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25 tpd Border Biofuels/Dynamotive PLANT in the UK

By Antony Robson, Dynamotive Europe Limited, UK

Border Biofuels and its consortium partners DynaMotive Europe Limited and Orenda Aerospace Corporation has been awarded one of the UK Government's largest ever grant offers to support the development of energy from biomass in the UK.

The £1.16 million/US$1.7 million grant from the Department of Trade & Industry (DTI), which was announced by the UK Energy Minister Peter Hain, will aid the development of an integrated feedstock preparation, Bio-oil production and power generation plant in the UK. The project is expected to cost in excess of £4.5 million/US $6.6 million and will be funded equally by the partners.

Border Biofuels plans to construct a 25-tonne/day facility utilising DynaMotive Europe's patented fast pyrolysis technology to produce Bio-oil under a licensing agreement. The plant is expected to have a capacity to produce 12,000 litres of Bio-oil a day – enough to power a sawmill.

Dynamotive 10 tpd Facility in Vancouver

Dynamotive is now operating its new 10 tpd fast pyrolysis plant in Vancouver, Canada (Figures 1 & 2) and initial production has been completed successfully.
Fuel quality oil was produced from British Columbia wood residues including mixed sawdust; softwood bark; mixtures of softwood and bark and sugar cane bagasse.

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Figure 1: 10 t/d fluid bed fast pyrolysis plant in Vancouver.

The 5th Biomass conference see p14

The 1st International Congress on Biomass for Metal Production and Electricity Generation see p15

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Comments and contributions are most welcome on any aspect of the contents.
Please contact your country representative for further details or send material to Claire Humphreys.

Contents

Co-ordinator
Tony Bridgwater

Newsletter & Website Administrator
Claire Humphreys

Events Organiser
Julie Ellen

Bio-Energy Research Group,
Aston University, Birmingham B4 7ET.
UNITED KINGDOM.
Tel +44 121 359 3611
Fax +44 121 359 6814

Email a.v.bridgwater@aston.ac.uk
c.l.humphreys@aston.ac.uk
j.ellen@aston.ac.uk

Website http://www.pyne.co.uk

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Continued from front cover

The new Bio-oil plant was designed in-house by Dynamotive's Technology Group and constructed at the British Columbia Research Complex in Vancouver BC. The plant conforms to all applicable safety, electrical and mechanical design standards,

Figure 2: 10 t/d fluid bed fast pyrolysis plant in Vancouver.

utilising state of the art 'smart' instrumentation and a high powered industrial-grade distributed control system (DCS). The plant was designed to facilitate easy scale up to commercial plant capacities.

Officially commissioned on March 8th, the fully automated plant will have a production capacity of 6,000 litres of Bio-oil per day, providing much larger quantities of Bio-oil for engine and combustion test programmes.

For more information in Europe contact:

Mr Antony Robson
Managing Director
DynaMotive Europe Limited
Tel: +44 (0) 20-7518-9380
Fax: +44 (0) 20-7518-9381
Email: arobson@dynamotive.com

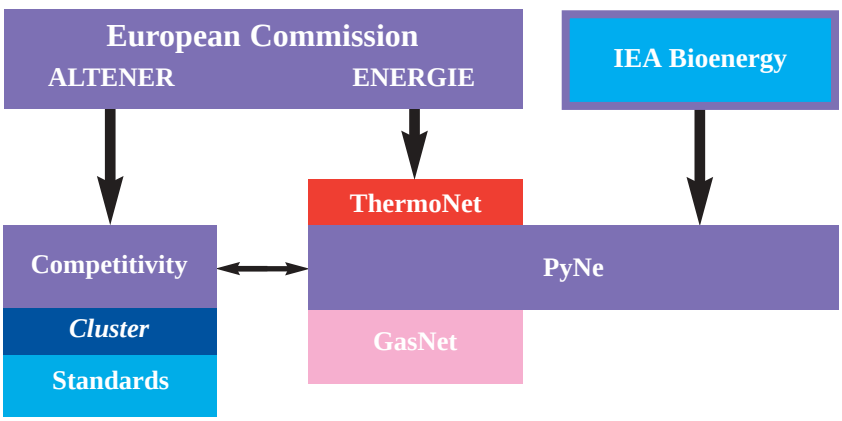
The latest news on ThermoNet and PyNe

By Tony Bridgwater, Aston University,UK

The EC contract for ThermoNet that incorporates the continuation of PyNe and the formation of GasNet – an analogous Network on biomass gasification – has now been signed and ThermoNet will officially start on 1st June 2001. PyNe is also sponsored by IEA Bioenergy and currently the USA is a member of PyNe.

In addition, two Altener Contracts have also been signed recently. One project will carry out a study on the competitivity of bio-oil in a variety of heat and power applications in every European country and which will involve all EU PyNe members.

The other project will investigate Norms and Standards for bio-oil. These two projects have been clustered by the European Commission to enhance interactions. The relationship between all these networks is shown in the figure below. An important feature of these combined networks and projects is the opportunities that will be created to benefit from all the knowledge and expertise of the members, particularly in the interactions and joint activities that are planned for the next three years.



The Hawaii Natural Energy Institute

By Gregg Hirata, Hawaii Natural Energy Institute, University of Hawaii, USA

The Hawaii Natural Energy Institute (HNEI) provides leadership and support for the research, development, and utilisation of technologies that will enable Hawaii to tap its land and ocean resources for energy, food, minerals, and other needs. HNEI conducts applied research, manages research facilities and laboratories, demonstrates the applications of its work, and investigates the social, environmental, and economic impact of energy – and marine-related activities. HNEI co-operates in these endeavours with researchers from the University of Hawaii, government, industry, public utilities, and universities and research institutes abroad.

High-yield charcoal reactor.

For further information contact:

Dr Michael Antal, Jr.,
Hawaii Natural Energy Institute
School of Ocean and Earth Science
and Technology
University of Hawaii
2540 Dole Street
Holmes Hall 246
Honolulu
Hawaii 96822
USA

Tel: +1 808 956 7267
Fax: +1 808 956 2336
Email: antal@wiliki.eng.hawaii.edu

The Hawaii Natural Energy Institute has an exceptional record of achievement in developing alternatives to fossil fuels, including:-

- Spearheading the discovery and use of geothermal power in Hawaii.
- Co-ordinating the first comprehensive wind surveys of the Hawaiian archipelago that furnished the data needed for the location of wind turbines.
- Conducting surveys of solar insulation and testing a variety of electricity-generating solar devices and systems.
- Conducting numerous studies on ocean thermal energy conversion.
- Testing biomass-derived alcohol fuels as a replacement for petroleum-based transportation fuels.
- Establishing the most comprehensive hydrogen program of any university in the USA, a standing attributable to pioneering research on the production of this gas through solar electrochemical advancements using thin semiconductor films, gasification of biomass, and genetic engineering of hydrogen-producing marine organisms.
- Supporting marine-related research on deep-sea minerals mining, open-ocean fish farming, very large disposal of greenhouse gases in the ocean.

HNEI's Renewable Resources Research Laboratory, under the direction of Dr Michael J Antal, Jr., is a pioneer in the research and development of biomass technologies. Dr Antal, who is the Coral Industries Professor of Renewable Energy Resources, has patented a charcoal production technology that gives high charcoal yields, producing charcoal in minutes or hours, as compared to the many days of existing industrial technology or the longer periods of traditional methods. The technology can accept a variety of feedstocks, including moist wood logs, wood chips, and other commonly available biomass and agricultural by-products and is virtually non-polluting. The laboratory is a test-bed for the production of hydrogen using supercritical gasification (i.e. water at high temperature and pressure) of biomass. Dr Antal is directing a project investigating the commercial potential of producing ethanol from bagasse using his liquid water pre-treatment technology. Another major project is the development of high-yield activated carbon from biomass for use in waste-water treatment.

