jahre Förderprogramm „Energetische Biomassenutzung“: Wege zur effizienten Bioenergie. S. 248–259. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. Leipzig. ISSN 2199-2792.

Krüger, D.; Ortwein, A.; Klemm, M. (2014): Mikro-Kraft-Wärme-Kopplung mit Vergasung fester Biomasse in Form von Holzkohle. In: Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät, ASW-Beiträge. S. 147–153. Universität Rostock. ISBN 978-3-86009-412-9.

Majer, S. (2014): Bewertung von Bioenergiesystemen – Entwicklung regionalisierter Ökobilanzen. In: Forschung-Themenheft Methoden der Nachhaltigkeitsbewertung landwirtschaftlicher Systeme – Möglichkeiten und Grenzen. Senat der Bundesforschungsinstitute des Bundesministeriums für Ernährung und Landwirtschaft. S. 56–61. Senat der Bundesforschungsinstitute des Bundesministeriums für Ernährung und Landwirtschaft. ISBN 978-3-95547-014-2.

Narra, S.; Logsch, F.; Glaser, C.; Ay, P.; Döhling, F.; Leistner, D.; Strube, D. (2014): LignoBioFuel – Verfahren zur Herstellung von Bioagglomeraten auf der Basis von Lignin. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Effizient, umweltverträglich, dezentral. Neue Konzepte für die Nutzung von biogenen Festbrennstoffen. Bd. 17. S. 85–99.

Nelles, M. (06/2014): Biomasse punktet im System. In: Deutscher Fachverlag GmbH „agrarzeitung“ (Hrsg.): Trendbuch Innovative Agrarwirtschaft 2014, S. 41–44. ISBN 978-3-86641-1.

Nyns, E.-J.; Nikolausz, M.; Liebetrau, J. (2014): Biogas. In: Ullmann's Encyclopedia of Industrial Chemistry. Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim. ISBN 9783527306732.-7.

Pelkmans, L.; Goovaerts, L.; Goh, C. S.; Junginger, M.; van Dam, J.; Stupak, I.; Smith, C. T.; Chum, H.; Englund, O.; Berndes, G.; Cowie, A.; Thiffault, E.; Fritsche, U.; Thrän, D. (2014): The Role of Sustainabiliy Requirements in International Bioenergy Markets. In: Junginger, M.; Goh, C. S.; Faaij, A. (Hrsg.): International Bioenergy Trade – History, status & outlook on securing sustainable bioenergy supply, demand and markets. S. 125–149. Lecture Notes in Energy 17. Springer Dordrecht Heidelberg New York London. ISBN 978-94-007-6981-6.

Schröder, T.; Lenz, V.; von Sonntag, J.; Ulbricht, T.; Heidecke, P.; Stahl, E.; Schön, C.; Hartmann, H.; Woltersdorf, N.; Kunde, R.; Adeili, M.; Volz, F. (2014): Messmethodensammlung Feinstaub – Methodenvorschlag zur Feinstaubmessung an Feuerungsanlagen für feste biogene Brennstoffe. In: Lenz, V.; Thrän, D.; Pfeiffer, D. (Hrsg.): Schriftenreihe des BMU-Förderprogramms „Energetische Biomassenutzung“. Leipzig. ISSN 2192-1806.

Seiffert, M.; Scholwin, F. (2014): Möglichkeiten der Biomethanbereitstellung – die Alternative LBG. In: Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät. S. 267–276. Rostock. ISBN 978-3-86009-412-9.

Thrän, D.; Hennig, C.; Thiffault, E.; Heinimö, J.; Onofre, A. (2014): Development of Bioenergy Trade in Four Different Settings – The Role of Potential and Policies. In: Junginger, M.; Goh, C. S.; Faaij, A. (Hrsg.): International Bioenergy Trade – History, status & outlook on securing sustainable bioenergy supply, demand and markets. S. 65–101. Lecture Notes in Energy 17. Springer Dordrecht Heidelberg New York London. ISBN 978-94-007-6981-6.

Thrän, D.; Pfeiffer, D. (2014): Vorwort. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Festschrift – Konferenz 5 Jahre Förderprogramm „Energetische Biomassenutzung“. Wege zur effizienten Bioenergie. S. 7–9. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. DBFZ. Leipzig. ISBN 2199-2762.

Thrän, D.; Pfeiffer, D. (2014): Fünf Jahre Forschung für Nachhaltigkeit und Effizienz im Förderprogramm „Energetische Biomassenutzung“. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Festschrift – Konferenz 5 Jahre Förderprogramm „Energetische Biomassenutzung“. Wege zur effizienten Bioenergie. S. 10–18. Schriftenreihe des Förderprogramms „Energetische Biomassenutzung“. DBFZ. Leipzig. ISBN 2199-2762.

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. Leipzig. ISSN 2199-2762.

Trommler, M.; Szomszed, G. (2014): Wirtschaftliche Analyse und Bewertung. In: Leitfaden Biogasaufbereitung und -einspeisung. S. 100–113, Kapitel 6. Bestell-Nr. 211, 5. vollständig überarbeitete Auflage. Fachagentur Nachwachsende Rohstoffe e.V. (FNR). Gülzow-Prüzen. ISBN 3-00-018346-9.

Würdemann, H.; Kleyböcker, A.; Lienen, T.; Liebrich, M.; Brehmer, M.; Kraume, M.; Daniel-Gromke, J.; Lorenz, H.; Balussou, D.; McKenna, R.; Moeller, L.; Görsch, K.; Müller, R.; Zehnsdorf, A.; Zirkler, D.; Kaupenjohann, M. (2014): OPT-GAS – Vergleichende Untersuchungen an großtechnischen Biogasreaktoren. In: Thrän, D.; Pfeiffer, D. (Hrsg.): Neue Wege zur Prozessoptimierung in Biogasanlagen. Abgeschlossene Vorhaben BMU-Förderprogramm Teil I. S. 9–24. Leipzig. ISSN 2192-1806.

Journal articles (reviewed)

Bunzel, K.; Kattwinkel, M.; Schauf, M.; Thrän, D. (2014): Energy crops and pesticide contamination: Lessons learnt from the development of energy crop cultivation in Germany. In: Biomass and Bioenergy. Bd. 70. S. 416–428. DOI: 10.1016/j.biombioe.2014.08.016. ISSN 09619534.

Gawel, E.; Grunwald, A.; Thrän, D. (2014): The transition of energy systems towards sustainability: Challenges and lessons learnt from the German „Energiewende“. In: Energy, Sustainability and Society (Special issue). Nr. 4.

Hartmann, I.; König, M.; Matthes, M. (2014): Investigations at a Micro-Scale Installation Regarding Emission Reduction by Air Staging and Integrated Catalysis. In: Chemical Engineering Transactions. S. 13–18. Florenz, Italien. DOI: 10.3303/CET1437003.

Janzon, R.; Schütt, F.; Oldenburg, S.; Fischer, E.; Körner, I.; Saake, B. (2014): Steam pretreatment of spruce forest residues: Optimal conditions for biogas production and enzymatic hydrolysis. In: Carbohydrate Polymers. Bd. 1/2014 (Nr. 100). S. 202–210. DOI: 10.1016/j.carbpol.2013.04.093.

Kiendl, I.; Klemm, M.; Clemens, A.; Herrmann, A. (2014): Dilute gas methanation of synthesis gas from biomass gasification. In: Fuel. Bd. 123. ISSN 0016-2361. DOI: 10.1016/j.fuel.2014.01.036.

Lv, Z.; Hu, M.; Harms, H.; Richnow, H. H.; Liebetrau, J.; Nikolausz, M. (2014): Stable isotope composition of biogas allows early warning of complete process failure as a result of ammonia inhibition in anaerobic digesters. In: Bioresource Technology. Bd. 167 (Nr. 0). S. 251–259. DOI: 10.1016/j.biortech.2014.06.029.

Lv, Z.; Leite, A. F.; Harms, H.; Richnow, H. H.; Liebetrau, J.; Nikolausz, M. (2014): Influences of the substrate feeding regime on methanogenic activity in biogas reactors approached by molecular and stable isotope methods. In: Anaerobe. Bd. 29. S. 91–99. DOI: 10.1016/j.anaerobe.2013.11.005. ISSN 1075-9964.

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.

Müller-Langer, F.; Kaltschmitt, M. (2014): Biofuels from lignocellulosic biomass – a multicriteria approach for comparing overall concepts. In: Biomass Conversion and Biorefinery. S. 1–19. DOI: 10.1007/s13399-014-0125. ISSN 2190 6815.

Müller-Langer, F.; Majer, S.; O'Keeffe, S. (2014): Benchmarking biofuels – a comparison of technical, economic and environmental indicators. In: Journal Energy, Sustainability and Society. Bd. 4 (Nr. 1). ISSN 2192-0567. DOI: 10.1186/s13705-014-0020-x.

Nie, H.; Jacobi, F. H.; Strach, K.; Xu, C.; Zhou, H.; Liebetrau, J. (2014): Mono-fermentation of chicken manure: Ammonia inhibition and recirculation of the digestate. In: Bioresource Technology. DOI: 10.1016/j.biortech.2014.09.029.

Poerschmann, J.; Weiner, B.; Wedwitschka, H.; Baskyr, I.; Koehler, R.; Kopinke, F.-D. (2014): Characterization of biocoals and dissolved organic matter phases obtained upon hydrothermal carbonization of brewer's spent grain. In: Bioresource Technology. Bd. 164, S. 162–169. DOI: http://dx.doi.org/10.1016/j.biortech.2014.04.052.

Purkus, A.; Röder, M.; Gawel, E.; Thrän, D.; Thornley, P. (2014): Handling Uncertainty in Bioenergy Policy Design – A Case Study Analysis of UK and German Bioelectricity Policy Instruments. In: Biomass and Bioenergy.

Reiche, N.; Westerkamp, T.; Lau, S.; Borsdorf, H.; Dietrich, P.; Schütze, C. (2014): Comparative study to evaluate three ground-based optical remote sensing techniques under field conditions by a gas tracer experiment. In: Environmental Earth Sciences. Bd. 72, S. 1435–1441. DOI: 10.1007/s12665-014-3312-8.

Rönsch, S.; Matthischke, S.; Müller, M.; Eichler, P. (2014): Dynamische Simulation von Reaktoren zur Festbettmethanisierung. In: Chemie Ingenieur Technik. Bd. 86 (Nr. 8). S. 1198–1204. DOI: 10.1002/cite.201300046. ISSN 1522-2640.

Rönsch, S.; Zeymer, M.; Majer, S. (2014): Treibhausgasvermeidungskosten von synthetischem Methan und Methanol aus Biomasse und Braunkohle. In: Chemie Ingenieur Technik. Bd. 86 (Nr. 10). S. 1678–1689. DOI: 10.1002/cite.201400047. ISSN 1522-2640.

Schmidt, T.; Nelles, M.; Scholwin, F.; Pröter, J. (09/2014): Trace element supplementation in the biogas production from wheat stillage – Optimization of metal dosing. In: Bioresource Technology. Bd. 168 S. 80–85. DOI: 10.1016/j.biortech.2014.02.124.

Schmidt, T.; Ziganshin, A. M.; Nikolausz, M.; Scholwin, F.; Nelles, M.; Kleinsteuber, S.; Pröter, J. (2014): Effects of the reduction of the hydraulic retention time to 1.5 days at constant organic loading in CSTR, ASBR, and fixed-bed reactors – Performance and methanogenic community composition. In: Biomass and Bioenergy. Bd. 69. S. 241–248. DOI: doi:10.1016/j.biombioe.2014.07.021.

Schumacher, B.; Wedwitschka, H.; Hofmann, J.; Denysenko, V.; Lorenz, H.; Liebetrau, J. (2014): Disintegration in the biogas sector – Technologies and effects. In: Bioresource Technology. Bd. 168 S. 2–6. DOI: 10.1016/j.biortech.2014.02.027.

Tafarte, P.; Das, S.; Eichhorn, M.; Thrän, D. (2014): Small adaptations, big impacts: Options for an optimized mix of variable renewable energy sources. In: Energy. Bd. 72, S. 80–92. DOI: 10.1016/j.energy.2014.04.094.

Weiser, C.; Zeller, V.; Reinicke, F.; Wagner, B.; Majer, S.; Vetter, A.; Thrän, D. (2014): Integrated assessment of sustainable cereal straw potential and different straw-based energy applications in Germany. In: Applied Energy, Special Energy Solutions in Agriculture. Bd. 114.

Wong, J.; Nelles, M.; Ok, Y. S.; Kumar, S. (09/2014): Special issue on Advance Biological Treatment Technologies for Sustainable Waste Management: Selected papers from "International Conference on Solid Waste – Innovation in Technology and Management (ICSWHK2013)", 5–9 May 2013, Hong Kong Convention and Exhibition Centre, Hong Kong SAR. In: Bioresource Technology. Nr. 168. S. 1. DOI: 10.1016/j.biortech.2014.07.035.

Journal articles

Altrock, M.; Vollprecht, J.; Trommler, M.; Barchmann, T.; Thorbecke, J. (2014): Der weite Anlagenbegriff des BGH: Gefahr für die Wirtschaftlichkeit von Biogasanlagen? In: Energiewirtschaftliche Tagesfragen (et). Bd. 6. S. 88–92. ISSN 0720-6240.

Angelova, E. (02/2014): German Government Encourages Green Business. In: Ökotechnik und Technologien. Sofia, Bulgarien, Februar 2014.

Barchmann, T.; Lauer, M. (2014): Flexibel Strom erzeugen? In: DLG-Mitteilungen. Nr. 10. S. 48–52. ISSN 0341-0412.

Bloche-Daub, K.; Witt, J.; Kaltschmitt, M.; Janczik, S. (2014): Erneuerbare Energien. In: BWK – Das Energie Fachmagazin. Nr. 66. S. 5–21. ISSN 1618-193x.

Bohnet, S. (2014): Veränderungen gestalten. Über Chancen und Herausforderungen der Energiewende im Umgang mit der Kulturlandschaft. In: Sachsen-Anhalt. Journal für Natur- und Heimatfreunde. 24. Jahrgang (Heft 4). S. 3–5.

Daniel-Gromke, J. (03/2014): Biogas als Beitrag zum Klimaschutz? Emissionsmessungen erlauben ökologische Bewertung von Biogasanlagen. In: Mais. (Nr. 03/2014). S. 135–138.

Daniel-Gromke, J.; Rensberg, N. (10/2014): Strom aus der grünen Tonne. In: DLG-Mitteilungen. Bd. 10/2014. S. 58–60.

Daniel-Gromke, J.; Trommler, M.; Denysenko, V. (2014): Biomethan – Stand und Perspektiven. In: gwf Gas Erdgas. Bd. 5398. S. 818–822. ISSN 0016-4909

Elnaas, A.; Nassour, A.; Schüch, A.; Nelles, M. (04/2014): Abfallverwertung im arabischen Raum – aktuelle Entwicklungen und Perspektiven, In: Erich Schmidt Verlag GmbH & Co. KG Berlin (Hrsg.): Müll und Abfall, Ausgabe 04/14, 46. Jg., S. 189–196. ISSN 0027-2957.

Grünes, J.; Xu, A.; Nelles, M. (06/2014): Verwertung von Phosphor aus organischen Abfällen

und Reststoffen, In: Erich Schmidt Verlag GmbH & Co. KG Berlin (Hrsg.): Müll und Abfall, Ausgabe 06/14, 46. Jg., S. 323-329. ISSN 0027-2957.

Kapsa, K.; Oehmichen, K. (2014): Biokraftstoffe in Deutschland und der EU: Erfahrungen mit der Nachhaltigkeitszertifizierung. In: Ew-Spezial. Bd. 3. S. 32–37. ISSN 1619-5795-D 9785 D.

Lenz, V.; Naumann, K.; Kaltschmitt, M.; Janczik, S. (2014): Erneuerbare Energien. In: BWK – Das Energie Fachmagazin. Nr. 04/14. S. 61–80.

Nelles, M. (2014): Biogas: Nach der EEG-Novelle – Wie geht es weiter mit der deutschen Biogasbranche? In: E21. Magazin für die Köpfe der Energiewende. Nr. 5. S. 12.

Nelles, M. (2014): Stoffliche und energetische Verwertung von biogenen Abfällen und Reststoffen als integraler Bestandteil des künftigen Energiesystems und der biobasierten Wirtschaft. In: Erich Schmidt Verlag GmbH & Co. KG Berlin (Hrsg.): Müll und Abfall. Nr. 7/14. S. 353. ISSN 0027-2957.

Morscheck, G.; Nelles, M.; Henneberg, M. (2014): Gereiftes Nassbaggergut als Rekultivierungssubstrat in Deponieoberflächenabdichtungssystemen. In: Erich Schmidt Verlag GmbH & Co. KG Berlin (Hrsg.): Müll und Abfall. Nr. 09/14. S. 508–514. ISSN 0027-2957.

Mühlenhoff, J.; Kajimmura, R.; Boenigk, N.; Ziegler, D.; Witt, J. (2014): Holzenergie in Deutschland, Status Quo und Potenziale. In: Renews Spezial, Sonderausgabe, Hintergrundinformationen der Agentur für Erneuerbare Energien (AEE). S. 13–18, Kapitel 5. ISSN 2190-3581.

Oehmichen, K.; Meisel, K. (2014): Standardwerte für THG-Emissionen auf dem Prüfstand – Optimierungspotentiale bei der Herstellung von Biokraftstoffen nutzen. In: Energie aus Pflanzen – Das Fachmagazin für Biogas, Holzenergie und NawaRo. Bd. 3. S. 46–48. ISSN H 42043.

