

Construction start for ethanol factory

The 5th of September was the official first day of construction for DONG's ethanol factory in Kalundborg. The factory, which is to be ready for the Copenhagen Climate Summit, will be one of the world's first plants that can produce fuel on the basis of straw and other residual products from farming.

By Torben Skøtt

– A 2nd-generation plant like this one is not based on food products, which means that it does not take the bread out of the mouths of the world's population. This is a positive contribution for the battle against climate changes, said the Danish Minister for Climate and Energy, Connie Hedegaard, at the official construction start of what is very quickly supposed to be one of the world's first straw-based ethanol plants.

It is DONG's subsidiary Inbicon that is supposed to handle the establishment and operation of the advanced plant. The company has been promised support from the EUDP pool of almost DKK 77 million out of a total fixed asset investment of DKK 300 million.

The people behind Inbicon do not make a secret of the fact that they are going to be very busy until the Climate Summit in December 2009, where they are hoping to be able to drive many of the foreign delegations to and from the Bella Center in cars running on straw-based bioethanol. Therefore, it was also necessary to "jump the gun" with regard to the construction, just as they are continuing developing the technology at a pilot plant in Skærbæk while the factory in Kalundborg is being built.

Started at the plant Fynsværket

The new plant in Kalundborg has roots back to the IBUS project, which DONG (previously Elsam) headed during the period 2002 - 2006. It was an extensive EU project for DKK 100 million, the purpose of which was to integrate the power and heat production at a power plant with a plant that could produce bioethanol and



Photo: Inbicon

The managing director of Inbicon, Niels Henriksen, explains to the Danish Minister for Climate and Energy, Connie Hedegaard, what the finished plant will look like.

feed for farming. During the project, a pilot plant was established at the plant called Fynsværket, which was later moved to DONG's headquarters in Skærbæk, where it is still being used for research and development.

Today, the plant in Skærbæk can handle one ton of straw per hour, and it is the experience from this plant that has been used to design the plant in Kalundborg. Here, the capacity has to be increased to four tons of straw per hour, which will result in an annual production of 5.4 million litres of ethanol, about 8,000 tons of fuel and 11,000 tons of feed pellets.

The location in Kalundborg has been chosen because it makes it possible to use some of the surplus heat from the coal-fired Asnæs plant. According to DONG's calculations, this will result in an additional plus on the CO₂ account of 10,000 tons per year, because the alternative would have been to direct the heat into the ocean. Furthermore, the ethanol plant can supply fuel pellets that have been cleaned of alkali, unlike untreated straw. Thus, you avoid corrosion problems at the power plant, even when using rather large amounts of biomass.

Focus on pre-treatment

Even though DONG now has six years of experience with development of 2nd-generation plants for production of bioethanol,

they still consider the technology to be so complicated that it is necessary to focus the development on specific areas.

– Our core area is a pressurised pre-treatment of the biomass. It is quite a challenge to get bales of straw into a pipe where there is a pressure of about 20 bar, explains Jan Larsen from Inbicon. He emphasises that they obviously have the whole process under control, but that they have chosen specific focus areas, which they now have a patent on.

– There is a remarkable number of areas that you have to be in control of when upscaling a plant, which means that it would not be realistic to have experts in all areas. We have chosen pre-treatment because it is an area that we can also use in other connections, and furthermore, we have developed a special technology that makes us capable of hydrolysing biomass with a dry matter content of more than 25 percent – nobody else has been able to do that, explains Jan Larsen.

According to the calculations of Inbicon, bioethanol can reduce the CO₂ emission by 84 percent compared to traditional fuel. If ten percent of the petrol consumption in Denmark is replaced by bioethanol, it would result in an annual CO₂ reduction of 600,000 tons. If you include the production of biofuel and feed, you achieve an additional reduction of 400,000 tons of CO₂ per year. ■