

BIOGAS FORUM AUSTRIA: NETWORK FROM RESEARCH, EXTENSION SERVICE AND COMMERCIAL FARMS

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ABSTRACT: A dynamic development in the area of agricultural biogas production can be observed. Agricultural biogas plants have to meet technological and security standards. The building of biogas plants must be cost efficient, an economic operation must be possible. Operators of existing or future biogas plants, planners and authorities need clear, transparent, and binding quality standards for the whole biogas process. It is essential to rapidly disseminate new research results and to coordinate future research activities. Biogas plant and process analysis and technology transfer to biogas plant operators require all partners that work in the biogas process chain to co-ordinate their work and to co-operate. The "Forum Biogas Austria" is a centre of excellence with the aim to optimise biogas production from agrarian biomass. It comprises horizontal and vertical co-operation between partners from research, extension service, authorities, planners, biogas plant operators and companies that work in the field of biogas production. The multi-disciplinary consortium covers all aspects of biogas production from agrarian biomass. It gives essential impetus for the future development of biogas production.
Key words: Anaerobic digestion; energy crops; sustainable use of biomass

1 INTRODUCTION

In Austria, a new law on green electricity production was issued on 2003-01-01. It forms the legal frame for a forward-looking biogas production from agrarian biomass. A dynamic development in the area of agricultural biogas production can be observed. More than 200 new biogas plants will be built in the near future and start operation until 2006-06-30. The performance of the new biogas plants will range between 70 kWel and 1 MWel. Agricultural biogas plants must fulfil technological and security standards. The building of biogas plants must be cost efficient, an economic operation must be possible. Operators of existing or future biogas plants, planners and authorities need clear, transparent, and binding quality standards for the whole biogas process starting from the production of energy crops and ending at the stage of biogas utilisation.

Animal manures, energy crops and organic wastes are very suitable for anaerobic digestion in agricultural biogas plants. In Austria, the amount of these raw materials would be sufficient to feed about 6000 biogas plants. This would result in a CO₂ emission reduction of more than 5 mio. t per year and in the creation of more than 5000 new jobs in rural areas. It is essential to rapidly disseminate new research results and to coordinate future research activities. Only then Austria can hold and further develop its leading role in biogas production and technology.

Quality standards are needed for the whole biogas process: production of energy crops and animal manures, biogas production, biogas processing, and biogas use, management and operation of agricultural biogas plants, substance and energy flow, investment costs, work requirement, and economic efficiency.

Biogas plant and process analysis and technology transfer to biogas plant operators require all partners that work in the biogas process chain to co-ordinate their work and to co-operate. Multi-disciplinary research must be carried out. Information, know-how and technology must be rapidly disseminated to farmers, planners, to the extension service, and to authorities. Biogas production from agrarian biomass must be promoted and a better use must be made of the huge potentials.

2 BIOGAS FORUM AUSTRIA

2.1 Mode of Work

The "Forum Biogas Austria" is a centre of economic, technological and research excellence with the aim to optimise biogas production from agrarian biomass. It comprises horizontal and vertical co-operation between partners from research, extension service, authorities, planners, biogas plant operators and companies that work in the field of biogas production. The multi-disciplinary consortium covers all aspects of biogas production from agrarian biomass: energy crop production, energy crop breeding, biogas technology, management of biogas plants, energy conversion, and biogas utilisation. It gives essential impetus for the future development of biogas production and for the maintenance of Austria's leading role in biogas production and technology.

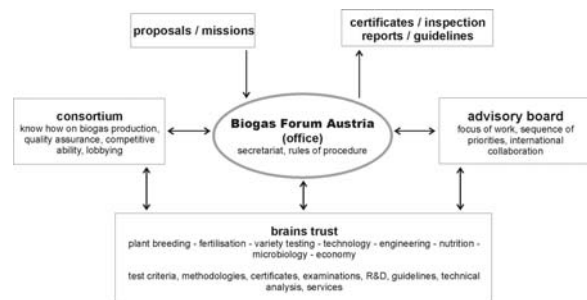


Figure 1: Planned organisation of the Biogas Forum Austria

Figure 1 gives an overview on the planned mode of work of the Biogas Forum Austria. The *advisory board* decides on the focus of work and identifies the problems to be solved most urgently. It is responsible for the communication with other national and international networks. The *consortium* consists of representatives from all fields of the biogas production chain. These propose future research programs and assist in the preparation of manuals and guidelines. The consortium members profit from the rapid transfer of new research and development results. In the *brains trust*, an trans- and interdisciplinary team of researchers works together.