Reinelt, T. (2014): Betriebsbedingte Methanemissionen aus Über-/Unterdrucksicherungen. In: Biogas Journal. S. 78–80.

Schüch, A.; Daniel-Gromke, J.; Liebetrau, J.; Nelles, M. (02/2014): Stand und Perspektiven der Abfall- und Reststoffvergärung in Deutschland. In: Fachverband Biogas (Hrsg.): BIOGASJournal 2/2014, S. 34–38. ISSN 1619-8913.

Schüch, A.; Daniel-Gromke, J.; Liebetrau, J.; Nelles, M. (2014): Status and prospects of waste and residue digestion in Germany. In: Biogas Journal – english issue. Nr. 2014/10. S. 12–16.

Stur, B.; Geisen, B.; Alter, N. (2014): Ausbau der Bioenergie in Kommunen. In: stadt + werk, Nr. 1, 2014, S. 48. ISSN 2193-195X.

Wu, K.; Xu, A.; Morscheck, G.; Nelles, M. (05/2014): Abfallwirtschaft in der VR China – Nutzung von Biogas zur Energiegewinnung. In: Springer (Hrsg.): Wasser und Abfall, Ausgabe 05/2014, S. 34–38. ISSN 1436-9095.

Contribution in conference transcripts

Alakangas, E.; Flyktman, M.; Lemus, J.; Sanchez Gonzalez, D.; Zwart, R.; Adler, P.; Stelte, W.; Pommer, L.; Weatherstone, S.; Kollberg, K. (2014): Biomass resources and quality requirements for torrefaction – SECTOR Project. In: Conference Proceedings of the Bioenergy from Forest, S. 83–90. Helsinki, Finnland.

Barchmann, T.; Lauer, M. (2014): Technisch-ökonomische Optimierung von flexiblen Biogaskonzepten im Kontext des EEG. In: Nelles, M. (Hrsg.): Tagungsband 8. Rostocker Bioenergieforum, Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät. S. 295–306. Rostock. ISBN 978-3-86009-412-9.

Barchmann, T.; Rensberg, N. (2014): Novelle des EEG – Konsequenzen für die Betreiber von Bioabfallvergärungsanlagen. In: Bioabfall Forum Baden-Württemberg 2014 – Zukunft der Bioabfallverwertung, Stuttgarter Berichte zur Bioabfallwirtschaft. S. 57–64. DIV – Deutscher Industrieverlag GmbH. ISBN 978-3-8356-7264-5.

Bienert, K.; Thrän, D.; Kiel, J.; Carbo, M.; Wolfesberger-Schwabel, U. (2014): New results of the SECTOR project: production of solid sustainable energy carriers from biomass by means of torrefaction. In: Conference Proceedings of the Bioenergy from Forest, S. 13–19. Helsinki, Finnland. ISBN 978-952-67890-2-6.

Billig, E. (2014): Evaluation of the technical and economical development of existing and future biomass-to-methane conversion processes – intermediate results. In: Conference Proceedings of the 1st International Conference on Renewable Energy Gas Technology. S. 127–128. Lund, Schweden. ISBN 978-91- 9881149-0-4.

Billig, E.; Devriendt, N.; Thrän, D.; Persson, T.; Kranzl, L.; Baldwin, J.; Ponitka, J.; Seiffert, M.;

Svensson, M.; Matzenberger, J.; Pelkmans, L.; Van Dael, M. (2014): Market Deployment of Biomethane in IEA Member Countries – Focus on Stakeholder Questionnaire. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 1688–1691. Hamburg. ISBN: 978-88-89407-52-3.

Bindig, R.; Butt, S.; Hartmann, I. (2014): Application of high temperature catalysis to abate emissions from a small scale combustion system. In: Conference Proceedings of the 5th International Conference „Biosystems Engineering 2014". Tartu, Estland.

Bohnet, S. (2014): Bioenergiedörfer: Erfolgsmodell für mehr Bürgerbeteiligung? In: Bund Heimat und Umwelt in Deutschland (BHU), Bundesverband für Kultur, Natur und Heimat e.V. (Hrsg.): Energielandschaften gestalten. Leitlinien und Beispiele für Bürgerpartizipation. Dokumentation der Veranstaltungen vom 28. bis 30. Oktober 2012 in Bonn, am 11. und 12. Juni in Freising und vom 30. September bis 2. Oktober in Naumburg/Saale. S. 164–170. Bonn.

Braun, T.; Dotzauer, M.; Goldbrunner, M.; Häring, G.; Hanby, V.; Krautz, A.; Pfeiffer, D.; Sonnleitner, M.; Zörner, W. (2014): Optimized operation of flexible biogas plants. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 9. Hamburg. ISBN: 978-88-89407-52-3.

Brosowski, A.; Majer, S. (2014): Biomassepotenziale und zukünftige Anforderungen an die Rohstoffbereitstellung. In: Nelles, M. (Hrsg.): Tagungsband zur DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!" S. 69–78. Leipzig. ISSN 2199-9384.

Budzinski, M.; Nitzsche, R.; Gröngröft, A.; Majer, S. (2014): Nachhaltige Erzeugung von Plattformchemikalien durch Bioraffinerien?! – eine ökologische und ökonomische Betrachtung. In: Tagungsband 10th naro.tech Erfurt. Erfurt.

Daniel-Gromke, J.; Rensberg, N.; Schüch, A. (10/2014): Ein Überblick – Potenziale, Techniken und Perspektiven von zukünftigen Substraten im Biogassektor. In: Nelles, M. (Hrsg.): Tagesband DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!" S. 37–44. Leipzig. ISSN 2199-9384.

Das, S.; Tafarte, P.; Thrän, D. (2014): Geospatial analysis for heat utilisation centers from bioenergy plants in Germany. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Online Proceedings of the 22nd European Biomass Conference and Exhibition EU BC&E. Hamburg. ISBN 978-88-89407-52-3.

Dernbecher, A.; Tabet, F.; Findeisen, F. (2014): Investigation of combustion processes in small-scale furnaces with a flamelet solver in OpenFOAM. In: Computational Fluid Dynamics (CFD) and biomass thermochemical Conversion. S. 95–97. Leipzig. ISSN 2199-9384.

Döhling, F.; Khalsa, J.; Weller, N. (2014): Influence of the Mineral Composition on the Thermo-Chemical Decomposition Behavior of Different Biomasses. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 711–718. Hamburg. ISBN 978-88-89407-52-3.

Dorn, T.; Nelles, M.; Flamme, S. (05/2014): Technology Transfer Matrices as a tool to improve technology transfer. In: Proceedings of the 5th International Conference on Environmental Technology and Knowledge Transfer (ICET), S. 256–273. Hefei, Anhui, China. ISBN 978-3-86009-411-2.

Elberg, K.; Fritz, T.; Ramhold, D.; Nelles, M.; Demmig, C. (06/2014): Wirkung von Enzymzusätzen auf die rheologischen Eigenschaften von Fermenterschlämmen. In: Nelles, M. (Hrsg.): Tagungsband zum 8. Rostocker Bioenergieforum, 19.–20.06.2014, S. 481–486. Rostock. ISBN 978-3-86009-412-9.

Elnaas, A.; Nassour, A.; Nelles, M. (2014): Waste Generation and Disposal Methods in Emerging Countries. In: Book for the International Recycling and Recovery Congress. S. 111–120. Wien, Österreich. ISBN 978-944310-15-2.

Engler, N.; Loewe, K.; Elberg, K.; Nelles, M. (2014): Interaction of different feedstocks for biogas plants: Superposition effects on biogas yield and kinetics of biogas formation. In: EUROWASTE srl (Ed.): Venice 2014 – 5th International Symposium on Energy from Biomass and Waste. Venedig, Italien. ISBN 978-88-6265-085-4.

Engler, N.; Nelles, M. (03/2014): Messungen zur Abbaukinetik von Einzelsubstraten und Substratmischungen. In: Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.): Tagungsreader zur Fachta-

gung Prozessmesstechnik in Biogasanlagen, 25.–26.03.2014. S. 15. Leipzig.

Eschrich, R.; Worch, D.; Böhm, J.; Fischer, M.; Müller-Langer, F.; Schröder, J.; Hartmann, F.; Gläser, R. (2014): Alterung von Dieselabgaskatalysatoren im Betrieb mit Biokraftstoffen. In: Tagungsband Frühjahrstagung 2014 Forschungsvereinigung Verbrennungskraftmaschinen e.V. S. 281–316. Leipzig.

Eschrich, R.; Worch, D.; Rammelt, T.; Böhm, J.; Gläser, R.; Schröder, J.; Hartmann, F.; Müller-Langer, F. (2014): Rapid Aging of Diesel Exhaust Catalysts in Use with Biofuels. In: Tagungsband 23rd Aachen Colloquium Automobile and Engine Technology. Aachen.

Fritz, T.; Lindorfer, H.; Demmig, C.; Engler, N.; Nelles, M. (06/2014): Die Rolle von Hemmstoffen in landwirtschaftlichen Biogasanlagen. In: Nelles, M. (Hrsg.): Tagungsband zum 8. Rostocker Bioenergieforum, 19.–20.06.2014, S. 391–401. Rostock. ISBN 978-3-86009-412-9.

Ganagin, W.; Loewen, A.; Hahn, H.; Nelles, M. (05/2014): Flexible Biogaserzeugung durch technische und prozessbiologische Verfahrensanpassung. In: ProFair Consult + Project GmbH (Hrsg.): Tagungsband zum 7. Biogas Innovationskongress, 22.–23.05.2014, S.99–112. Osnabrück. ISBN 978-3-9813776-4-4.

Ganagin, W.; Loewen, A.; Hahn, H.; Nelles, M. (06/2014): Flexible Biogaserzeugung durch technische und prozessbiologische Verfahrensanpassung. In: Nelles, M. (Hrsg.): Tagungsband zum 8. Rostocker Bioenergieforum, 19.–20.06.2014, S. 307–321. Rostock. ISBN 978-3-86009-412-9.

Ganagin, W.; Loewen, A.; Krieg, A.; Nelles, M. (2014): Treatment of Wastewater in Anaerobic Fixed Bed Bioreactors. In: Proceedings of the 5th International Conference on Environmental Technology and Knowledge Transfer (ICET), 15.–16. May 2014, Hefei, Anhui, China. ISBN 978-3-86009-411-2.

Grünes, J.; Nelles, M. (04/2014): Recycling von Phosphor aus biogenen Abfällen und Reststoffen. In: Nelles, M. (Hrsg.): 16. DIALOG Abfallwirtschaft MV – Aktuelle Entwicklungen in der Abfallwirtschaft, Tagungsband, Schriftenreihe UIW Bd. 44, S. 159–173. Rostock. ISBN 978-3-86009-410-5.

Grünes, J.; Nelles, M. (2014): Recycling of phosphorus from organic waste and residues in Germany. In: Proceedings of the 5th International Conference on Environmental Technology and Knowledge Transfer (ICET). S. 12–21. Hefei, Anhui, China. ISBN 978-3-86009-411-2.

Hartmann, I.; Lenz, V. (2014): Wissenschaftliche Einblicke zur Emissionsminderung bei Biomasse-Kleinfeuerungen. In: Nelles, M. (Hrsg.): DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ S. 118–129. Leipzig. ISSN 2199-9384.

Herrmann, A.; Klemm, M.; Ortwein, A.; Krause, H.; Nitzsche, J. (05/2014): Konversion von Biomassen. In: Beiträge zur DGMK-Fachbereichstagung „Konversion von Biomassen“ vom 12.–14. Mai 2014 in Rotenburg an der Fulda. S. 127–134. Rotenburg an der Fulda. ISBN 978-3-941721-43-2.

Herrmann, A.; Zeymer, M.; Schneider, R.; Heidecke, P.; Volz, F.; Heigl, F.; Egeler, R. (2014): Feldmessdaten der Biomassevergasung zur Anlagenoptimierung – Erfahrungen aus dem Bundesmessprogramm. In: Tagungsband 2. VDI-Fachtagung Anlagenbezogenes Monitoring. Karlsruhe.

Herrmann, A.; Zeymer, M.; Schneider, R.; Heidecke, P.; Volz, F.; Heigl, F.; Egeler, R. (2014): Vergleichbarkeit von Feldmessdaten zur technischen Bewertung von Biomassevergasern – Erfahrungen aus dem Bundesmessprogramm. In: Tagungsband 4. Mitteleuropäische Biomassekonferenz. Graz, Österreich.

Hildebrandt, J.; Bezama, A.; Thrän, D. (2014): Establishing a robust sustainability index for the assessment of bioeconomy regions. In: Conference Proceedings of the International Conference and Utility Exhibition 2014 (ICUE 2014) on Green Energy for Sustainable Development of the Asian Institute of Technology, Thailand and the IEEE Power and Energy Society. S. 1–4. IEEE. Bangkok, Thailand. ISBN 978-1-4799-2628-2.

Hildebrandt, J.; Bezama, A.; Thrän, D. (2014): A hybrid-MCDA tool for assessment of added value networks in a woodbased bioeconomy. In: Conference Proceedings of the Bioenergy from Forest Conference. Helsinki, Finnland. ISBN 978-88-89407-52-3.

Holzhammer, U.; Tobisch, J. R.; Scholwin, F.; Nelles, M. (05/2014): Beeinflussung der Erzeugungskosten der Stromproduktion aus Biomethan durch die Berücksichtigung der fluktuierenden erneuerbaren Energien. In: ProFair Consult + Project GmbH (Hrsg.): Tagungsband zum 7. Biogas Innovationskongress, 22.–23.05.2014. S. 39–56. Osnabrück. ISBN 978-3-9813776-4-4.

Jacobi, F. H. (2014): Mono-fermentation of high solids chicken manure by ammonia removal. In: Tagungsband Progress in Biogas III. S. 48. Stuttgart. ISBN 978-3-940706-07-2.

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

Janke, L.; Leite, A.; Wedwitschka, H.; Nicolausz, M.; Schmidt, T.; Stinner, W. (2014): Biomethane production integrated to the Brazilian sugarcane industry: The Case study of Sao Paulo State. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 1295–1299. Hamburg. ISBN 978-88-89407-52-3.

Khalsa, J.; Döhling, F.; Weller, N.; Lenz, V. (2014): Prospects and limitations of solid fuel enhancement through torrefaction, hydrothermal carbonization or mechanical leaching – conclusions from combustion experiments and emission measurements. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Online Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

Kiel, J.; Carbo, M.; Thrän, D.; Witt, J. (2014): New results of the SECTOR project: production of solid sustainable energy carriers from biomass by means of torrefaction. A European R&D Project funded within the Seventh Framework Programme by the European Commission. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Online-Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

Kirsten, C.; Lenz, V.; Schröder, H.-W.; Repke, J.-U. (2014): Additional Analyses for Development and Quality Management of Alternative Fuel Pellets. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Online-Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

König, M.; Hartmann, I.; Matthes, M.; Weller, N.; Döhling, F. (2014): Nutzung alternativer biogener Festbrennstoffe in Kleinfeuerungsanlagen – Anlagentechnik und Emissionen. In: Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät. S. 113–121. Universität Rostock. ISBN 978-3-86009-412-9.

Kröger, M. (2014): Ansätze für eine mehrstufige hydrothermale Verflüssigung. In: Tagungsreader zum HTP-Fachforum „Biobasierte hydrothermale Prozesse – Technologien zur stofflichen und energetischen Nutzung“. S. 267–280. Leipzig. ISSN 2199-9856.

Kröger, M.; Klemm, M. (2014): Continuous liquefaction of biomass model compounds for chemicals and fuels. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Online-Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 1124–1126. Hamburg. DOI: 10.5071/22nd EUBCE 2014-3CV.2.6. ISBN 978-88-89407-52-3.

Laska, D.; Dernbecher, A.; Tabet, F. (2014): Investigation of internal flow in a domestic wood pellet stove. In: Computational Fluid Dynamics (CFD) and biomass thermochemical Conversion. S. 91–94. Leipzig. ISSN 2199-9384.

Majer, S.; Oehmichen, K.; Brosowski, A. (2014): Are we overestimating the potentials of biofuels from wastes and residues? – Summary of two recent DBFZ studies. In: Conference Proceedings of the 11th International Conference on Biofuels, „Fuels of the Future 2014“. Berlin.

Matthes, M.; Dobler, U. (2014): Emissionsminderung an Multifuelkesseln. In: Tagungsband der DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ S. 136–143. Leipzig. ISSN 2199-9384.

Matthischke, S.; Rönsch, S. (2014): Lastflexibilität der Festbettmethanisierung am Beispiel der kombinierten SNG-Produktion. In: DGMK Tagungsbericht 2014-2. Rotenburg an der Fulda. ISBN 978-3-941721-43-2.

Mauky, E.; Jacobi, H. F.; Liebetrau, J.; Nelles, M. (2014): Flexible biogas production for flexible energy supply. In: Tagungsband Progress in Biogas III. S. 77–78. Stuttgart. ISBN 978-3-940706-07-2.

Meisel, K.; Zech, K.; Müller-Langer, F. (2014): Bioethanol aus Lignozellulose – eine ökologische und ökonomische Bewertung ausgewählter

Konzepte. In: Nelles, M. (Hrsg.): Tagungsband 8. Rostocker Bioenergieforum, Schriftenreihe Umweltingenieurwesen, Agrar- und Umweltwissenschaftliche Fakultät. S. 257–266. Rostock. ISBN 978-3-86009-412-9.