First results on investigation on competitiveness of biomass pyrolysis applications

By Max Lauer, Joanneum Research, Graz, Austria

The competitiveness of bio-oil compared to conventional fossil fuel in different heat and power applications is being studied by the PyNe Implementation Subject Group. Some preliminary results of this competitivity assessment are given below based on the situation in Austria in January 2000.

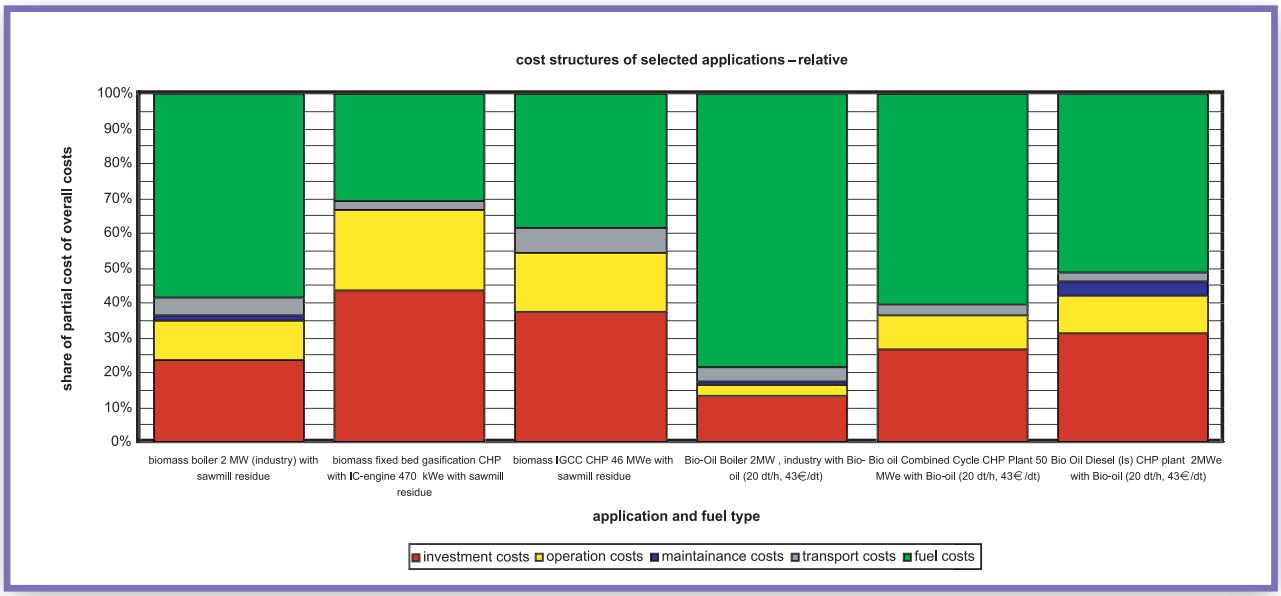


Figure 1: Cost structures (relative) of the selected biomass applications.

Method

The principle of competitivity assessment is that a potential investor faced with alternative different options (such as applications of different technologies), will tend to choose the most attractive to him, normally this will be the most competitive (i.e. most economic) one. From the view of an investor the term competitiveness can be described as the relation of annual cost of two applications using different technologies but giving the same service. For easy comparison between a variety of applications a "competitiveness factor" (CF) is introduced using the relation:

$$CF = \frac{\text{annual cost of conventional alternative}}{\text{annual cost of biomass technology application}}$$

As CF is a non-dimensional factor describing a cost relation, the economic competitiveness of different applications of different biomass conversion technologies can be compared to each other. If the bio-energy option is more attractive, i.e. cheaper, CF will be greater than 1.0.

The annual cost of the bio-energy application is calculated as the sum of costs of investment, operation and consumption and follows VDI 2067.

The annual cost of the conventional alternative is calculated assuming heat production with fossil gas/oil boilers and buying electricity (if applicable). All calculations are based on the cost/price situation for Austria in January 2000, an interest rate of 6% and a price for biomass fuel (sawmill residue) of 43 € /dry t.

The production cost of bio-oil is calculated using the function published in PyNe Guide 1, March 1999.

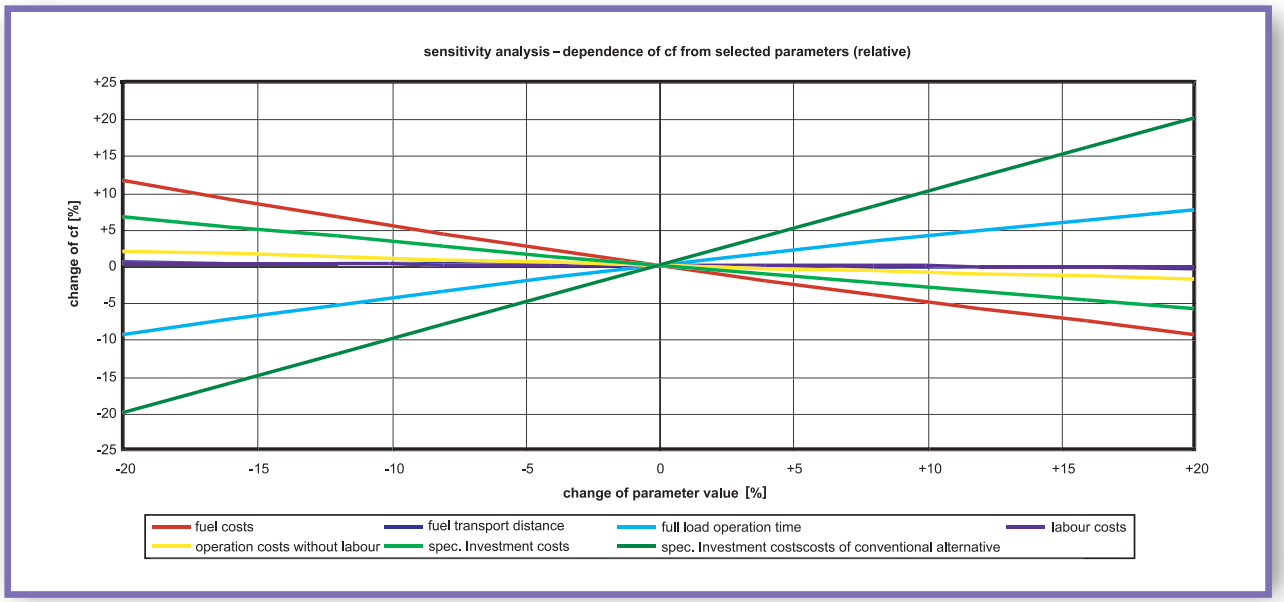


Figure 2: Sensitivity analysis – dependence of CF from selected parameters; Example Bio-oil Diesel CHP.

Application	Competitiveness factor CF
Biomass boiler 2000kW (industrial use)	1.03
Biomass FB gasification + IC engine 470 kWe, (industrial use)	0.83
Biomass IGCC CHP 46 MWe, (utility)	0.82
Bio-oil Boiler 2000kW (Industrial use)	0.79
Bio-oil Combined cycle CHP Plant 50 MWe (utility)	0.77
Bio-oil Diesel (low speed) CHP 2000 MWe (industrial use)	1.00

Table 1: Preliminary calculations on the competitiveness of bio-energy applications.

Results

As a preliminary assessment, six bio-energy applications were selected, three of them using pyrolysis liquid (bio-oil) applications. The results are summarised in Table 1.

