

Biogas work placement, Obernzenn, Bavaria, Germany 12th to the 27th April, 2013 – Billy Hamilton

Introduction

My interest in biogas production from anaerobic digestion comes from a number of different sources. Having grown up on a farm and having worked on farms for many years I understand the growing pressures on farmers to adapt to ever-changing guidelines and regulations while trying to maintain a reasonable income and standard of living. I see anaerobic digestion as a chance for farmers to take a lead in moving society as a whole toward a more sustainable future while improving on-farm waste management and generating an additional farm income. I have also studied environmental science at university and have worked in the environmental sector for the past ten years so I am very much aware of the need for encouraging sustainable energy production from renewable sources. Not only would this improve energy security by reducing the reliance on imported fuels and electricity but it is also important for reducing green house gas emissions from the burning of fossil fuels.

When participating in the IBBK Biogas Operators and Engineering course (St Ives, Cambridgeshire, 22-25 January, 2013) I learned of the Leonardo Da Vinci placement opportunities available on biogas companies in Germany. As I am currently unemployed I decided to apply for this placement as it would be a good opportunity for me to learn more about biogas production in Germany as well as to experience German culture and language.

The Placement

My placement was for two weeks on a family run pig farm and biogas plant near Obernzenn, Bavaria (Sturm GbR) from the 12th to the 27th April. Another Leonardo candidate, Justyna Franuszkiewicz, was also on the same placement at the same time. The farm is located in a little village called Esbach which is in North West Bavaria approximately 24 km from Ansbach. Aside from the biogas plant they have 2000 finishing pigs and they farm 250 ha. The biogas plant itself has a 500 kw production capacity and is run on a mixture of pig slurry, maize and rye-grass silage.

Biogas Production

The biogas plant was built in 2005 and was one of the first in the local area. Originally there was a digester, a post digester and an end-storage tank, which ran a 250 kw generator. This system had a 50 day retention time. In 2010 they decided to expand and converted the end-storage tank into a digester, covered two smaller existing slurry storage tanks to use as post digesters and built a large end-storage tank to replace the converted one. With the additional digester capacity it was

possible run a second generator of 250 kw, and the retention time increased to 100 days. The substrates used are pig slurry (35-40%), maize silage (45-50%) and rye-grass silage (10-20%).

The digesters are covered by single membrane covers in the case of the three main digesters, and concrete covers in the case of the converted slurry tanks. The main digesters are heated using heat from the combined heat and power generators (CHP) while the converted slurry tanks are not heated.

The digestate is land spread on the Sturm farm and on land rented for the purpose of growing maize and grass for substrate, and cereal crops for pig feed. This off-sets significantly the amount of bought-in nitrogen fertilizer and effectively provides the entire potassium and phosphate requirement in many of their crops. Neighbouring farmers also collect and spread a certain amount of the digestate.

The majority of the heat produced from the CHP is used to heat the digesters and district heating network provides heat to the nearby village of Esbach. They also use excess heat from the exhaust to dry timber.

It is the intention of the Sturm family to move to flexible electricity production. This is being driven by the German government as electricity production from biogas can be varied on a day to day basis depending on demand from the grid. This is important as electricity production from other, weather dependant, renewable-energy production methods, such as solar and wind turbines, has increased significantly in Germany in recent years.

In order to facilitate flexibility in their system the Sturms are going to install a third generator giving them a maximum electrical production capacity of 750 kw. The third generator will only be operational when there is demand from the grid.

Daily Tasks

We very quickly became involved in the day-to-day running of the farm. April is a very busy time for farmers with crop planting, spraying, digestate/slurry spreading and silo preparation being just some of the additional work being carried out over and above the normal operations of feeding the digesters, maintenance etc. Specific tasks that I was involved in included:

- Repair of the pumps that supplied heat from the CHP to the digesters
- Repair of feeders for the pig barn
- Painting the silo with bitumen in preparation for the rye-grass harvest
- Servicing one of the CHP engines
- Replacing the activated carbon in the H₂S gas filter

We were given a daily task of FOS/TAC and dry matter analysis of samples taken from the three

digesters as well as dry matter analysis of the maize silage. This helped us to understand the processes taking place in the digesters and at the same time provided the biogas operator with valuable information on any changes taking place in the system on a day-to-day basis.

Cultural aspects of the placement

The Sturm family made us feel very welcome during our two week stay. We were accommodated in the family home and we had all our meals with the family. Although Thorsten and Georg Sturm spoke English well and were glad of the opportunity to practise with us, the other family members and Christian, the farm labourer, only spoke German and the local dialect. This was a great opportunity for me to practise speaking and understanding German.

I greatly enjoy German cuisine and baking and Christa, Georgs wife, is an excellent cook and in fact runs her own small bakery on the farm. We were treated daily to apfel strudel, schneeball, and many varieties of wurst.

We were also lucky enough to be there during a 350 year anniversary party of a local brewery. This party took place in a Oktoberfest-style tent with traditional music and food. I dressed in a Bavarian traditional "Lederhosen" and found that the local people really appreciated the effort and made us feel very welcome.

Also during our stay we visited the "Bauma" Expo in Munich which is an international expo for construction machinery. This included a very impressive display of some of the largest construction and mining machinery in the world – much of which is German made.

Conclusions

I am very glad to have had the opportunity to participate in the Leonardo Da Vinci biogas placement programme in Germany. I feel I benefited greatly from the experience in a number of ways. Firstly, I gained valuable experience in the day-to-day operation of a biogas plant – something that I intend to put to good use back home. Secondly, I enjoyed very much the cultural aspect of the placement and learned quite a bit about Bavarian culture, cuisine and language. And finally I made good friends while there and will remain in contact with Thorsten Sturm and the Sturm family. I will probably visit Bavaria and the Sturm farm again and have invited Thorsten to come visit me also.

I would not hesitate in recommending this programme to anyone who is potentially interested in participating.