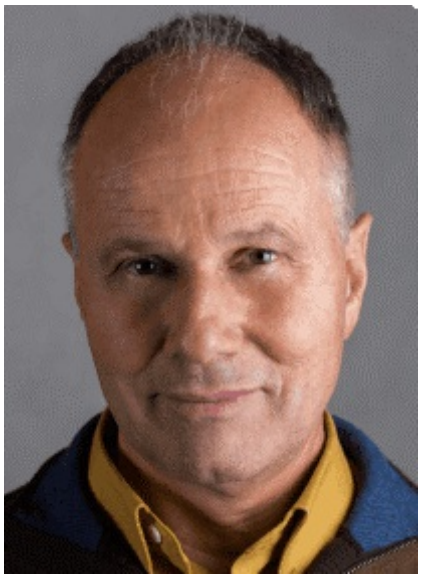
The International Biogas and Bioenergy Competence Centre (IBBK) and its role in Baden-Württemberg's bioeconomy

The number of biogas plants in Germany has increased almost tenfold since the start of the new millennium[1]. IBBK Fachgruppe Biogas GmbH, founded in 2000, has helped shape this development through training, consulting services and projects. Since 2015, the company has also been working on behalf of the Baden-Württemberg government to advise operators of existing and planned biogas facilities. Agricultural biologist Michael Köttner, founder and CEO of IBBK, gives us an insight into what his company does and explains what needs to change in the biogas industry in particular before the bioeconomy can be successfully implemented in Baden-Württemberg.



Michael Köttner, founder and CEO of IBBK
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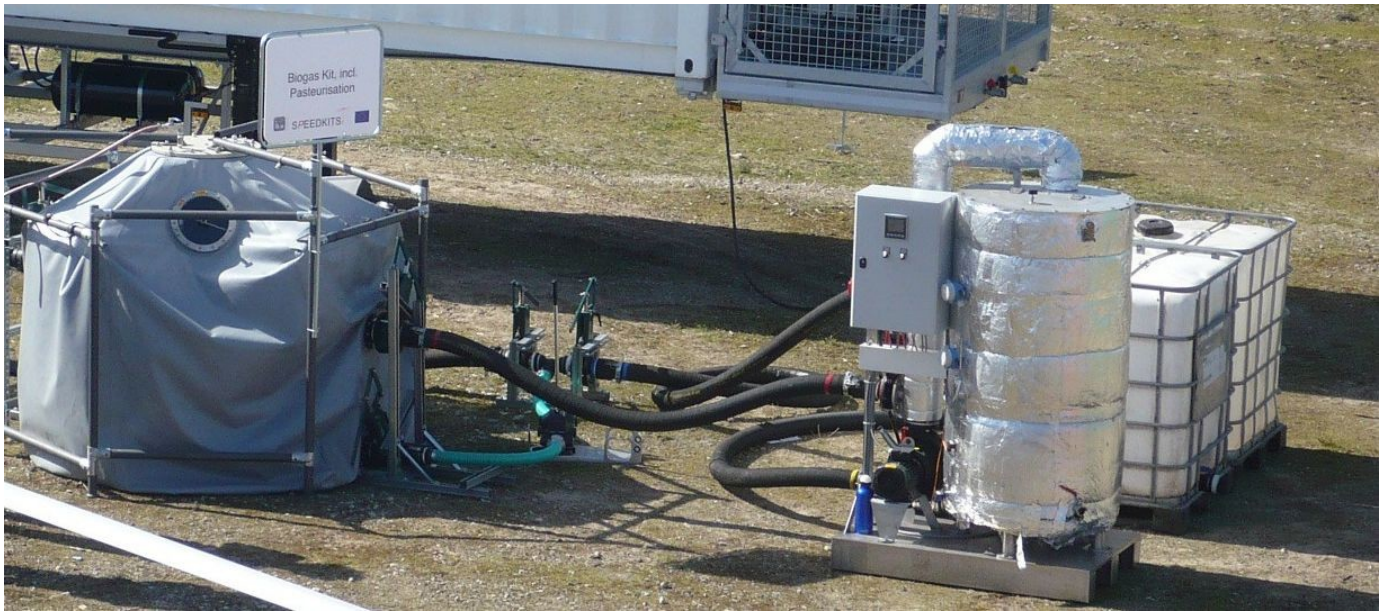
Just over 1,000 biogas plants with a total capacity of approximately 100 MW were in operation in 2000, and current forecasts predict an increase in numbers by the end of 2018 to almost 9,500 biogas plants with a total output of over 4,800 MW[2]. But these figures are deceptive when it comes to the crisis that the biogas industry has been going through from 2012 onwards during which time several amendments to relevant European regulations have been passed. The number of newly established biogas plants has decreased by around 70% due to more restrictive European biogas production plants regulations; the number of plants built annually since 2012 falls somewhere between 100 and 200 (compared to as many as 1,525 new biogas plants built in 2011)[2]. This situation has created a lot more work for the IBBK biogas experts as strategy advice relating to existing plants is becoming increasingly important to ensure their future profitability.