These initial results show that the competitiveness of bio-energy can be quite different. The most competitive application investigated shows the mid-size biomass boiler for process heat production in industries and this in fact corresponds to market reality. Boilers using bio-oil of the same size seem to be less competitive (CF = 0.79); and bio oil diesel CHP seems to be competitive compared to conventional energy supplies and also compared to fixed bed biomass gasification systems.

The relative cost breakdown of the applications selected is shown in Figure 1. The sensitivity analysis of changes in the parameters for the calculations is very important for interpretation of the results. For example the sensitivity analysis for the bio-oil diesel CHP is given in Figure 2. It can be seen that competitiveness depends mostly on the cost of conventional alternatives and from the bio-fuel cost. All other parameters are of relatively minor importance.

Conclusions

As many of the data especially for the bio-oil applications and the IGCC plants are based on expectations and not on practical experience, the results of these initial calculations should be viewed as an attempt to illustrate the procedure rather than give exact figures.

An Altener Contract has recently been awarded to develop the procedure and improve the cost bases used in the analysis.

For further information contact:

Mr Maximilian Lauer
Joanneum Research
Graz, Elisabethstrasse 5,
A-8010, Austria

Tel: +43 316 876 1336
Fax: +43 316 876 1320
Email: max.lauer@joanneum.ac.at

An environment-friendly oil sorbent from wood by heat-treatment

By Katsuo Umehara, Hokkaido Forest Products Research Institute, Japan

Introduction

Recent oil spills have received considerable attention from the resultant environmental pollution and environmental problems. Of the various methods proposed for the recovery of waste oil, adsorption by synthetic polymers such as polypropylene and polyurethane have been considered to be very promising, however the use of waste synthetic materials may themselves create undesirable problems. An alternative material has been developed based on low temperature pyrolysis of softwood fibre.

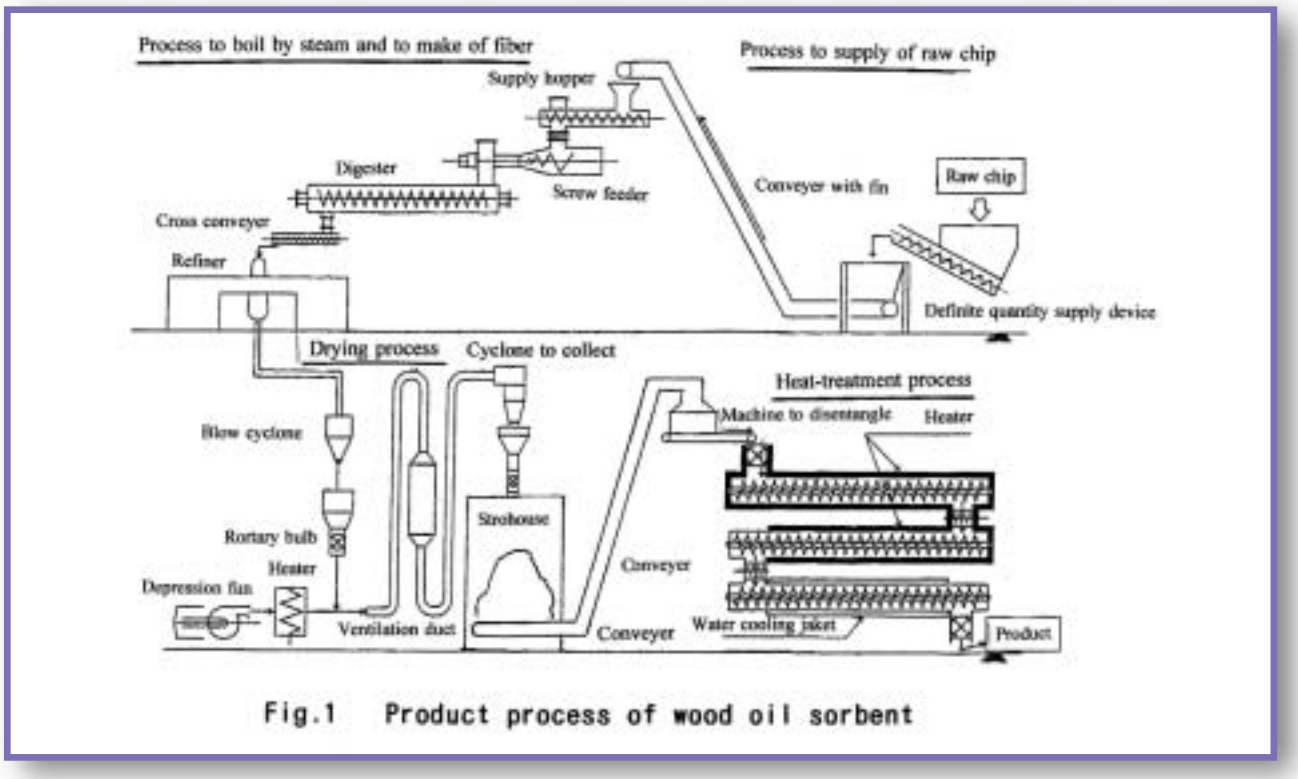


Figure 1: Product process of wood oil sorbent.

Experimental results

Softwood chips were defiberized by a pressured double disk refiner with saturated steam. The resulting fibre was dried in an air steam drier at 130°C. The bulk density of the fibre was 10.2 mg cm^{-3}. The fibre was treated in an electric rotary oven (10 dm^3) at 200 to 500°C for a various periods of time.

The liquid sorption capacity of the heat-treated products is significantly affected by temperature. The oil capacity was almost constant at a temperature range of 200 to 350°C but above this temperature the oil sorption capacity decreased. In addition, a steady decrease in the water adsorbance was observed as temperature increased up to 500°C.

To examine the effect of residence time at high temperature on oil and water adsorbance, the softwood fibre was heated at 350°C for 10 to 180 minutes. When the fibre was heated for 60 minutes, the maximum oil sorption was obtained with minimum water sorption although the variation was not significant. From an evaluation of the results, it was recommended that the optimum temperature was 325°C. The oil adsorption capacities of the heat-treated products were 19, 30, 28, 34 g/g sorbent for kerosene, machine oil, salad oil, anti-freeze (propylene glycol), respectively.

As mentioned above, these heat-treated products of wood are considered to be an excellent and environmental-friendly oil sorbent.

Results from a production unit

A continuous production furnace was installed in the institute and tested. The furnace is constructed in three parts. For the first 2-4 minutes, the fibre was dried and preheated at 200-250°C, and then heated at 300-350°C for 4-8 minutes. Subsequently it was heated at 200-250°C for 2-4 minutes in order to fix the pyrolysates onto the surface of the fibre, and then cooled. (Figures 1 and 2). The sorption ability of the fibrous sorbent manufactured by this practical scale did not differ significantly from the one produced experimentally. For class A fuel oil and light oil, for example, it adsorbed 20 g/g of sorbent.

Based on these experiments, a commercial factory was built in 1999 with an annual production capacity of 100 tons. Using this material with a non-woven cloth of polypropylene, a package of sorbent was made. This can be used for adsorption of oil spills in rivers and seas, and on the road. It is also useful for removal of waste cooking oil.

Patent

The oil sorbent is patented in USA (USA patent 5,585,319), Canada (Canada patent 2,115,009) and Europe (Europe patent EP0612562B1.)