Morscheck, G.; Nelles, M.; Henneberg, M. (2014): Gereiftes Nassbaggergut als Rekultivierungssubstrat für Deponien. In: Kühle-Weidemeier, M. (Hrsg.): 6. Praxistagung Deponie 2014. S. 52–67. Hannover. ISBN 978-3-95404-876-2.

Müller-Langer, F.; Majer, S.; Naumann, K.; Thrän, D. (2014): Stand und Perspektiven für Biokraftstoffe – Überblick und Forschungsschwerpunkte des DBFZ. In: Krahl, J.; Munack, A.; Eilts, P.; Bünger, J. (Hrsg.): Kraftstoffe für die Mobilität von morgen. S. 29–34. Cuvillier Verlag. Braunschweig. ISBN 978-3-95404-802-1.

Naumann, K. (2014): Die Zukunft der Biokraftstoffe – Quotenumstellung in Deutschland versus Kehrtwende der EU. In: Schriftenreihe Umweltingenieurwesen, Agrar- und Umweltwissenschaftliche Fakultät, Universität Rostock. S. 167–176. Rostock. ISBN 978-3-86009-412-9.

Nelles, M. (04/2014): Biogas in the Energy System of Germany. In: Conference proceeding of the 2nd Annual China International Bioenergy and Biomass Utilization Summit, S. 360–367. Shanghai, China.

Nelles, M. (05/2014): 5th International Conference on Environmental Technology and Knowledge Transfer (ICET). Hefei, Anhui, China. ISBN: 978-3-86009-411-2.

Nelles, M. (2014): Biogas in the Energy System of Germany. In: 2nd Annual China International Bioenergy and Biomass Utilization Summit. S. 360–367. Shanghai, China.

Nelles, M.; Elnaas, A.; Nassour, A.; Schüch, A. (04/2014): Stand und Perspektiven der Abfallwirtschaft im arabischen Raum. In: Nelles, M. (Hrsg.): Tagungsband zum 16. DIALOG Abfallwirtschaft MV – Aktuelle Entwicklungen in der Abfallwirtschaft, Schriftenreihe UIW, Bd. 44, S. 203–219. Rostock. ISBN 978-3-86009-410-5.

Nelles, M.; Glowacki, R.; Daniel-Gromke, J.; Scholwin, F.; Thrän, D. (10/2014): Energetische Biomassenutzung im Energie- und Bioökonomiesystem der Zukunft. In: Beckmann, M.; Hurtado, A. (Hrsg.): Kraftwerkstechnik 2014, Strategien, Anlagentechnik und Betrieb, Tagungsband zum 46. Kraftwerkstechnischen Kolloquium, 14./15. Oktober 2014, S. 687–703. Dresden. ISBN 978-3-934409-62-0.

Nelles, M.; Glowacki, R.; Scholwin, F.; Thrän, D. (06/2014): Bioenergie – überflüssig oder integraler Bestandteil des Energie- und Bioökonomiesystems der Zukunft? In: Nelles, M. (Hrsg.): Tagungsband zum 8. Rostocker Bioenergieforum, S. 45–62. Rostock. ISBN 978-3-86009-412-9.

Nelles, M.; Grünes, J.; Rensberg, N.; Schüch, A. (2014): Utilization of Organic Waste and residues in Germany. In: Nelles, M.; Cai, J.; Wu, K. (Hrsg.): Proceedings of the 5th International Conference on Environmental Technology and Knowledge Transfer (ICET), 15./16. May 2014. S. 22–28. Hefei, Anhui, China. ISBN 978-3-86009-411-2.

Nelles, M.; Liebetrau, J.; Daniel-Gromke, J.; Stinner, W.; Rensberg, N.; Denysenko, V. (05/2014): Perspektiven der Biogaserzeugung und -nutzung in Deutschland – Aktuelle Entwicklungen bei der Erzeugung und Nutzung von Biogas. In: ProFair Consult + Project GmbH (Hrsg.): Tagungsband zum 7. Biogas Innovationskongress, 22./23.05.2014, S. 23–37. Osnabrück. ISBN 978-3-9813776-4-4.

Nelles, M.; Liebetrau, J.; Schüch, A. (11/2014): Energiewende in Mecklenburg-Vorpommern: Beitrag der energetischen Verwertung von Abfällen und Biomasse. In: Tagungsband zum 21. Symposium an der FH Stralsund Nutzung regenerativer Energiequellen und Wasserstofftechnik.

Nelles, M.; Oos, M.; Mingyu, Q.; Raninger B.†; Schüch, A. (10/2014): Abschlussvortrag: Ein Blick über den Tellerrand – Bioenergienutzung in China. In: Nelles, M. (Hrsg.): Tagungsband zur DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ 1./2. Oktober 2014, S. 21–27. Leipzig. ISSN 2199-9384.

Nelles, M.; Schüch, A. (2014): Energetische Verwertung von biogenen Abfällen und Reststoffen in Deutschland. In: DepoTech 2014 – Abfallwirtschaft, Abfallverwertung und Recycling, Deponietechnik und Altlasten. S. 609–614. ISBN 978-3-200-03797-7.

Nelles, M.; Weiland, P.; Liebetrau, J. (05/2014): Vorwort des Wissenschaftlichen Kongress-Beirates. In: ProFair Consult + Project GmbH (Hrsg.): Tagungsband zum 7. Biogas Innovationskongress, 22./23.05.2014, S. 7–9. Osnabrück. ISBN 978-3-9813776-4-4.

Nitzsche, J.; Kühn, M.; Herrmann, A.; Klemm, M.; Ortwein, A. (2014): Hochtemperatur-Teerentfernung aus biomassestämmigen Vergasungsgasen durch ein kombiniertes katalytisch-adsorptives Verfahren. In: Tagungsband zur 20. Fachtagung „Nachwachsende Rohstoffe“ 2014, 4./5.09.2014, Dresden.

Nitzsche, R.; Budzinski, M.; Gröngröft, A.; Majer, S. (2014): Bewertungsansätze bei der Optimierung von Bioraffinerie-Konzepten. In: Tagungsband DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich sauber?!“ S. 57–68. Leipzig. ISSN 2199-9384.

Nitzsche, R.; Budzinski, M.; Gröngröft, A.; Majer, S. (2014): Development and optimization of a wood-based biorefinery concept for the production of platform chemicals on the basis of economic and environmental aspects. In: Conference Proceedings of the 4th Central European Biomass Conference. S. 222. Graz, Österreich.

Oehmichen, K.; Koeppel, W. (2014): Emissionen von Biomethananlagen und Herausforderungen bei der Zertifizierung. In: Tagungsband DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich sauber?!“ S. 77–78. Leipzig. ISSN 2199-9384.

Purkus, A.; Röder, M.; Gawel, E.; Thrän, D. (2014): Handling Uncertainty in Bioenergy Policy Design – A Case Study Analysis of UK and German Bioelectricity Policy Instruments. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 1441–1444. Hamburg. ISBN 978-88-89407-52-3.

Reinelt, T.; Westerkamp, T. (2014): Treibhausgasemissionen aus Biomethananlagen – Messergebnisse und Ursachenanalyse. In: Nelles, M. (Hrsg.): Tagungsband 8. Rostocker Bioenergieforum. S. 403–409. Rostock. ISBN 978-3-86009-412-9.

Reinelt, T.; Westerkamp, T.; Liebetrau, J. (2014): Klimarelevante Emissionen aus Biogasanlagen mit Biogasaufbereitung und Einspeisung in das Erdgasnetz. In: VDI Berichte. S. 203–213, VDI-Verlag GmbH. Düsseldorf. ISBN 978-3-18-092214-0.

Rensberg, N.; Daniel-Gromke, J. (2014): Biogas Generation from Biowaste in Germany – Status Quo and Development. In: Tagungsband Progress in Biogas III. Stuttgart. ISBN 978-3-940706-07-2.

Rönsch, S.; Schneider, J.; Grasemann, E. (2014): Versuchs- und simulationsgestützte Untersuchungen zur SNG-Produktion aus Biomassestäuben. In: DGMK Tagungsbericht 2014-2. Rotenburg an der Fulda. ISBN 978-3-941721-43-2.

Schlüter, M.; Klemm, M.; Kiendl, I. (06/2014): Methanation studies with a high pressure fixed bed tube reactor, Effect of nitrogen dilution on the hydrogenation of carbon monoxide. In: Tagungsband zur 2nd TMFB International Conference, Eurogress Aachen, S. 60–61. Aachen.

Schmidt, S.; Büchner, D. (2014): Versuchsstand zur messtechnischen Bestimmung der Wirkungsgrade von Pelletkesseln. In: Technologie- und Anwenderkongress „Virtuelle Instrumente in der Praxis“ (VIP). VDE VERLAG. Dresden. ISBN 978-3800735723.

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

Schmidt-Baum, T.; Viehmann, C.; Witt, J. (2014): Analysis of the Population of Small-scale Furnaces on the Example of Germany. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88- 89407-52-3.

Schröder, J.; Hartmann, F.; Müller-Langer, F.; Worch, D.; Eschrich, R.; Böhm, J.; Gläser, R. (2014): Entwicklung einer Methodik zur beschleunigten Alterung von Dieselabgaskatalysatoren beim Einsatz von Biodiesel. In: Schriftenreihe Umweltingenieurwesen, Agrar- und Umweltwissenschaftliche Fakultät, Universität Rostock. S. 205–210. Rostock. ISBN 978-3-86009-412-9.

Schröder, T.; Lenz, V.; Pfeiffer, D. (2014): Particulate matter emission from residential wood combustion, measurement methods and status of harmonization efforts within the national funding program “Biomass energy use”. In: Conference Proceedings of the 4th Central European Biomass Conference. S. 45. Graz, Österreich.

Schüch, A.; Engler, N.; Nelles, M. (06/2014): Einfluss von Vorbehandlung und anaerober Vergärung auf die Faserzusammensetzung

von Reisstroh. In: Nelles, M. (Hrsg.): Tagungsband zum 8. Rostocker Bioenergieforum, 19./20.06.2014. S. 487–490. Rostock. ISBN 978-3-86009-412-9.

Schüch, A.; Höfs, F.; Nelles, M. (04/2014): Möglichkeiten der Bioabfallbewirtschaftung in Mecklenburg-Vorpommern. In: Nelles, M. (Hrsg.): Tagungsband zum 16. DIALOG Abfallwirtschaft MV – Aktuelle Entwicklungen in der Abfallwirtschaft, Schriftenreihe UIW, Bd. 44, S. 79–90. Rostock. ISBN 978-3-86009-410-5.

Schüch, A.; Rensberg, N.; Nelles, M. (2014): Potenziale und Chancen der Abfall- und Reststoffverwertung in Deutschland. In: Tagungsband zum 6. Hohen Luckower Bioenergie-Seminar „Biogasherstellung aus Rest- und Abfallstoffen“. Hohen Luckow. ISBN 0947-4374.

Schulte, N.; Gellenbeck, K.; Nelles, M. (03/2014): Entwicklung von praxisorientierten Qualitätsprüfungen für die haushaltsnahe Abfallsammlung im Holsystem. In: Bockreis, A.; Faulstich, M.; Flamme, S.; Kranert, M.; Nelles, M.; Rettenberger G., Rotter, V. S. (Hrsg.): 4. Wissenschaftskongress Abfall- und Ressourcenwirtschaft der Deutschen Gesellschaft für Abfallwirtschaft am 27./28. März 2014 in Münster, S. 109–112. Münster. ISBN 978-3-9811142-4-9.

Schulte, N.; Nelles, M.; Gellenbeck, K. (04/2014): Entwicklung von Konformitätskennzahlen im Rahmen von Qualitätsprüfungen für die haushaltsnahe Abfall- und Wertstoffsammlung. In: Nelles, M. (Hrsg.): Tagungsband zum 16. DIALOG Abfallwirtschaft MV – Aktuelle Entwicklungen in der Abfallwirtschaft, Schriftenreihe UIW Bd. 44, S. 189–202. Rostock. ISBN 978-3-86009-410-5.

Seidler, A. (03/2014): Zeit- und ortsaufgelöste Spurenstoffanalyse in Feuerungsanlagen für biogene Reststoffe mittels Laser-Massenspektrometrie. In: Bockreis, A.; Faulstich, M.; Flamme, S.; Kranert, M.; Nelles, M.; Rettenberger, G.; Rotter, V. S. (Hrsg.): Tagungsband 4. Wissenschaftskongress Abfall- und Ressourcenwirtschaft der Deutschen Gesellschaft für Abfallwirtschaft am 27. und 28. März 2014. S. 209–212. Münster. ISBN 978-3-9811142-4-9.

Seidler, A.; Weickhardt, C.; Hartmann, I.; Nelles, M. (10/2014): Zeit- und ortsaufgelöste Spurenstoffanalyse in Feuerungsanlagen für biogene Reststoffe mittels Laser-Massenspektrometrie. In: Nelles, M. (Hrsg.): Tagungsband zur DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“, S. 113–117. Leipzig. ISSN 2199-9384.

Seiffert, M.; Nelles, M. (2014): Concepts for Biomethane Production and Usage. In: Proceedings of the 5th International Conference on Environmental Technology and Knowledge Transfer (ICET), S. 203–207. Hefei, Anhui, China. ISBN 978-3-86009-411-2.

Tabet, F. (2014): Keynote: Towards efficient and environmental friendly heating using CFD. In: Online Proceedings of the CFD-Workshop “Computational Fluid Dynamics (CFD) and biomass thermochemical Conversion”, S. 8. Leipzig. ISSN 2199-9384.

Thrän, D. (10/2014): Bioenergieforschung heute und Visionen 2050. In: Nelles, M. (Hrsg.): Tagungsband zur DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“, S. 13. Leipzig. ISSN 2199-9384.

Thrän, D.; Krautz, A.; Scheftelowitz, M.; Lenz, V.; Liebetrau, J.; Daniel-Gromke, J.; Zeymer, M.; Nelles, M. (2014): Auswirkungen der gegenwärtig diskutierten Novellierungs-Vorschläge für das EEG-2014. In: ProFair Consult + Project GmbH (Hrsg.): Tagungsband zum 7. Biogas Innovationskongress. S. 11–22. Osnabrück. ISBN 978-3-9813776-4-4.

Thrän, D.; Krautz, A.; Scheftelowitz, M.; Lenz, V.; Liebetrau, J.; Daniel-Gromke, J.; Zeymer, M.; Nelles, M. (06/2014): DBFZ-Hintergrundpapier: Auswirkungen der gegenwärtig diskutierten Novellierungsvorschläge für das EEG-2014. In: Nelles, M. (Hrsg.): Tagungsband zum 8. Rostocker Bioenergieforum, 19./20.06.2014, S. 13–25. Rostock. ISBN 978-3-86009-412-9.

Thrän, D.; Pfeiffer, D. (2014): Transparency and harmonization amongst evaluation methods. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

Thrän, D.; Pfeiffer, D. (2014): BEST PRACTICE – Erfolgskriterien für eine nachhaltige Energetische Biomassenutzung. In: Nelles, M. (Hrsg.): Tagungsband zur DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ S. 145–146. Leipzig. ISSN 2199-9384.

Thrän, D.; Ponitka, J. (2014): Die Rolle der Bioenergie in einer nachhaltigen Energieversorgung. In: Bruhns, H. (Hrsg.): Energie – Forschung und Konzepte. Tagungsband der DPG-Frühjahrstagung in Berlin 2014, Bad Honnef, 2014. S. 20–32. ISBN 978-3-9811161-6-8.

Von Sonntag, J.; Zeng, T.; Pilz, A.; Lenz, V. (2014): Concept and Implementation of Test Fuels for the Very First Non-Woody Biomass Boiler Type Tests According to 1st Bimschv in Germany. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Online Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

Weinrich, S.; Nelles, M. (03/2014): Praxisnahe Modellierungen von Biogasanlagen. In: Liebetrau, J.; Thrän, D.; Pfeiffer, D. (Hrsg.): Tagungsreader zur Fachtagung Prozessmesstechnik in Biogasanlagen, S. 38–39. Leipzig.

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. Stuttgart. ISBN 978-3-940706-07-2.

Weinrich, S.; Weißbach, F.; Pröter, J.; Liebetrau, J.; Nelles, M. (06/2014): Massenbilanzierung von Biogasanlagen – Möglichkeiten und Herausforderungen zur Effizienzbewertung von Biogasanlagen. In: Nelles, M. (Hrsg.): Tagungsband zum 8. Rostocker Bioenergieforum, 19./20.06.2014, S. 369–379. Rostock. ISBN 978-3-86009-412-9.

Weißbach, G.; Müller, H.; Nelles, M. (2014): Mikrowellen-assistierter Organsolv-Aufschluss biogener Reststoffe. In: DepoTech 2014 – Abfallwirtschaft, Abfallverwertung und Recycling, Deponietechnik und Altlasten. S. 603–608. Leoben, Österreich. ISBN 978-3-200-03797-7.

Weißbach, G.; Nelles, M. (04/2014): Vorbehandlung von Getreidestroh zur Gewinnung von Treibstoffen und Basischemikalien durch mikrowellen-assistierten Aufschluss. In: Nelles, M. (Hrsg.): Tagungsband zum 16. DIALOG Abfallwirtschaft MV – Aktuelle Entwicklungen in der Abfallwirtschaft, Schriftenreihe UIW Bd. 44, S. 175–188. ISBN 978-3-86009-410-5.

