ENERGY FROM BIOMASS

Bioenergy competence
in education, research and business

Foto: iStockphoto.com/AndreasReh

Great hopes are pinned on the use of biomass when it comes to a shift toward renewable energies. At the Technopol Wieselburg, there has been a concentration of expertise on the subject, which has international appeal. Research, education and business activities act together to respond to the current and future challenges of energy supply.

TECHNOPOL Wieselburg

BIOMASS AND ITS LIFE CYCLE

Competencies at the Technopol Wieselburg

Given climate change and depletion of fossil fuels, agriculture and forestry products are gaining great importance in the shifts in energy and raw material supply. In general, a cascading use is preferred: High quality products are used for food and feed production or are used materially. By-products, residues and organic waste are available for energy uses.

All these raw materials must be harvested, collected and made available. For transport and storage, specially customised logistics solutions are required. Through appropriate treatment or chemical conversion processes, solid, liquid and gaseous fuels are produced, which are used in heating systems, heating plants, thermal power stations and motor vehicles. For best use and distribution of the energy obtained in this manner, energy systems are used that must be optimally designed and regulated.

Over the decades, a high level of expertise has been developed in these fields of technology at the Wieselburg site. The core of this development is the teaching and research centre, Francisco-Josephinum and its subsidiary facility, BLT. BLT's expertise in the field of biogenic fuels was introduced in the K-plus competence centre at the Austria Bioenergy Centre. Since 2008, its successor in the context of the FFG Comet Programme has been the K1 Centre Bioenergy 2020+, which received an extension of its contract for another eight years in July 2014.

At the site and in the region, together with EEC, Ökofen and Ortner, other companies are also located, which benefit from this expertise.

At the Francisco-Josephinum and at the Wieselburg Campus of the University of Applied Sciences (FH) Wiener Neustadt, there are also training opportunities offered, in which the energy use of biomass is the focus. ■

www: www.josephinum.at/blt.html

INFO

Energy use of biomass

Harvesting and collecting organic raw and residue materials

▼

Treatment and conversion to fuels (solid, liquid, gaseous)

▼

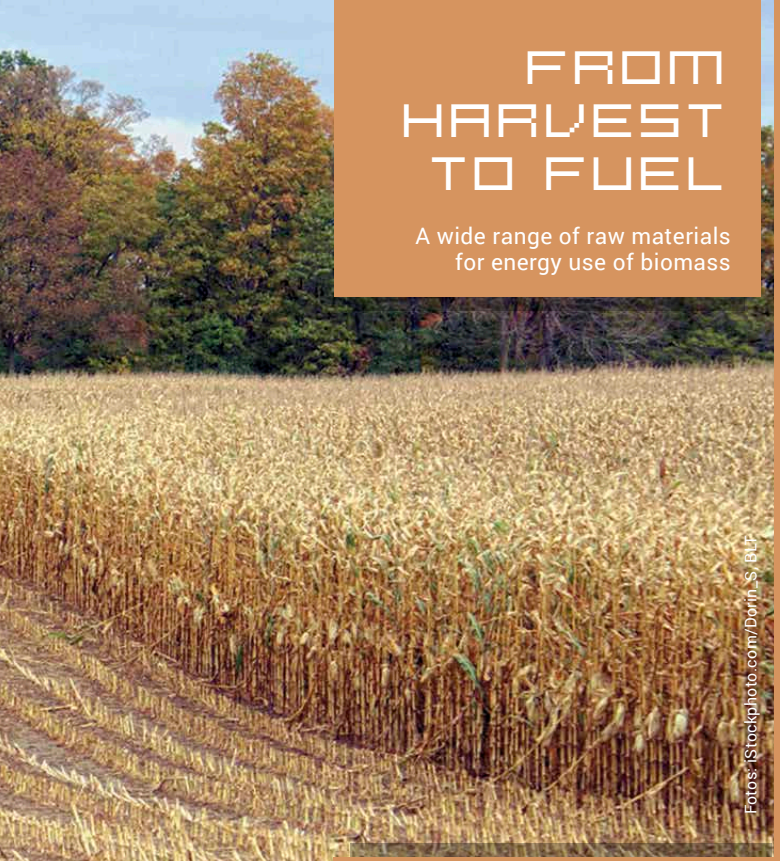
Incineration

▼

Distribution and use of power and heat

FROM HARVEST TO FUEL

A wide range of raw materials for energy use of biomass



Fotos: iStockphoto.com/Dorin_S, BLT

For the energy use of biomass, there is a wide range of raw materials available. There is a great potential in this regard in particular with special energy plants and fast-growing trees and shrubs, in addition to crop residues from agriculture and forestry, organic by-products such as manure or sawmill residues or biomass-containing waste. All these raw materials must be harvested, collected and made available. They are also often treated to produce pellets for thermal use.

