

Spotlight

Putting the discussion on biogas on an objective footing is absolutely essential

**Dr Hans Oechsner**

Photo: private

Interest in biogas has been very strong in Germany for more than 20 years now. The production of biogas has become an important second source of income for many farms, thanks to the statutory provisions of the German Renewable Energy Resources Act (EEG). More than 9 000 agricultural biogas plants exist today, in which biogas is mainly converted to electricity and heat in CHP plants. In addition, biomethane is produced in about 200 large plants and fed into the natural gas grid. Roughly 6–7% of electricity consumed in Germany currently comes from biogas.

Livestock manure, organic waste and renewable raw materials produced specifically for producing energy are available as raw substrates for generating biogas. Using waste in the biogas process makes its plant nutrient content available as fertilizer for plants. Feeding the nutrients back into the natural cycle conserves resources and reduces the use of mineral fertilisers. The use of energy crops as fermentation substrate, which is often regarded by the public as being unecological, offers society several benefits. For instance, it makes it possible to achieve added value in rural areas and thus secures valuable jobs in regions that are all too often neglected. Prices of agricultural products are stabilised. This would again make it interesting for farm heirs to become farmers. Moreover, latest studies show that electricity generation from biogas causes 50% less CO₂ emissions than the German electricity mix and that producing biogas from farm manure efficiently minimises greenhouse gas emissions from livestock farms.

The political decision to limit support for biogas electricity in future through the EEG disregarded the fact that an important and excellent source of renewable energy will gradually fall away after 20 years of operation. A reduction of production costs per kilowatt hour for biogas electricity, as originally considered, could not be achieved up to now as the quite reasonable stipulations regarding the construction and operation of digesters (leakage detection, safety requirements, maintenance and inspection effort, housing etc.) have been regularly increased; hence, capital expenditure has more than doubled in the past 15 years. At the same time, technical reliability, flexibility and safety of the plants have improved considerably.

If the production of biogas is no longer economic, a renewable energy source which offers many advantages will be lost. Electricity from biogas can, to a certain extent, be flexibly produced and can be used both as a short-term and a seasonal source of balancing energy. This form of electricity is particularly indispensable if the generation of electricity from renewable energies is expanded further, leading to an increase in demand for balancing energy.

The biogas process can even be used to temporarily convert surplus electricity from these fluctuating sources to hydrogen via electrolysis, which, together with CO₂, is then biologically transformed to biomethane through hydrogenotrophic methane formation in the biogas digester. This biomethane can easily be temporarily stored

in the existing natural gas grid so that it can be used whenever and wherever demand arises. Biomethane can also be used as fuel for vehicles due to its high energy density as CNG (compressed natural gas); this should become increasingly important in the future. This form of renewable energy is unbeatable, at least until other powerful, inexpensive and environmentally friendly storage technologies (e.g. high-performance accumulators) are available.

The question remains: Why has biogas scored so poorly in the public debate during the past 5 years? Unfortunately, interest groups have sometimes publicised far too much one-sided negative information that does not stand up to an objective assessment but stays in the minds of the public. Today, it is practically impossible to find acceptance among the public for the construction of a biowaste digestion plant, which, by all means, is preferable to composting plants with regard to odour development. Examples in the region around Stuttgart demonstrate this. Here, the afore-mentioned information culture plays a role.

It is indisputable that the EEG Surcharge (2018: 6.792 cents/kWh) increases the price of electricity – at least for unprivileged end consumers. The cost of environmental degradation and the greenhouse effect caused by the use of fossil energy sources is not borne by the polluters, i.e. the consumers, but rather, inconspicuously, by global society as a whole, mostly even by groups who are not even involved at all or only to a relatively small extent in the high energy consumption and CO₂ emissions. This discrepancy is particularly noticeable in the case of nuclear-generated electricity, as an example. The cost, for research and the development of storage facilities for spent nuclear fuel elements, is borne almost inconspicuously by taxpayers and future generations. Hence, this cost does not appear on electricity bills, other than in the case of renewable energy.

Conclusion

The sustainable supply of energy for the growing world population on the basis of renewable resources will require far-reaching changes to the energy supply systems. A change of thinking in society regarding the types of energy sources used is absolutely essential for the future. The introduction of a CO₂ tax, taking into account the social cost of carbon (SCC), can certainly lead to a fairer distribution of cost recovery among the polluters. Tackling such approaches and implementing them throughout the world will be an important task for policy-makers. Only through objective information, discussion and the assessment of all negative effects as well as the willingness to accept a certain amount of additional cost in favour of a sustainable development can an energy supply that has less negative effects on the environment and global climate be found and expanded.

Biogas, as the only regulatable renewable energy source, can make a significant contribution to future energy supply systems. It enables the efficient utilisation of waste, reduces greenhouse gas emissions from livestock farms and makes it possible to use renewable fuels without expensive storage technologies. In Germany in the past 20 years, numerous jobs have been created in this segment, major investments made in this technology and unprecedented knowledge collected in science and agricultural practice. Knowledge and technology for the production of biogas must be developed further and integrated efficiently into future energy supply systems.



Dr Hans Oechsner

Director of State Institute of Agricultural Engineering
and Bioenergy, University of Hohenheim
www.uni-hohenheim.de/labioenergie