IEA Bioenergy Task 39

Commercializing 1st- and 2nd- Generation Liquid Biofuels from Biomass

Task 39 Newsletter • Issue # 22 • February 2009

SUMMARY

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FROM THE TASK

Welcome to the first edition of the IEA Bioenergy Task 39 (Liquid Biofuels) newsletter for 2009! The past year was a good year for Task 39 and 2009 promises to be even more exciting.

In this issue, we focus our attention on the biochemical conversion research and development (R&D) activities of one of our member countries, Denmark. This includes a detailed profile on Inbicon, a Task 39 member institute based in Denmark. We would like to extend profound gratitude to Henning Jørgensen, Michael Persson, and Mette Maj Norddahl Kirsch for contributing this article.

Many of you have already confirmed your participation in our upcoming Task 39 business meeting, which takes place on May 2, 2009 - a day prior to the official commencement of the 31st Symposium on Biotechnology for Fuel and Chemicals in San Francisco, USA. The Task meeting will focus on progress made in commercialisation of 2nd-generation liquid biofuels. As part of the meeting, Task 39 plans to have a joint lunch with Task 40, with the aim of identifying opportunities for collaboration for the next triennium. If you are interested in attending this meeting, please contact Emmanuel Ackom (emmanuel.ackom@ubc.ca).

Task 39 will meet in Dresden, Germany from June 2-5, 2009 for a four-day policy workshop. This policy workshop is themed *"From today's to tomorrow's biofuels - from the Biofuels Directive to bio-based transport systems in 2020".* Please contact our colleague, Dina Bacovsky (dina.bacovsky@abc-energy.at) directly if you are interested in attending the Dresden meeting.

Task 39 is also helping to organise the IEA Bioenergy Multi-Task Conference in Vancouver, Canada from August 23-26, 2009. This meeting, entitled "*Biofuels and Bioenergy: A changing climate*", will bridge topics from conversion technologies to socioeconomic impacts and trade. More information is available on the conference website, http://www.ieabioenergyconference.org. We have just released the call for oral presentations and posters. The deadline for final submission is April 1, 2009. Vancouver is incredible at this time of year and the conference is shaping up to be a great place for networking and staying on top of the latest developments in bioenergy.

Our colleague, Dina Bacovsky has developed an interactive web link where Task 39 members can identify and contribute to a map of existing and planned 2nd generation biofuel projects. The map and information on individual projects can be found at Task 39 website at http://www.task39.org/TaskOutputs/Implementation/tabid/2677/language/en-US/Default.aspx

This newsletter marks a change in the Task membership. We are very happy to welcome Kieran Power, who has replaced Trevor Raggatt as our new Task 39 Executive Committee Member from the UK. We would like to thank Trevor very much for his active role while in Task 39.

As always, we invite you to continue to use the Task 39 website (www.task39.org). Task members can access presentations from past Task 39 meetings as well as up-to-date reports, such as the Biofuel Implementation Agendas. All visitors to our website will find older reports and a wealth of information on liquid biofuels. We hope to continue to expand the website into a one-stop resource for those looking for information on Task 39 personnel and biofuels research. – Emmanuel Ackom, Warren Mabee, Jack Saddler.

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IN THE NEWS

Corn ethanol emits 51 percent less Greenhouse gas than gasoline

Thanks to recent improvements in production process efficiency, researchers at the University of Nebraska-Lincoln have shown that an average of 51% less greenhouse gas (direct emissions) are associated with corn ethanol in comparison to gasoline. These findings represent significant improvements over reported values in earlier research. The research published in the Journal of Industrial Ecology, evaluated dry-mill ethanol plants (accounts for 90% of current US production capacity) that use natural gas. More information

Biofuel carbon footprint not as negative

A recent paper "*Biofuels, Land Use Change, and Greenhouse Gas Emissions: Some Unexplored Variables*", published by researchers at Michigan State University in the journal Environmental Science & Technology, indicates that effective land management practices leads to significant reductions in the carbon profile of biofuels . More information