BLT has one of its research priorities set on the field of primary production, harvesting and treatment of fixed biomass. Current projects are focused on growing and harvesting the energy crop miscanthus, using corn cobs as fuel and with short rotation areas, in which fast-growing woody plants are used in a targeted manner.

Furthermore, the further development of agricultural machinery technology on the basis of agromechatronic systems is one of BLT's core competencies. The lessons learned here to minimise wear and reduce power requirements also benefit crop harvesting for energy recovery.

The finished fuel is at the centre of BLT's activities in regards to standardisation and testing. Experts at the facility are represented in multiple national and international standardisation committees. Biogenic fuels are tested, evaluated and analysed. Using an isotope analysis, proof of origin of biomass can be performed.

The competence centre Bioenergy 2020+ is dedicated to the full range of energy use of biomass. At the Wieselburg site, provision of raw materials, fuel design and fuel production are, among other things, the focus. Current priorities for research include the safety of storage of wood pellets in terms of self-heating and CO release or the evaluation of ash-melting behaviour. ■

"For the optimum utilisation of resources, agricultural background knowledge must be anchored in original production".

DI Heinrich Prankl, Head of Research BLT

FIRE UNDER CONTROL

The process of combustion as the centre of energy use

The aim of every energy use of biomass – whether for the production of space heating, to produce electricity or to power motor vehicles – is their combustion. The control of the combustion process and the design of corresponding devices are therefore of central importance.

At the Wieselburg site of the competence centre Bioenergy 2020+, work is being carried out in research on the combustion technology of next generation biomass combustion. The primary objectives are an increase in the degree of efficiency and the further reduction of emissions. Activities are concentrated on individual fireplaces, especially wood burning stoves, and central heating boilers for private homes.

A long-standing cooperation has developed in the Ortner company located in Loosdorf. The company, whose core business consists of materials for stove making, has developed a modular system with a high degree of prefabrication for the construction of tile stoves. Together with Bioenergy 2020+, a calculation programme was created, which gives the management company the possibility of designing combustion chambers and to calculate the chimney size needed. On the basis of this, the prefabricated components for the entire storage system can be selected right in the programme.

"With Bioenergy, we have found a highly motivated, market-oriented young team that is also of great help in funding matters", says DI Manfred Huber, CEO of Ortner GmbH. "Due to the regional proximity, but also the European network of the competence centre, a close cooperation has developed in recent years".

In cooperation with another innovative company, the idea was also developed of an automated introduction of wood logs and pellets for a prototype and then a patent was applied for. ■

Foto: Ortner GmbH

"The European network of the Wieselburg site has proven to be a great advantage for us".

