

## Danish Crop Production Conference 2013

Session 45: Biogas and economy

**The Energy agreement of March 2012 has provided new opportunities for the production of biogas in Denmark. Is Biogas good business? The note is a review of the business operation and what matters.**

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### **Biogas production and potential**

The production of biogas in Denmark is about 4.1 Petra Joule, equivalent to 100 mill m<sup>3</sup> of natural gas pr. year.

We use approx. 5 pct. of the existing manure in Danish agriculture to produce the 4 PJ.

The potential is much larger. In addition to utilizing manure better than it's done today, there is a partly untapped potential for biogas production from e.g. industrial waste, sewage sludge and municipal waste. The agriculture is not using the straw, grass and so on to any noticeable extent. Within the coming years straws might become a natural part of biomass to the biogas plants.

### **The model of settlement**

The energy agreement of March 2012 introduces a new subsidy to the biogas producers. The agreement has not yet been approved in EU. We expect that the agreement will be approved beginning of June 2013.

The draft model of settlement looks like the following. Is given a basic grant to the use of biogas for:

- CHP (Combined Heat and Power) plants – 10.60 €/Giga Joule (as now)
- Sales to the natural gas grid – 10.60 €/GJ
- Used in industrial processes – 5.23 €/GJ
- Used for transport – primarily for transport trucks – 5.23 €/GJ

In addition to the basic subsidy a further subsidy of 3.49 €/GJ for all uses will be given. The subsidy of 3.49 €/GJ is indexed to the consumer price index each year, but at the same time the subsidy will be following the natural gas prices.

For instance the subsidy will be reduced by 1 cent €/GJ, whenever the natural gas prices decrease by 1 cent €/ GJ

From 2013 to 2016 there will be a form of incentive grants of 1.34 €/GJ. The subsidy will be reduced by 0.26 €/GJ from 2016 to 0 €/GJ in 2020.

The total payment for power will then be 15.43 € (115 DKK) / GJ.

On the sale of biogas to natural gas network the requirement will be that the biogas has nearly the same quality as natural gas - this means a methane content about 98 per cent or better.

Therefore, methane in the biogas has to become concentrated by upgrade which has a cost of approx. 0.1 € to 0.13 € kr. per. m<sup>3</sup> of methane.

## **Second questions**

“Utilization rate (preferences) for biogas. (e.g. electric, heat, direct supply of upgraded biogas into the natural gas grid, fuel).”

The CHP plant has a power efficiency of between 35-40 pct. of the energy input. The total energy loss is about 15-25 pct. The heat (in this case warm water to the CHP -district heating plant) production is about 40 pct. of the energy input.

The efficiency of the district heating network may be in the order of 70 pct. on a yearly basis.

Sales price for heat to district heating is about 40 €/MWh.