Lignol receives $1.82 Million (CDN) from British Columbia bioenergy Network

Lignol Energy Corporation, a leading technology company in the cellulosic ethanol and biorefining sector, announced that a project led by its wholly-owned subsidiary, Lignol Innovations Ltd., has been awarded up to $1.82 million in funding assistance from BC Bioenergy Network Association (BCBN). More information

New Generation Biofuels & First Florida Biofuels form strategic alliance

New Generation Biofuels Holdings Inc., a development stage renewable fuels provider, announced the signing of a Memorandum of Understanding (MOU) with First Florida Biofuels LLC (FFB) to pursue development of biofuel projects in Florida. More information

USDA approves first guaranteed loan for commercial cellulosic ethanol plant

Then U.S. Agriculture Secretary Ed Schafer announced last week that USDA Rural Development has approved the first ever loan guarantee to a commercial-scale cellulosic ethanol plant. This US $80 million loan guarantee for Range Fuels Inc. comes from the Section 9003 Biorefinery Assistance Program authorized by the 2008 Farm Bill. More information

Proteus & Syngenta to collaborate on enzyme development for biofuels

Proteus announced that it has entered into a collaboration agreement with agribusiness firm Syngenta. The two companies plan to work together on the development of novel high performing enzymes for next generation biofuel production. More information

US DOE announces $200 million for advanced biofuel refineries

The U.S. Department of Energy on Monday said it was making available up to $200 million for advanced biofuel pilot refineries, expecting to award five to twelve projects over the next six years. The DOE said that if deployed on a large scale, the commercial facilities could produce volumes that would contribute significantly to the new national renewable-fuels mandate. More information

New ethanol start-up in Sweden

One of the world's most energy-efficient bioethanol production plants is currently being commissioned in Norrköping, Sweden by Austrian firm Vogelbusch GmbH. With a weekly output of more than 3 million liters of bioethanol from grain, the multi-pressure system is one of the biggest in northern Europe. More information

An ethanol pipeline begins service

A key challenge in piping ethanol is the effect of corrosion (resulting from the reaction with alcohol) leading to cracks in pipelines. Additionally, water can often seep into pipeline systems and damage the fuel (ethanol). Kinder Morgan, one of the United States' largest fossil fuel pipeline companies, is now piping ethanol over 85 miles from Tampa to Orlando. More information

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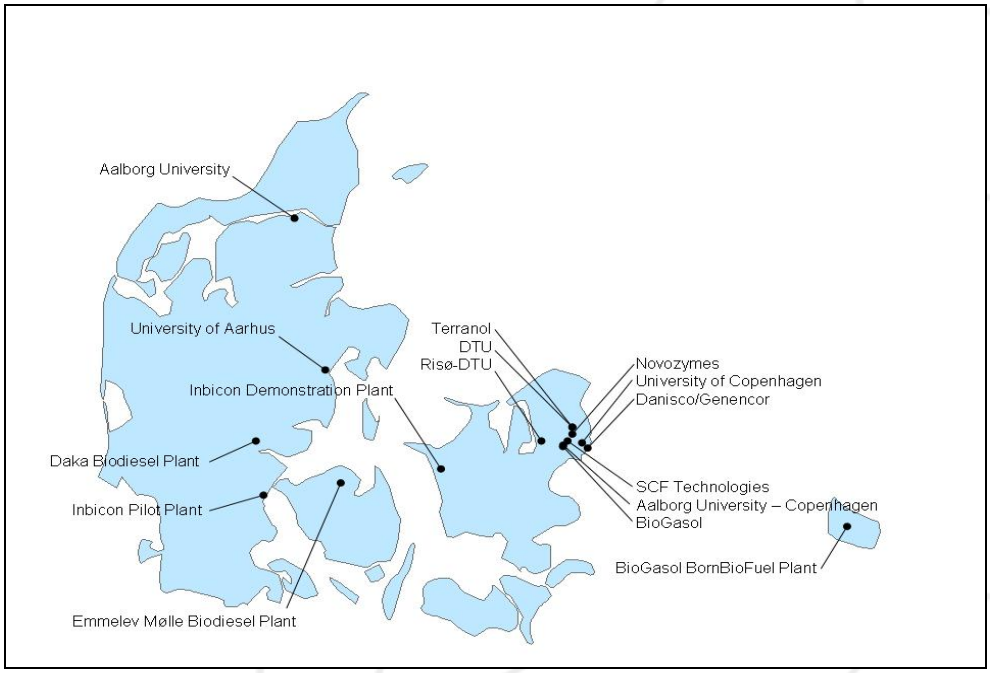
BIOCHEMICAL CONVERSION RESEARCH AND DEVELOPMENT IN DENMARK

