Overview of German Biogas Situation, perspectives and research activities
Frank Scholwin
History of Renewables

Development of electricity generation from renewable energy sources in Germany since 1990

- Hydropower
- Wind energy
- Biomass *
- Photovoltaics

EEG: January 2009
EEG: April 2000
EEG: August 2004
Amendment to BauGB: November 1997


Development of biogas plants in Germany

7,200 Biogas facilities
2,850 MWel install. capacity

Source: DBFZ 2012

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Biogas facilities in Germany

Around 7200 biogas plants with electricity production in CHP (combined heat and power) in front of the biogas plant

Around 83 Biogas plants with upgrading the biogas to biomethane in operation (further plants projected within the next years)

Source: DBFZ 2012

Biogas upgrading

- Technology: mainly Amin scrubber, water scrubber and PSA
- Data base: 31.12.2011

Source: DBFZ 2012
Biogas upgrading technology and plant number

- Technology: mainly Amin scrubber, water scrubber and PSA
- End of 2011: 83 biomethane plants with upgrading technology
- Total upgrading capacity biomethane (12/2011): ~ 460 Million Nm³/a

Biogas market in Germany

- Mainly the legislative framework force this development of renewable energy sources for electricity production in Germany
- Increasingly importance for Biogas development in Germany esp. due to the Renewable Energy Act
- Biogas for electricity production in 2011 (17.5 TWh) contribute with 14.4% to total electricity production of total renewable energy sources in Germany (121.9 TWh in 2011)*
- Share of renewable energy sources to total electricity production obtain 20% in 2011*
- To raise the efficiency of biogas utilization and to improve the flexibility of its use alternative utilization of biogas become more interesting → more than 80 plants upgrading the biogas are in operation
- Biogas and biomethane are technical efficient options to apply significant volumes in the medium term and will be play an important role within the total energy systems
- Biogas is a promising option for energy supply

Source: DBFZ 2012
Research in Germany

Governmental funding
Ministries and their authorities / assigned bodies, Deutsche Forschungsgemeinschaft

Federal states funding
Ministries and their authorities

State independent funding
foundations (independent, companie-owned), associations

International funding
EU

Companies funding / payed research
not public
Main biogas research institutions

- LfL Bayern, TLL...
- UFZ
- DBFZ, vTI
- ATB
- DVGW research unit, Companies itself
- Fraunhofer, Gesellschaft
- IWES, IKTS, Umsicht...
- Federal institutions
- Helmholtz Association
- Leibniz Association
- Max Planck Society
- Universities
- Academies
- Research Infrastructures
- State ("Länder") Institutions
- Companies / Industrial Research
- Networks and Clusters

Governmental funding
Ministries of Agriculture (FNR), Environment, Science, Economy

Federal states funding
very different, Ministries of Agriculture, Environment, Science, Economy

State independent funding
foundations (independent, company-owned), associations

International funding
EU

Companies funding / payed research
not public
Main biogas research topics in Germany

- Substrates supply („new“ energy crops)
- Storage of substrates
- Substrates pretreatment (mechanical, thermal, chemical, Enzymes)
- Microbiology of fermentation process / addition of trace elements / disturbances of the process
- Modelling of fermentation process
- Fermenter design in dependency of substrates
- Residues aftertreatment
- Control equipment / measurement technologies
- Biogas cleaning
- Biogas upgrading (new technologies / improved technologies)
- Ecological effects / Sustainability criteria / biodiversity
- Emission measurements and evaluation / GHG balances

Biogas – a key for future energy systems and nutrient cycles

Prof. Dr.-Ing. Frank Scholwin

Henßstraße 9, D-99423 Weimar
Tel  +49 (0)3643 - 7 40 23 64
Mobil  +49 (0)177 - 2 88 56 23
Fax  +49 (0)3643 - 7 40 23 63
frank.scholwin@uni-rostock.de