Weißbach, G.; Schüch, A.; Engler, N.; Müller, H.; Nelles, M. (06/2014): Pretreatment of rice straw by microwave-inducted catalytic wet oxidation. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceeding of 22nd European Biomasse Conference and Exhibition (EUBC&E), S. 837–842. Hamburg. ISBN 978-88-89407-52-3.

Weller, N. (2014): Combustion of hay pellets – Effects of Kaolin and Limestone addition on the combustion behaviour, ash sintering and emissions. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

Weller, N.; Leistner, D. (2014): Treatment and characterization of torrefied biomass for Co-Combustion in power plants. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). Hamburg. ISBN 978-88-89407-52-3.

Witt, J.; Bienert, K.; Carbo, M.; Kiel, J.; Wolfesberger-Schwabel, U.; Thrän, D. (2014): Possibilities of Torrefied Biomass Co-gasification and Co-firing. In: DGMK-Tagungsbericht 2014-2 „Konversion von Biomassen“. Rotenburg an der Fulda. ISBN 978-3-941721-43-2.

Witt, J.; Weller, N.; Bienert, K.; Khalsa, J. (2014): Thermisch modifizierte Festbrennstoffe im Überblick. In: Nelles, M. (Hrsg.): Tagungsband zur DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ S. 49–52. Leipzig. ISSN 2199-9384.

Wochele, S.; Priess, J.; Thrän, D.; O’Keeffe, S. (2014): Crop Allocation Model „CRAM“ – An Approach for Dealing with Biomass Supply from Arable Land as Part of a Life Cycle Inventory. In: Hoffmann, C.; Baxter, D.; Maniatis, K.; Grassi, A.; Helm, P. (Hrsg.): Conference Proceedings of the 22nd European Biomass Conference and Exhibition (EUBC&E). S. 36–40. Hamburg. ISBN 978-88-89407-52-3, DOI: 10.5071/22nd EUBCE2014-1AO.5.4.

Xu, A.; Nelles, M. (05/2014): Mecklenburg-Vorpommern goes to Anhui -The Safe Disposal of Sewage Sludge in Germany. In: Nelles, M.; Cai, J.; Wu, K. (Hrsg.): Proceedings of the 5th International Conference on Environmental Technology and Knowledge Transfer (ICET). S. 29–38. Hefei, Anhui, China. ISBN 978-3-86009-411-2.

Zeymer, M. (2014): Technik, Betrieb und Wirtschaftlichkeit von Holzvergasungsanlagen in der Praxis. In: Nussbaumer, T. (Hrsg.): 13. Holzenergie-Symposium: Entwicklungen für

Wärme, Kraft und Fernwärme aus Holz. Zürich, Schweiz. ISSN 3-908705-25-8.
Zeymer, M.; Herrmann, A.; Oehmichen, K. (2014): Technisch-ökonomisch-ökologische Bewertung von kleintechnischen Biomassevergasern. In: Tagungsband 4. Mitteleuropäische Biomassekonferenz. Graz, Österreich.
Zeymer, M.; Rönsch, S. (2014): Die Preisfrage – Nachhaltige Bioenergie durch Co- Vergasung von Biomasse und Kohle? In: Tagungsband der 4. Mitteleuropäische Biomassekonferenz. Österreichischer Biomasse-Verband. Graz, Österreich.
Ziegler, D.; Witt, J.; Bienert, K.; Schaubach, K. (2014): Torrefizierte Bioenergieträger: Auch für Deutschland interessant? In: Nelles, M. (Hrsg.): Tagungsband 8. Rostocker Bioenergieforum, Schriftenreihe Umweltingenieurwesen Agrar- und Umweltwissenschaftliche Fakultät. S. 87–94. Rostock. ISBN 978-3-86009-412-9.

Presentations

Angelova, E. (04/2014): Biomethane production as a development option for the Ukraine. Vortrag gehalten: BioGasWorld 2014. Am 01.04.2014 in Berlin.
Angelova, E. (05/2014): Erfahrungsbericht: Bioenergienetzwerk SOJUS. Vortrag gehalten: 4. Deutsch – Russischer Wirtschaftsstammtisch. Am 13.05.2014 in Leipzig.
Angelova, E.; Kittler, R.; Stinner, W. (01/2014): The role of bioenergy – lessons learned in Germany and small scaled initiatives runned by farmers and local communities. Vortrag gehalten: Am 27.01.2014 in Tallin, Estland.
Barchmann, T. (01/2014): Flexibilisierungsansätze von Biogasanlagen – Nutzungskonzepte für Blockheizkraftwerke für eine bedarfsorientierte Stromerzeugung. Vortrag gehalten: Biogas-Fachgespräch. Am 29.1.2014 in Leipzig.
Barchmann, T. (03/2014): Flexibilisierung von Biogasanlagen – Konzepte, Technik und Ökonomie im Kontext des EEG. Vortrag gehalten: Akademischer Energieverein Leipzig (AEL) e.V. Am 6.3.2014 in Leipzig.
Barchmann, T. (10/2014): Flexibilisierung von Biogasanlagen nach dem EEG 2012 und EEG 2014 – Konzepte, Kosten und mögliche Erlöse. Vortrag gehalten: biogas expo & congress – 23. Jahrestagung Biogas & Bioenergie in der Landwirtschaft. Am 22.10.2014 in Offenburg.
Barchmann, T. (11/2014): Flexible Bioenergie als Ausgleichsoption im Stromsystem Deutschlands. Vortrag gehalten: metaStream Fachgesprächsreihe – Energieversorgungssysteme der Zukunft. Am 06.11.2014 in Leipzig.
Barchmann, T.; Lauer, M.; Dotzauer, M. (06/2014): Technisch-ökonomische Optimierung von flexiblen Biogaskonzepten im Kontext des EEG. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 20.6.2014 in Rostock.
Barchmann, T.; Rensberg, N. (10/2014): Novelle des EEG – Konsequenzen für die Betreiber von Bioabfallvergärungsanlagen. Vortrag gehalten: Bioabfall Forum Baden-Württemberg 2014. Am 15.10.2014 in Stuttgart.
Bezama, A.; Thrän, D.; Siebert, A.; Hildebrandt, J.; O'Keeffe, S.; Gröngröft, A.; Majer, S. (05/2014): A review on the challenges, opportunities and needed research for implementing the bioeconomy strategy in a regional scale. Vortrag gehalten: 13th International Symposium on Bioplastics, Biocomposites & Biorefining: „Moving towards a Sustainable Bioeconomy". Am 24.05.2014 in Guelph, Ontario, Kanada.
Billig, E. (04/2014): Biomethane and Bio-SNG-a brief overview. Vortrag gehalten: Official Opening of BioGasWorld 2014. Am 2.4.2014 in Berlin.
Billig, E. (12/2014): Biomethane and Bio-SNG – An Overview. Vortrag gehalten: Workshop on Technologies for Biogas Purification, 2014. Universidade Federal do Ceará. Am 05.12.2014 in Fortaleza, Brasilien.
Billig, E.; Nelles, M. (10/2014): Biomethane and Bio-SNG – An Overview. Vortrag gehalten: Great Cycle Workshop, 2014. Chinese University of Agriculture. Am 30.10.2014 in Beijing, China.
Bindig, R. (03/2014): Möglichkeiten und Grenzen der Katalytischen Emissionsminderung. Vortrag gehalten: 5. Fachgespräch „Partikelabscheider in häuslichen Feuerungen". Am 26.3.2014 in Leipzig.
Bindig, R.; Butt, S.; Dvoracek, D.; Enke, D.; Hartmann, I. (10/2014): Challenges and recent developments for emission control on stationary biomass combustion devices for energy production. Vortrag gehalten: 8th International Conference on Environmental Catalysis. Am 20.10.2014 in Asheville, USA.

Bohnet, S. (05/2014): Wärmenutzung in Bioenergie-Regionen – Status quo und Perspektiven. Vortrag gehalten: 5. Arbeitstreffen der Bioenergie-Regionen. Am 14.5.2014 in Wettenberg.
Brosowski, A. (01/2014): Potenziale zur Biogas- und Biomethanproduktion. Vortrag gehalten: Leipziger Biogas-Fachgespräche. Am 29.1.2014 in Leipzig.
Brosowski, A. (03/2014): Ergebnisse der BLAG „Nachwachsende Rohstoffe" zu Bioenergiepotenzialen. Vortrag gehalten: Workshop „Bioenergiepotenziale und – monitoring in den BL" der Agentur für Erneuerbare Energien. Am 25.3.2014 in Berlin.
Brosowski, A. (04/2014): Potenziale für Biogas und Biomethan in Deutschland und Europa. Vortrag gehalten: Pressehintergrundgespräch „Die Krise als Chance". Fachverband Biogas. Am 7.4.2014 in Berlin.
Brosowski, A. (04/2014): Räumliche Verteilung von Reststoffpotenzialen zur energetischen Nutzung – GIS-gestützte Identifikation von Mindestmengen und Standortplanung. Vortrag gehalten: GeoForum MV – Mehrwerte durch Geoinformation. Am 8.4.2014 in Warnemünde.
Brosowski, A. (07/2014): Biomassepotenzial mit dem Fokus auf Rest- und Abfallstoffe in Deutschland. Vortrag gehalten: „Fachgespräch der Fachagentur Nachwachsende Rohstoffe (FNR)" Am 14.07.2014 in Gülzow-Prüzen.
Brosowski, A.; Adler, P. (03/2014): Ergebnisvorstellung technische Biomassepotenziale. Vortrag gehalten: 14. Workshop Bioenergie-Regionen. Am 11.3.2014 in Straubing.
Brosowski, A.; Majer, S. (10/2014): Biomassepotenziale und zukünftige Anforderungen an die Rohstoffbereitstellung. Vortrag gehalten: DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!" Am 1.10.2014 in Leipzig.
Budzinski, M.; Nitzsche, R. (06/2014): Development of more sustainable wood-based biorefinery concepts using eco-efficiency analysis. Vortrag gehalten: 10th International Conference on Renewable Resources and Biorefineries. Am 05.06.2014 in Valladolid, Spanien.
Budzinski, M.; Nitzsche, R.; Gröngröft, A.; Majer, S. (09/2014): Nachhaltige Erzeugung von Plattformchemikalien?!- Eine ökologische und ökonomische Betrachtung. Vortrag gehalten: Naro.tech – 10. Internationales Symposium. Am 17.09.2014 in Erfurt.
Budzinski, M.; Nitzsche, R. (09/2014): Wie nachhaltig können Bioraffinerien sein? Eine Betrachtung mit Hilfe eines Ökoeffizienzansatzes. Vortrag gehalten: 10. Ökobilanzwerkstatt. Am 09.09.2014 in Dresden.
Büchner, D.; von Sonntag, J. (10/2014): Assessment of boiler efficiency under real-life conditions. Vortrag gehalten: 13th Pellets Industry Forum. Am 15.10.2014 in Berlin.
Carbo, M.; Kiel, J.; Witt, J.; Thrän, D. (05/2014): New results of the SECTOR project: production of solid sustainable energy carriers from biomass by means of torrefaction. A European R&D Project funded within the Seventh Framework Programme by the European Commission. Vortrag gehalten: 6th International Freiberg Conference on IGCC & XtL Technologies. Am 19.5.2014 in Freiberg, Germany.
Carbo, M.; Leiser S.; Kiel, J.; Thrän, D.; Witt, J. (06/2014): New results of the SECTOR project: production of solid sustainable energy carriers from biomass by means of torrefaction. A European R&D Project funded within the Seventh Framework Programme by the European Commission. Vortrag gehalten: Clearwater Clean Coal Conference. Am 04.06.2014 in Clearwater, USA.
Daniel-Gromke, J. (02/2014): Life cycle analysis and overall GHG emissions saved by biogas. Vortrag gehalten: EBA – Workshop on Sustainability of biogas. Am 29.4.2014 in Brüssel, Belgien.
Daniel-Gromke, J.; Barchmann, T.; Trommler, M. (02/2014): Optimization of biogas plants – focus: flexible energy supply of AD plants. Vortrag gehalten: AD Europe 2014. Am 21.2.2014 in Dublin, Irland.
Daniel-Gromke, J.; Denysenko, V.; Rensberg, N. (01/2014): Bundesweites Monitoring von Biogasanlagen. Vortrag gehalten: Leipziger Biogas-Fachgespräche. Am 29.1.2014 in Leipzig.
Daniel-Gromke, J.; Denysenko, V.; Rensberg, N.; Scheftelowitz, M.; Naumann, K. (03/2014): Bundesweites Monitoring – Bioenergie – Datenbasis und Datenlücken. Vortrag gehalten: AEE-Workshop „Bioenergiepotenziale in den Bundesländern". Am 25.3.2014 in Berlin.
Daniel-Gromke, J.; Denysenko, V.; Trommler, M. (06/2014): Biomethan: Status Quo – Markt und Wirtschaftlichkeit. Ergebnisse aktueller Forschungsprojekte. Vortrag gehalten:

DVGW-Workshop „Erzeugung, Aufbereitung und Einspeisung von Biogas“. Am 5.6.2014 in Augsburg.

Daniel-Gromke, J.; Majer, S.; Oehmichen, K.; Naumann, K. (03/2014): Markt und Wirtschaftlichkeit von Biomethan im Rahmen der THG-Quote. Vortrag gehalten: DENA Biogaspartner – AG Biokraftstoffe. Am 4.3.2014 in Berlin.

Das, S.; Tafarte, P.; Thrän, D. (06/2014): Geospatial analysis of heat utilization centers from bioenergy plants in Germany. Vortrag gehalten: 22nd European Biomass Conference and Exhibition (EUBC&E). Am 24.06.2014 in Hamburg.

Dernbecher, A.; Findeisen, F.; Tabet, F.; Ortwein, A.; Werner, F.; Hartmann, I. (10/2014): Biomass combustion in small-scale furnace systems. Vortrag gehalten: 2nd OpenFOAM User Conference. Am 08.10.2014 in Berlin.

Dorn, T.; Nelles, M.; Flamme, S. (05/2014): Technology Transfer Matrices as a tool to improve technology transfer, Vortrag gehalten: 5th International Conference on Environmental Technology and Knowledge Transfer (ICET). Am 15./16. Mai 2014 in Hefei, Anhui, China.

Dotzauer, M. (03/2014): Handlungsleitfaden zur Umsetzung der bedarfsgerechten Stromerzeugung. Vortrag gehalten: Flexibilisierung von Biogasanlagen. Am 6.3.2014 in Siebenlehn.

Dotzauer, M. (06/2014): Optimized operation of flexible biogas plants. Vortrag gehalten: 22nd European Biomass Conference and Exhibition (EUBC&E). Am 25.6.2014 in Hamburg.

Elberg, K.; Ramhold, D.; Nelles, M.; Demmig, C. (06/2014): Wirkung von Enzymzusätzen auf die rheologischen Eigenschaften von Fermenterschlämmen. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 19./20.06.2014 in Rostock.

Elnaas, A.; Nassour, A.; Nelles, M. (09/2014): Waste Generation and Disposal Methods in Emerging Countries. Vortrag gehalten: International Recycling & Recovery Congress IRRC. Am 08.09.2014 in Wien, Österreich.

Engler, N.; Loewe, K.; Elberg, K.; Nelles, M. (11/2014): Interaction of different feedstocks for biogas plants: Superposition effects on biogas yield and kinetics of biogas formation. Vortrag gehalten: Venice 2014 – 5th International Symposium on Energy from Biomass and Waste. Am 17.11.2014 in Venedig, Italien.

Fischer, E. (11/2014): Effizienzsteigerung beim Repowering von Biogasanlagen. Vortrag gehalten: Energy Decentral 2014. Am 11.11.2014 in Hannover.

Fritz, T.; Lindorfer, H.; Demmig, C.; Engler, N.; Nelles, M. (06/2014): Die Rolle von Hemmstoffen in landwirtschaftlichen Biogasanlagen. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 19.–20.06.2014 in Rostock.

Ganagin, W.; Loewen, A.; Hahn, H.; Nelles, M. (05/2014): Flexible Biogaserzeugung durch technische und prozessbiologische Verfahrensanpassung. Vortrag gehalten: 7. Biogas Innovationskongress. Am 22.–23.05.2014 in Osnabrück.

Ganagin, W.; Loewen, A.; Hahn, H.; Nelles, M. (06/2014): Flexible Biogaserzeugung durch technische und prozessbiologische Verfahrensanpassung. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 19.–20.06.2014 in Rostock.

Ganagin, W.; Loewen, A.; Krieg, A.; Nelles, M. (05/2014): Treatment of Wastewater in Anaerobic Fixed Bed Bioreactors. Vortrag gehalten: ICET 2014. Am 15.05.2014 in Hefei, Anhui, China.

Gröngröft, A. (10/2014): Optimierungspotenziale von Biokraftstoffanlagen. Vortrag gehalten: Treibhausgasbilanzen von Biokraftstoffen – Bestandsaufnahme und Optimierungsansätze. Am 01.10.2014 in Berlin.

Gröngröft, A.; Hauschild, S.; Grasemann, E.; Meisel, K.; Meyer, K. (01/2014): Technical, ecological and economic assessment of biokerosene production. Kraftstoffe der Zukunft 2014. Am 21.01.2014 in Berlin.

Grünes, J.; Nelles, M. (05/2014): Recycling of phosphorus from organic waste and residues in Germany. Vortrag gehalten: ICET 2014. Am 15.05.2014 in Hefei, Anhui, China.