Henning Jørgensen[1], Mette Maj Norddahl Kirsch[1], Michael Persson[2]
[1] Forest & Landscape Denmark, Faculty of Life Sciences, University of Copenhagen
[2] Inbicon A/S

Denmark is located in Northern Europe and occupies 43,094 square kilometres. The principal use of biomass in Denmark is for heat and power generation. Biomass accounts for approximately 13% of Denmark's total energy consumption.



Map of Denmark showing location of major biofuel related activities.

At a national level, the usage of bioenergy feedstock, primarily agricultural residues has been supported through regulated obligations since 1993. The target for liquid biofuels in Denmark is the European Union (EU) goal of 5.75 % blend in transportation fuels by 2010 and a 10 % mix by the year 2020. In order to reach these targets, increased funding has been allocated for research in 2nd generation biofuels. Annual funding for energy research and demonstration has been projected to double from the current € 66.5 million to €133 million in 2010.

Biofuel activities in Denmark can be group into two main categories namely:

- Demonstration/pilot projects; and
- University Research and Development

Demonstration and commercialisation of biofuels

Picture of Daka Biodiesel a.m.b.a.

Daka Biodiesel a.m.b.a. - The company is a pioneer in its industry and produces a biodiesel product based on agricultural by-products and refined animal fat from slaughterhouse waste. In addition to biodiesel, the production process results in glycerine and potassium sulphate. By the beginning of 2009, Daka will provide biodiesel for mixing with diesel at the gas stations of Denmark's second-largest city, Aarhus. The company's plant has a capacity of approximately 55 million litres / year and is preparing to expand that capacity to 100 million litres / year. Due to the relatively high content of free fatty acids and micro-components in the feedstock, the conversion process involves more stages than conversion from plant oils. The development effort at Daka is aimed at improving production efficiency, primarily to obtain cheaper and more efficient catalysts. In the near future, Daka hopes to focus on effective methods for utilising the energy in the by-product glycerine.

Inbicon – Inbicon is a DONG Energy spin-off company. Inbicon is presently constructing a € 40 million demonstration plant for producing 2nd generation bioethanol. A detailed profile on Inbicon A/S has been provided below.

BioGasol – BioGasol plans to open its demonstration plant, BornBioFuel this year (2009). BornBioFuel will have the capacity to process 40,000 tons of biomass per year for cellulosic bioethanol production. The plant will demonstrate conversion of agricultural residues, garden waste, straw, energy crops, and road side grass clippings into ethanol and other by-products. BioGasol's proprietary process technologies originate, in part, from the Maxifuel concept developed in collaboration with the Denmark Technical University (DTU). A pilot plant for demonstrating the Maxifuel concept was built in 2007 at DTU. The technologies developed by BioGasol also form the basis for processes at existing plants in the United States e.g. a US DOE-funded 1:10 scale cellulosic bioethanol plant at an existing corn-to-ethanol plant (in collaboration with Pacific Ethanol Inc.) in Boardman, Oregon and a process for conversion of residual corn fibres into bioethanol and other co-products at Tate & Lyle LCC's wheat-based biorefinery plants.

Novozymes – Novozymes is the world's largest producer of industrial enzymes for bioethanol production, although most of its research activities related to 2nd generation bioethanol has been relocated to the United States upon winning US DOE grants in 2000. A relatively smaller group is still working on both 1st and 2nd generation biofuels in Denmark. In addition to bioethanol, Novozymes also has projects on enzyme applications for biodiesel production via lipid extraction and esterification. Novozymes is also very actively involved in a number of research projects with Danish universities.

