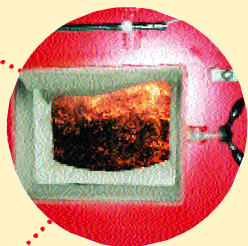




IEA Bioenergy News

EDITORIAL



We were happy to announce that Australia joined IEA Bioenergy earlier this year, and it is excellent to see they have now expanded their membership to include four

more Tasks. This edition will therefore provide some details on the activities and resources in Australia and how you can obtain more information. I would like to gratefully acknowledge the assistance of Steve Schuck, the Australian Biomass Taskforce manager, and Alan Burdon from the Australian Greenhouse Office, for providing information and links.

A major force behind bioenergy in Australia

has been the Biomass Taskforce, which was formed in 1997. The membership has now grown to 24 members including government agencies, research organisations and industry participants. The range of activities performed include:

- Providing information on industry participants and activities
- Assessing the impact of competition reform, land rehabilitation and other relevant issues within the Federal/State arena on biomass energy activities
- Developing and implementing a strategic plan to realise opportunities for biomass in Australia
- Brokering and facilitating the development of jointly funded biomass projects
- Promoting the benefits of and seeking additional funding for membership of the Taskforce
- Membership of the IEA Implementing Agreement on Bioenergy

The Australian Greenhouse Office is now heavily involved in renewable energy, administering a number of programmes to help expand the renewable energy industry. As part of the Measures for a Better Environment announcement in May by the Prime Minister, the Government is providing additional funding of up to A\$321million over four years for renewable energy, commencing 1 July 2000. With such a considerable boost to the Australian renewable energy scene, we look forward to reporting significant advances in the near future.

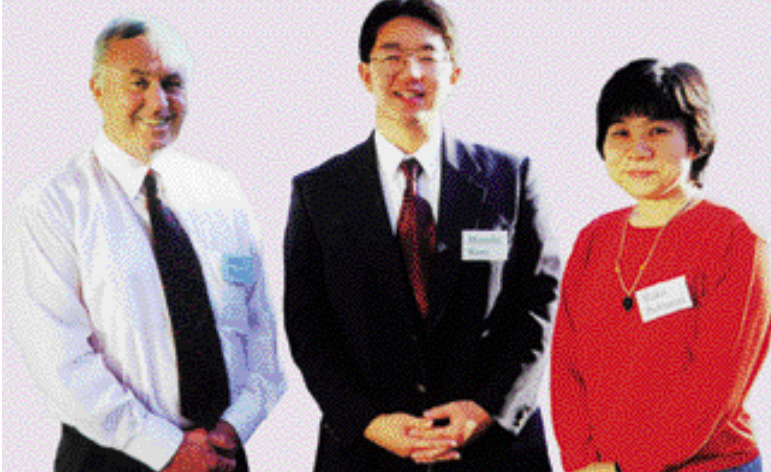
Finally, on behalf of the IEA Bioenergy team here, I would like to wish you all a very merry Christmas and best wishes for the new millennium.

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Left: John Tustin with meeting organisers Hiroshi Sano and Yoko Sakurai of NEDO



New Annex Approved

The new Annex proposal tabled by Croatia "Socio-Economic Aspects of Bioenergy Systems" was approved. It will come into force on 1 January 2000 with six countries participating: Austria, Canada, Croatia, Japan, Sweden and the United Kingdom.

MoU With FAO

IEA Bioenergy is finalising a Memorandum of Understanding with FAO, Rome, to collaborate on projects of mutual interest in the field of Bioenergy. This is an exciting development, which should add value to the businesses of clients of both organisations. Contacts for more information are the Secretary and Mr Miguel Trossero, Senior Forestry Officer in the FAO Wood Energy Programme.

