

**4BIOMASS – Fostering the Sustainable Usage of Renewable Energy Sources
in Central Europe - Putting Biomass into Action!**

3rd study tour

**Bioenergy Region Straubing-Bogen,
Germany**

31. Aug and 01. Sep 2010

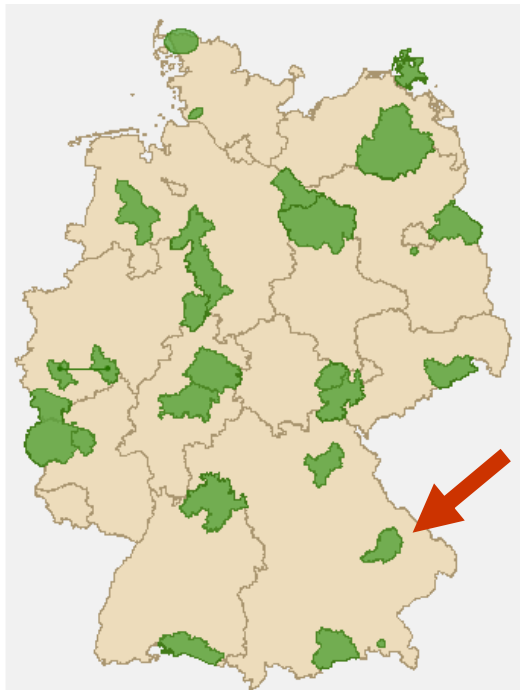


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Gülzow, Sep 2010

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1 Location:



Germany and its Bioenergy Regions 2009

The District Straubing-Bogen is situated in the Free State of Bavaria. Together with the city Straubing it builds the Bioenergy Region Straubing Bogen. This is one of 25 Bioenergy Regions in Germany in 2009.



2 Background

The FNR – Agency for Renewable Resources – organised this study tour to give all 4Biomass partners an impression of the bioenergy sector in Germany. The Region Straubing-Bogen was chosen for the following reasons: Firstly, this region is situated in the Central European area. Secondly, Straubing-Bogen was awarded the status of Bioenergy Region by the Federal Ministry of Food, Agriculture and Consumer Protection for their concept of developing bioenergy. Thirdly, many bioenergy plants and facilities in this area are situated in close proximity of each other and last but not least, this region has long-standing experience in the field of bioenergy.

In the county Straubing-Bogen, 17 biogas plants generate about 22MW energy per year. Moreover, 4 biomass combustion units and 11 other heating plants are in operation with a total output of about 14 MW. Additionally, 30 open air photovoltaic plants are installed, supplying about 65MW annually. Hydropower and geothermal energy is used in the region as well.

Biomass potentials are high in the region, with woodland the main source for bioenergy in the North and fertile arable land in the South. 63% of the total area is under cultivation. The infrastructure of the region is excellent, with 16 declared commercial areas and 10 industrial zones.

Activities in the bioenergy sector have been supported since the 1990s. Between 1998 and 2002, the so-called "Agenda 21" initialised pilot projects, organised exhibitions and workshops and developed brochures on renewable energies. Between 2002 and 2007, the LEADER+ project organised further activities, e.g. energy workshops, trainings and exhibitions on renewable energies. Study tours to other regions as well as specials in newspapers informed people on the subject. Currently, the LEADER project is being carried on and has led to a holistic energy concept to further develop this area as Bioenergy Region of Germany.

3 Activities

The objective of the project 4Biomass is to foster the sustainable usage of renewable energy sources in Central Europe. 4 Biomass is funded through the EU by the ERDF. In total, 5 study tours are organised to visit outstanding bioenergy companies, technologies or concepts. The first two visits were to Slovakia and Italy; the next study tour is planned for Austria and Hungary and the fifth to Poland.

The participants of the 3rd 4Biomass study tour arrived at the Centre of Excellence for Renewable Resources in Straubing. The two presentations contained an overview of the Region Straubing-Bogen and the structure and tasks of the Centre of Excellence.

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3.1 Centre of Excellence for Renewable Resources

At the Centre of Excellence for Renewable Resources in Straubing, the Bavarian State Government focuses all its activities in the field of renewable resources. The objective is to support applications of renewable resources by basic or applied research. This includes the development and testing of equipment as well as the exchange of technology and knowledge. Support is also given to emerging new markets, evaluation of projects and for the execution of support programmes.

At the Centre of Excellence these goals are achieved by the cooperation of three independently organised facilities; the Science Centre Straubing, the Technology and Support Centre and C.A.R.M.E.N. e.V. Each of these three institutions has a specific purpose and the objectives are attained by the combined effort and collaboration.



The exhibition 'From the crop to the product'

The 4Biomass group visited the 'From the crop to the product' exhibition, where the context of the transformation of different crops to energy or materials is demonstrated. This exhibition is a joint cooperation of the TFZ and C.A.R.M.E.N. e.V. In this exhibition, posters and demonstration objects are displayed to show the global context of energy and raw materials at about 300m².