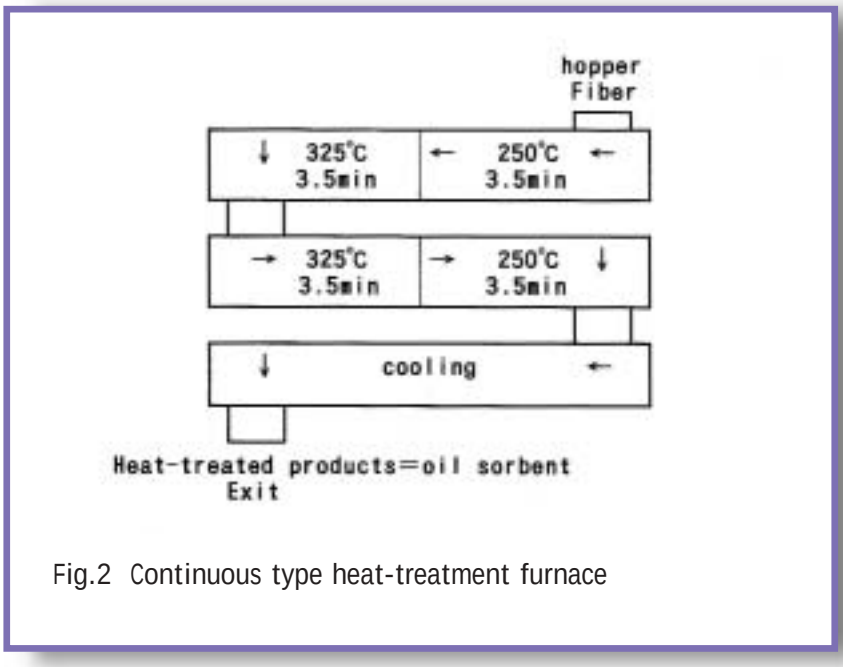
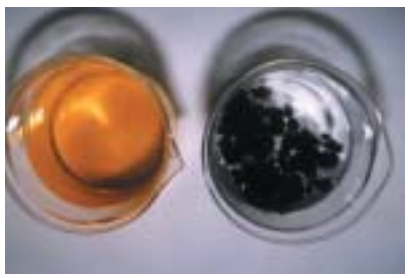


Fig.2 Continuous type heat-treatment furnace

Figure 2: Continuous type heat-treatment furnace.

Commercial bag of oil sorbent (packed heated wood fibre).



Left: Heavy oil on water in the beaker.
Right: Wood oil sorbent in the beaker.

Continuous type heat-treatment furnace.

For more information contact:

Mr Katsuo Umehara
Hokkaido Forest Products Research Institute
1-10 Nishikagura
Asahikawa
Hokkaido
071-0198
Japan

Tel: +81 166 75 4233
Fax: +81 166 75 3621
Email: honma@fpri.asahikawa.hokkaido.jp

For more information about patent license, please contact:
endou@fpri.asahikawa.hokkaido.jp

Any technical questions, please contact:
umehara@fpri.asahikawa.hokkaido.jp

Report on Research on Pyrolysis in Spain

By Jesus Arauzo, University of Zaragoza, Spain

In Spain, most of the activities, which have been developed in pyrolysis, are based on obtaining charcoal and activated carbon from different raw materials, nevertheless, there has also been some research in pyrolysis processes to obtain bio-oil. Most work has been carried out by Chemical Engineering Departments in different Universities. Union Fenosa with the University of Santiago have carried out the only industrial research. Both institutions, as it is well known, have developed, built and operated a pilot-plant of semi-industrial scale (200 kg/h of dry biomass) using the WFPP technology (see PyNe Newsletter issue 6). The plant is currently on stand-by waiting for future projects.

Figure 1: Spouted bed pyrolysis unit at University of Basque.

At the University of Basque Country, pilot plants based on spouted bed reactors, have been developed for sawdust pyrolysis, with a liquid yield similar to fluidized beds (see Figures 1 and 2) (e.g. 1,2). The technology allows operation with a catalyst without segregation problems. The utilisation of zeolite HZSM-5 as a catalyst gives a less oxygenated liquid and a lower CO_2 yield operating at atmospheric pressure. This provides an alternative to catalytic hydrogenation. The facilities given by this technology for different size and density solids, have lead to new pyrolysis pilot plants for different kinds of materials such as plastic waste, tires and mixtures of these two materials, with or without catalyst.

Two projects are currently being developed at the University of Alicante on primary decomposition of solid wastes and thermal decomposition of natural and synthetic polymers (e.g. 3,4). The research is based on the analysis of the major and minor products, (toxic in many cases), which are produced during primary and secondary stages in pyrolysis processes, using TG, DSC, FTIR, GC and MS.

Kinetic models for basic and catalytic pyrolysis are being developed by several Research Centres such as the University of Zaragoza (e.g. 5,6). Hydrogen and syngas production is one of the main goals of the research. The equipment is shown in Figure 3. A study on black liquor pyrolysis is being carried out in collaboration with the Institute of Pulp and Paper (Atlanta, USA) in order to make use of this residue for energy purposes.

Conventional pyrolysis of two different materials: biomass waste from pine, eucalyptus and holm oak sawmills and industrial waste such as Kraft lignin is being developed by University of Malaga (e.g. 7,8). This University is also developing co-pyrolysis of carbon and biomass waste in laboratory and pilot plant scale. Several universities are developing biomass pyrolysis using different catalysts to obtain a higher charcoal yield with great surface activity, particularly the Universities of Malaga and Extremadura.

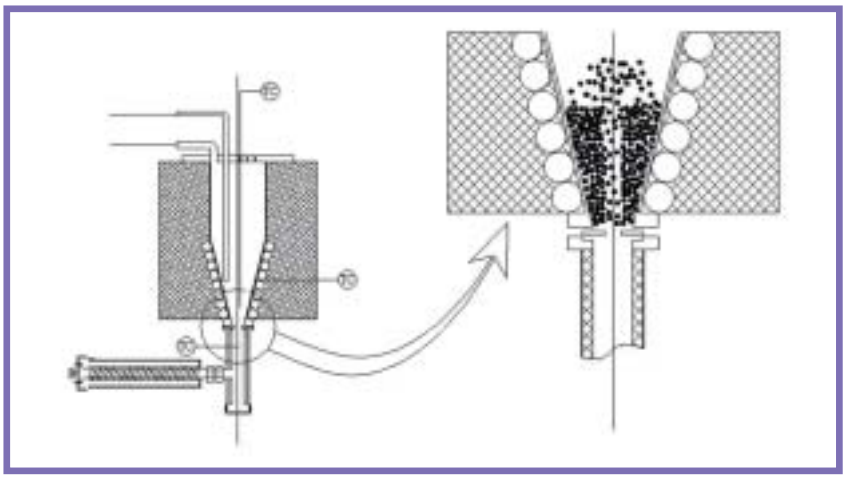


Figure 2: Spouted bed reactor.

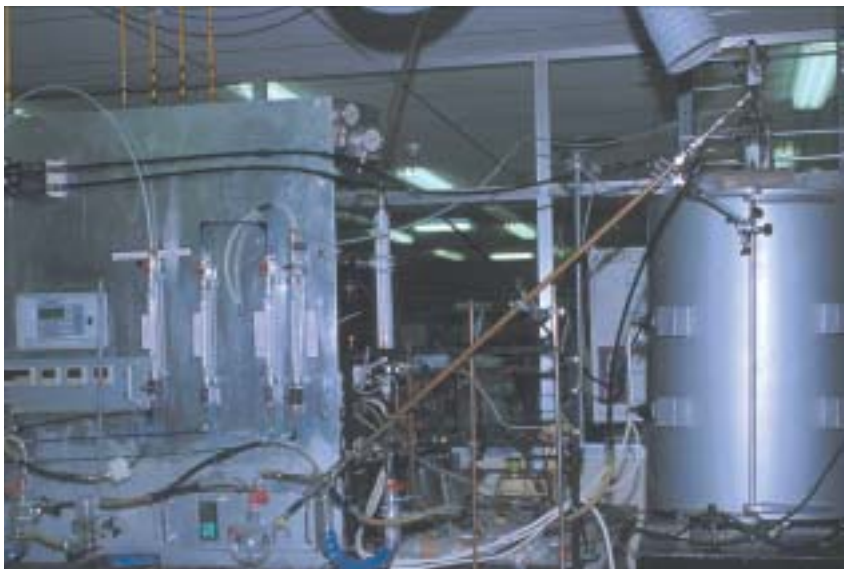


Figure 3: University of Zaragoza research unit.

