

Seminar on business plans

**March 27th 2008 from 9am to 5pm
"Søhuset", Hørsholm**

The new EUDP program entry requirements include an overview of both technical as well as business-related developments foreseen within the projects. If no business plan is submitted, the project will not qualify for a grant.

Having developed the commercial requirements on behalf of the EUDP secretariat, the company 1st Mile now offers a seminar on business plan writing for EUDP program applicants. The seminar has been put together in co-operation with the EUDP secretariat in order to fulfil their wish for high-quality applications.

The seminar starting point is the applicants own applications, due to arrive at the EUDP secretariat no later than April 11th 2008. One of the seminar goals is to provide the participants with an outline of the commercial part of their individual EUDP application, based on the knowledge gained.

Not only will this seminar raise the application quality by means of better competences and a better understanding, it will also save the participants a lot of time with regards to the wording of their applications, and increase the chances of obtaining a positive answer.

Program:

8.30am - 9am	Registration and morning coffee.
9am - 9.30am	Presentation of participants, seminar goals and the commercial criteria defined by EUDP.
9.30am - 11am	Group task: What if...? An exercise introducing the participants to a commercial way of thinking.
11am - 12.15pm	Case study: Identify the product and its value proposal. Following a short introduction, the participants will identify the commercial core of a case study.
12.15pm - 1pm	Lunch
1pm - 2pm	Commercial criteria defined by EUDP: presentation of the new EUDP requirements and their background.
2pm - 2.30pm	Walk-and-talk - and afternoon coffee
2.30pm - 4pm	Participant applications: Value proposal and business plan.
4pm - 4.45pm	Review of general experiences.
4.45pm - 5pm	Evaluation and round-off.

Practical information:

Price:	DKK 6,900 excl. VAT. Company group discount available.
Time:	March 27th 2008 from 9am to 5pm
Place:	"Søhuset", Hørsholm, Denmark
Registration:	www.1stmile.dk

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Fuel cells for gasification gas

Title: 33030-0036 – Integration of a SOFC fuel cell and the two-step process

Project manager: COWI A/S, Jens Dall Bentzen, ☎ +45 4597 2211

Grant: EFP – DKK 120,000

Part of a larger EU project task, this project involves tests on a SOFC fuel cell running on gas from five different gasification plants across Europe. Click on www.biocellus.de for a more detailed project description.

The Danish part of the project involved testing the fuel cell function when using gas from the so-called wiking-gasifier at the Danish University of Technology. The test was carried out in spring 2006 and the fuel cell was up and running for 168 hours at maximum output without any problems. The test was only terminated because the external partners responsible for the fuel cell had to leave the plant.

In comparison, none of the other four European gasification plants managed to surpass 48 hours of operating time. The reasons for the good results at the Danish University of Technology were most probably that the wiking-gasifier features an extremely stable operation and that it produces high-quality gas that contains neither chlorine, nor sulphur compounds.



photo: henrik flyverchristiansen

The wiking-gasifier at the Danish University of Technology.

IEA biogas co-operation

Title: 33032-0004 – IEA Renewable energy technologies, bioenergy agreement: Task 37 – Energy from biogas and landfill gas

Project manager: The bioenergy task group within the University of Southern Denmark in the town of Esbjerg, Jens Bo Holm-Nielsen, ☎ +45 6550 4166

Grant: EFP – DKK 220,000

This project involves Danish participation in the International Energy Agency co-operation project on biogas and landfill gas throughout the years of 2006 and 2007.

Since 1997, the bioenergy task group at the University of Southern Denmark has been participating in the technical co-operation of IEA Task 37. The main goal of this co-operation is exchanging and imparting knowledge and experiences within the area of biogas production and utilisation, as well as co-operating with all other international organisations within the biogas industry.

Click on www.novaenergie.ch/iea-bioenergy-task37/index.htm for more detailed information about the work of IEA Task 37. Furthermore, the bioenergy task group has ensured that any relevant information is made available to the Danish biogas industry through the website www.sdu.dk/bio.