Genencor – a division of the Danish company Danisco A/S, Genencor is the second largest producer of enzymes for 1st and 2nd generation bioethanol. In Denmark, the company has a group of researchers collaborating with Genencor centres in USA and the Netherlands on bioethanol-related projects.

Terranol A/S – Terranol A/S specializes in the development of yeasts for 2nd generation bioethanol production. Under the new Energy Technology Development and Demonstration Program (EUDP), the Danish Energy Agency has granted Terranol A/S €1.5 million to developed yeast to ferment C5 sugars.

Emmelev* Mølle *A/S – *Emmelev* Mølle A/S is the only Danish producer of 1st generation biodiesel from rapeseed oil. Due to more favourable market conditions, the biodiesel produced by Emmelev is exported to Germany, Norway and Sweden. The Biodiesel plant handles around 200,000 tons raw materials a year to produce 80,000 tons biodiesel and 120,000 tons rapeseed cakes. To support the increased biodiesel production, Emmelev A/S built a glycerine distillation plant in 2005.

SCF Technologies – *SCF Technologies* are the developers of the CatLiq® technology, which converts biomass and organic waste into biofuel. The CatLiq® process is especially well suited for treating organic waste with high levels of water content. This 2nd generation technology uses high pressures to convert waste biomass to biofuel using an engineering process that is similar to nature's formation of fossil oil.

University Research and Development

Research at University of Copenhagen

Most research activities related to production of bioenergy, including bioethanol, are carried out at the Faculty of Life Sciences (LIFE), which was an independent university (The Royal Veterinary and Agricultural University) until 2007. Here, research focuses on plant biomass for energy, ranging from molecular improvement of plant biomass feedstocks for conversion to logistics and land use. In 2007, the Faculty established a strategic research initiative, *Fuel for Life*, covering the whole value chain of biofuels.

Faculty of Life Sciences, University of Copenhagen.

Some of the core research on bioenergy at LIFE targets commercial applications in the form of optimized processing, new genetic tools and potentially new and improved methods for pretreating biomass feedstocks.

Forest and Landscape Denmark

This is an independent research centre at LIFE. Here, research and development on bioenergy focus on structural analysis of the biomass feedstock and improved conversion technologies. A central issue in recent years has been the liquefaction, hydrolysis, and fermentation of lignocellulosic materials at high solids concentrations (above 25% DM). The aim is to improve hydrolysis efficiency when operating at high solids concentrations by improving the processing technologies and efficiency of the enzymes. Examples include the use of thermophilic enzymes in the liquefaction process and using enzymatic liquefaction for preparing municipal solid waste for gasification and subsequent synthesis fuel production. In collaboration with Department of Agriculture and Ecology, a large screening of program of more than 200 varieties of wheat straw for their ethanol potential has been undertaken.

Atomic Force Microscope (AFM) for imaging biomass

Hydrolysis and fermention reactor at high solids concentration

Other areas of expertise include characterisation of the plant cell wall structures and functions responsible for conversion efficiency (recalcitrance); enzyme-substrate interactions in the plant cell wall; and testing and evaluation of various feedstocks. The group has access to tools for bio-imaging (SEM and AFM), spectroscopy (NIR and ATR-FTIR), and low field NMR. Overall, the work contributes to elucidate how feedstock, biomass structure, pretreatment and enzymes interact in the processing of biomass for fermentable sugars.

Research at Forest and Landscape Denmark also deals with logistics of biomass and land use aspects of agricultural and forest production of biomass for energy.

Department of Plant Biology and Biotechnology

The production of carbohydrates in the plant cell wall is at the centre of this department's biofuel-related research. This includes carbohydrate metabolism and metabolite profiling as well as elucidation of cell wall biosynthesis, molecular characteristics of the cell wall, and the products of the cell wall degrading enzymes. Ultimately, this work contributes to coupling the genes responsible for relevant characteristics of the plant to biomass phenotypes. The aim is to develop transgenic plants with increased carbohydrate content and an improved profile, easing conversion to fermentable sugars.