Tenders For New Tasks

Following a call for "Expressions of Interest", 11 titles for new Tasks were agreed as follows:

- ▲ Short Rotation Crops for Bioenergy Systems
- ▲ Conventional Forestry Systems for Bioenergy and Carbon Sequestration
- ▲ Biomass Combustion and Co-firing
- ▲ Thermal Gasification of Biomass
- ▲ Pyrolysis of Biomass
- ▲ Techno-Economic Assessments for Bioenergy Applications
- ▲ Energy from Integrated Solid Waste Management Systems
- ▲ Energy from Biogas and Landfill Gas
- ▲ Greenhouse Gas Balances of Biomass and Bioenergy Systems
- ▲ Biotechnology for the Conversion of Lignocellulosics to Ethanol
- ▲ Integrated Liquid Biofuels

The next step is a call for firm proposals, which will need to be in the hands of the Secretariat by Friday 11 February 2000. These will be evaluated at ExCo45.

From the Secretariat

The 44th meeting of the Executive Committee was held in Kyoto, Japan, on 11-12 November 1999, with Josef Spitzer as Chairman and John Tustin as Secretary. The meeting was hosted by NEDO (New Energy and Industrial Technology Development Organisation). Some key points from the meeting were:

Possible New Contracting Party

India has expressed a strong interest in joining the Implementing Agreement. They have advised that their "Ministry of Non-Conventional Energy Sources" will be the Contracting Party with Mr Ajit K Gupta the proposed new ExCo Member. A designation letter to the Executive Director of IEA with firm indications of which Annexes they will join, along with the official signing of the Agreement, are the remaining formalities.

Australia Joins More Tasks

Australia will join four more Tasks from 1 January 2000. The relevant Tasks with the nominated National Team Leader are as follows: Task 18 Dr John Raison, CSIRO Forestry and Forest Products; Task 19 Peter Coombes, Delta Electricity; Task 23 Perry Toms, Energy Development Ltd; and Task 25 Dr Annette Cowie, State Forests of New South Wales. For further details, contact the Secretary or Dr Stephen Schuck, the ExCo Member for Australia.

Joint Study Tour

NEDO, the hosts in Japan, organised a very interesting joint study tour for ExCo Members and Task 23 Members of the "Energy from Thermal Conversion of MSW and RDF" programme. Twenty-seven participants visited the Ibaraki City Environment and Hygiene Centre and a demonstration Biogas Plant based on garbage fermentation. The latter had been sparked by a report from IEA Bioenergy on Anaerobic Digestion. This created considerable interest with the relevant Task Members.

Election Of Chairman And Vice-Chairman

Dr Josef Spitzer was elected Chairman and Dr Kyriakos Maniatis Vice-Chairman for the 2000 year.

Next ExCo Meeting

ExCo45 will be hosted by NOVEM in Utrecht, The Netherlands, on 29-31 May 2000. Please note the amended timing to accommodate ExCo Members who will travel on to the 1st World Biomass Conference in Seville, Spain, the following week.





BIOENERGY IN AUSTRALIA

An overview of the general Australian context is provided at the Australian Greenhouse Office (AGO) renewable energy Biomass section of the new AGO renewable energy website. This information can be found at: <http://renewable.greenhouse.gov.au>

The policy in Australia has traditionally been that potential animal or human foodstuffs are not used as a biomass energy feedstock.

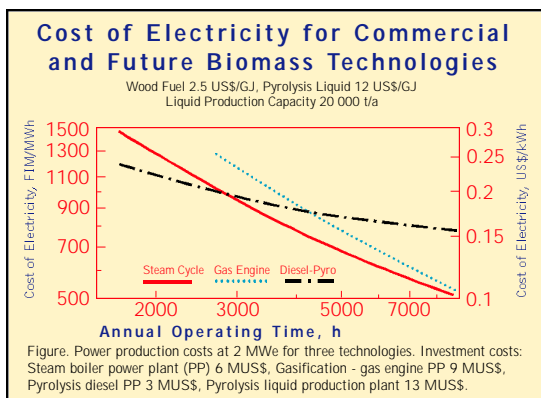
Food industry byproducts and various forms of biomass waste are readily available in most high and medium rainfall regions of Australia. It is estimated that there are at least 50 million tonnes per annum of waste biomass currently available for use. Municipal solid waste (MSW) is another major form of biomass waste that currently offers a negative cost feedstock, much of which is from biomass sources. Support for a range of biomass to energy projects has been provided under the Renewable Energy Showcase and Renewable Energy Conservation Programs. Details of the types of project supported, including biomass to energy projects, can be found at www.greenhouse.gov.au by searching the site under renewable energy and grants programs. These projects have sought to demonstrate some of the commercially viable opportunities for realising biomass to energy. These are associated, for example, with developing more efficient and year-round generation of electricity from bagasse wastes associated with sugar production or the gasification of MSW.