For further details contact:

Dr Jesus Arauzo
Universidad de Zaragoza
Chemical & Environmental Engineering Department
Centro Politecnico Superior
María de Luna 3
E 50015 Zaragoza
SPAIN
Tel: +34 97 676 1878
Fax: +34 97 676 1879
Email: qtarauzo@posta.unizar.es

Prof. Dr. Tomas Cordero
Departamento de Ingeniería Química
Universidad de Malaga
Campus Universitario de Teatinos
29071 – Malaga
Email: cordero@uma.es

Prof. Dr. Martin Olazar
Departmento de Ingeniería Química
Facultad de Ciencias Químicas
Universidad del Pais Vasco
48080 – Vizcaya
Apartado de Correos 644
Email: iqpolaum@lg.ehu.es

Prof. Dr.Antonio Marcilla
Departmento de Ingeniería Química
Universidad de Alicante
Apartado 99
Email: antonio.marcilla@ua.es

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ENEL Pilot Plant

By Giuseppe Neri, ENEL Production, Italy

Enel Produzione

The largest fast pyrolysis plant in Europe is located in Italy near the town of Bastardo. It is sized at 3.3 MWth and at the nominal feed of 625 kg/h of hardwood sawdust it produces about 400 kg/h of bio-oil with a typical water content of 25 %. It uses the Rapid Thermal Pyrolysis process, a trademark of the Canadian company Ensyn.

Figure 1: ENEL Fast Pyrolysis Plant in Bastardo.

The plant was commissioned in 1998 and since then has been operating occasionally during 1998 and 1999. After a shut down of almost two years the plant will be reactivated in the 5th Framework Programme of the European Commission. The plant owner ENEL Produzione, the Finnish organizations VTT and Fortum, the Italian regional agency ARUSIA and the Italian company CCT have begun a project entitled PYROHEAT, which aims to produce 100 metric tons of bio-oil of improved quality in order to assess the performance of two different types of commercial boiler from a few hundred kW to a few MW.

The plant improvements include adding a second cyclone downstream of the reactor for improving solids separation, and modifying the bio-oil recovery stage to improve the liquid yield and reduce the water content of the bio-oil. Modifications to the liquid recovery stage have been initiated as well as the overhaul of the plant. The work programme of the combustion tests of bio-oil in the boilers will be carried out in parallel in Italy and in Finland. Boilers designed for light and heavy fuel oils will be used after having modified the feeding system and the burners.

The conclusion of the project is expected in the first half of 2003 and by that time the partners are confident that they can show that it is possible to produce bio-oil suitable for feeding boilers of small size normally used for generating hot water or low pressure steam. The project will thus provide a real perspective of the use of pyrolysis oil in thermal power plant.

For further information contact:

Dr Giuseppe Neri
ENEL Production
Via A Pisano 120
56122 Pisa
Italy

Tel: +39 050 53 5815
Fax: +39 050 53 5521
Email: nerig@pte.enel.it

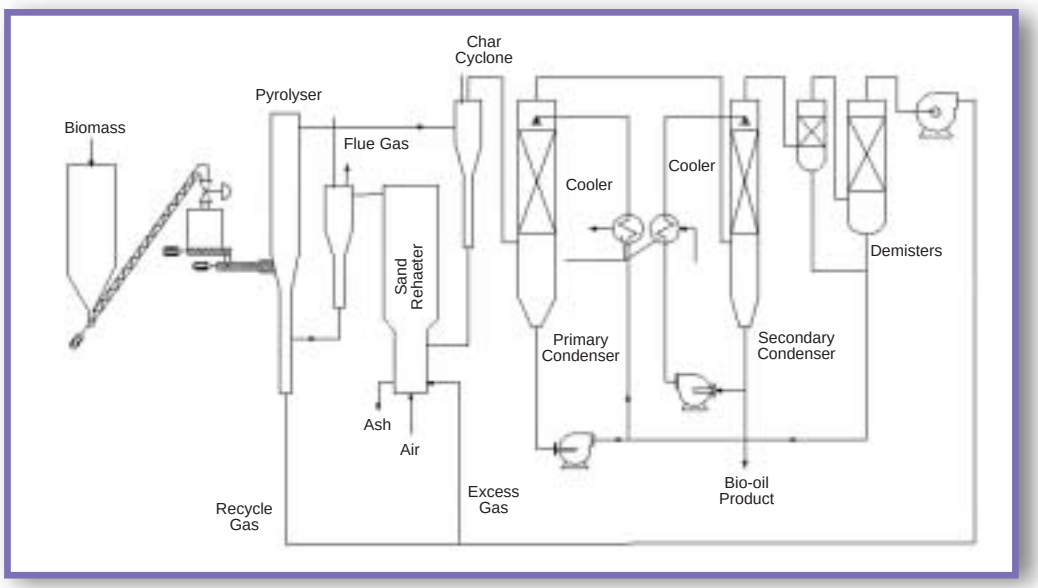


Figure 2: ENEL Fast Pyrolysis flowsheet.

TNO Environment, Energy and Process Innovation (TNO MEP)

By Jan Zeevalkink, TNO, The Netherlands

The ambition of this TNO institute for applied scientific research is to facilitate sustainable industrial production and environmental management. Through technological innovation and collaboration with industry and government TNO wants to contribute to implement solutions that stand the test of time. The introduction of biomass as a fuel and as a raw material for non-food products is an important field of activities, comprising development of bio-energy technology, research on products from biomass and policy studies for industry and government to support the implementation of biomass.

HTU® Pilot plant.

The energy-from-biomass activities are concentrated in the Environmental Systems Department, active in technological development and innovations in thermal processing of biomass and waste. The entire range of activities from wood-burning stoves to large-scale industrial energy generation is covered. Important developments supported by own research and study are:

- Flash pyrolysis for oil production: reactor development and products research.
- Participation in the development of the HTU®, process for thermal liquefaction of biomass to produce bio-crude as an alternative for fossil crude (see PyNe Newsletter number 10 for further information). The 20 kg/h pilot plant was started up in October 1999 with the primary objective of deriving data for design of a commercial unit. The results are promising and construction of a demonstration plant is being considered.
- Gasification: pre-engineering of a 1 MWe biomass gasification plant on TNO's premises is conducted. The plant will demonstrate heat and power production by biomass gasification and will be used as research reactor.
- Modelling large scale biomass gasification and combustion systems.

TNO is appointed by the government as the certification body for wood burning stoves.

The use of biomass for non-food applications is also being investigated and developed. The department for Environmental Analysis concentrates on technology development and chain studies for the integrated assessment of production chains. Important projects to demonstrate these activities are:

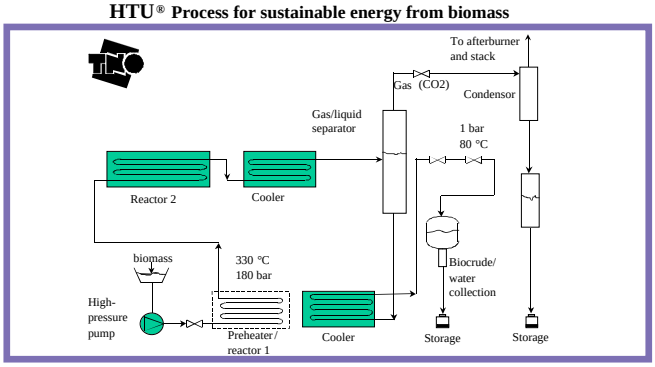
- The bio-cascade: a study into the integrated use of biomass for products and energy, in order to derive maximum profit from the available biomass.
- Life cycle analysis of various methods of energy recovery from wood or waste wood.
- Development of dry separation methods for agricultural products, to obtain valuable components or to remove negative properties.