Haak, F. (05/2014): Die Gestaltung von Stoffströmen. Ein ganzheitlicher Ansatz für Entscheidungsträger. Vortrag gehalten: CityTagung Workshop „Effizienz von Bioenergie“. Am 21.5.2014 in Leipzig.

Haak, F. (09/2014): Deckung kommunaler Wärmesenken mit heimischer Biomasse. Vortrag gehalten: Fachgespräch Feste Biomasse. Am 25.9.2014 in Leipzig.

Hartmann, I. (01/2014): Technische Fortschritte und weiterer Entwicklungsbedarf bei der Effizienzsteigerung und Emissionsminderung bei Einzelraumfeuerungen. Vortrag gehalten: FNR-Fachveranstaltung: Effizienzsteigerung und Emissionsminderung bei Biomassefeuerungsanlagen im Zuge der Umsetzung der 1.BImSchV. Am 21.1.2014 in Berlin.

Hartmann, I. (03/2014): Emissionsminderung bei Biomassefeuerungen. Vortrag gehalten: EFA-Fachgruppentagung und JHV 2014. Am 26.3.2014 in Olsberg.

Hartmann, I. (05/2014): Feste Bioenergieträger-Holzpellets. Vortrag gehalten: FNR-Fachveranstaltung: Nutzung fester Biobrennstoffe im Rahmen der 1.BImSchV – Herausforderungen und Handlungsbedarf. Am 14.5.2014 in Berlin.

Hartmann, I. (09/2014): Emissionsminderung bei Biomasse-Kleinfeuerungen. Vortrag gehalten: Fachgespräch „Partikelfilter und Umweltzone“. Am 30.9.2014 in Berlin.

Hartmann, I. (10/2014): Wissenschaftliche Einblicke zur Emissionsminderung bei Biomasse-Kleinfeuerungen. Vortrag gehalten: DBFZ Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ Am 2.10.2014 in Leipzig.

Hartmann, I.; Billig, E.; Bindig, R.; Carstens, S.; Liebetrau, J. (09/2014): Möglichkeiten, Limitierungen und Entwicklungsbedarf zur katalytischen Emissionsminderung. Vortrag gehalten: VDI-Forum: Emissionen aus Biogasanlagen. Am 25.9.2014 in Frankfurt/Main.

Hartmann, I.; König, M.; Matthes, M. (05/2014): Investigations at a Micro-Scale Installation Regarding Emission Reduction by Air Staging and Integrated Catalysis. Vortrag gehalten: Icon BM – international conference on BioMass. Am 7.5.2014 in Florenz, Italien.

Herrmann, A. (01/2014): Vergleichbarkeit von Feldmessdaten zur technischen Bewertung von Biomassevergasern – Erfahrungen aus dem Bundesmessprogramm. Vortrag gehalten: 4. Mitteleuropäische Biomassekonferenz. Am 17.1.2014 in Graz, Österreich.

Herrmann, A. (10/2014): Vergleichbarkeit von Feldmessdaten zur technischen Bewertung von Biomassevergasungsanlagen. Vortrag gehalten: 2.VDI-Fachtagung „Anlagenbezogenes Monitoring“. Am 15.10.2014 in Karlsruhe.

Holzhammer, U.; Tobisch, J. R.; Scholwin, F.; Nelles, M. (05/2014): Beeinflussung der Erzeugungskosten der Stromproduktion aus Biomethan durch die Berücksichtigung der fluktuierenden erneuerbaren Energien. Vortrag gehalten: 7. Biogas Innovationskongress. Am 22./23.05.2014 in Osnabrück.

Jacobi, H. F.; Trommler, M. (04/2014): Technische Möglichkeiten und Potenziale der flexiblen Strombereitstellung aus Biogas. Vortrag gehalten: Dezentrale flexible Strombereitstellung aus Biogas: Entwicklung, Möglichkeiten und Perspektiven. Am 03.04.2014 in Berlin.

Janke, L.; Leite, A.; Wedwitschka, H.; Nikolausz, M.; Schmidt, T.; Stinner, W. (06/2014): Biomethane production integrated to the Brazilian sugarcane industry: The Case study of São Paulo State. Vortrag gehalten: 22nd European Biomass Conference and Exhibition (EUBC&E). Am 23.–26.06.2014 in Hamburg.

Khalsa, J.; Pilz, A.; Weller, N. (06/2014): Optimized production of torrefied pellets from alternative biomasses. Vortrag gehalten: 22nd European Biomass Conference (EUBC&E). Am 25.6.2014 in Hamburg.

Kiel, J.; Carbo, M.; Thrän, D.; Witt, J. (06/2014): New results of the SECTOR project: production of solid sustainable energy carriers from biomass by means of torrefaction. A European R&D Project funded within the Seventh Framework Programme by the European Commission. Vortrag gehalten: 22nd European Biomass Conference and Exhibition (EUBC&E). Am 25.6.2014 in Hamburg.

Kirsten, C., Lenz, V., Schröder, H.-W., Repke, J.-U. (03/2014): Pellets aus Gärresten – Herstellung und Herausforderungen. Vortrag gehalten: Jahrestagung ProcessNet-Fachgruppe Agglomerations- und Schüttguttechnik. Am 11.03.2014 in Magdeburg.

Kirsten, C., Lenz, V.; Schröder, H.-W.; Repke, J.-U. (06/2014): Additional Analyses for Development and Quality Management of Alternative Fuel Pellets. Vortrag gehalten: 22nd European Biomass Conference (EUBC&E). Am 25.6.2014 in Hamburg.

Kirsten, C., Lenz, V., Schröder, H.-W., Repke, J.-U. (11/2014): Bindemechanismen im Pellet – was hält ein Pellet zusammen. Vortrag gehalten: Leipziger Fachgespräch Feste Biomasse 2014: Biomasse-Kompaktierung zur energetischen Nutzung. Am 05.11.2014 in Leipzig.

Klemm, M.; Herrmann, A.; Ortwein, A.; Krause, H.; Nitzsche, J. (05/2014): Konversion von Biomassen. Vortrag gehalten: GGMK-Fachbereichsta-

gung Konversion von Biomasse. Am 14.5.2014 in Rotenburg an der Fulda.

König, M. (06/2014): „Investigations at a micro-scale biomass combustion system with respect to low pollutant emission operation“, Presentation at the Conference „Renewable Energy Sources – engineering, technology, innovation“, 25.06.2014, Krynica, Poland.

König, M.; Hartmann, I.; Matthes, M.; Weller, N.; Döhling, F. (06/2014): Nutzung alternativer biogener Festbrennstoffe in Kleinfeuerungsanlagen. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 20.6.2014 in Rostock.

Krautz, A.; Lauer, M. (01/2014): Praxisbericht – Erfahrungen aus dem Forschungsprojekt OptFlex Biogas. Vortrag gehalten: 22. Jahrestagung Fachverband Biogas. Am 14.01.2014 in Nürnberg.

Krautz, A. (04/2014): Bedarfsgerechte Anlagen passen sich den Marktbedingungen an. Vortrag gehalten: Tagung Dezentrale flexible Strombereitstellung aus Biogas. Am 3.4.2014 in Berlin.

Krautz, A.; Lauer, M.; Dotzauer, M. (07/2014): Wo stecken die Chancen im EEG 2014 für NawaRo-Bestandsbiogasanlagen? – Auswirkungen der neuen Regelungen des EEG 2014. Vortrag gehalten: 4. VDI-Fachkonferenz Bedarfsorientierte Stromerzeugung aus Biogas und Biomethan. Am 01.07.2014 in Düsseldorf.

Kröger, M. (11/2014): Ansätze für eine mehrstufige hydrothermale Verflüssigung. Vortrag gehalten: HTP Fachforum Biobasierte hydrothermale Prozesse – Technologien zur stofflichen und energetischen Nutzung. Am 11.11.2014 in Leipzig.

Krüger, D. (09/2014): Echtzeitsimulation des Naturzuges für Prüfstandsmessungen. Vortrag gehalten: Fachtagung Prozesssimulation in der Energietechnik. Am 10.9.2014 in Leipzig.

Krüger, D.; Ortwein, A.; Klemm, M. (06/2014): Mikro-Kraft-Wärme-Kopplung mit Vergasung fester Biomasse in Form von Holzkohle. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 20.6.2014 in Rostock.

Lenz, V. (01/2014): Particulate matter emission from residential wood combustion, measurement methods and status of harmonization efforts within the national funding program „Biomass energy use“. Vortrag gehalten: Europäische Biomassekonferenz. Am 16.1.2014 in Graz, Österreich.

Lenz, V. (01/2014): Stand und technische Entwicklungspotenziale bei Pellet- und Hackschnitzelkesseln in Deutschland im Hinblick auf Effizienz und Emissionen. Vortrag gehalten: FNR-Fachveranstaltung: Effizienzsteigerung und Emissionsminderung bei Biomassefeuerungsanlagen im Zuge der Umsetzung der 1.BImSchV. Am 21.1.2014 in Berlin.

Lenz, V. (02/2014): Stand und Entwicklung der Emissionen aus automatisch betriebenen Biomasse-Kleinfeuerungsanlagen. Vortrag gehalten: Jahrestreffen der ProcessNet-Fachgruppen „Abfallbehandlung und Wertstoffrückgewinnung“, „Gasreinigung“ und „Hochtemperaturtechnik“. Am 17.2.2014 in Karlsruhe.

Lenz, V. (02/2014): Use of solid biomass in small scale combustion. Vortrag gehalten: Estonian Delegation. Am: 20.2.2014 in Leipzig.

Lenz, V. (05/2014): Stand der Technik und Qualitätsparameter fester Bioenergieträger, mögliche emissionsrechtliche Probleme bei Kleinfeuerungsanlagen der 1. BImSchV in der Praxis. Vortrag gehalten: FNR-Fachveranstaltung: Nutzung fester Biobrennstoffe im Rahmen der 1.BImSchV – Herausforderungen und Handlungsbedarf. Am 14.5.2014 in Berlin.

Lenz, V. (05/2014): Biomassenutzung in Deutschland – Einblick in Forschungsaktivitäten zur Nutzung fester und torrefizierter Biomasse. Vortrag gehalten: Japanische Delegation der Ecosystem Conservation Society. Am 21.5.2014 in Leipzig.

Lenz, V. (07/2014): Staubemissionen bei Holzfeuerungen – Umweltwirkungen der Biomassenutzung. Vortrag gehalten: 22. C.A.R.M.E.N.-Symposium: „Erneuerbare Energien – die ökologische und ökonomische Wende. Am 8.7.2014 in Würzburg.

Lenz, V. (12/2014): SmartBiomassHeat – Intelligente Biomasseheiztechnologien für eine erneuerbare Zukunft. Vortrag gehalten: 8. Expertentreffen: Leipzig – gutes Klima für Macher! Am 11.12.2014 in Leipzig.

Lenz, V. (12/2014): Future Perspectives of renewable heat supply from biomass in Germany – SmartBiomassHeat as one possible pathway. Vortrag gehalten: Re3build ICU Seminar. Am 18.12.2014 in Tokio, Japan.

Lenz, V.; Büchner, D. (10/2014): Zukunftsweisende Einbindung von Bioenergie in Strom und Wärmesysteme am Beispiel der Festbrennstoffnutzung. Vortrag gehalten: DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ Am 2.10.2014 in Leipzig.

Lenz, V.; Liebetrau, J.; Ortwein, A. (10/2014): Status and perspectives of combustion process for solid biomass-technology, market and frame conditions in the German energy system. Vortrag gehalten: 1st Baden-Württemberg Bioeconomy Congress 2014. Am 30.10.2014 in Hohenheim.

Lenz, V.; Majer, S. (06/2014): Protecting the Climate by Promoting and implementing Bioenergy – the German example. Vortrag gehalten: DBU/Humboldt-Stiftung. Am 26.6.2014 in Berlin.

Lenz, V.; Ortwein, A.; Ponitka, J. (02/2014): Meilensteine 2030 – Perspektiven der Biomasse im Wärmesektor – Teil II. Vortrag gehalten: Workshop „Biomasse im Wärmemarkt der Zukunft“. Am 18.2.2014 in Frankfurt/Main.

Lenz, V.; Ulbricht, T. (03/2014): Aktuelle Entwicklungen der Rahmenbedingungen für Staubabscheider an Kleinfeuerungsanlagen in Deutschland. Vortrag gehalten: 5. Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. Am 26.3.2014 in Leipzig.

Liebetrau, J. (03/2014): Biogas – ein Auslaufmodell? Vortrag gehalten: Kurt-Schwabe-Institut. Am 24.3.2014 in Waldheim.

Liebetrau, J. (10/2014): Biogas technology – current challenges for plant construction and operation. Vortrag gehalten: Biogas Science. Am 29.10.2014 in Wien, Österreich.

Liebetrau, J. (11/2014): State of art and perspectives of biogas production from organic materials in Germany. Vortrag gehalten: 2nd German-Japanese Biomass Day. Am 07.11.2014 in Tokio, Japan.

Liebetrau, J.; Adler, P. (03/2014): Potenziale der Biomasse zur stofflichen und energetischen Nutzung: Wo sind Faserstoffe zu finden? Vortrag gehalten: Kooperationsforum: Erhöhung der Ressourceneffizienz in der faserverarbeitenden Industrie. Am 6.3.2014 in Heidenau.

Liebetrau, J.; Jenson, E.; Wedwitschka, H. (04/2014): Substrate characterization for dry fermentation in garage systems. Vortrag gehalten: Biogas World. Am 2.4.2014 in Berlin.

Liebetrau, J.; Ortwein, A. (10/2014): Identifizierung und Beschreibung der Kernprobleme der auslaufenden Förderung über das EEG auf die Erzeugung von Strom aus Biomasse. Vortrag gehalten: Expertentreffen „Forschungsförderbedarf für Strom aus Biomasse“. Am 23.10.2014 in Berlin.

Liebetrau, J.; Reinelt, T.; Daniel-Gromke, J.; Krebs, C.; Clemens, J. (09/2014): Abfallvergärungsanlagen – Besonderheiten hinsichtlich der Emissionen: Ergebnisse aus Forschungsvorhaben. Vortrag gehalten: VDI Forum Emissionen aus Biogasanlagen. Am 24.09.2014 in Frankfurt.

Liebetrau, J.; Schmidt, T. (06/2014): Reduction of the hydraulic retention time to 1.5 days in a CSTR – performance and methanogenic community composition. Vortrag gehalten: 2nd International Conference on Biogas Microbiology ICBM. Am 11.6.2014 in Uppsala, Schweden.

Liebetrau, J.; Weinrich, S.; Pröter, J. (03/2014): Effizienz der Biogasproduktion: Probleme und Lösungsansätze. Vortrag gehalten: Fachtagung Prozessmesstechnik an Biogasanlagen. Am 25.3.2014 in Leipzig.

Liebetrau, J.; Weinrich, S.; Pröter, J. (10/2014): Efficiency of biogas production. Vortrag gehalten: Conference of the European Biogas Association 2014. Am 01.10.2014 in Alkmaar region, Niederlande.

Liebetrau, J.; Westerkamp, T.; Reinelt, T. (10/2014): Analysis of greenhouse gas emissions from biomethane plants – methods and results. Vortrag gehalten: Biogas Science. Am 29.10.2014 in Wien, Österreich.

Liebetrau, J.; Westerkamp, T.; Reinelt, T.; Kranert, M.; Reiser, M. (09/2014): Methoden zur Quantifizierung von Methanemissionen – Ergebnisse aus aktuellen Forschungsvorhaben. Vortrag gehalten: VDI Forum Emissionen aus Biogasanlagen. Am 24.09.2014 in Frankfurt.

Lorenz, H.; Fischer, P.; Pröter, J.; Philipp, W. (06/2014): Evaluation of Biogas Plants concerning Hygiene Aspects. Vortrag gehalten: 2nd International Conference on Biogas Microbiology ICBM. Am 10.6.2014 in Uppsala, Schweden.

Majer, S.; Oehmichen, K. (02/2014): Perspektiven für Pflanzenölkraftstoffe durch die Einführung der THG-Quote. Vortrag gehalten: Ölmüllertage Fulda. Am 25.2.2014 in Fulda.

Majer, S.; Oehmichen, K. (12/2014): THG-Effizienz bestimmt den Wettbewerb – die Qualifizierungsanforderungen an Zertifizierungsstellen steigen! Vortrag gehalten: 3. BBE/UFOP-Fachseminar „Nachhaltigkeit von Biokraftstoffen“. Am 04.12.2014 in Berlin.

Matthes, M.; Hartmann, I. (11/2014): Emissionsminderung an Kleinfeuerungen für Biomasse durch Feuerungsoptimierung und Katalysatoren. Vortrag gehalten: Bioenergiefachtagung „Energetische Nutzung von Biomasse – Ansätze für die Region“ im Rahmen der Zukunftstechnologietage. Am 06.11.2014 in Cottbus.

Matthes, M.; Hartmann, I.; König, M. (10/2014): Investigations at a Micro-Scale Biomass Combustion System Regarding Application of Integrated Catalysis Using Ceramic Foams as Support Material. Vortrag gehalten: Cellular Materials – CellMAT 2014. Am 24.10.2014 in Dresden.

Matthes, M.; Dobler, U. (10/2014): Emissionsminderung an Multifuelkesseln. Vortrag gehalten: DBFZ Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ Am 2.10.2014 in Leipzig.

Mauky, E. (09/2014): Flexible Biogas production for flexible energy provision. Vortrag gehalten: Progress in Biogas III. Am 11.09.2014 in Stuttgart.