Köttner attaches great importance to the concept of closed cycles. "We do not believe in building biogas plants on green fields with the sole aim of producing biogas." Instead, Köttner prefers to focus

on the idea of a circular economy. For Köttner, biogas technology is first and foremost an instrument within the circular economy whose primary objective is to close nutrient cycles. All IBBK projects aim at the optimal utilisation of biomass for producing materials and energy through cascade use.

Projects in Germany and abroad



S(P)EEDKITS prototype.

IBBK's reach extends beyond Germany. The company is currently involved in several EU projects, including the Horizon 2020 project "NoAW - Agricultural Residues for Bioenergy and Bioeconomy", which involves a total of 24 partners. NoAW aims to contribute to the "zero waste economy" by treating agricultural residues not as waste, but as a raw material that is made suitable for efficient utilisation (for example conversion into biobased products) in the bioeconomy sense.

"Biogas Action" is another Horizon 2020 project that aims to sustainably produce biogas and biomethane from manure and other agricultural waste in Europe. IBBK brings to the project decades of experience in the field of biogas plant design and presents best practice examples. IBBK is thus making an active contribution to the EU-wide transfer of knowledge in the biogas sector.

The company is also involved in projects world-wide. One project involves the establishment of a biogas plant that utilises the faecal sludge of 6 million inhabitants in the Ghanaian capital, Accra. Funded through the EU-FP7 S(P)EEDKITS programme, the IBBK has also developed a small mobile system that can be transported to crisis-hit areas and set up within a few hours. A miniature biogas plant of this kind has a capacity of 1 to 5 cubic meters and can serve as a temporary treatment facility in refugee camps or disaster areas where a lack of disposal solutions for faecal sludge can quickly lead to the outbreak of disease and epidemics. Working with international aid organisations, the product has been continuously improved in recent years and is now sold worldwide.

Perspectives for the biogas technology in Germany

While on the international level it is more a question of promoting the broad application of biogas technology, the developments mentioned at the beginning of this article have only led to limited demand for designing and building biogas plants in Germany in the past few years. However, there is

Michael Köttner giving a speech in a training course organised by IBBK Fachgruppe Biogas GmbH.
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still high demand for IBBK's expertise, especially in Baden-Württemberg. The Baden-Württemberg government recently increased funding available for consulting contracts with existing biogas plants from 50% to 80% of total costs. This clearly shows that expert knowledge and strategy consulting on biogas technology are currently much needed in Baden-Württemberg. Köttner believes that this demand is mainly down to the fact that access to the power market has become increasingly complicated over recent years. "It is not just the power grid and emission requirements that are becoming increasingly complex. The requirements for operating CHPs (combined heat and power stations) are becoming more and more restrictive," says IBBK managing director Köttner. He is therefore calling for the biogas industry to be refocused: "We need to move away from electricity and focus more on the production of biofuels and on the gas market."

The political framework conditions make it very difficult for biogas plant operators to understand and comply with the complex requirements. That's why IBBK also offers training in this area. However, Köttner is of the opinion that biomass barely features on the political agenda and he sees great potential in the field of biomethane-based mobility in particular. He also believes that mobility issues should not only focus on short-distance car journeys but equally so on many other types of journeys. "Sustainable solutions are required for long-distance journeys in particular. Second-generation fuels such as biomethane that are made of regional biomass represent a sustainable solution that needs to be higher up on the political agenda," says Köttner.

Bioeconomy through reverse cascade use

Köttner uses a vivid example to explain what such a solution could look like. He says: "Before the combustion engine appeared, around 35% of agricultural produce was used for fuel, namely for feeding the horses that pulled carts and carriages. If nowadays biomass were to be used to a similar extent for producing fuels such as biomethane, it would not just benefit the environment." It would reduce agricultural surplus and help avoid cheap exports that have devastating effects on the fragile situation of the exporting developing countries. Köttner's vision for achieving this is what he calls "reverse cascade use".

Köttner believes that instead of prioritising the use of biomass for the production of energy (e.g. nutrient recovery from sewage sludge, followed by the fermentation of the remainder in a biogas plant), the focus should be more on generating energy. “Hardly anything is left at the end of the cascade. Biogas plant fermentation would therefore not be profitable,” says the CEO of IBBK. He believes that fermenting biomass in a biogas plant, converting it into biomethane, and, in a second step, converting the fermentation residues into biobased products and recovering the nutrients, makes more sense. Köttner explains that this is not only more efficient, but also corresponds to the ideas behind the bioeconomy. He goes on to say that, for this to be possible, there needs to be a national strategy for biomass use. Bioeconomy strategies are already being implemented, at least on the state level in Germany. The Baden-Württemberg government expects to publish a state strategy called “Sustainable Bioeconomy” in 2019[3]. The IBBK is also involved in preparing this strategy.

References

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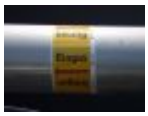

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