To support the implementation of biomass systems, TNO is performing and contributing to many studies to support the Dutch biomass policy. Important subjects studied in this respect are:

- Road maps for sustainable energy production from biomass and waste in the Netherlands in 2020.
- Formulation a system for the classification of biomass fuels.
- Assessment methods for energy from biomass projects.
- Availability of biomass for energy production in the Netherlands, and on an European and global scale for the Dutch biomass policy.

Furthermore, TNO has started the Dutch Information Centre for Biomass (ICB) and leads the IEA Bioenergy Task 19 on Biomass Combustion.

HTU® Process for sustainable energy from biomass



HTU® Process flowsheet for sustainable energy from biomass.

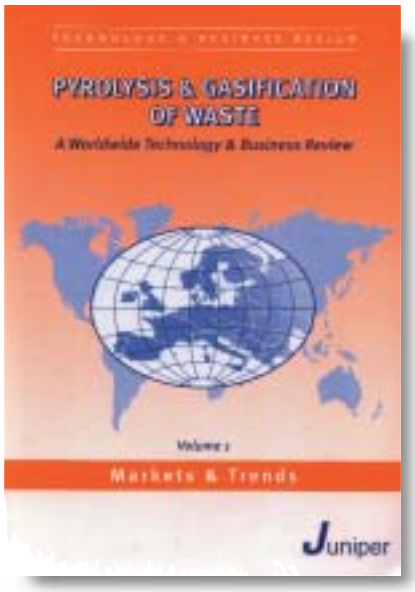
For further information contact:

Dr J A Zeevalkink
TNO Environment, Energy and Process Innovation
Laan van Westenenk 501
PO Box 342
7300 AH Apeldoorn
The Netherlands

Tel: +31 55 549 37 44
Fax: +31 55 549 37 40
Email: jan.zeevalkink@mep.tno.nl
Web: http://www.mep.tno.nl

Pyrolysis and Gasification of Waste: A Worldwide Technology and Business Review

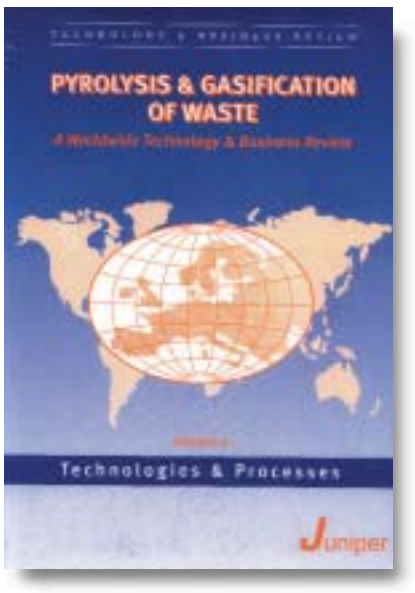
Juniper Consulting Ltd. – Reviewed by Dr Cordner Peacocke, Care Ltd, UK



Volume 1: Markets & Trends.

Volume 1 gives a considerable analysis of the potential wastes, feedstocks, conversion routes and technologies available for its disposal with projections for consumption to 2008. It is apparent that efforts have been made to encompass all the possible waste streams that may be suitable for pyrolysis and gasification. Important information on the fiscal and legislative incentives are provided predominantly for the EU, North America and Asian markets, which is useful in assessing local effects on technology developments and acceptance. Unfortunately, this laudable attempt does not give the reader a clear indication of what the market-leading technologies are and how suitable they are for the range of wastes considered.

The future of this sector depends very much on market demands and pressures. However, the market predictions reported are very generalised and unsubstantiated. For example in the case of sewage sludge, the industry knows that sewage sludge thermal conversion will be a growth sector, due to recent changes in EU legislation on emissions to the environment, but by how much and what technology leaders are emerging is not discussed. Market analyses and forecasts are influenced by a wide range of legislative, economic, fiscal and political measures, all of which are subject to change. Thus the predictions for markets sizes to 2008 can only be viewed as highly speculative. As more evidence of commercial ventures emerges, then more rational and balanced assessments can be made and these need to be carefully evaluated on a country-by-country basis. The present conclusions on each country are therefore vague and generalised and the suggestions that additional information can be purchased does not sit comfortably with the high cost of the report (about USD 2000, 2000 Euros, 1300 GBP).



Volume 2: Company Profiles.

The range of organisations covered is very extensive, with over 65 separate entries that cover activities and processes all over the world. Unfortunately, a generic or common profile template is not applied to each entry, which would help to highlight discrepancies and inconsistencies on a comparative basis, and allow the reader to make an assessment of the substantiation of claims and operational systems. Juniper does, however, use a basic template for the basic information about the organisation.

In the majority of cases, information has been obtained from sales literature, Internet sites, published papers and information provided from questionnaires sent to the respective organisations. The degree of detail in each company profile is, therefore, highly varied and an objective assessment of the processes covered is therefore difficult. It is evident that in very few cases has a direct visit been made to view facilities, discuss the technology with the providers and inspect operational plant where appropriate.

The authors admit in their introduction that there are omissions and inaccuracies. Some of the stated facts in the report are inaccurate and in some cases, photographs are incorrectly captioned such as Dynamotive, Fig. 2.59, p 2.93, which is not a pyrolysis plant, but a calcium enriched bio-oil plant. This is where the weaknesses in the second volume become apparent. The authors of the report should consider obtaining independent expert advice on the technologies, preferably those who have worked with operational systems and should also have visited some of the organisations listed. This would reduce the level of errors; improve the quality of the technical analysis given at the end of each profile and instil confidence in the reader as to the robustness of the information.

Overall, the two volumes are useful as reference material. However, direct consultation and discussion with the technology providers is recommended to avoid costs and obtain first hand information.

Diary of Events

Information compiled by Claire Humphreys, Aston University, UK

WasteTech 2001, 2nd International Trade Fair and Congress on waste Management

Venue: Moscow, Russia
Date: 5-8 June 2001
Contact: The Exhibition Management and the Congress Secretariat
PO Box 173
Moscow, 107078, Russia
Tel: +7 95 975 1364 / 975 5104
Fax: +7 95 207 6376 / 207 6310
Email: waste-tech@sibico.com
Sibico@dialup.ptt.ru
Website: www.sibico.com/waste-tech

Seminar on Aerosols from Biomass Combustion

Venue: Swiss Federal Institute of Technology, Switzerland
Date: 27 June 2001
Contact: Dr. Thomas Nussbaumer
Verenum, Langmauerstrasse 109
CH – 8006 Zürich, SWITZERLAND
Tel: +41 (0)1 364 14 12
Fax: +41 (0)1 364 14 21
Email: verenum@access.ch

38th IUPAC Congress

Venue: Bristane, Australia
Date: 1-6 July 2001
Contact: World Chemistry Congress Secretariat (Carillon Conference Management)
PO Box 177
Red Hill, Q 4059, Australia
Tel: +61 7 3368 2644
Fax: +61 7 3369 3731
Email: cc2001@ccm.com.au
Website: www.ccm.com.au/wcc

Trade Fair Renewable Resources and Technologies 3rd International Congress 'Materials made from renewable Resources'

Venue: Germany
Date: 5-6 September 2001
Contact: Dr Günter Matter (Project Leader)
Gothaer Strasse 34, D-99094, Germany
Tel: +49 (0)361 400 1440
Fax: +49 (0)361 400 1112
Email: dr.matter@messe-erfurt.de
Website: www.narotech.de