Meisel, K.; Majer, S. (05/2014): THG-Bilanzen unterschiedlicher Biokraftstoffe. Vortrag gehalten: BBE/UFOP-Fachseminar – Nachhaltigkeit von Biokraftstoffen. Am 6.5.2014 in Berlin.

Meisel, K.; Majer, S. (08/2014): Bioenergie und Nachhaltigkeit am DBFZ. Vortrag gehalten: Workshop – Nachhaltigkeit und Umweltschutz. Am 25.8.2014 in Leipzig.

Morscheck, G.; Lemke, A.; Nelles, M.; Henneberg, M. (05/2014): Dredged Material as Recultivation Substrate. Vortrag gehalten: ICET 2014. Am 15.05.2014 in Hefei, Anhui, China.

Morscheck, G.; Nelles, M. (05/2014): Waste management in Germany – Status and Development. Vortrag gehalten: 5th International Conference on Environmental Technology and Knowledge Transfer (ICET). Am 15./16. Mai 2014 in Hefei, Anhui, China.

Morscheck, G.; Nelles, M.; Henneberg, M. (12/2014): Gereiftes Nassbaggergut als Rekultivierungssubstrat für Deponien. Vortrag gehalten: 6. Praxistagung Deponie 2014. Am 10.12.2014 in Hannover.

Müller-Langer, F.; Brosowski, A. (01/2014): Residue-based biofuels – Presentation of different conversion paths. Vortrag gehalten: 11th International conference „Fuels of the Future 2014“. Am 21.1.2014 in Berlin.

Müller-Langer, F.; Zech, K.; Oehmichen, K.; Rönsch, S.; Michaelis, J.; Funke, S. (02/2014): Hydrogen supply from biomass – evaluation of selected overall concepts. Vortrag gehalten: Jahrestreffen der ProcessNet-Fachgruppe „Energieverfahrenstechnik“. Am 18.2.2014 in Karlsruhe.

Naumann, K. (02/2014): Stationäre und mobile Nutzung von Pflanzenöl – Stand und Ausblick. Vortrag gehalten: 10. Ölmüllertage. Am 26.2.2014 in Fulda.

Naumann, K. (03/2014): Biobasierte Kerosinsubstitute. Vortrag gehalten: Internationale Tourismus-Börse ITB. Am 05.03.2014 in Berlin.

Naumann, K. (06/2014): Status Quo und Perspektiven der politischen Rahmenbedingungen im Biokraftstoffsektor. Vortrag gehalten: Leipziger Biokraftstofffachgespräch. Am 18.06.2014 in Leipzig.

Naumann, K. (11/2014): Change in the biofuel sector. Vortrag gehalten: 7th International AGQM Conference FAME. Am 06.11.2014 in Berlin.

Naumann, K. (12/2014): Aktuelle politische Entwicklungen im Biokraftstoffsektor. Vortrag gehalten: 1. Sächsische Ölsaatentage, Tagung zum „Ausbau der dezentralen Ölsaatenwirtschaft in Sachsen“. Am 05.12.2014 in Dresden.

Naumann, K.; Klauenberg, J. (11/2014): Biomasse – Ein vielversprechender Markt für Binnenschiffstransporte. Vortrag gehalten: Fachworkshop der Mobilitäts- und Kraftstoffstrategie. Am 04.11.2014 in Berlin.

Nebel, E. (04/2014): Abbildung flexibler Betriebszustände im Projekt Optflex. Vortrag gehalten: THG-Workshop im Rahmen des Projektes Optflex. Am 28.4.2014 in Leipzig.

Nebel, E. (04/2014): Referenzen im Projekt Optflex. Vortrag gehalten: THG-Workshop im Rahmen des Projektes Optflex. Am 28.4.2014 in Leipzig.

Nebel, E. (09/2014): Abbildung flexibler Betriebszustände von Biogasanlagen in einer Ökobilanz. Vortrag gehalten: 10. Ökobilanzwerkstatt. Am 9.9.2014 in Dresden.

Nelles, M. (04/2014): Biogas in the Energy System of Germany. Vortrag gehalten: 2nd Annual China International Bioenergy and Biomass Utilization Summit. Am 23./24.04.2014 in Shanghai, China.

Nelles, M. (05/2014): Organic waste and Residues for Energy Recovery in Germany. Vortrag gehalten: IFAT China. Am 20.–22.05.2014 in Shanghai, China.

Nelles, M.; Glowacki, R.; Daniel-Gromke, J.; Scholwin, F.; Thrän, D. (10/2014): Energetische Biomassenutzung im Energie- und Bioökonomiesystem der Zukunft. Vortrag gehalten: 46. Kraftwerkstechnisches Kolloquium. Am 15.10.2014 in Dresden.

Nelles, M.; Glowacki, R.; Scholwin, F.; Thrän, D. (06/2014): Bioenergie – überflüssig oder integraler Bestandteil des Energie- und Bioökonomiesystems der Zukunft? Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 19./20.06.2014 in Rostock.

Nelles, M.; Grünes, J.; Rensberg, N.; Schüch, A. (05/2014): Utilization of Organic Waste and residues in Germany. Vortrag gehalten: 5th International Conference on Environmental Technology and Knowledge Transfer (ICET). Am 15./16. Mai 2014 in Hefei, Anhui, China.

Nelles, M.; Liebetrau, J.; Daniel-Gromke, J.; Stinner, W.; Rensberg, N.; Denysenko, V. (05/2014): Perspektiven der Biogaserzeugung und -nutzung in Deutschland – Aktuelle Entwicklungen bei der Erzeugung und Nutzung von Biogas. Vortrag gehalten: 7. Biogas Innovationskongress. Am 22./23.05.2014 in Osnabrück.

Nelles, M.; Liebetrau, J.; Schüch, A. (11/2014): Energiewende in Mecklenburg-Vorpommern: Beitrag der energetischen Verwertung von Abfällen und Biomasse. Vortrag gehalten: 21. Symposium an der FH Stralsund. Nutzung regenerativer Energiequellen und Wasserstofftechnik. Am 6.–8.11.2014 in Stralsund.

Nelles, M.; Naumann, K.; Müller-Langer, F.; Angelova, E.; Kittler, R. (07/2014): Bioenergie im Verkehrssektor – Grundlagen, Technik, Bewertung & künftige Herausforderungen. Vortrag gehalten: Beitrag im Modul „Bioenergie“ im Rahmen des Masterstudiengangs Umweltingenieurwissenschaften an der Agrar- und Umweltwissenschaftlichen Fakultät Rostock. Am 03.07.2014 in Rostock.

Nie, H.; Jacobi, F. H. (04/2014): Monofermentation of chicken manure- longterm laboratory experiences. Vortrag gehalten: BiogasWorld. Am 2.4.2014 in Berlin.

Nitzsche, R.; Budzinski, M.; Gröngröft, A.; Majer, S. (10/2014): Bewertungsansätze bei der Optimierung von Bioraffineriekonzepten. Vortrag gehalten: DBFZ Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ Am 01.10.2014 in Leipzig.

Oehmichen, K.; Majer, S. (01/2014): Nachhaltige Nutzung von Biomasse im Energiebereich. Vortrag gehalten: 7. Fachgespräch – Energieversorgungssysteme der Zukunft. Am 16.01.2014 in Leipzig.

Oehmichen, K.; Majer, S. (03/2014): Energie aus nachwachsenden Rohstoffen – Stand und Perspektiven. Vortrag gehalten: Workshop "Welchen Weg wird Biomasse gehen?". Am 26.03.2014 in Hamburg.

O'Keeffe, S.; Bezama, A.; Thrän, D. (10/2014): RELCA – an approach for assessing future bioeconomy chains on a regional level. Vortrag gehalten: 1st Bioeconomy Congress Baden-Württemberg. Am 30.10.2014 in Stuttgart.

O'Keeffe, S.; Thrän, D.; Priess, J.; Wochele, S. (06/2014): Crop Allocation Model „CRAM“ – An Approach for Dealing with Biomass Supply from Arable Land as Part of a Life Cycle Inventory. Vortrag gehalten: 22nd European Biomass Conference and Exhibition (EUBC&E). Am 25.06.2014 in Hamburg.

Pilz, A.; Weller, N. (07/2014): 2. Stufe der 1. BImSchV– Impulse für die Brennstoffqualifizierung? Vortrag gehalten: 9. Sitzung des Arbeitskreises Holzhackschnitzel. Am 17.7.2014 in München.

Pollex, A. (10/2014): Ausgasungs- und Selbsterwärmungsrisiken bei Pellets – neue Erkenntnisse. Vortrag gehalten: ENplus-Schulung. Am 20.10.2014 in Fulda.

Reinelt, T. (06/2014): Treibhausgasemissionen aus Biomethananlagen – Messergebnisse und Ursachenanalyse. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 22.6.2014 in Rostock.

Reinelt, T.; Westerkamp, T.; Liebetrau, J. (05/2014): Klimarelevante Emissionen aus Biogasanlagen mit Biogasaufbereitung und Einspeisung in das Erdgasnetz. Vortrag gehalten: Emissionsminderung 2014 Stand – Konzepte – Fortschritte. Am 21.5.2014 in Nürnberg.

Rönsch, S.; Dietrich, S. (02/2014): Lastflexibilität von Reaktoren zur Festbettmethanisierung. Vortrag gehalten: Jahrestreffen der ProcessNet Fachgruppe Hochtemperaturtechnik. Am 17. Februar 2014 in Karlsruhe.

Rönsch, S.; Dietrich, S. (05/2014): Festbettmethanisierung – Simulation und Versuche zum last-

flexiblen Verhalten. Vortrag gehalten: TUM-Workshop „SNG als Schlüssel für zukünftige Energiesysteme“. Am 09. Mai 2014 in München.

Rönsch, S.; Dietrich, S. (06/2014): Flexible operation of fixed-bed methanation reactors. Vortrag gehalten: 2nd Nuremberg Workshop „Methanation and Second Generation Fuels“. Am 13. Juni 2014 in Nürnberg.

Scheftelowitz, M. (06/2014): Verwendung von NawaRo in der Biogasproduktion. Vortrag gehalten: Workshop Nutzung von NawaRo im Energie- und Kraftstoffsektor – Fakten und Trends 2013/2014. Am 17.06.2014 in Berlin.

Scheftelowitz, M.; Krautz, A. (06/2014): Auswirkungen der Novellierungsvorschläge für das EEG-2014. Vortrag gehalten: 16. Treffen des Biomethan Kuratoriums, „Biomethanerzeugung und -nutzung in Großstädten – Vorteile und Grenzen“. Am 02.06.2014 in Berlin.

Scheftelowitz, M.; Lauer, M.; Hennig, C. (11/2014): Nach der EEG-Novelle: Welche Optionen und Perspektiven gibt es noch mit Bioenergie? Vortrag gehalten: Fachtagung KWK bei Stadtwerken. Am 19.11.2014 in Gießen.

Schlüter, M.; Klemm, M.; Kiendl, I. (06/2014): Methanation studies with a high pressure fixed bed tube reactor, Effect of nitrogen dilution on the hydrogenation of carbon monoxide. Vortrag gehalten: 2nd TMFB International Conference, Eurogress Aachen. Am 17. Juni 2014 in Aachen.

Schmidt, S. (10/2014): Untersuchung zur flexiblen Strombereitstellung durch eine Brennstoffzelle. Vortrag gehalten: DBFZ Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ Am 2.10.2014 in Leipzig.

Schmidt, T.; Fischer, E. (05/2014): Biogaspotential für Agroindustrielle Reststoffe in Kenia. Vortrag gehalten: GIZ- PEP-Informationsveranstaltung. Am 22.5.2014 in Berlin.

Schmidt-Baum, T. (06/2014): Analysis of the Population of Small-scale Furnaces on the Example of Germany. Vortrag gehalten: 22nd European Biomass Conference and Exhibition (EUBC&E). Am 24.6.2014 in Hamburg.

Schneider, J. (09/2014): Dynamische Simulation von Methanisierung und Dampferzeugung unter Lastwechseln. Vortrag gehalten: Workshop Prozesssimulation in der Energietechnik. Am 10.09.2014 in Leipzig.

Schumacher, B.; Wedwitschka, H.; Friedrich, F.; Wernecke, H. (04/2014): Experience gained with the pre-treatment of fibrous substrates by use of pressure swing conditioning. Vortrag gehalten: Biogas World. Am 2.4.2014 in Berlin.

Schüch, A.; Engler, N.; Nelles, M. (06/2014): Einfluss von Vorbehandlung und anaerober Vergärung auf die Faserzusammensetzung von Reisstroh. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 19.06.2014 in Rostock.

Seidler, A. (10/2014): Zeit- und ortsaufgelöste Spurenstoffanalyse in Feuerungsanlagen für biogene Reststoffe mittels Laser-Massenspektrometrie. Vortrag gehalten: DBFZ Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“ Am 2.10.2014 in Leipzig.

Stinner, W.; Liebetrau, J. (09/2014): Kleine Gülle Biogasanlagen – Wirtschaftsdüngerpotenziale und verfahrenstechnische Konzepte. Vortrag gehalten: Fachtagung: Chancen der Güllevergärung in kleinen Hofbiogasanalgen. Am 25.09.2014 in Oldenburg.

Thiel, C. (03/2014): Emissionsminderung an Klein-Holzfeuerungsanlagen/Sensoren zur Optimierung der Verbrennungsluftregelung. Vortrag gehalten: Energiesparmesse Wels. Am 4.3.2014 in Wels, Österreich.

Thiel, C.; Hartmann I. (03/2014): Emissionsminderung durch integrierte und kombinierte Maßnahmen in Biomasse-Kleinfeuerungen. Vortrag gehalten: 5. Fachgespräch „Partikelabscheider in häuslichen Feuerungen“. Am 26.3.2014 in Leipzig.

Thrän, D. (04/2014): Assessment of the availability of solid crop residues in Germany for energetic uses. Vortrag gehalten: FAO Technical Consultation on Crop and wood residue management for food security: Guiding farmers and managers in a growing bio-economy, FAO Headquarters. Am 14.4.2014 in Rom, Italien.

Thrän, D. (05/2014): National Feedstock Potential & Green Energy Independence. Vortrag gehalten: 2nd aireg International Biofuel Conference 2014. The future of alternative aviation fuels. Am 19.5.2014 in Berlin.

Thrän, D. (05/2014): Effizienz in der Nachhaltigkeitsdebatte, Verschiedene Dimensionen zusammen bringen. Vortrag gehalten: Workshop „Effizienz von Bioenergie“. Am 21.5.2014 in Leipzig.

Thrän, D. (07/2014): Auf dem Weg in die nachhaltige Bioökonomie – Navigationssysteme und Stolpersteine. Vortrag gehalten: Ringvorlesung Bioökonomie Martin-Luther-Universität Halle. Am 08.07.2014 in Halle.

Thrän, D. (09/2014): The German Bioeconomy Council – perspectives on impact, private sector engagement and financing the transition towards the bioeconomy. Vortrag gehalten: Nordische Botschaften – Realizing the Bioeconomy in the Baltic Sea Region – Workshop II. Am 19.9.2014 in Berlin.

Thrän, D. (10/2014): Bioenergieforschung heute und Visionen 2050. Vortrag gehalten: DBFZ Jahrestagung: Vielseitig, sicher, wirtschaftlich, sauber?! Am 1.10.2014 in Leipzig.

Thrän, D. (11/2014): Impulsvortrag zum Thema „Begleitforschung des Spitzenclusters BioÖkonomie“. Vortrag gehalten: Strategieworkshop des Spitzenclusters Bioökonomie im Rahmen der Mitgliederversammlung des BioEconomy e. V. Am 06.11.2014 in Halle.

Thrän, D. (11/2014): Begrenzte Ressource Land. Vortrag gehalten: Jahresempfang UFZ. Am 17.11.2014 in Leipzig.

Thrän, D.; Bienert, K.; Kiel, J.; Carbo, M.; Wolfesberger-Schwabel, U. (09/2014): New results of the SECTOR project: production of solid sustainable energy carriers from biomass by means of torrefaction. Vortrag gehalten: Bioenergy from Forest. Am 16.9.2014 in Helsinki, Finnland.

Thrän, D.; Krautz, A. (04/2014): Flexible Energiebereitstellung, Regelenergie durch EE. Vortrag gehalten: Netzwerk Bioenergie der Deutschen Umwelthilfe e. V.. Am 9.4.2014 in Berlin.

Thrän, D.; Krautz, A.; Schefelowitz, M.; Lenz, V.; Liebetrau, J.; Daniel-Gromke, J.; Zeymer, M.; Nelles, M. (05/2014): Auswirkungen der gegenwärtig diskutierten Novellierungs-Vorschläge für das EEG-2014. Vortrag gehalten: 7. Biogas Innovationskongress. Am 22.–23.05.2014 in Osnabrück.

Thrän, D.; Majer, S. (01/2014): Bioenergie Umwelteffekte und Ökobilanzen. Vortrag gehalten: Ringvorlesung TU Dresden. Am 06.01.2014 in Dresden.

Thrän, D.; Majer, S. (04/2014): Potential von Rest- und Abfallstoffen und Verhinderung von Missbrauch. Vortrag gehalten: Netzwerk Bioenergie der Deutschen Umwelthilfe e. V.. Am 9.4.2014 in Berlin.