Department of Agriculture and Ecology

The biofuel related research in this department ranges from plant nutrition and agroecology to molecular improvement of the bioenergy crop. Overall, advances made within these fields aim at enhancing the environmental sustainability of bioenergy crops and mitigating the potential negative impact on food production.

Some of the major research areas in this context are processes involved in nutrient acquisition and carbon allocation by higher plants, ecosystem services in agricultural and in other human managed systems, modelling of cropping systems, combined food and energy systems, barley and wheat mutant population, plant quality traits, and sequence analysis.

Other departments at the University of Copenhagen

Elsewhere at the University, researchers deal with various aspects of the usage of biomass for energy. For instance, research at the Department of Chemistry has long included analysis of exhaust gasses from the combustion of biofuels. The Faculty of Law have taken up the intricacies of bioenergy law and regulations and recently held an international conference on bioenergy and climate. Also the economic aspects of biomass production and bioenergy are dealt with at the Institute of Food and Resource Economics at LIFE. These very widespread research groups all contribute to a lively debate within the biofuel network at the university as well as publicly.

Biofuel research in other Danish Universities

Almost all Danish universities and research institutions became part of a major merger in the year 2007. This process resulted

in a sometimes confusing reshuffling of departments at various geographical locations and much fewer universities namely; the universities of Aarhus, Aalborg, Copenhagen, Roskilde and Southern Denmark as well as the Technical University of Denmark. All of these have research groups with some focus on bioenergy but at different scales and with a very different involvement in commercial biofuels.

Information on biofuel research at three of these universities, the University of Aarhus, Risø National Laboratory and Technical University of Denmark, and Aalborg University is provided below:

University of Aarhus, the Faculty of Agricultural Sciences

Research here focuses on plant biotechnology, efficiency of plant nutrient use, and molecular breeding regarding carbon allocation in higher plants. The research also includes cell wall biology with a focus on the biosynthesis and technical uses of complex plant polysaccharides.

Risø National Laboratory and Technical University of Denmark (Risø-DTU)

With the university merger in 2007, Risø National Laboratory became part of DTU. Risø has for many years been working on conversion technologies, and in particular, wet oxidation pretreatment. The university currently has access to several pretreatment reactors and pilot plant facilities for the production of 2nd generation bioethanol. Besides the pre-treatment, the Biosystems Division at Risø-DTU is working on the development of new microorganisms (yeast and anaerobic bacteria) for efficient fermentation of pentoses and hexoses. Research also involves looking into new feedstocks for bioethanol production as well as biorefinery related issues, including new polymers based on hemicelluloses derived from the bioethanol process. The Department of Chemical and Biochemical Engineering has numerous biofuel-related projects including enzymatic hydrolysis of lignocellulose, reactor design, and overall system modelling. Additionally, there are several research projects on cocktail optimization of mono-component enzymes for hydrolysis of arabinoxylans and cellulose.

Aalborg University, Department of Biotechnology, Chemistry and Environmental Engineering

A research group lead by Professor Birgitte Ahring (originating at the Technical University of Denmark) moved to Aalborg University in the summer 2008. The group has a long history of working with thermophilic anaerobic bacteria for bioethanol production based on pentoses as well as hexoses, and has significant expertise in genetic modification of thermophilic anaerobic bacteria and the use of immobilised reactor systems for fermentation. The group has been involved in the development and testing of the Maxifuel concept, which is now part of the technology in the company BioGasol. The group just received the equivalent of €2.3 million for a biorefinery project for production of 2nd generation bioethanol, feed and chemicals.

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Inbicon: demonstrating industrial scale cellulosic ethanol (from December 2009).

