

Energy from biomass:

What importance does bioenergy have worldwide?

As part of the climate conference in 1997 in Kyoto, an additional protocol was concluded, which stated that emissions of environmentally harmful greenhouse gases should be significantly reduced by 2012. The signing of this protocol may be seen as the birth of industrial development of renewable energies from the sun and wind and of the consistent development and more efficient use of existing hydroelectric plants.

In the wake of these renewable energies, the almost CO₂ neutral use of biogas made from renewable raw materials has been being developed to an industrial level of use. For the greater part, however, merely as a direct conversion from biogas into electrical energy.

It only required a small step to upgrade this biogas and inject it into the gas grid. The European Parliament ensured with Directive 2003/55/EC that biogas may be injected into gas grids across Europe. The implementation of item 24 of this Directive in national directives is the job of the member states. In Germany, this has been implemented by way of the Gas Network Access Ordinance, for example.



Gas pipeline network in Europe with an overall length of more than 200,000 kilometres

Directive 98/30/EC states: "Member States should ensure that, taking into account the necessary quality requirements, biogas and gas from biomass or other gas types are granted non-discriminatory access to the gas system, provided such access is permanently compatible with the relevant technical rules and safety standards."

These rules and standards should ensure that these gases can technically and safely be injected into and transported through the natural gas system and should also address the chemical characteristics of these gases."

In 2008, approximately 80 plants were in operation across Europe, and the greatest producer of biogas was Sweden. As of

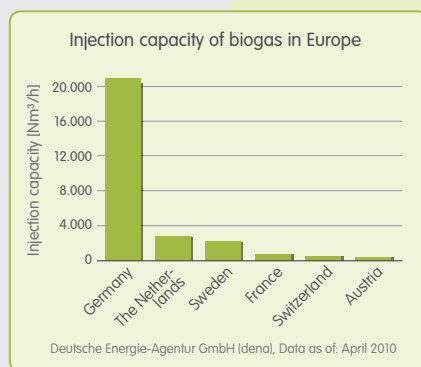
2009, approximately 50% of the biologically produced methane being generated in Europe was being produced in Germany, thereby replacing Sweden as the greatest producer. While in Germany approximately 75% of biogas is produced from agricultural sources, such as slurry and renewable raw materials, in 2008 in Great Britain, biogas was produced predominantly from landfill gases and in France approx. 50% from sewage or fermentation gases and 50% from landfill gases.

The conditions for access to the gas grid are regulated very differently, although the quality of the gas is to be demonstrated in accordance with the appropriate valid regulations in the individual EU states. In Switzerland, the Directive SVGW G 13 applies, while in Austria, the ÖVGW Codes of Practice G 13 and G 31 apply. In Sweden, the standard SS155438 "Motorbränslen – Biogas som bränsle till snabbgående ottomotorer" was issued as early as the end of the 1990s. In Sweden, the gas has not yet been injected into the transport grid, but only into regional distribution networks so far.

For all injections into international gas transport grids, the provisions of EASEE (European Association for the Streamlining of Energy Exchange) apply, which may slightly deviate from the relevant national regulations.

The potential of biogas

Following current investigation, approx. 53 plants in Europe inject upgraded biogas into public gas grids. This year, a further 47 plants were planned, the majority being in Germany. Further investigation led to the finding that approx. 89 billion kWh have been generated from biogas in 2010. This potential could further develop to such an extent that it could climb to 500 billion kWh/annum by 2030.



If all the individual national targets for the injection of biogas were now to be taken



into account, considerable investment would be needed for upgrading plants with the necessary measurement and control equipment for the injection of biologically produced methane into distribution networks or transport grids.

In by far the largest proportion of biogas plants however, the plants are employed for directly using biogas to produce electrical energy. In many countries, a fixed amount is paid for injection of electricity generated from renewable energies, which strongly influences the profitability of these plants.

The traditional markets in Central Europe have been the greatest so far and are constantly expanding. A particularly attractive feature, according to a study, is the direct injection of biogas into the gas grid. Private and communal energy suppliers are piling into this market. Both the construction of new plants and the retrofitting of existing plants for gas injection will therefore continue to increase.

New markets are opening up in Eastern Europe, such as the Czech Republic, Slovakia or Hungary, however predominantly for the direct production of electricity. The market development in these countries is therefore very much comparable with that in Germany.

What importance does bioenergy – particularly biogas – have outside Europe?

The USA's economic stimulus package agreed in 2009 clearly places the focus on both renewable energies and energy efficiency and has laid out USD 70 billion for this purpose. The popularity of biomass as a versatile energy carrier is growing in the USA. Electricity, water and

fuel made from biomass, together with the high efficiency of this technology, offer for the most part an economic alternative to the traditional energy carriers. The industrial sector has recognized this and uses the most biomass, compared with other consumer groups.

In Asia, biogas has already been being used intensively since the middle of the 20th century, but only in small holdings. Including India, approximately eight million biogas plants are in existence, but the gas produced from these is mostly used for heating or cooking. These plants need to be optimized both in terms of technology and process engineering in order to be able to use the energy produced sensibly. The technology required for this is being developed in industrialized countries, creating enormous potential for technical collaboration with these countries as in all newly industrializing countries.

Japan is the pioneer in Asia for using bioenergy. Pollution in the Tokyo region, caused by landfills and CO₂ emissions, should be significantly reduced by using biomass from waste material. In 2020, Tokyo wants 20% of its energy to be produced from renewable sources.

In accordance with the relevant publications, biogas should also be injected into the pipe system in Tokyo city as of 2011.

The increase in the worldwide energy demand and the associated price development requires vigorous efforts to increase the proportion of bioenergy.

For all the metrological requirements relating to the use of biogas, whether this is for recording electrical energy or gas flow rates, or for measuring the gas quality, Elster offers suitable measuring instruments for plant control, and for the regulation and billing of the relevant energy. Turbine and rotary gas meters are used here and have proved their worth in many biogas plants across Germany. For the injection of upgraded biologically produced methane into natural gas grids, we are happy to plan complete system solutions, including pressure adjustment where applicable. Take advantage of our experience!

Speak to your Elster Account Executive or send an enquiry directly to: biogas@elster.com

Hans Kullmann hans.kullmann@elster.com