Corrosion study at the plant Avedøreværket

Title: 6511 – High-temperature corrosion study of an AVV2 bioboiler

Project manager: Dong Energy A/S, Peter Simonsen, ☎ +45 9955 1111

Grant: PSO – DKK 6,800,000

The project was initiated based on the wish to increase the steam temperature to 580°C at the biomass-based part of the plant Avedøreværket. Existing results from corrosion studies at the plant Masnedø led to the assumption, however, that the risk of starting out at such high temperature would be too high.

The project involved monitoring corrosion developments in a variety of test superheaters, installed in the bioboiler, in order to identify the maximum superheater temperature. Furthermore, boiler corrosion developments throughout the initial years of operation were monitored, in turn making it possible to select the optimal steam temperature that would lead to the highest possible level of efficiency and the lowest possible level of maintenance costs.



photo: torben skætt/biopress

Avedøreværket close to Copenhagen features an extremely high level of efficiency, not least because of the high steam temperature within the boiler.

IEA co-operation on biomass combustion

Title: 33032-0027 – IEA bioenergy agreement: Task 32 – Biomass combustion and co-firing.

Project manager: FORCE Technology, Anders Evald, ☎ +45 7215 7700

Grant: EFP - DKK 299,000

This project involves Danish participation in the International Energy Agency co-operation project on biomass combustion throughout the years of 2006 and 2007.

In practice, the IEA group co-operation consists of work meetings held every six months. Such meetings see the exchange of experiences, discussions of new developments as well as updates on and evaluations of ongoing research projects. Between meetings, lively exchanges of experiences take place by means of e-mail and telephone, the group website www.ieabcc.nl making up a central focus point.

Danish participants exchange their experiences through a network established for this particular purpose, through which the participants receive relevant material and post problematic issues that can be analysed through the IEA co-operation.

Optimisation of staged gasification plants

Title: 6530 – Optimisation and automation of a staged gasification plant

Project manager: TK Energi A/S, Thomas Koch, ☎ +45 4618 9000

Grant: PSO – DKK 2,267,895

Originally, the purpose of this project was to carry out long-term testing on a pilot plant for biomass gasification with a view to become experienced in long-term operation as well as component and operating system troubleshooting. The project was supposed to assist in developing the TK Energi staged gasification concept and support the establishment of a full-scale plant in the village of Gjøl in northern Jutland.

However, as the full-scale plant in Gjøl was in fact fully established before the pilot plant, the latter was never actually completed. For that reason, the project would no longer be a source of new knowledge with regards to the Gjøl project. TK Energi decided to terminate the project on the grounds of budget overrun and a lacking Danish market for that kind of technology. Neither long-term operation, nor component and operating system troubleshooting was carried out. No final report has been compiled; however, the last intermediate report is available from Energinet.dk.

Biomass and working environment

Title: 4774 – Biomass technology efficiency improvements and a good working environment

Project manager: National Research Centre for the Working Environment, Anne Mette Madsen, ☎ +45 3916 5200

Grant: PSO – DKK 1,800,000

The purpose of the project was to evaluate the working environment within biomass-based plants, including identification of those work processes featuring an unacceptably high level of endotoxin and microorganism exposure, and definition of suitable means of reducing such exposure.

Investigating working environments at no less than 25 biomass-based plants, the results showed the following:

- Staff members are subject to high levels of endotoxin and microorganism exposure.
- In some cases, the level of endotoxin and microorganism exposure is so high that symptoms of respiratory tract diseases are to be expected at some point in time.
- In general, no serious health issues were identified at straw-based CHP plants.
- Fungal allergies do not seem to be a big problem.
- The studies do indicate, however, that high levels of microorganisms in the air lead to more people developing symptoms of respiratory tract diseases. Therefore, lowering the exposure level would still be advantageous in health-related terms.
- Areas reserved for straw scarifiers and straw reception have been identified as high exposure areas.
- When bales of straw are uncovered, straw is being unloaded, straw is swept around using a broom, or when straw is being relocated, dust exposure levels increase markedly.
- Dust and microorganism exposure levels may be reduced by means of utilising a central vacuum system instead of a broom or by shielding off the straw scarifier.