Michael Persson
Inbicon A/S

The construction site in December 2008

Inbicon A/S is a Danish biotech start-up company focusing on cellulosic conversion technologies. The mission of Inbicon is to develop and market technologies that reduce the pressure on the earth resources by converting agricultural and other green residues into useful products, such as fuel, feed and chemicals. Inbicon wants to do this in a flexible and intelligent way for environmental and economic sustainability. The name Inbicon is derived from INtegrated BIOmass COnversion – (but it might as well have been formed from INtelligent BIOmass Conversion). The company aims to become the world leader of technology for conversion and refining of soft lignocellulosic biomass into fuel, feed and green chemistry products. Inbicon wants their technology to be the preferred entry point before downstream processing technologies such as enzymatic liquefaction, bio-gasification, and thermal gasification.

History of the company

In the 1990's, the Danish power company Elsam took on the task of utilizing wheat straw and wood chips for large scale energy production. Several approaches were chosen and many lessons were learned. One of the most important findings was that salts in the biomass created several problems when the biomass was burned in high-temperature boilers. Elsam found different ways to work around this, and the basis was formed for the development of a new biomass pre-treatment technology. In the late 90's, the core concepts of the conversion technology were developed by combining biomass treatment, traditional ethanol technology, and 2nd generation bioethanol technology. From 2002 to 2006 Elsam led the large scale European R&D project "Co-production Biofuels", under which prototypes were built, and the complete process was demonstrated.

In 2007, Inbicon A/S was established as a separate subsidiary to focus on further development of the biomass pre-treatment technology. As for Elsam, in 2006 it had merged with six other energy companies in Denmark to form DONG Energy A/S. In its heat and power plants, DONG Energy burns more than 1.5 million tons of biomass every year.