Studies to demonstrate the commercial possibilities for realising biomass to energy in Australia have been published by the former Energy Research and Development Corporation, entitled "Biomass in the Energy Cycle". The Biomass Taskforce (www.users.bigpond.com/steve.schuck/abt) has developed as a direct outcome of this study and within its membership includes many, but not all, of the parties in Australia with an interest and involvement in biomass. The Australian Commonwealth Government has recently approved legislation that will set a target of an additional 2% of electricity to be generated from renewable energy resources by 2010. A fixed annual requirement of 9500 GWh has been set for this date which will require a projected capital expenditure of at least A\$2 billion on renewable energy generation. Recent studies of possible options to meet this target have indicated that biomass could represent the major source of renewable energy developed to meet this target.

Techno-Economic Assessments of Bioenergy Applications

Task 22 has conducted technical and economic feasibility studies for several biomass power and fuel conversion technologies in Austria, Canada, Finland, Sweden and the United States during 1998-99.

The core technologies analysed include:



- a flue gas condensing system for increased heat production integrated to a biomass boiler,
- fast pyrolysis for chemicals,
- small scale steam boiler power plant compared to new concepts,
- fast pyrolysis liquid production for district heat production within a city, and
- small scale modular bioenergy concepts.

Performance (mass and energy balances) of systems are determined rigorously, and the economic assessment will be carried out with companies supplying or planning to use these systems. One such example is given below. For further examples see the IEA Bioenergy 1998 Annual Report.

The first BioPower Rankine co-generation power plant (0.9 MW power - 6 MW heat) suitable for sawmill and district heat operation, will be commissioned by Sermet Oy, Kiuruvesi, Finland, during the fall of 1999. A comparison between the conventional steam boiler power plant and two new concepts proposed (gasification - gas engine, pyrolysis - diesel engine) is carried out to study the competitiveness of the BioPower concept. Due to the small scale, electricity costs are rather high for all the cases (see Figure, above). With more than 3000 annual operating hours the Rankine cycle offers the lowest power production cost, around 0.14 US\$/kWh at 5000 h/a. This may be compared to 0.04 or 0.07 US\$/kWh, which are typical costs for power produced in a large natural gas combined cycle, and a large wood fired Rankine cycle power plant, respectively.



Task Reports

Task 18 Workshop Charleston, South Carolina, USA, 19-25 September 1999

The theme of the workshop was "Integrating Production of Energy in Sustainable Forestry: Guiding Principles and Best Management Practices". By good luck, the timing of the event managed to narrowly avoid the impact of Hurricane Floyd, which passed through the area four days before the start of the workshop.

Almost 50 participants from 11 countries took part in the event. During the technical program, a total of 24 papers and 10 posters were presented, addressing the workshop theme in relation to silvicultural systems, harvesting and procurement, and environmental issues. Some of the papers will be incorporated in the synthesis publication following revision. The others will be published in a peer-reviewed proceedings as a special issue of the New Zealand Journal of Forestry Science.

Good progress was made in planning the further development of the synthesis publication project. A 200-page book is planned, with the working title of "Integrating Production of Energy in Sustainable Forestry: Guiding Principles and Best Management Practices". The book will be published by Kluwer Academic Publishers by the end of the Task period.