BIOS ENERGIE 2001

Venue: Mulhouse, France
Date: 13-16 September 2001
Contact: François Bornschein or
Cécile Pierron
BP 149, 28 Boulevard Gambetta
F-39004 , LON LE SAUNIER Cedex, France
Tel: +33 384 47 8100
Fax: +33 384 47 8119
Email: salons@itebe.org
Website: www.itebe.org

Foresta Legno Energia

Venue: Biella, Italy
Date: 27-30 September 2001
Contact: Giustino Mezzalira
I-30171 MESTRE (VE)
Via Monte Sabotino 1, Italy
Tel: +39 041 92 4672
Fax: +39 041 92 4672
Email: forlener@paulownia.it
Website: www.paulownia.it

Energie Aus Holz 2001

Venue: Straubing, Germany
Date: 4-7 October 2001
Contact: Christian Schröter or
Walter Wallrapp
C.A.R.M.E.N.
Technologiepark 13
D-97222 RIMOAR, Germany
Tel: +49 9365 8069 32
Fax: +49 9365 8069 55
Email: contact@carmen-ev.de
Website: www.carmen-ev.de

Fifth Biomass Conference of the Americas

Venue: Orlando, Florida
Date: 17-21 September 2001
Website: www.nrel.gov/bioam

1st International Congress on Biomass for Metal Production and Electricity Generation

Venue: Centre in Belo Horizonte, Brazil
Date: 8-11 October 2001
Website: www.issbrazil.org/congress1.asp

Symposium on Energy and Green Chemicals from Biomass
51st Canadian Chemical Engineering Conference

Venue: Nova Scotia, Canada
Date: 14-17 October 2001
Contact: Professors A K Dalai, NN Bakhshi or Dr M Ikura
Department of Chemical Engineering
University of Saskatchewan
110 Science Place, Saskatoon
SK, Canada, S7N 5C9
Tel: **+1 306 966 4771**
Fax: **+1 306 966 4777**
Email: **dalai@engr.usask.ca**
Website: **www.chemeng.ca/halifax2001/**

18th World Energy Congress: Energy Markets: The Challenges of the New Millennium

Venue: Buenos Aires, Argentina
Date: 21-25 October 2001
Contact: 18th WEC
c/o Congresos Internationales SA
Moreno 584 – Piso 9
1091 Buenos Aires, Argentina
Tel: +54 1 4342 3216/4342 3283
Fax: +54 1 331 0223/334 38111
Email: 18th-wec@congresosint.com.ar

Renewable Energy Indonesia 2001

Venue: Jakarta's International Exhibition Centre, Kemayoran
Date: 7-10 November 2001
Contact: Stephen Luff
Overseas Exhibition Services Ltd
11 Manchester Square
London
W1U 3PL, UK
Tel: +44 207 862 2090
Fax: +44 207 862 2098
Email: indonesia@montnet.com
Website: www.montnet.com

Conferencia Cientifica internaacional MEDIO AMBIENTE SIGLO XXI

Venue: Santa Clara, Cub
Date: 20-24 November 2001
Contact: Ing. Pedro Casanova Treto
Universidad Central 'Marta Abreu' de las villas
CETA
Carretera a Camajuaní km 5½
Santa Clara, CP 54830
Villa Clara, Cuba
Tel: +53 422 281194 / 281630
Fax: +53 422 281608
Email: pcasanova@fim.uclu.edu.cu
Website: www.pcasanova2000@yahoo.com

BIOS ENERGIE 2000

Venue: Lons le Saunier, France
Date: 4-7 April 2002
Contact: Francçis Bornschein or
Cécile Pierron
BP 149
28 Boulevard Gambetta
F-39004
LONS LE SAUNIER cedex, France
Tel: +33 384 47 8100
Fax: +33 384 47 8119
Email: salons@itebe.org
Website: www.itebe.org

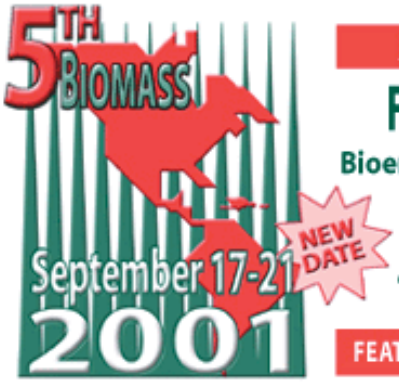
Technibois Energie 2002

Venue: Québec, Canada
Date: 2-4 may 2002
Contact: Rolande Gauvin
GESTION TB Inc
C.P. 1010
CAN-G6P 8Y1
Victoria (Québec), Canada
Tel: +1 418 845 8247
Fax: +1 418 845 8576
Email: gesttb@videotron.ca
Website: www.technibois.com

ISREE-8 Conference

Venue: Orlando, Florida
Date: 4-8 August 2002
Website: www.fsec.ucf.edu/ed/iasee

Preliminary programme



ANNOUNCEMENT

FIFTH BIOMASS CONFERENCE OF THE AMERICAS

Bioenergy and Biobased Products: Technologies, Markets, and Policies

An International Conference • September 17-21, 2001
• The Rosen Centre Hotel; Orlando, Florida, USA •

ORGANIZERS: U.S. DEPARTMENT OF ENERGY • U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CANADA • NATIONAL RENEWABLE ENERGY LABORATORY

FEATURING: ORAL PRESENTATIONS • INTERACTIVE POSTER CLUSTERS • EXHIBITS

Biomass resources
Advances in biomass production, residues availability, soil sustainability, and related environmental topics.

Bioenergy products
Advances in conversion for a wide range of bioenergy products such as power generation, biofuels like ethanol, biodiesel and other liquid or gaseous fuels.

Integrating emerging technologies with conventional energy systems – exploring synergisms
Such as cofiring of coal and biomass, natural gas and biomass gasification.

Biobased products
Advances in production of commodities, intermediate products, fine and specialty chemicals, and natural fibers and derivatives.

Biomass refineries: the link between biobased and bioenergy products
Food/forest products refineries; emerging refineries based on sugars, syn gas, and new fractionation technologies.

Environmental and ecological impacts of bioenergy and biobased products
Includes life cycle analysis and impact assessment methodologies.

Public/private partnerships
Examples of success stories.

Social acceptability of bioenergy and biobased products
International, regional, national, and local approaches and methodologies.

Policies for market development
Federal, state, and local programs; policy framework development to accelerate penetration; and incorporation of externalities.

Bioenergy and biobased product acquisition by the federal government

Papers will be presented in oral and interactive poster cluster sessions. All papers will be included in the proceedings. Full papers will be accepted at the conference, in electronic form, published as a CD-ROM, and mailed to all participants.

For further information visit: www.nrel.gov/bioam

Vacancy

Associate Professional Officer, Wood Energy Information Systems

Title:	Associate Professional Officer, Bioenergy Information System
Sector:	Bioenergy, Wood Energy, Economics of Energy
Location:	Italy, Rome; with travel to Austria and New Zealand
Languages:	English with (desirable) knowledge of Spanish and French
Duration:	2 years

For further information, contact:

Supervisor

Mr Miguel Angel Trossero
Food and Agriculture Organisation
Viale delle Terme di Caracalla
Rome, 00100
ITALY
Tel: +39 06 5705 4175
Fax: +39 06 5705 5618
Email: Miguel.Trossero@fao.org

Symposium on Energy and Green Chemicals

From Biomass 51st Canadian Chemical Engineering Conference

World Trade and Convention Centre, Halifax, Nova Scotia, October 14-17, 2001, www.chemeng.ca/halifax2001/

The possibility of future shortage of conventional oil reserves has created considerable interest in using alternative source of energy. Amongst the entire renewable energy spectrum, biomass represents the highest potential and should play a vital role in the future energy scenario. It is the intent of this symposium to bring to the attention of chemical engineering community a new and useful energy source (especially CO_2-neutral fuel from biomass).