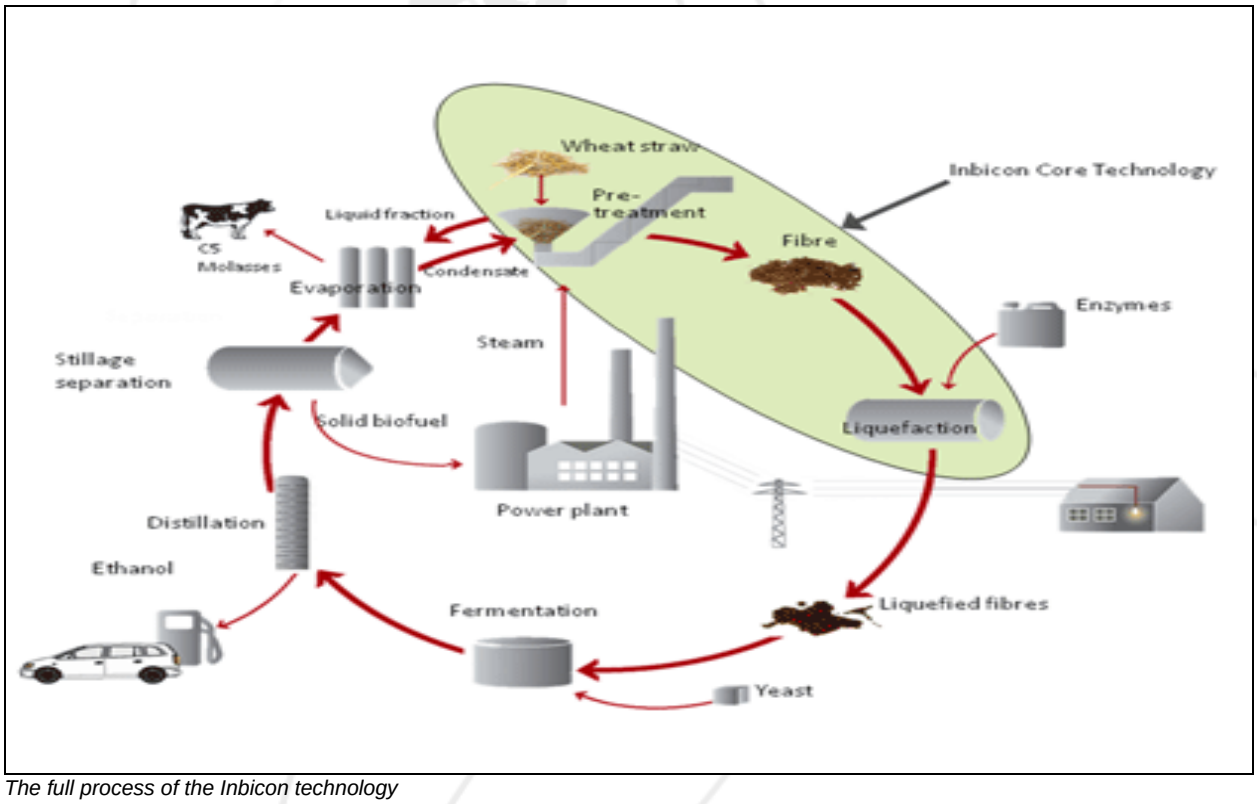
Business philosophy

Inbicon's objective is to develop pre-treatment concepts and to demonstrate technologies on a commercial scale in order to license the technologies to commercial partners, which can then sell and construct plants for biorefineries. Inbicon aims to form partnerships with companies able to complement their technologies to Inbicon's technologies. Examples of this cooperative approach are C5 fermentation technologies, where Inbicon has no technology, but is willing to supply C5 molasses for testing.

Another area where Inbicon pursues a non-exclusive approach is with enzymes. Inbicon wants enzymes from as many suppliers as possible to be suitable for its technology and has pre-qualified both Danisco Genencor and Novozymes as enzyme supplier for the demonstration plant presently under construction.

The Core Technology

The core technology of Inbicon is a three-stage process: mechanical, hydrothermal, and enzymatic treatment of biomass. Under the patented hydrothermal pretreatment process, the biomass is continuously mixed with water and heated to around 180-200ºC for 5-15 minutes in order to break down the protective lignin structure and make the cellulose available for enzymes. Another important function of the pretreatment is the separation of the alkali content and a portion of the inhibitors formed through partial degradation of the hemicellulose.



The full process of the Inbicon technology

The process operates at high (30% - 40%) dry matter content, minimizing the consumption of water and energy. The straw is fed into the pressure reactor with the Inbicon proprietary particle pumps. After hydrothermal pretreatment, the biomass is split into two fractions: the fiber fraction, which consists of 50-60% cellulose and 2-10% hemicelluloses; and the liquid fraction, which contains high levels of C5 sugars, salts and inhibitors. Enzymes are added to the fibre fraction, which is liquefied as part of the cellulose is converted to lower carbohydrates. The process is continuous and takes place in a horizontal reactor with paddles (a so-called free fall mixer). The fibre mass leaves the pretreatment with 30-40% dry matter content, enters the reactor at one end, and, after a couple of hours, exits the other end of the reactor. By the time the fiber mass leaves the reactor, the viscosity has been dramatically reduced, and the substance can be pumped to traditional fermenters typically used in 1st generation ethanol plants. The liquid fraction will initially be used as molasses feed for domestic animals, but at a later stage and with appropriate technology, could be converted into ethanol or other chemicals. Because Inbicon's pretreatment yields a much higher concentration of sugar in the liquid going to fermentation, the resulting alcohol concentration can reach 12% (vol/vol). This is double the concentration of normal cellulosic ethanol processing and ensures high yield and efficiency.

The process was originally developed to convert straw into bioethanol, animal feed and solid biofuel, but has been tested with other types of biomass such as corn stover, grasses, bagasse, household waste, etc. Just recently, Inbicon announced an agreement with Mitsui Engineering and Shipbuilding of Japan to test a residual product from plantations in Asia.

The Pilot Plant facilities

The pilot plant facilities are located in a former turbine hall at the Skaerbaek power plant and next to the headquarters of DONG Energy. Inbicon has two hydrothermal pretreatment reactors at the facility, with the smaller reactor, which is used for process development, operating at a capacity of 100 kg/h. The biomass is treated at near-industrial conditions, while operational and process parameters can be varied and tested within a short time frame. In 2005, Inbicon inaugurated a larger 25 t/d facility for hydrothermal treatment of wheat straw, which is used for mechanical development through testing of new designs and

equipment. To complete the process, Inbicon has a number of liquefaction reactors in sizes from 0.4 to 11 m^3, and a distillation tower with stripper and rectifier. Furthermore, there is a laboratory facility fully equipped with liquefaction reactors, fermentors and analytical equipment – all optimised for rapid process development.