For demonstration purposes conventional as well as new crops are grown in the courtyard of the building complex, e.g.: corn, millet, sunflower and miscanthus.



Renewable crops in the courtyard of the Centre



The exhibition of domestic biomass combustion units

Furthermore, the TFZ organises a combined seminar and exhibition tour on domestic applications regarding information on solid biofuels. It is conducted weekly during winter and once a month during summer. The exhibition displays around 100 domestic biomass combustion units. The exhibition and the seminar are free of charge.

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3.2 Port Straubing-Sand

The BioCampus Straubing GmbH manages a network for the energetic and material utilisation of renewable raw materials. Straubing is connected to the Danube countries by the port Straubing-Sand. The target of the BioCampus network is to develop the port Straubing-Sand to a main reloading point for renewable raw materials at the Danube. The industrial zone Straubing-Sand is a declared industrial zone of high importance.



Meeting the cluster manager of the BioCampus Straubing GmbH at the BioCubator, the office for entrepreneurs in bioenergy at the port Straubing-Bogen.



Visit the ENVIVA Pellet producer in the port of Straubing-Bogen

The first company to settle near the Danube harbour in 2005 was the company Enviva Pellets GmbH&Co. KG which produces app. 120 000 t of pellets per year.

This area has direct access to the Danube through the port.



Port Straubing-Sand

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3.3 Bioenergy Village Ascha



The mayor welcomes the 4Biomass group in the village Ascha.

Over the last ten years, many bioenergy villages have been founded in Germany. These communities aim to produce more than 50% of their consumed energy in the community itself.

Ascha - one of the Bioenergy villages of Germany - is located near Straubing. The visitors were welcomed by the mayor of Ascha, Mr Zirngibl.

Facts about Ascha:

- 1995 start of operation biomass heating plant,
- 2000 founding solar community (Solar thermal plants),
- 2001 start of operation biogas plants,
- 2001 establishing of first PV-plants,
- 2004 citizens' solar plant,
- 2008 last expansion of district heat grid,
- 2008 start of operation of photovoltaic park

- 1532 inhabitants, ca. 570 households
- Share of district heat (priv./publ.): 12,28 %,
- alternative electricity generation: 123,91 %, (Biogas 79,25 %, Photovoltaic equipped 44,67 %) biogas plant 320 kW
- Biomass combustion: two 700 kW-boiler 1,4 MW (efficiency 73 %), app. 3 km heating grid supplying heat to 60 private households,



Visit the wood chip heating plant with app. 3 km district grid heat



Solar field in the village of Ascha

- private and public photovoltaic installations 517 kWp
- park with photovoltaic plants 876 kWp,
- Solar panels on 77 roofs,
- in future: installing wind turbines

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3.4 PP meeting in the administration building of the county Straubing-Bogen



4Biomass partners in front of the district administrative building with Mr. Laumer

The partner meeting was held in the Landratsamt Straubing-Bogen, the district administrative building. The county officer, Mr Laumer welcomed the group and asked them to sign the guest book of Straubing-Sand.

3.5 Compost plant Aiterhofen -ZAW – SR



Listening the manager of the compost plant Aiterhofen

The communal compost and waste management company runs a biogas plant, which turns biodegradable waste into heat and power with an annual output of app. 2.371.000 KWh electricity and 2.527.000 KWh heat.

- Total quantity bio waste material: app. 13.000 t/a
- In winter 30 – 40 t bio waste material per day
- In summer 50 - 60 t waste material per day
- Investments for biogas plant: app. 4,5 Mio €
- Start of operation: November 2008
- Digestives: max throughput 15.000 t/a bio waste material app. 11.000 t/a digestives extracted and composted with green materials
- Fermentation tunnel: 7 pcs. with a length of 20 m and a width 4 m
- Capacity: every 3 day-amount equals app. 150 t (ventilation of whole tunnel in one process required)
- Fermenter: Capacity: 793 m³
- Excess percolate water regularly extracted and used in agriculture

- Gas mixture: output up to 100 m³/t
- Mixture consists of app. 50 – 60 % Methane, plus CO₂ and low share of hydrogen sulfide
- Exploitation of gas: The CHP – combined heat and power plant produces 364 kW electric power Electricity is fed into regional grid and paid acc. EEG (Renewable Energy Sources Act)
- amount of electricity covers demand for app. 600 households/a
- Heat is supplied to the EON/Schmack biogas plant in the neighborhood
- Grade of coverage with bio-waste containers: 60% for whole area
- Personnel compost plant: 11 employees
- Energy output: output of app. 2.371.000 KWh electricity/a and 2.527.000 KWh heat/a (own needs already subtracted) (process of dry fermentation own needs of about 438.000 kWh/a)
- Compost: 12.000 t/a compost produced in total.