There was an excellent field day featuring visits to Westvaco Company forest operations to see an overview of sustainable ecosystem management in the southeast coastal region. This included an experimental site under the Long Term Site Productivity Program, and harvesting systems with potential for use of forest residues for fuel. Their webpage (www.westvaco.com/environment/diagram/diagram.htm) demonstrates the integration of biomass production into an ecosystem-based multiple-use approach to forest management.

Task 23 Joint Meeting with Executive Committee

Kyoto, Japan, 8-12 November 1999

The Earth moved for members of Task 23 "Energy from Thermal Conversion of Municipal Solid Waste and Refuse Derived Fuel" in Kyoto during the night of Saturday 6 November with an earthquake of point 3 on the Richter scale (point 5 at the epicentre).

The meetings hosted by NEDO included a joint study visit for Task 23 and the Executive Committee to Ibaraki City Environment and Hygiene Centre. In 1980, Ibaraki City adopted a new waste treatment system, to respond to ever-increasing and diversifying waste. Firstly the recyclable waste is removed, then the remaining waste is melted at high temperatures and converted into re-usable slag and iron. The slag and iron can be used in a broad range of commercial applications, such as construction material for pavements, interlocking blocks for road facing and counterweights for construction machines. The only remaining residue is fly ash from the dust collector, which minimises both the necessity for landfill and the overall cost of waste treatment. During the second part of the study tour, a visit to a plant producing biogas from municipal solid waste in Kyoto, it transpired that the idea to build the plant came after reading a 1994 IEA Bioenergy publication entitled "Biogas from Municipal Solid Waste, Overview of Systems and Markets for Anaerobic Digestion of MSW", which emphasises the credence being given to IEA Bioenergy and its publications.

The beautiful autumn colours of Kyoto and the meticulous planning by NEDO made this a very successful and memorable meeting for members of Task 23 and the Executive Committee.



Niranjan Patel, leader of Task 23 with Mr Hiromu Takatsuka, general manager of product development, power systems, Mitsubishi Heavy Industries Ltd.

Task 25 News



The Task 25 workshop "Bioenergy for Mitigation of CO₂ Emissions: the Power, Transportation and Industrial Sectors" took place in Gatlinburg, Tennessee, USA, 27-30 September, 1999. It included two days of presentations, a working session on baseline scenarios, and a field study tour including a visit to the FACE trial at ORNL. The workshop was attended by 42 participants from 15 countries. More information on this event as well as the proceedings of the workshop (should be available in early 2000) can be found on the Task 25 website.

Kimberly Robertson joined the management team at Joanneum Research in early November 1999. Previously she was working at Forest Research (NZ) on carbon accounting, monitoring and modelling issues concerning forestry and bioenergy. We welcome this exchange of personnel within the participating countries.

Task 25 members at the Free Air CO₂ Enrichment trial at ORNL.

Task 26 had a very successful meeting in South Africa, which will be featured in their forthcoming Newsletter.

Task 28 activities are intimately connected to the production of draft European Standards for solid biofuels. At a joint meeting with the Solid Biofuels Working Group of the European Committee for Standardisation in March 1999, overviews of standards for 13 countries were presented and discussed. A subsequent meeting in September identified an urgent need for standardisation of terminology and definitions, and for clarification of the borderline between biofuels and wastes. If at all possible, standard testing methods for biofuels should be developed that should be simple, cheap and reliable. The final work programme for standards development will be presented at the next meeting in Brussels in February 2000.

Networking



Oil Mallee in Western Australia

The Australian Biomass Taskforce website (www.users.bigpond.com/steve.schuck/abt) contains information on Australian activities, newsletters and reports, and an extensive list of links to other bioenergy related websites.

The Australian Greenhouse Office has just launched a

renewable energy website (renewable.greenhouse.gov.au) that includes sections on biomass resources, conversion technologies and applications. The backbone of this site is a comprehensive searchable database of the Australian renewable energy industry. On the main AGO website there is an Emissions Trading Discussion Paper Series (www.greenhouse.gov.au/emissionstrading/paper.html).