They work out research proposals, and manage research activities. Manuals, guidelines, certificates, and inspection reports are worked out in collaboration with the other members of the Biogas Forum Austria. The brains trust advices and evaluate the work of the Biogas Forum Austria in the fields of advice, planning and certification. It considers the whole chain of biogas production from energy crops and agrarian raw materials.

The Biogas Forum Austria covers a range of field of work (Figure 2). Research is necessary in the field of energy crop production and methane yield from energy crops and other agrarian biomass sources. Biomass quality influences the whole biogas production process. It determines for example the processing technology, the digester technology, the methane yield, the biogas composition and the biogas conversion to electricity and heat. Biomass quality is thus an important factor of the economic efficiency of biogas production.

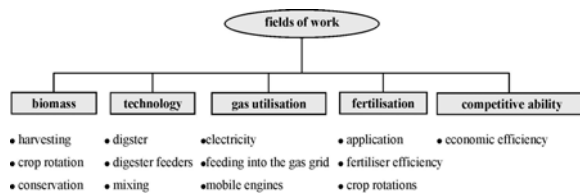


Figure 2: Fields of work of the Biogas Forum Austria

The new law on green electricity production (BGBl. I Nr. 149/2002) offers good frame work conditions for agricultural biogas production from energy crops. A new generation of biogas plants is currently entering into operation. The new biogas plants mainly digest energy crops and they are often bigger (70 kWel. to 1 MWel.) than former biogas plants. These new plants need to be monitored in detail and guidelines on their optimum management and operation must be developed. This is currently one of the main focuses of work of the Biogas Forum Austria. The digestion of energy crops requires the adaptation of the biogas technology to their specific requirements. This is why biogas technology is a major field of work of the Biogas Forum Austria.

Economic efficiency requires the produced biogas to be optimally utilised. Flexible options for biogas utilisation must be established. The digested substrate is a valuable fertiliser that contains considerable amounts of N, P and K. Strategies for optimum fertiliser use and application must be developed. Suggestions for crop rotations must be made considering the pre-requisites of the different locations in Austria and Europe. The competitive ability of biogas production must be optimised in order to substitute fossil energy sources in the future run.

2.2 Aims

The “Biogas Forum Austria” aims at improving biogas production from energy crops and animal manures through optimising the whole process from energy crop production to biogas utilisation. This ambitious aim can only be achieved through interdisciplinary collaboration.

The “Biogas Forum Austria” focuses on the following:

- building of biogas plants with optimum technology and safety standards

- development of a quality assurance system for the whole biogas process chain
- decrease investment risks for biogas plant operators
- decrease planning risk for authorities and biogas plant operators
- stimulate system oriented research
- rapid dissemination of information and know-how
- improve competitive ability of biogas production

Through the work of the “Biogas Forum Austria” the following is achieved:

- rapid dissemination of new know-how
- critical mass in R & D
- collaboration with international networks
- know-how pool for the whole biogas process chain
- improved lobbying
- intensification of research and development activities
- rapid market introduction of new technologies

2.3 Current focus of work

Currently, the “Biogas Forum Austria” works in the following fields:

Biomass production and raw materials:

- quality requirements for energy crops and other raw materials
- optimisation of the methane hectare yield of sustainable crop rotations through variety, crop management and harvesting time
- recommendations on optimum variety and cultivation of energy crops
- harvesting technologies adapted to the special needs of biogas production
- benchmarks on methane yield from various raw materials
- sustainable production of energy crops

Biomass processing and optimum biomass quality:

- conservation
- chopping
- additives
- pre-treatment

Biogas plants, technology and fermentation:

- adaptation of biogas technology to the special requirements of energy crops
- optimisation of the conditions during anaerobic digestion
- benchmarks on the nutrient requirement of micro-organisms in the digester
- technical analysis and optimisation of biogas plants
- data on management, work requirement and economic efficiency

Biogas utilisation:

- requirements on biogas quality for different options of utilisation
- technical and economic benchmarks for biogas purification systems

Fertilisation:

- recommendations on the fertilisation with digestates from anaerobic digestion of energy crops and animal manures

- technologies for an environmentally friendly fertiliser application
- development of sustainable fertilisation systems

3 CONCLUSIONS AND OUTLOOK

The “Biogas Forum Austria” currently works with bilateral or multilateral collaborations between the various partners from research, extension service, authorities, planners, biogas plant operators and companies that work in the field of biogas production. A multitude of research topics has already been and is currently handled. The rapid dissemination of the results is a core element of the “Biogas Forum Austria”. For a further improvement of the Forum’s efficiency, the collaboration will receive a more formalised framework. A registered association will be founded. Internal rules of procedure will be worked out and the partners will have the possibility to become official members of the “Biogas Forum Austria”.