Thrän, D.; Pfeiffer, D. (06/2014): Transparency and harmonization amongst evaluation methods. Vortrag gehalten: 22nd European Biomass Conference and Exhibition (EUBC&E). Am 25.6.2014 in Hamburg.

Thrän, D.; Pfeiffer, D. (10/2014): BEST PRACTICE – Erfolgskriterien für eine nachhaltige Energetische Biomassenutzung. Vortrag gehalten: DBFZ Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!“, Side-Event BMWi-Förderprogramm „Energetische Biomassenutzung“. Am 2.10.2014 in Leipzig.

Thrän, D.; Ponitka, J. (03/2014): Die Rolle der Bioenergie in einer zukunftsfähigen Energieversorgung. Vortrag gehalten: 78. DPG-Jahrestagung der DPG Deutsche Physikalische Gesellschaft e. V. Am 17.3.2014 in Berlin.

Thrän, D.; Schock, S.; Witing, F. (04/2014): Ökologische Bewertung der Bioenergie. Vortrag gehalten: 2. Energiepolitischer Workshop: „Bioenergie – Wie viel Energiewende wächst auf Baum und Feld?“. Am 1.4.2014 in München.

Trommler, M.; Daniel-Gromke, J. (03/2014): Biomethan: Ganzheitliche ökonomische Betrachtung entlang der Wertschöpfungskette. Vortrag gehalten: Energieforen, UserGroup Biogas, 6. Arbeitstreffen. Am 6.3.2014 in Leipzig.

Trommler, M.; Denysenko, V. (02/2014): Status quo of Biomethane in Germany – Development, Technology and Costs. Vortrag gehalten: DFBEE, „Biogas in Germany and France: Regulatory Framework, Biomethane Potentials and Challenges“. Am 12.2.2014 in Paris, Frankreich.

Van Dael, M.; Devriendt, N.; Billig, E.; Thrän, D.; Persson, T.; Kranzl, L.; Baldwin, J.; Ponitka, J.; Seiffert, M.; Svensson, M.; Matzenberger, J.; Pelkmans, L. (06/2014): Market Deployment of Biomethane in IEA Member Countries – Focus on Stakeholder Questionnaire. Vortrag gehalten: 22nd European Biomass Conference and Exhibition (EUBC&E). Am 25.6.2014 in Hamburg.

Von Sonntag, J. (04/2014): Stand der Dinge zur ersten Typenprüfung von Anlagen für Brennstoffe nach § 3 Abs. 1 Nr. 8 BImSchV (Kessel für Stroh und Körner). Vortrag gehalten: Seminar Lösungsansätze und Möglichkeiten der Umsetzung von Maßnahmen, die der Luftreinhaltung in Städten dienen. Am 8.4.2014 in Jena.

Von Sonntag, J.; Zeng, T.; Pilz, A.; Lenz, V. (06/2014): Concept and Implementation of Test Fuels for the Very First Non-Woody Biomass Boiler Type Tests According to 1st Bimschv in Germany. Vortrag gehalten: 22nd European

Biomass Conference (EUBC&E). Am 25.6.2014 in Hamburg.
Weinrich, S.; Nelles, M. (03/2014): Praxisnahe Modellierung von Biogasanlagen. Vortrag gehalten: Fachtagung Prozessmesstechnik an Biogasanlagen. Am 26.3.2014 in Leipzig.
Weinrich, S.; Pröter, J.; Liebetrau, J. (01/2014): Massenbilanzierung von Biogasanlagen: Möglichkeiten und Herausforderungen zur Effizienzbewertung von Biogasanlagen. Vortrag gehalten: Workshop Qualitätsbewertung der Gärstrecke. Am 23.1.2014 in Kassel.
Weinrich, S.; Weißbach, F.; Pröter, J.; Liebetrau, J.; Nelles, M. (06/2014): Massenbilanzierung von Biogasanlagen – Möglichkeiten und Herausforderungen zur Effizienzbewertung von Biogasanlagen. Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 19./20.06.2014 in Rostock.
Weißbach, G.; Schüch, A.; Engler, N.; Müller, H.; Nelles, M. (06/2014): Pretreatment of rice straw by microwave-inducted catalytic wet oxidation. Vortrag gehalten: 22nd European Biomass Conference and Exhibition. Am 23.–26 Juni 2014 in Hamburg.
Weller, N.; Leistner, D. (06/2014): Treatment and characterization of torrefied biomass for Co-Combustion in power plants. Vortrag gehalten: 22nd European Biomass Conference (EUBC&E). Am 25.6.2014 in Hamburg.
Westerkamp, T. (09/2014): Scientific measurements of methane emissions with remote and on-site methods in comparison. Vortrag gehalten: 2nd IBBA-Workshop „Methane emissions". Am 4.9.2014 in Kiel.
Wirkner, R. (10/2014): Inwertsetzung schadstoffbelasteter Standorte mittels schnellwachsender Energiehölzer. Vortrag gehalten: 14. BBE-Fachkongress für Holzenergie. Am 10.10.2014 in Augsburg.
Wirkner, R.; Adler, P.; Brosowski, A. (04/2014): Potenzialanalysen, Methodik, Anwendung und Folgerungen. Vortrag gehalten: Energetische Holznutzung. Am 7.4.2014 in Dresden.
Witt, J. (10/2014): Macro Perspective: Challenges in the Energy Sector using the example of Torrefied Fuels. Vortrag gehalten: 2nd European Conference on Chemical Fuels & Clean Coal Technologies. Am 6.10.2014 in Berlin.
Witt, J.; Bienert, K.; Carbo, M.; Kiel, J.; Wolfesberger-Schwabel, U.; Thrän, D. (05/2014): Possibilities of Torrefied Biomass Co-gasification and Co-firing. Vortrag gehalten: DGMK-Fachbereichstagung Konversion von Biomassen. Am 13.5.2014 in Rotenburg an der Fulda.
Witt, J.; Peetz, D.; Ristola, M. (11/2014): Normen und Märkte für biogene Festbrennstoffe. Vortrag gehalten: Leipziger Fachgespräch Feste Biomasse „Biomasse-Kompaktierung zur energetischen Nutzung". Am 05.11.2014 in Leipzig.
Witt, J.; Weller, N.; Bienert, K.; Khalsa, J. (10/2014): Thermisch modifizierte Festbrennstoffe im Überblick. Vortrag gehalten: DBFZ-Jahrestagung „Bioenergie. Vielseitig, sicher, wirtschaftlich, sauber?!" Am 02.10.2014 in Leipzig.
Wittus, N.; Hartmann, I.; Werner, F.; Ulbricht, T.; Günther, S.; Butt, S.; Bindig, R.; Eisinger, K.; König, M.; Matthes, M.; Enke, D.; Dvoracek, D. (11/2014): Collaborative Stove Design Workshop 2014 Stove: NEKO (Team Wittus). Vortrag gehalten: The Collaborative Stove Design Workshop at Brookhaven National Laboratory in Upton. Am 07.11.2014 in Town of Brookhaven, USA.
Xu, A.; Nelles, M. (05/2014): Mecklenburg-Vorpommern goes to Anhui – The Safe Disposal of Sewage Sludge in Germany. Vortrag gehalten: 5th International Conference on Environmental Technology and Knowledge Transfer (ICET). Am 15./16.05.2014 in Hefei, Anhui, China.
Zech, K.; Meisel, K.; Brosowski, A.; v. Toft, L. (09/2014): Environmental and Economic Assessment of a Lignocellulose-Based Bioethanol Plant with Inbicon-Technology. Vortrag gehalten: 4th ICLE. Am 25.09.2014 in Landshut.
Zech, K.; Meisel, K.; Brosowski, A. (01/2014): Environmental and economic assessment. 4th Central European Biomass Conference, Am 17.01.2014 in Graz, Österreich.
Zeymer, M. (01/2014): Technical, economic and environmental evaluation of small scale biomass gasifiers. Vortrag gehalten: 4. Mitteleuropäische Biomassekonferenz. Am 18.1.2014 in Graz, Österreich.
Zeymer, M. (09/2014): Technik, Betrieb und Wirtschaftlichkeit von Holzvergasungsanlagen in der Praxis. Vortrag gehalten: 13. Holzenergie-Symposium: Entwicklungen für Wärme, Kraft und Fernwärme aus Holz. Am 12.9.2014 in Zürich, Schweiz.
Zeymer, M.; Herrmann, A.; Oehmichen, K. (01/2014): Technisch-ökonomisch-ökologische Bewertung von kleintechnischen Biomassevergasern. Vortrag gehalten: 4. Mitteleuropäische Biomassekonferenz. Am 16.1.2014 in Graz, Österreich.
Ziegler, D.; Witt, J.; Bienert, K.; Schaubach, K. (06/2014): Torrefizierte Bioenergieträger: Auch für Deutschland interessant? Vortrag gehalten: 8. Rostocker Bioenergieforum. Am 19.6.2014 in Rostock.

Projects (selection)

The language of the title reflects the language of the project

Federal Ministry of Food and Agriculture (BMEL)

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., 01.06.2013–30.11.2015 (FKZ: 22408812)

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)

Biomassepotenziale und deren Nutzung unter besonderer Berücksichtigung der Rest- und Abfallstoffe – Status quo in Deutschland (BioPOT), Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V. (FNR), 01.10.2014–28.02.2015 (FKZ: 22020114)

Diesel Kat Aging II – 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)

Effizienz von Förderstrategien, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 01.01.2012–15.10.2014

Einfluss der landwirtschaftlichen Biogaserzeugung auf die Qualität von Gärresten: Bewertung des Einflusses des Biogasprozesses auf die Inaktivierung von Erregern von Bestandserkrankungen (BIOGAS-SANITATION), Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/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, Landwirtschaft und Verbraucherschutz/Bundesanstalt für Landwirtschaft und Ernährung, 01.10.2013–30.09.2016 (FKZ: 2815600211)

Emissionsminderung durch Spurenelemente in Abfallanlagen, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Projektträger Jülich, 01.09.2011–30.06.2014 (FKZ: 03KB063A)

Emissionsminderungen durch integrierte Maßnahmen in Biomasse-Kleinfeuerungen, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Projektträger Jülich, 01.01.2011–31.03.2014 (FKZ: 03KB051A)

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 von Handreichungen zur Überprüfung von THG-Bilanzen von Biokraftstoffen (Handout), Fachagentur Nachwachsende Rohstoffe e. V. (FNR), 01.12.2014–30.09.2015 (FKZ: 22031014)

Entwicklung und Validierung neuer Online-Messmethoden zur Bewertung und Optimierung der anaeroben Fermentation in Biogasanlagen; Teilvorhaben 2, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V., 15.03.2013–15.09.2015 (FKZ: 22002213)

Entwicklung von wissenschaftlichen Ansätzen zur Bewertung der Effizienz von Biogasaufbereitungs – und –einspeiseanlagen, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 01.01.2012–15.10.2014

Grundlagen und Voraussetzungen für die Integration von Biomasse ins Energiesystem, Bundes-

ministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 01.01.2012–15.10.2014

Harmonisierung und methodische Weiterentwicklung der Bioenergiedatenbasis, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 01.01.2012–15.10.2014

Innovatives bedarfsangepasstes Kommunal-Energieträger-Konzept, Projektträger Jülich/Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 15.09.2013–16.03.2015 (FKZ: 03KB088D)

Klein aber effizient – Kosten- und energieeffiziente Biomethanproduktion (ERANET Bioenergy – SE.Biomethan), Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V., 01.02.2013–31.01.2016 (FKZ: 22028412)

Klimaeffekte einer Biomethanwirtschaft, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V., 01.03.2011–31.08.2014 (FKZ: 22009310)

Lignobiofuel – Entwicklung eines Verfahrens zur Herstellung von stofflich und energetisch nutzbaren Bioagglomeraten auf der Basis von Lignin, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Projektträger Jülich, 01.07.2011–28.02.2014 (FKZ: 03KB058B)

MONA: Monitoring des Biomethanproduktionsprozesses, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V., 01.05.2011–30.04.2015 (FKZ: 22003511)

Nachhaltigkeit der Biomassepotenziale, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 01.01.2012–15.10.2014

Optimierungspotenziale von Biokraftstoffanlagen, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V., 01.07.2012–30.09.2014 (FKZ: 22403111)

Potenziale zur Steigerung der Leistungsfähigkeit von Biogasanlagen – Energetische Effizienz von Repoweringmaßnahmen, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V., 01.01.2014–31.12.2015 (FKZ: 22400912)

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, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V., 01.03.2013–29.02.2016 (FKZ: 22020412)

ToxOAb – Optimierung der Feinstaubminderung von Abscheidern für Biomassefeuerungen unter Berücksichtigung der toxikologischen Relevanz mittels mikrobieller Testsysteme, Projektträger Jülich/Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 01.09.2013–31.08.2016 (FKZ: 03KB090A)

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)

Überwachung von Biogasanlagen mittels der Analyse von Verhältnissen stabiler Isotope, Bundesministerium für Ernährung und Landwirtschaft/Fachagentur Nachwachsende Rohstoffe e. V., 01.09.2014–31.08.2017 (FKZ: 22013113)

Verbundvorhaben: Untersuchungen und Bewertungen zum Einsatz von Enzymen in Biogasanlagen auf deren Wirksamkeit und deren Wirkungsweise sowie zur Veränderung des Verfahrensablaufs im Labor-, Technikum- und Praxisanlagen-Maßstab, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz/Fachagentur Nachwachsende Rohstoffe e. V., 01.10.2010–31.03.2014 (FKZ: 22027808)

Voraussetzungen und Konzepte für innovative Festbrennstoffe, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 01.01.2012–15.10.2014

Wissens- und Technologietransfer im Bioenergiesektor und Entwicklung und Begleitung konkreter Forschungsvorhaben – Schwerpunkt 1: Osteuropa, Russland, Asien; Schwerpunkt 2: Lateinamerika, Afrika, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 01.01.2012–15.10.2014

Federal Ministry of Education and Research (BMBF)

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)

Kooperation zur Aufnahme und Evaluierung von Primärdaten zu pflanzenölbasierten Bioraffinerien in Chile sowie Austausch zu erfolgversprechenden Technologien, Bundesministerium für Bildung und Forschung/DLR, 01.09.2012–31.08.2014 (FKZ: 01DN12105)

Mobilität Biogas Mexiko, Bundesministerium für Bildung und Forschung/DLR, 01.01.2012–31.08.2014 (FKZ: 01DN12063)

REMISBIO: Maßnahmen zur Reduzierung von Emissionen von Biogasanlagen – Katalysatortest, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.01.2011–31.12.2014 (FKZ: 03KB052A)

SoMaRu Marketingmaßnahmen für das Forschungsnetzwerk SOJUS Bioenergie Russland, DLR-IB/Bundesministerium für Bildung und Forschung, 01.04.2012–31.05.2014 (FKZ: 01DJ12078B)

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

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)

stadt PARTHE land, 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, 01.06.2014–31.05.2015 (FKZ: 01DS14010A)

Verbundvorhaben „ZERO-WASTE – Die Stadt der Zukunft – Eine bedarfsangepasste ZERO-WASTE-Bioraffinerie“ Teilvorhaben 4 „Deutsches Biomasseforschungszentrum“, Bundesministerium für Bildung und Forschung/Projektträger Jülich, 01.01.2009–30.06.2014 (FKZ: 03SF0345D)

Verbundvorhaben FEBio@H_2O 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)

Flottenaufbau mit Multiplikatoren und wissenschaftlicher Begleitung – Multi-Flottenaufbau, VDI/VDE-IT, 01.12.2012– 30.11.2015

Rahmenvertrag zur wissenschaftlichen Begleitung, Unterstützung und Beratung des BMVBS in den Bereichen Verkehr und Mobilität mit besonderem Fokus auf Kraftstoffen und Antriebstechnologien sowie Energie und Klima, DLR/Bundesministerium für Verkehr und digitale Infrastruktur, 01.04.2012–31.12.2014

Federal Ministry for Economic Affairs and Energy (BMWi)/Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Abgestimmte Effizienzsteigerung und Emissionsminderung der Feststofffermentation mit nachfolgender Kompostierung (FermKomp), Projektträger Jülich/Bundesministerium für Wirtschaft und Energie, 01.10.2014–30.09.2017 (FKZ: 03KB100A)

Abscheider-Monitoring für Holzkessel kleiner Leistung mit Hersteller-Hersteller-Begleitkreis, Projektträger Jülich/Bundesministerium für Wirtschaft und Energie, 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, Projektträger Jülich/Bundesministerium für Wirtschaft und Energie, 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, Projektträger Jülich/Bundesministerium für Wirtschaft und Energie, 01.09.2014–31.08.2017 (FKZ: 03KB099D)

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

Emissionsarmer Scheitholzvergaserkessel mit integriertem Katalysator und optimierter Verbrennungsregelung, Bundesministerium für Wirtschaft und Energie/AiF, 01.01.2013–30.06.2015

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, 01.07.2013–31.12.2015

Entwicklung eines Verfahrens zur Vergasung von asche- und chlorhaltiger Biomasse am Beispiel Stroh, Projektträger Jülich/Bundesministerium für Wirtschaft und Energie, 01.08.2013–31.03.2016 (FKZ: 03KB085B)

FlexiTorr – Flexibilisierung der Energiebereitstellung in Bioenergiekleinanlagen durch den Einsatz torrefizierter Brennstoffe, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.09.2013–31.08.2015 (FKZ: 03KB091A)

Integrierte Verwertungsanlage und Strategie für kommunale Biomasse „HTC Hallesche Wasser- und Stadtwirtschaft“, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.12.2010–31.12.2014 (FKZ: 03KB049A)