The 100 kg/hr pretreatment pilot plant - Skaerbaek power plant

The distillation tower - Skaerbaek power plant

Demonstration Plant in Kalundborg (to be ready for Copenhagen Climate Summit in 2009)

Inbicon is constructing a demonstration plant in Kalundborg, Denmark. The primary purpose of the demonstration plant is to show that Inbicon's straw-to-ethanol production technology can be applied on a large scale.

The Kalundborg plant will also demonstrate energy integration with a power station. Steam from the power plant will cook the straw, and residual biofuel from the ethanol plant can be burned by the power plant. Since the cellulosic ethanol plant produces more energy than it consumes to convert the biomass, the end result is an energy surplus that brings down the cost for both plants. The investment is in the range of € 40 million, of which the Danish Energy Authority has granted € 10 million.

Location:	Kalundborg (at Asnaes Power Station)
Scheduled start-up:	November-December 2009
Raw materials:	30,000 tonnes of straw per year (four tonnes / hr.)
	Danisco Genencor and Novozymes are pre-qualified as suppliers of enzymes
Output:	4,300 tonnes / 5,400 m^3 of ethanol per year
	8,250 tonnes of bio pellets per year
	11,100 tonnes of C5 molasses (65%DM) per year (will be used as feed but could, in the future, also be used for bioethanol or biogas production)

Kalundborg - summary of material inputs and capacity

Links:
Inbicon: www.inbicon.com
BioGasol: www.biogasol.dk
Daka Biodiesel: www.dakabiodiesel.com
Emmelev Mølle: www.emmelev.dk
Genencor: www.genencor.com
Novozymes: www.novozymes.com
SCF Technologies: www.scf-technologies.com
Terranol: www.terranol.dk
Risø-DTU: www.risoe.dk
Technical University of Denmark: www.dtu.dk
University of Copenhagen: www.ku.dk
Faculty of Life Sciences: www.life.ku.dk
Biofuel initiative Fuel for Life: www.fuel.life.dk
University of Aalborg: www.aau.dk
University of Aarhus: www.au.dk

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UPCOMING TASK 39 MEETINGS

Task 39 will be holding a full day business meeting on May 2, 2009 in San Francisco, USA, to discuss progress in commercializing 2nd -generation liquid biofuels, in conjunction with the 31st Symposium on Biotechnology for Fuel and Chemicals (May 3-6, 2009).

On June 2-5, 2009, there will be a four-day Task 39 policy workshop in Dresden, Germany.

Task 39 is assisting to organize the IEA Bioenergy Multi-Task Conference in Vancouver, Canada from August 23-26, 2009.

We would encourage you to contact Emmanuel Ackom (emmanuel.ackom@ubc.ca) for more details on these meetings.

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NEW REPORT

1. An Examination of the Potential for Improving Carbon/Energy Balance in Bioethanol

This consultant report is available to all Task members on Task 39's website. Non-members wishing to view the report should contact their appropriate country representative.

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TASK 39 MANAGEMENT TEAM

Operating Agent, Agency: Ed Hogan, Natural Resources Canada, ehogan@nrcan.gc.ca
Task Leader, Agency: Jack Saddler, University of British Columbia, jack.saddler@ubc.ca

Associate Task Leaders:
(Implementation Issues): Manfred Wörgetter, manfred.woergetter@blt.bmlfuw.gv.at
(Technology): Guido Zacchi, guido.zacchi@chemeng.lthl.se
(Policy, Europe): John Neeft, J.Neeft@senternovem.nl
(Policy, North America): Warren Mabee, warren.mabee@ubc.ca

Task Coordinator, Editor/Webmaster: Emmanuel Ackom, emmanuel.ackom@ubc.ca