Watching the wheel loader at the compost plant

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3.6 EON/Schmack Biogas Plant in Aiterhofen



Site visit with the EON manager

The EON/Schmack biogas plant uses silage to feed its biogas fermenters. The biogas is upgraded and fed into the natural gas grid. The annual output is equivalent to about 10 MW gas.

The heat for the fermenters, 364 kW el., is supplied by another biogas plant through district heat. Annually, app. 16,5 Mio m³ of biogas is fed into the grid supplying energy to app. 5.500 households. In total 80.000 t of renewable resources are processed per year. 150 farmers produce the corn, cereal and undersown crops and grass for the plant's silos.



Renewable energy – corn silage

The upgraded biogas costs in the pipeline from 7 to 7,5 €cent per kWh (natural gas costs app. 4 cent)

The costs are as follows:

3 cent for crops, material, fermenter input

3 cent for technology and processing

1 cent for upgrading to natural gas quality.

In total 90 GWh is fed into the grid per year.

Additions of 15% to 20% to the total energy balance is needed for production of crops and for maintenance of the process (input energy)

3.7 Biomass heating plant - Stadtgärtnerei Straubing



The market garden in Straubing

The community gardeners collect large amounts of wood materials from the city region of Straubing. The wood material is shredded and goes into storage at the market garden site.

- a wood chip boiler with 500 kW nominal heat capacity had been chosen for wood chips with a water content of w20-w50 and a particle size distribution acc. to norms of max P100, especially for landscape materials (P45-100, W30-55/60) with ash content of max. 10%
- The heating plant was established in the area of the garden market, the school is connected through insulated pipes

- the material from landscape management is mostly wet and contains a high amount of bark and may be contaminated with unwanted materials – therefore, hydraulic bottom extraction and a boiler with in feed grid firing.

- no screw conveyers used, only hydraulic driven conveyers

- For peak demands and for emergency situations gas boilers with 450 kW at the market garden and 360 kW at the school are available. The school uses this boiler in summer for warm water supply

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- in the medium term, it is planned to supply the nearby bowling centre with warm water as well (demand app. 250 MWh / a)
- the heat demand at the school is about 950 kW, the predicted demand per annum was 1400 MWh and 2976 h/a on the basis of consumption data from 2003-2005
- the current consumption is lower, because the school was supplied with single room heat regulators and floor heating
- a buffer storage is installed with a capacity of 25000 l to supply for heating the gymnasium
- Waste air is cleaned
- The ash falls through to a 800 l ash container
- Savings per year of CO² are 302 t and almost 180 000 l heating oil
- Every year savings of about 100000 € less for gas payments
- Investments for the plant: about 690 000 € incl. all costs
- The Free State of Bavaria has paid 65 000 € on subsidies
- This project was accompanied by the TFZ in Straubing and by C.A.R.M.E.N. e.V.



The head of the market garden explains the hydraulic driven conveyers

4 Summary

The Bioenergy Region Straubing-Bogen serves as an excellent example for an advanced bioenergy application. People in this region know how to use its resources for the utilisation of bioenergy. Administration and politicians have understood the high potential of bioenergy as a source for added value for all citizens. The local administration supports new technologies, information, trainings and exhibitions on bioenergy. In addition, the strong network of more than 90 partners from administration, economy, science, agriculture, media and investment sector leads to a high public awareness of the possibilities bioenergy offers, and therefore to the realization of bioenergy projects in this region.

Citizens benefit in different ways: Increase in the general output of the whole area, increase in employment, income and taxes. Bioenergy also contributes to climate protection.

Success is based partly on volunteers under the citizens and on the information flow and public awareness. It was mentioned several times by the stakeholders, that the citizens have been involved in the whole process from the beginning.

In the Bioenergy Region Straubing-Bogen, years of preparation preceded this success. Firstly, the potentials were analysed and a clear concept for the implementation agreed on. This whole process was accompanied by well-directed public relation activities and financial support through different sources. In the implementation phase, trainings and workshops were organised to qualify specialists and consultants. Additionally, many citizens and investors who implemented their bioenergy concepts benefited from financial support programs for bioenergy installations.

The application of similar concepts in other regions is possible only to some extent as differences in potentials must be considered. But some aspects like the networking and raising public awareness can be applied everywhere.

The programme of our study tour focused on the different bioenergy technologies for biomass such as pellets, biogas, combustion plants and district heat. The other focus was on the different types of bioenergy networks: the network of Bioenergy Regions, the Centre of Excellence for Renewable Resources and the BioCampus. Additionally, the concept of Bioenergy villages in Germany was demonstrated using the example of Ascha. The participants obtained new impressions and knowledge on a wide range of applied bioenergy concepts. They left with the impressions of an advanced bioenergy region as a good example for successful deployment of renewable resources in Germany. This study tour was a successful for all participants.