KoSePo – Kostensenkungspotenziale von Biogasanlagen im bestehenden EEG, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.11.2013–14.10.2016 (FKZ: 03KB091A)

ManBio – Entwicklung von technischen Maßnahmen zur Verbesserung des Gasmanagements von Biogasanlagen, Projektträger Jülich/Bundesministerium für Wirtschaft und Energie, 01.09.2014–28.02.2017 (FKZ: 03KB094A)

Meilensteine 2030 – Elemente und Meilensteine für die Entwicklung einer tragfähigen nachhaltigen Bioenergiestrategie, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.01.2012–30.11.2014 (FKZ: 03MAP230)

Meilensteine 2030 – Elemente und Meilensteine für die Entwicklung einer tragfähigen nachhaltigen Bioenergiestrategie (Detailstudie), Bundesministerium für Wirtschaft und Energie/ Projektträger Jülich, 01.08.2012–30.11.2014 (FKZ: 03KB065A)

OptFlex Biogas – Ermittlung eines technisch-ökonomisch optimierten Betriebs von flexiblen Biogasanlagen, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.09.2012–31.03.2015 (FKZ: 03LB073A)

Perspektiven der Biogaseinspeisung und instrumentelle Weiterentwicklung des Förderrahmens, Universität Rostock, Verbundvorhaben im Auftrag des Bundesministeriums für Wirtschaft und Energie (BMWi), 01.09.2013–28.02.2015

Potenziale alternativer Kraftstoffe im operationellen Betrieb (burnFAIR), Bundesministerium für Wirtschaft und Energie, Lufthansa, 01.09.2010–01.01.2014

Programmbegleitung für das Förderprogramm zur Optimierung der energetischen Biomassenutzung, Projektträger Jülich/Bundesministerium für Wirtschaft und Energie, 01.01.2014–31.12.2015 (FKZ: 03KB001A)

RegioBalance – Bioenergie-Flexibilisierung als regionale Ausgleichsoption im deutschen Stromnetz, Projektträger Jülich/Bundesministerium für Wirtschaft und Energie (BMWi), 01.08.2013–31.07.2015 (FKZ: 03KB087A)

TORBIMA: Torrefizierung – ein Verfahren zur Homogenisierung schwieriger Biomassen für eine energetische Nutzung, Bundesministerium für Wirtschaft und Energie/Projektträger Jülich, 01.07.2011–31.03.2014 (FKZ: 03KB057B)

Wissenschaftliche Vorbereitung und Begleitung der EEG-Monitoringberichte und des EEG-Erfahrungsberichts für die Stromerzeugung aus Biomasse (Vorhaben II a Biomasse), Bundesministerium für Wirtschaft und Energie (BMWi)/ Projektträger Jülich, 01.06.2012–30.06.2015

EU projects

BioEcoMatic – Construction of small-to-medium capacity boilers for clean an efficient combustion of biomass for heating, KIC Inno Energy, EU-Projekt, 01.04.2012–31.12.2015

BioMaxEff – Cost efficient biomass boiler system with maximum annual efficiency and lowest emissions, EU-Projekt, 15.04.2011–14.10.2014 (FKZ: GA 268217)

BioORC – Construction of cogeneration system with small to medium size biomass boilers, KIC InnoEnergy EU-Projekt, 05.05.2014–30.12.2015 (FKZ: 13_2014_IP92_BioOrc)

Framework contract for the provision of Renewable Energy Potential Data Sets for the JRC-EU-TIMES model 2013/S 150-260084, EU JRC Institute for Energy and Transport, 01.01.2014–31.12.2014 (FKZ: 2013/S 150-260084)

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

KACELLE – Demonstrating Industrial Scale Second Generation Bioethanol Production – KAlundborg CELLulosic Ethanol plant, EU-Projekt, 01.08.2009–31.01.2014 (FKZ: GA 239379)

SafePellets – Safety and quality assurance measures along the pellets supply chain, EU-Projekt, 01.01.2011–31.01.2014

SECTOR – Production of Solid Sustainable Energy Carriers from Biomass by Means of Torrefaction, EU-Projekt, 31.12.2011–30.06.2015 (FKZ: GA 282826)

SolidStandards – Entwicklung und Durchführung von Trainings bezüglich der neuen EU-Normen für biogene Festbrennstoffe, EU-Projekt, 01.04.2011–30.04.2014 (FKZ: IEE/10/218/ SI2.591097)

Services/Contract research

Begutachtung von Biowärme aus Mitverbrennung von Biomasse in konventionellen Heizkraftwerken, Vattenfall Europe Wärme AG, 01.01.2014–31.08.2019

Beratung zur Vorbereitung einer Forschungs- und Ausbildungsbiogasanlage in Concordia/Brasilien, GIZ GmbH, 15.01.2014–28.02.2014

Bewertung der Treibhausgasemission aus der offenen Gärrestelagerung der Abfallvergärungsanlage Gröden, Schradenbiogas GmbH & Co. KG, 01.03.2014–31.08.2014

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, 01.02.2014–31.10.2014 (FKZ: GERG 1.73)

Construction of cogeneration system with small to medium size biomass boilers, KIC InnoEnergy, 01.04.2014–31.03.2017 (FKZ: 13_2014_ IP92_BioOrc)

Detailstudie zu ausgewählten energetischen Klärschlammnutzungsverfahren für den Standort Klärwerk Rosenthal, KWL, 01.09.2012–31.03.2014

Dienstleistungen zur Unterstützung der Weiterentwicklung von Systemen zur Abgaswärmenutzung und Abgasnachbehandlung, UfE GmbH, 01.06.2013–30.06.2014

Einfluss der Forschungsthemen Holzvergasung und Holzverbrennung auf die Energiewende in der Schweiz – eine gutachterliche Kurzstudie, Paul Scherrer Institut, 19.05.2014–30.09.2014

Energie- und Treibhausgasbilanz von hydrierten Pflanzenölen – eine vergleichende Analyse, VDB Verband der Deutschen Biokraftstoffindustrie e. V., 08.01.2014–31.03.2014

Energetische Nutzung von Biogas für das DKTI-Vorhaben „Förderung klimafreundlicher Biogastechnologien in Brasilien“ – Technologieprospetion, GIZ GmbH, 08.10.2013–31.12.2014

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 Biomasseaufschluss, Vattenfall Europe New Energy GmbH, 01.11.2012–30.06.2015

Entwicklung eines Verfahrens zur Abscheidung von Polymeren in Altspeiseölen- und -fetten durch Sedimentation, gbf german biofuels GmbH, 01.09.2014–28.02.2015

Erneuerbare Energien: Optimierung der Nutzung von Biomasse in der VR China, GIZ GmbH, 30.07.2014–15.11.2014

Erstellung einer Benchmarking-Betrachtung: „Sorghum vs. Maissilage zur Erzeugung und Bereitstellung von Biomethan“, KWS Saat AG, 01.12.2012–30.11.2015

Evaluierung und Untersetzung der relevanten Regelungen zu Naturschutzanliegen bei der Stromerzeugung aus Biomasse im aktuell verabschiedeten Erneuerbare-Energien-Gesetz, Bundesamt für Naturschutz (BfN), 01.11.2012–31.10.2014

Fortschreibung der Daten zur Stromerzeugung aus Biomasse, ZSW, 01.02.2010–01.01.2015
Förderung klimafreundlicher Biogastechnologien in Brasilien, GIZ GmbH, 19.07.2013–31.12.2014
Gutachten Biowärme- u. Biostrombereitstellung 2010–2014, Vattenfall Europe Wärme AG, 01.11.2009–31.12.2014
Herstellung und Analyse von Halmgutpellets, Universität Greifswald, 12.03.2014–15.11.2014
Innovationskoordinator Bioenergie, Leipziger Stiftung, 01.11.2010–31.10.2014
iNOPA Biogas from waste substrates of Brazilian bioethanol industry, Universität Rostock, 01.01.2014–28.02.2015
Kleine Feuerungsanlagen für feste Brennstoffe – Ermittlung des Standes der Technik, Umweltbundesamt (UBA), 01.07.2012–31.03.2014
Leistungsfähigkeit von Biogasanlagen im Energiemix der Zukunft am konkreten Beispiel Honigsee, EKSH/BGA Honigsee, 01.07.2012–30.11.2014
Literaturstudie Biomassepotenziale, GIZ GmbH, 06.10.2014–16.01.2015
Machbarkeitsstudie zum Aufbau eines Chinesisch-Deutschen Biogasforschungs- und Entwicklungszentrums in China, GIZ GmbH, 10.08.2013–30.06.2014
Nachhaltige Bioökonomie, Helmholtz-Zentrum für Umweltforschung – UFZ, 01.12.2011–30.11.2015
Prognose zur Stromerzeugung aus Biomasse, Zentrum für Sonnenenergie- und Wasserstoff-Forschung (ZSW), 01.09.2013–15.09.2015
Rahmenvertrag zu Untersuchungen in BGA Westewitz, BGA Westewitz, 01.08.2012–31.12.2014
Tests und Bewertung zur Hydrothermalen Carbonisierung von Abfällen der Lebensmittelindustrie, Fraunhofer Chile Research, 01.07.2014–31.12.2014
THG-Bilanzierung eines Verfahrens zur Aufbereitung halmgutartiger Biomasse, florafuel AG, 31.01.2013–31.03.2014
Verbrennbarkeit von HTC-Kohle aus Klärschlamm, AVA-CO_2 Schweiz AG, 01.03.2013–31.03.2014
Verbrennbarkeit von HTC-Kohle aus Mono-Biomasse, AVA-CO_2 Schweiz AG, 01.03.2013–31.03.2014
Untersuchung zu Einflussfaktoren auf die Kalibrierung eines NIRS-Systems, m-u-t AG, 01.04.2011–31.08.2014
Zuarbeit zur Errichtung eines Abfallwirtschaftszentrums in Jundiai, Universität Braunschweig, Leichtweiß-Institut, 01.07.2014–15.03.2015
Zuarbeiten zum Europäischen Verbundprojekt EN-PME-TEST, Technologie- und Förderzentrum (TFZ), 01.05.2012–30.09.2014

Other funding bodies (donations, foundations, country)

Automatisierte Leistungssicherung in einem Netz tausend dezentraler Energieerzeuger mit Hilfe eines IKT-Cockpitansatzes basierend auf dem Konzept des Lieferkettenmanagements, Sächsische Aufbaubank (SAB), 01.08.2012–31.10.2014 (FKZ: 100127660)
Bedarfsgenaue Regelung von Energie aus Biomasse, Sächsische Aufbaubank (SAB), 01.01.2013–30.11.2014 (FKZ: 100143221)
Biogaskonferenz „Small Scale Biogas Produktion“ in Podlassien, Bundesverwaltungsamt (Auswärtiges Amt), 01.11.2014–31.12.2014 (FKZ: 2514AA0641)
Biomethane Trade, IEA Bioenergy Task 40, 01.05.2013–31.09.2014
Entwicklung eines katalytisch-adsoptiven Heißentteerungssystems zur Behandlung biomassestämmiger Synthesegase – KatASyn, Sächsische Aufbaubank (SAB), 18.03.2012–30.11.2014 (FKZ: 100100178)
Gemeinsame Versuche und wissenschaftlicher Austausch zur Methodenentwicklung und darauf aufbauende Veröffentlichung (Percolation Contract Canada), Alberta Innovates, 01.01.2013–16.01.2014
Konzeptentwicklung zur marktnahen Produktion von Synthetic Natural Gas – SNGPro, Sächsische Aufbaubank (SAB), 01.07.2012–30.09.2014 (FKZ: 100116093)
Nachrüstung zum katalytischen Abbau von gasförmigen organischen Emissionen aus Kaminöfen, Deutsche Bundesstiftung Umwelt (DBU), 01.08.2013–31.01.2015 (FKZ: 31032)
Untersuchung innovativer Ansätze zur Minderung der Schadstoffemissionen von Kaminöfen durch katalytisch wirksame Baugruppen – Hauptphase „NEKO – Neuartiger emissionsarmer Kaminofen“, Deutsche Bundesstiftung Umwelt (DBU)/Specht, 18.03.2013–18.03.2015

Fig. 64 A German-Polish press delegation visiting the DBFZ (October 14, 2014)

DBFZ in the press (selection)

Bioenergie mit Blick auf das Jahr 2050, Biogas Journal, Januar 2014
„Das EEG deckelt bereits Einsatz von Mais“, Agrarzeitung, Januar 2014
DBFZ: Berechnungsmethode und Standardwerte der Treibhausgas-Bilanzierung von Biokraftstoffen aus Reststoffen überprüfen, www.ufop.de, Januar 2014
Schwermetalle aus Klärschlamm entfernen, www.process.vogel.de, Januar 2014
Neues aus der Forschung: Wärme aus Biomasse soll sauberer werden, www.iwr.de, Februar 2014
UFOP study: Rapeseed biodiesel dominates German winter mix, Biodiesel Magazine, Februar 2014
DBFZ veröffentlicht Hintergrundpapier zu EEG-Novellierung, Joule, März 2014
Im Profil: Deutsches Biomasseforschungszentrum, gwf, März 2014
Katalysatorentest an Bioenergieanlagen, Umwelt-Magazin, März 2014
Biogas soll russisches Erdgas ersetzen, www.e21.info, April 2014
DBFZ entwickelt Datensätze zu Biomassepotenzialen, Holz-Zentralblatt, April 2014
Forscher beschleunigen Alterungsprozess von Katalysatoren, www.springerprofessional.de, April 2014
Ignoriert die Regierung eigene Experten?, Neue Energie, April 2014
DBFZ: Flexible Strombereitstellung mit dezentralen Energieerzeugern, www.ee-news.ch, Mai 2014
FNR: Biomasse zur bedarfsgerechten Stromerzeugung, www.ee-news.ch, Mai 2014
Versuchsfeld für dezentrale Erzeugung, energy2.0week, Mai 2014
Wie man Wasserstoff aus Biomasse gewinnt, www.springerprofessional.de, Mai 2014
Der stoppelige Weg der Strohenergie, Neue Energie, Juni 2014
Energie-Lieferketten unter der Lupe, Solarthemen, Juni 2014
Bioethanol aus Stroh?, www.agaraheute.com, Juli 2014
Bioethanolproduktion aus Stroh bereit für industriellen Maßstab, EUWID Neue Energien, Juli 2014
DBFZ: Weiterentwickelter „Twinfire“-Ofen bei US-Wettbewerb, www.ee-news.ch, Juli 2014
Flexibilisierung vor Neubau, E&M, Juli 2014
Innovation Bioökonomie, regjo, Juli 2014
Kohle sparen mit Holz, pellets, Juli 2014

Kraftstoff aus Stroh, Green Radio, Juli 2014
Marktreife Bioraffinerie-Anlage: Alkohol aus Reststoffen, www.biotechnologie.de, Juli 2014
Monitoring-Bericht: Biomethan-BHKW erzeugen im Jahr 2013 rund 1,5 TWh Strom, EUWID, Juli 2014
Monitoring-Bericht: Bremsspuren bei Bioenergie, www.stadt-und-werk.de, Juli 2014
Organische Abfälle nutzen, Holz-Zentralblatt, Juli 2014
Stoffliche und energetische Verwertung von biogenen Abfällen und Reststoffen als integraler Bestandteil des künftigen Energiesystems und der biobasierten Wirtschaft, Müll und Abfall, Juli 2014
Biomasseforschungszentrum arbeitet an neuer Technik für Kaminöfen, www.freiepresse.de, August 2014
Jetzt kommt der Katalysator für den Kaminofen, www.morgenpost.de, August 2014
Leipziger Forschungsinstitut entwickelt neue Technik für Kaminöfen, www.sz-online.de, August 2014
„Biomethan braucht klare Rahmenbedingungen für Wachstum“, www.process.vogel.de, September 2014
Deutschland und Schweden führen bei Biomethan, www.stefanschroeter.com, September 2014
Forscher ermitteln CO_2-Einsparpotenzial von Biokerosin, www.process.vogel.de, September 2014
Abfälle und Reststoffe können noch viel Bioenergie liefern, www.stefanschroeter.com, Oktober 2014
Baustart für Technikum erst 2015, LVZ, Oktober 2014
Biogas aus Wasserpflanzen, www.energiezukunft.eu, Oktober 2014
Der Zukunft gewachsen, www.welt.de, Oktober 2014
Flexibel mit Holz, E&M, Oktober 2014
Katalysator gegen die Schadstoffe der Biomassefeuerung, www.stefanschroeter.com, Oktober 2014
Mit Natur hat der deutsche Wald nichts zu tun, www.morgenpost.de, Oktober 2014
Biodiesel und Biogas aus Deutschland bleiben gefragt, www.topagrar.com, November 2014
Biomethan – Stand und Perspektiven, gwf, November 2014
Der Wald als Rohstofflieferant, www.faz.net, November 2014
Eckpunkte einer tragfähigen Bioenergiestrategie, www.process.vogel.de, November 2014
Meilensteine 2030: Bioenergie aus der Landwirtschaft bleibt wichtig, www.iwr.de, November 2014
Schwierige Umwandlung von Grünschnitt zu Biokohle, www.stefanschroeter.com, November 2014
Erste Ausgründung am DBFZ: emissionsarme Feuerungsanlagen, Transferbrief Leipzig, Dezember 2014
Wankelmotor zur Reichweitenverlängerung, BWK, Dezember 2014,
Abschied vom Holz, Erneuerbare Energien, Dezember 2014

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