DI Manfred Huber,
CEO of Ortner GmbH

www.ortner-cc.at

IN THE RIGHT PLACE AT THE RIGHT TIME

Energy systems distribute and use energy

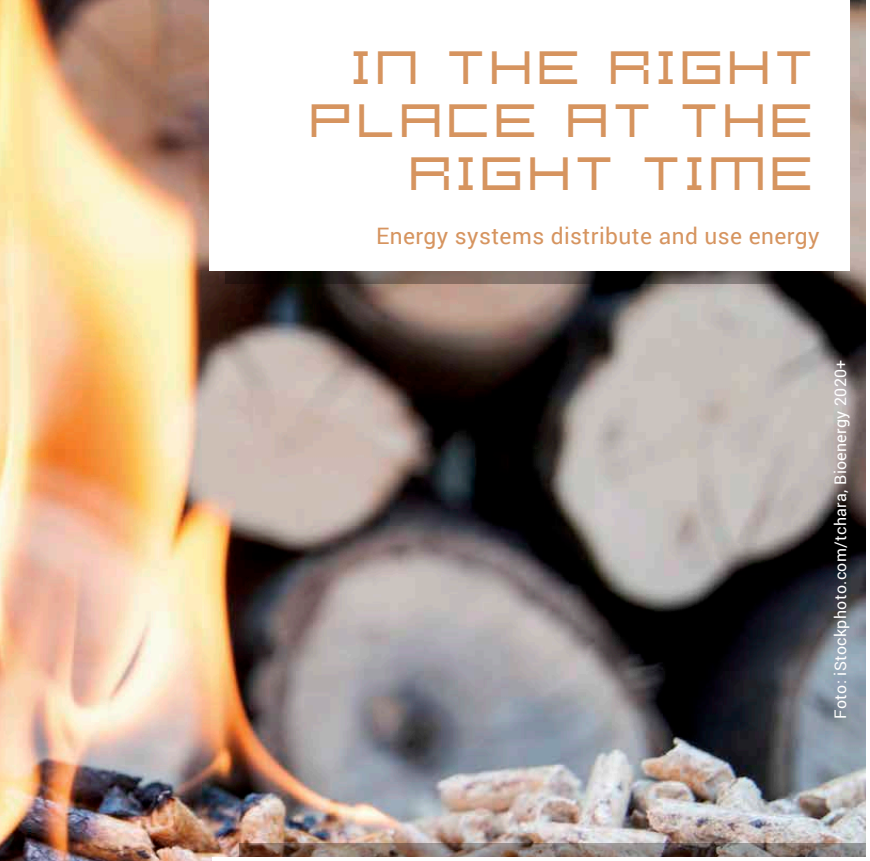


Foto: iStockphoto.com/tchara, Bioenergy 2020+

The energy recovered from the combustion of biomass can be used as heat or electricity and provided in corresponding distribution networks. The study of energy systems is aligned with the task.

At Bioenergy 2020+, the creation of simulation models and control concepts for thermal systems is handled in a separate research area. On the one hand, this involves the optimised integration of heating plants in utility networks. One approach for this is bidirectional networks in which users can feed the surplus, for example, from solar thermal energy, into the network. By means of the simulation, the use of heat pumps for active condensation of waste gases from biomass combustion is also being explored. The heat thus generated is used in addition to existing heating plants in expansion of capacity.

A special focus exists in the field of development of cogeneration technologies in the small and very small power ranges. Currently, there are three projects being coordinated by Bioenergy 2020+ experts or in which they are involved. Technically, steam engines, Stirling engines or thermoelectric generators are used.

With its research expertise, Bioenergy 2020+ is well connected internationally. In the context of the seventh research framework programme of the European Commission, four projects were coordinated by Wieselburg experts. Currently, several applications in the context of the follow-up programme "Horizon 2020" are in preparation.

BLT at the HBLFA Francisco-Josephinum is the most important test centre for biomass in Austria. Type tests on boilers for biomass fuels have been performed here since the 1970s. The furnaces must provide proof of compliance with emission limit values and the required efficiencies. ■

"Bioenergy 2020+ has developed the highest international recognition and visibility".

DI Dr. Walter Haslinger,
CEO of Bioenergy 2020+

www.bioenergy2020.eu

FUEL FROM NATURE

Biofuel expertise with tradition

Biomass is used not only for energy for space heating and electricity. Very early on, fuel for motor vehicles began to be obtained from renewable raw materials.

At Francisco-Josephinum, work on the topic dates back to the oil crisis of the 1970s. At that time, the Ministry of Agriculture commissioned the facility to work on alternatives to fossil fuels. "The fact that the first generation of these fuels is in widespread use today is due to a large extent to the Wieselburg facility", says BLT Research Director DI Heinrich Prankl.

Today at BLT, there is a well-equipped laboratory that is used in routine analyses, for example, based on orders from fuel producers. In research, today people are engaged in special second-generation fuels that are generated from agricultural residues or special plant oils.

At Bioenergy 2020+, when it comes to biofuels, it's not so much the research that is the focus, but participation in international networks (for example, in the IEA Bioenergy Task 39). The group of experts working at the Technopol Wieselburg has acquired a great deal of international recognition. Currently, they are partnering in an EU project, under which the European biofuel technology platform is scientifically supported.. ■

www: www.josephinum.at

EEC - Erneuerbare Energie Consulting

EEC is a young company that provides consulting services around biomass heating systems. The services range from selecting the right location through the definition of size and coverage area up to processing of the authorisation procedure with the competent authorities. A special focus has emerged in the field of heat distribution and the acquisition of district heating customers, as founder and CEO Mag. (FH) Kerstin Glöckl-Steininger explains. The 1.5-women company was founded in 2008 and has been based at the Wieselburg technology and research centre since 2013.

www: www.eec-erneuerbare-energie.at

ÖKOFEN

INFO

The Ökofen company, a pioneer in the field of pellet heating systems, operates a major manufacturing site in nearby Purgstall. The company brought the first type-tested pellet heating systems and the first pellet equipment with condensing boiler technology onto the market. Ökofen has developed heating systems that can be flexibly adapted to a building. There is also a combined solar-pellet system for new buildings in the works.

www: www.pelletsheizung.at

BRINGING COMPETENCE TO THE WORK LIFE

Training on the topic of biomass

Fotos: iStock.com/hidesy, FH Wiener Neustadt

"One of the great advantages of the location is the direct access to research facilities",

Dr. Christoph Schmidl, Course Director at the Wieselburg Campus of the University of Applied Sciences Wiener Neustadt

The training at the Teaching and Research Centre of the Francisco-Josephinum, which is directed by HR DI Alois Rosenberger, is divided into the tracks of agriculture, agricultural engineering and food science/biotechnology. In particular, the agricultural engineering training enables the students to gain a strong focus in process technology around biomass. In addition to solid training in theoretical areas, practice is also a focus in the context of a bioenergy laboratory. However, the agricultural training also draws on the expertise available at the subsidiary BLT on the topic of biomass. In project and thesis work in both training tracks, the students also come in contact with relevant companies and learn, in addition to the technical side, the economic side of biomass utilisation.