A report on The Evolving Renewable Energy Market has recently been published by the IEA's Renewable Energy Working Party. The report is available from the IEA website at www.iea.org/new/releases/1999/renew.htm

GEMIS, a model for life cycle analysis of alternative energy systems based on a huge database, is available free from www.oeko.de/service/temis



Greenwaste gasifier, currently being installed at Whytes Gully Landfill, Wollongong, NSW.

The Greenwaste project will consume up to 15,000 tpa of source separated greenwaste, convert it into a synthetic gas (syngas), which will be used to generate electricity.

Publications

Bioenergy Bibliography

The new, electronic edition of the Bibliography "Greenhouse Gas Balances of Bioenergy, Forestry, Wood Products, Land Use, and Land-Use Change" containing existing publications, unpublished reports and databases has been completed and contains about 1000 entries on 600 plus pages. This bibliography includes not only literature with reference to "bioenergy" and "greenhouse gases", but also work that deals with greenhouse gases as they relate to land use (eg agriculture, forestry) and land-use change. Information on the greenhouse gas implications of some selected fossil fuel based energy systems complements the collection as this is needed for a comparison with biomass energy systems. The updated version of the bibliography,

with a full-text search facility, is available on the Task 25 homepage:

www.joanneum.ac.at/iea-bioenergy-task25

Fast Pyrolysis of Biomass: A Handbook (Bridgwater et al., 1999)

This handbook is an edited and updated version of the final report of the IEA sponsored Pyrolysis Activity that officially finished in 1998. It provides a useful guide to newcomers to the subject area as well as those already involved in research, development and implementation. It is also an excellent example of the benefits of R&D networking within IEA Bioenergy, in this case in collaboration with the European Commission. Contact Task 21 Leader for details.

continued following page

Publications (cont.)

Task 18 Publications

Proe, M., C.T. Smith and A.T. Lowe (guest eds.) 1999. Indicators of Sustainable Forest Management. Papers presented at the IEA Bioenergy Task XII workshop, Eddleston, Scotland, 20-25 September 1997.

Forest Ecology and Management 122 (1/2): 1-198. See website for details about orders (www.elsevier.nl/locate/foreco).

Lowe, A.T. and C.T. Smith (compilers) 1999. Developing Systems for Integrating Bioenergy into Environmentally Sustainable Forestry. Proceedings of IEA Bioenergy Task 18 workshop (incorporating a joint workshop session with Task 25), 7-11 September 1998, Nokia, Finland, New Zealand Forest Research Institute. Forest Research Bulletin No. 211. 128p.

Hudson, B. (Editor) 1999.

Task 18 Technical Notes, Issue No. 1. IEA Bioenergy Task 18. 16p.

Task 24: Two new publications on biological conversion

"Hygienic and Environmental Aspects of Anaerobic Digestion: Legislation and Experiences in Europe" Volume II IEA Bioenergy workshop, price 25DM, Deutschen Veterinarmedizinischen Gesellschaft eV, Frankfurter Str. 89, D-35392 Giessen, Germany, Fax +49 641 25375.

Earlier this year in March, Task 24 held a very successful workshop on the issues of pathogen kill and hygienic standards and regulations for digestate application to land. This workshop was held in conjunction with the regular Hohenheim conference that is organised by the German Veterinary Medicine Association in Hohenheim. The workshop included a visit to a new anaerobic digester taking in wastes from the local communities, restaurants and farms and generating electricity and compost for spreading on the local farms.

The workshop had 14 excellent papers covering the detailed science of pathogen kill in digesters, the practical implementation of digestion technology and regulation in a number of European countries. These papers generated a great deal of discussion, especially on the simulation of the internal environment of a digester. This is important as the chemical environment has a role in pathogen kill in addition to the time temperature relationships.

The proceedings of this workshop have been very popular and have sold out. A reprint is underway and

copies will be available from the German Veterinary Medicine Association shortly.