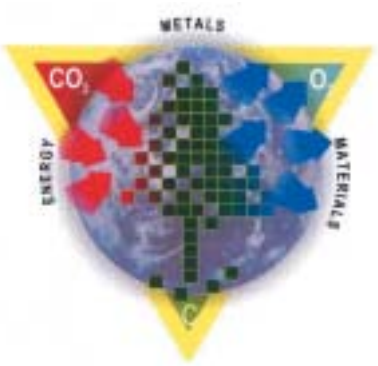
This symposium aims at attracting researchers from industry, academia, and various other organizations.
The topics included are given below:

- Thermochemical processing technologies (biomass combustion, gasification, pyrolysis, esterification, ash characterization and utilization, etc.)
- Value-added products (fuel gases, biomass derived oils and chemicals, fuel additives etc.) and their applications.
- Characterization of biomass derived products.
- Biological processes.
- Commercial applications.

For further information contact:

Professors A.K. Dalai and N.N. Bakhshi
Department of Chemical Engineering
University of Saskatchewan
110 Science Place, Saskatoon, SK, Canada S7N 5C9
Tel: +1 306 966-4771
Fax: +1 306 966-4777
Email: dalai@engr.usask.ca

Dr. M. Ikura
CANMET Energy Tech. Centre
Natural Resources Canada
1 Haanel Drive, Nepean, ON Canada K1A 1M1
Tel: +1 613 996-0505
Fax: +1 613 943-8882
Email: mikura@nrcan.gc.ca



BRAZIL

The 1st International Congress on Biomass for Metal Production and Electricity Generation is to be held at the Congress and Exhibition Centre in Belo Horizonte, Brazil between 8-11 October 2001.

This congress is conceived to be the major technical forum and business meeting to enhance the self-sustainability capacity of the cultivated biomass uses to produce materials. The Brazilian Charcoal, Iron, steel, Ferro-Alloys and Thermal Utility industries based on cultivated biomass and biomass wastes will be its focus as well as their equivalent overseas activities. Various international and Brazilian companies, organisations, universities and research centres will also participate in the conference, especially the ones dealing with applications of wood and other biomass material technologies and processes, towards self-sustainable development for the production of metals and electricity. The state of the art of this industry and future challenges will be addressed and discussed among world experts present at the conference.

The enormous implications of the planted biomass based metal industries towards the acid rain, ozone depletion, global warming and mitigation will be one of the topics discussed, and also ways and means to make them permanently self-sustainable and highly competitive associated to real examples.

Technical visits will be done in some major companies that are self-sustainable and certified as being environmentally and socially beneficial for the living creatures of the eco-system they are part of.

Topics/sections that will be addressed include:

- Introduction.
- Biomass.
- Biomass carbonisation.
- Biomass carbonisation by products.
- Metallurgical.
- Electricity from biomass.

Technical visits to carbonisation plants, iron making and steel making mills and Forro-alloy plants.

For further information on the conference programme visit:
www.issbrazil.org/congress1.asp

PyNe Membership

Please contact your country representative for further information.

Co-ordinator

Tony Bridgwater
Bio Energy Research Group
Aston University
Birmingham
B4 7ET
UNITED KINGDOM
Tel: +44 121 359 3611
Fax: +44 121 359 6814/4094
Email: a.v.bridgwater@aston.ac.uk

Austria

Maximilian Lauer
Institute of Energy Research
Joanneum Research
Elisabethstrasse 5
A-8010 Graz
AUSTRIA
Tel: +43 316 876 1336
Fax: +43 316 876 1320
Email: max.lauer@joanneum.ac.at

Belgium

Yves Schenkel
Centre for Agricultural Research (CRA)
Chaussée de Namur, 146
Gembloux
B–5030
BELGIUM
Tel: +32 81 612501
Fax: +32 81 615847
Email: schenkel@cragx.fgov.be

Denmark

Karsten Pedersen
Danish Technological Institute
Teknologiparken
DK8000 Aarhus C
DENMARK
Tel: +45 7220 1000
Fax: +45 89 43 8673
Email: karsten.pedersen@dti.dk

Finland

Anja Oasmaa
VTT Energy
New Energy Technologies
PO Box 1601
Espoo, FIN-02044 VTT
FINLAND
Tel: +358 9 456 5594
Fax: +358 9 460 493
Email: Anja.Oasmaa@vtt.fi

France

Philippe Girard
Cirad Forêt
Maison de la Technologie
73 rue Jean François Breton
BP5035
34032 Montpellier
FRANCE
Tel: +33 467 61 44 90
Fax: +33 467 61 65 15
Email: philippe.girard@cirad.fr

Germany

Dietrich Meier
BFH-Institute for Wood Chemistry
Leuschnerstrasse 91
D-21031 Hamburg
GERMANY
Tel: +49 40 739 62 517
Fax: +49 40 739 62 502
Email: d.meier@holz.uni-hamburg.de

Greece

Elma Gyftopoulou
C.R.E.S. – Biomass Department
19th km Athinon Marathonos Ave
GR 190 09
Pikermi – Attikis
GREECE
Tel: +30 1 60 39 900 Ext 416
Fax: +30 1 60 39 904/905
Email: elma@cres.gr

Ireland

Pearse Buckley
United Waste Ireland Limited
33 Elm Road
Donnycarney
Dublin 9
IRELAND
Tel: +353 1 805 8222
Fax: +353 1 805 8223
Email: pearseb@iol.ie

Italy

Colomba Di Blasi
Universitá degli Studi di Napoli
'Federico II'
Dipartimento di Ingegneria Chimica
P. le V. Tecchio
80125 Napoli
ITALY
Tel: +39 081 768 2232
Fax: +39 081 239 1800
Email: diblasi@unina.it

Netherlands

Wolter Prins
BTG
Business & Science Park
Pantheon 12
PS Enschede
7521
NETHERLANDS
Tel: +31 53 486 2282
Fax: +31 53 432 5399
Email: w.prins@ct.utwente.nl

Norway

Morten Gronli
SINTEF Energy Research
Thermal Energy and Hydropower
7034 Trondheim
NORWAY
Tel: +47 73 59 37 25
Fax: +47 73 59 28 89
Email: Morten.Gronli@energy.sintef.no

Portugal

Filomena Pinto
INETI-ITE-DTC
Edificio J
Azinhaga dos Lameiro
Estrada do Paço do Lumiar
1699 Lisboa Codex
PORTUGAL
Tel: +351 1 716 52 99
Fax: +351 1 716 65 69
Email: Filomena.Pinto@ineti.pt

Spain

Jesus Arauzo
Universidad de Zaragoza
Chemical & Environmental Engineering
Department
Centro Politecnico Superior
María de Luna 3
E 50015 Zaragoza
SPAIN
Tel: +34 97 676 1878
Fax: +34 97 676 1879
Email: qtarauzo@posta.unizar.es

Sweden

Erik Rensfelt
TPS Termiska Processer AB
Studsvik
S-611 82 Nykoping
SWEDEN
Tel: +46 155 221385
Fax: +46 155 263052
Email: erik.rensfelt@tps.se

USA

Stefan Czernik
NREL
1617 Cole Boulevard
Golden, Colorado,
80401, USA
Tel: +1 303 384 7703
Fax: +1 303 384 6363
Email: Stefan_Czernik@NREL.Gov

PyNe Group in Birmingham, UK, December 2000.

IEA Bioenergy

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For further details or offers to contribute, please contact Claire Humphreys (see inside front cover for details).

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