Advantages of Decentralized Bioethanol Production

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Summary

Europe is undergoing great efforts to build production plants for biological fuels. Besides biodiesel, bioethanol will be the largest fraction of biological fuels. Right now, mostly large scale production plants are being built, being planned or are already in use with an annual capacity of more than 1,000,000 m³ bioethanol (i.e. Pischelsdorf, Austria 2,400,000 m³ p.a.). All these large-scale plants ere characterized by very low energy efficiency (input output ration of< 1 :1.5). Senn and Luca have previously demonstrated that utilization of residues from bioethanol and biogas plants could improve the energy balance in a large part and, hence, the economical efficiency. By use of the rejected heat from the power generation of biogas in the bioethanol plant for fermentation and distillation of the alcohol and by the use of the distillers wash from the bioethanol plant as substrate for the biogas plant a further improvement of the energy balance is possible. In the project presented here, an integrated system for the use of raw materials and energy in a combined bioethanol/biogas plant is introduced. One of the remaining questions for the operation of such systems is the effect of using mash in the biogas plant with respect to the amount and quality of produced biogas.

The energy balance of a combined 500 kW biogas - 10.000 hl/a bioethanol plant is presented. The comparison demonstrates, that the thermal and electrical energy needed for fermentation and distillation at the ethanol production can completely be provided by the rejected heat from the biogas plant. The overall energy balance is further improved because less energy is needed for transportation and because the distillers wash from the bio-ethanol production is used as substrate in the biogas plant. First results from experiments on a laboratory scale (according to DIN) are discussed. When using corn mash instead of corn silage, the methane production per kg organic dry substance decreases by 16 percent after 30 days. However, the required methane content of 40 % for the operation is reached easily this way. This decrease in production has to be considered when planning biogas plants, which are supposed to use mash/slop as substrate for biogas production. Through the use of different substrates, such as mash/slosh, silage and manure, the decreased biogas production might be compensated.

Beamer-Presentation shown at the meeting.

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