Task 24 has also just issued a new report – "Biogas Upgrading and Utilisation". This covers the techniques for upgrading biogas from digesters and landfills to natural gas standards. It also identifies some 32 installations around the world where gas upgrading is being performed. This report details the options for preparing gas for injection in to the natural gas network or for use in standard natural gas vehicles. The report also covers some of the newer uses such as fuel cells.

The report is available from the national representatives or the Task Leader (Pat Wheeler, AEA Technology, F6 Culham, Abingdon, Oxfordshire, OX14 3ED; patrick.wheeler@aeat.co.uk).



Pat Wheeler, Leader of Task 24

Fuel for the Future video

This 50 minute video includes examples of applications of biomass for energy from several countries. These include Miscanthus and transport fuels in The Netherlands, wood fuel heating in Scandinavia, biodiesel in Austria, and algae production with solar lighting in Japan. It has recently been released and is available from Rob Swanenburg, NPS, The Netherlands, Fax: +31 35 677 4023, Email: rob.swanenburg@nps.nl or Maximilian Lauer, Joanneum Research, Austria, Fax: +43 316 876 1320; Email: max.lauer@joanneum.ac.at

Calendar of Events

IEA Bioenergy Meetings

ExCo45 will be hosted by NOVEM in Utrecht, The Netherlands on 29-31 May 2000. The post-out date deadline for material sent by the Secretary will be 10 April 2000.

Contact: John Tustin, IEA Bioenergy Secretariat.

Task 18: The next annual workshop will be held in Australia, during the week 16-20 October 2000. This will include two days of field visits in the Brisbane to Coffs Harbour area near the Queensland-New South Wales border, featuring bioenergy and biomass production. This will be followed by a 3-day workshop at Coffs Harbour, New South Wales. Following this meeting there will be a field tour in the South Island of New Zealand, covering plantations and native forest management, as well as bioenergy use in industry. Full details are available from the Task Leader.

Task 20 meetings:

- 5-7 April 2000, The Netherlands.
- 5-9 June 2000, Seville, Spain. Organise, conduct and participate in gasification sessions.
- 4-6 October 2000, UK. Special discussion topic with industrial participation: Fuel Gas Energy Conversion Devices.

Task 22 working group meeting: March 2000, The Netherlands.

Task 25 workshop: May or June 2000 in Zagreb, Croatia, will include hands-on sessions working with computer models, particularly fuel-cycle analysis, GHG-balance, and carbon sequestration models developed by Task 25 participants. Nominations of models to be demonstrated and used at the workshop are welcome and should be sent to the Task Leader (bernhard.schlamadinger@joanneum.ac.at).

Task 26 workshop: "Technical and Process Advances in Biomass to Ethanol", 10 or 11 May 2000. Held within the 22nd Symposium on Biotechnology for Fuels and Chemicals, 7-11 May 2000, Gatlinburg, Tennessee, USA. Registration and other information on the complete symposium is available at www.ct.ornl.gov/symposium or contact Local Organiser: Dr. Brian Davison, Oak Ridge National Laboratory, Email: bod@ornl.gov

Task 27 working group meetings:

- 31 January - 2 February 2000, Vienna, Austria.
- 22-23 May 2000, Amsterdam.

Other Meetings

Clean Energy 2000

25-29 January 2000, Geneva, Switzerland

Contact: Clean Energy 2000 Secretariat, Rue de Varembe 3, POB 200, CH-1211 Geneva 20, Switzerland. Tel: +41 22 910 3006;

Fax: +41 22 910 3014; Email: conference@cleanenergy2000.com; Web: www.cleanenergy2000.com

Renewable technologies conference

9-11 February 2000, Tamil Nadu, India

Contact: Dr C Palaniappan, Organising Secretary, 171/2, Madurai Kamaraj University Rd, Rajambadi, Madurai Kamaraj University, Post, Madurai 625021, India. Tel / Fax: +91 452 858607; Email: pen@vsnl.com

Renewable Energy for the New Millennium

8-10 March 2000, Hilton Hotel, Sydney, Australia

Contact: Contacts Meetings Manager, PO Box N542, Grosvenor Place NSW 1220 Australia.