Anne Mette Madsen is still available for presentations on project results.

New concept for district heating production



photo: torben skott/biopress

Title: 33032-0070 – Improved heat production method by means of waste gas cooling, wetting and condensation

Project manager: COWI A/S, Jens Dall Bentzen, ☎ +45 4597 2211

Grant: EFP – DKK 323,000

By applying a well-known industry technique, COWI has developed a completely new concept for waste gas cooling at district heating plants. This concept is expected to feature a variety of advantages compared to traditional plants, the most important ones being:

- No deposits in the waste gas cooler
- No corrosion in the waste gas cooler
- Higher level of efficiency (10 - 15 percent)
- NO_x reduction
- Low price
- Low maintenance costs

Within this concept, waste gasses from the boiler room are cooled down by means of injecting atomised water into them. Because of the high level of latent heat of evaporation within the water, the waste gasses are quickly cooled down whilst the water evaporates. Amongst other places, this technique is applied in the production of cement and glass in which waste gasses must be cooled down to 200°C in order for it to be purified before escaping into the environment.

By utilising the industry cooling technique within this new type of district heating plants, the vaporised water will turn into water again, at the same time giving off heat to the district heating water. In this simple way, the injected water has been used to relocate energy from the extremely hot waste gasses to the district heating water.

Traditional district heating plants let the waste gasses be cooled down in a heat exchanger that will only cool the waste gasses down to around 130°C because of corrosion issues. The new concept allows waste gasses to be cooled down to 30 – 40°C, whereby the energy potential contained in the fuel is exploited at a level some 10 – 25 percent higher than in traditional plants, depending on the moisture ratio of the fuel in question.

COWI has compiled technical documentation on this new concept, which is being tested at the district heating plant in the town of Hundested in 2008.

MaxiFuels pilot plant

Title: 33031-0066 – MaxiFuels – Pilot-scale testing and further development of a fermentation platform for maximum bioenergy production (ethanol, hydrogen and methane) using biomass residual products such as straw

Project manager: BioCentrum/Danish University of Technology, Birgitte K. Ahring, ☎ +45 4525 2600

Grant: EFP – DKK 10,779,000

The purpose of the project was to establish and test a pilot plant based on the so-called MaxiFuels concept, which converts agricultural waste and residual products into bioethanol. The MaxiFuels concept is a patented technology with a proven ability - at laboratory level - to produce bioethanol at very low costs based on the integration of several processing procedures; hydrolysis through addition of enzymes; fermentation as well as conversion of residual products into biogas.

Inaugurated in September 2006, the following months were spent performing equipment testing and adjustments of the MaxiFuels plant in order to increase the efficiency of each individual process.

Overall, the pilot plant is now up and running and the test schedule has been adhered to in accordance with the original application. Operational data has been utilised to establish an economic model of the entire concept, showing how the efficiency of each individual sub-process influence the final production of ethanol. Based on this model, a full-scale plant has been designed and a business plan has been drawn up. The model, the full-scale design and the business plan were prepared by the company BioGasol in co-operation with BioCentrum/Danish University of Technology.

Furthermore, a confidential report on pilot plant operation results has been drawn up and given to the consultancy firm Black&Veatch with a view to obtaining an objective evaluation of the MaxiFuels concept. A scientific paper on operation results of the biogas process is being published and more are underway.

The MaxiFuels concept is continuously developed: currently BioGasol is establishing a demonstration plant on the island of Bornholm in co-operation with Siemens, Alfa Laval, Agrotech and Grundfos. Ethanol production will be initiated by the end of the year and the plant is expected to be fully developed by 2009.



photo: bo jærner, danmarks tekniske universitet

A photo taken at the inauguration of the MaxiFuels plant at the Danish University of Technology in September 2006.