The University of Applied Sciences Wiener Neustadt – Wieselburg Campus, under the direction of Dr. Astin Malschinger, offers tertiary training in the fields of marketing and innovation management. Among other things, the new Master's programme "Regenerative Energy Systems and Technical Energy Management", with course director Dr. Christoph Schmidl, brings an important focus to the field of renewable energy. The curriculum combines technical and economic aspects with each other; bioenergy and the economics of energy represent focal points of the extra occupational course of study. The Master's programme can be completed by building on the Bachelor's degree programme, also offered in Wieselburg, in product marketing and project management, but also on appropriate training courses in other facilities.

"One of the great advantages of the location is the direct access to research facilities", says Schmidl, who is himself a Senior Researcher at Bioenergy 2020+. In the context of research and Master's programme work, one can take advantage of the possibilities offered by these facilities without having to build one's own infrastructure. Furthermore, one can employ the experts from research and industry as lecturers. The Wieselburg location is also active in the qualification of industry specialists: The Francisco-Josephinum, in cooperation with the Austrian Biomass Association, has developed training as a Biomass heating installer. ■

www.wieselburg.fhwn.ac.at

TECHNOPOL WIESELBURG

EFRE
Europäische Union Investitionen in Wachstum & Beschäftigung. Österreich.

The Technopol Wieselburg is considered to be an international centre for bioenergy, agriculture and food technology. The facilities located there operate renowned advanced research in the technology fields of biomass, bioenergy, energy systems, agriculture and foot technology, and water management. The competence centre Bioenergy 2020+ is located at the technology and research centre of Wieselburg. The main topics of applied research and development are energy efficiency and renewable energies. BLT Wieselburg at the Teaching and Research Centre of Francisco-Josephinum works on research and testing in the field of biomass and agricultural engineering. The University of Applied Sciences Wiener Neustadt – Wieselburg Campus also offers Master's programmes for marketing and innovation management, in particular for the areas of food and energy efficiency. The research facilities of LMTZ – Food Technology Centre, the Institute for Culture Technology & Ground Water Balance of the Austrian Federal Office of Water Management, the Feed Laboratory of Rosenau of the Chamber of Agriculture of Lower Austria and the Lunz Water Cluster are also all part of the Technopol Wieselburg.

This brochure is also available as an e-paper. Simply scan the QR code or download it at:

www.ecoplus.at/technopol_wieselburg

AN OVERVIEW OF CONTACTS

Bioenergy 2020+ GmbH
walter.haslinger@bioenergy2020.eu

BLT Wieselburg
heinrich.prankl@josephinum.at

University of Applied Sciences Wiener Neustadt – Wieselburg Campus
astin.malschinger@amu.at
christoph.schmidl@amu.at

EEC – Erneuerbare Energie Consulting GmbH
eec@eec-erneuerbare-energie.at

Ortner GmbH
huber@ortner-cc.at

ÖkoFEN GmbH
leopold.datzreiter@oekofen-ost.at

Technopol Wieselburg, ecoplus GmbH
k.nagelhofer@ecoplus.at

There are a total of around 65 scientists employed in the competency areas of biomass and bioenergy.

Imprint: Editors - Publisher - Place of publication:
ecoplus. Niederösterreichs Wirtschaftsagentur GmbH
(The Business Agency of Lower Austria)
Niederösterreichring 2 | Building A | 3100 St. Pölten | Austria
Responsible for the content: ecoplus. Niederösterreichs Wirtschaftsagentur GmbH Overall design | Editor: Josef Brodacz Chemiereport.at
Editorial management: Mag. Georg Sachs | Graphics: Mag. Stefan Pommer

In this brochure, all person-related statements apply equally to women and men. It is merely for the sake of simplicity that the masculine form was selected in the text.

BLT Wieselburg | FJ | lfz Wieselburg

bioenergy2020+

ecoplus. The Business Agency of Lower Austria

EEC Erneuerbare Energie Consulting GmbH

FH Wiener Neustadt Wieselburg

ÖkoFEN Pelletsheizung

ORTNER Kachelofen mit System