Tel: +61 2 9241 2955; Fax: +61 2 9241 5354; Email: meetings@tmm.com.au

National Conference on Ethanol Policy and Marketing

22-24 March 2000, San Francisco, USA. Sponsored by the Renewable Fuels Association

Contact: Nicole Graf, Tel: +1 719 942 4353; Email: bbincole@ris.net

14th International Symposium on Analytical and Applied Pyrolysis (Pyrolysis 2000)

2-6 April 2000, Seville, Spain

Contact: F.J. Gonzalez-Vila, Vice Chairman, Instituto de Recursos Naturales y Agrobiologia de Sevilla-CSIC, PO Box 1052, 41080-Seville, Spain

Tel: +34 95 462 47 11; Fax: +34 95 462 40 02; Email: fjgon@irnase.csic.es; Web: www.irnase.csic.es/py2000/index.html

Green-Tech 2000, International Conference & Exhibition on Sustainable and Renewable Raw Materials

3-5 April 2000, Royal Dutch Jaarbeurs, Utrecht, The Netherlands

Web: www.europoint-bv.com/events/greentech2000/index.html

The Australian Greenhouse Conference, Enviro2000 (Held with the Fifth Australian Waste Convention)

9-13 April 2000, Sydney Convention & Exhibition Centre, Sydney, Australia

Contact: Tel: +61 2 9410 1302; Fax: +61 2 9415 1599; Email: quitz@dot.net.au

Gasification 4 the Future

11-13 April 2000, Huis Ter Duin Hotel, Noordwijk, nr Amsterdam, The Netherlands.

Contact: Miss Jennie Black, (Gasification 4), IChemE Conference Department, 165-189 Railway Terrace, Rugby, Warwickshire CV21 3HQ, United Kingdom

Tel: +44 1788 578 214; Fax: +44 1788 577 182; Email: jblack@icheme.org.uk

International Science Conference on "The Role of Boreal Forests and Forestry in the Global Carbon Budget"

8-12 May 2000, Edmonton, Alberta, Canada.

Contact: Carbon Conference Co-ordinator, 5320-122 Street, Edmonton, Alberta, Canada, T6H 3S5. Fax: +1 780 435 7356; Email: carbon@nofc.forestry.ca; Web: www.nofc.forestry.ca/carbon

Sustainable Energy: New Challenges for Agriculture and Implications for Land Use

May 18-20 2000, Wageningen University, Wageningen, The Netherlands

Web: www.sls.wau.nl/congresme

1st World Conference and Exhibition on Biomass for Energy and Industry

(Sponsored by IEA Bioenergy)

5-9 June 2000, Conference and Exhibition Centre, Seville, Spain

Contact: Angela Grassi, EnergiaTA-Florence, Piazza Savonarola 10, I-50132, Firenze, Italy

Tel: +39 055 5002174; Fax: +39 055 573425; Email: eta.fi@etaflorence.it; Web: www.etaflorence.it/sevilla.htm or www.wip-munich.de

23rd International Annual Conference of the International Association for Energy Economics

7-10 June 2000, Hilton Hotel, Sydney, Australia.

Contact: Professor A D Owen, School of Economics, The University of New South Wales, Sydney, NSW 2052, Australia.

Tel: +612 9385 3351; Fax: +612 9313 6337; Email: a.owen@unsw.edu.au

II International Symposium on Anaerobic Digestion of Solid Waste (II ISAD-SW)

15-18 June 2000, Barcelona, Spain

Contact: II-ISAD-SW, Apdo. Correos 30124, E-08080 Barcelona, Spain

Tel: +34 929 920 591; Fax: +34 919 751 180; Email: congres@waste.qui.ub.es

Web: www.II-ISAD-SW.ub.es

Renewable Energy 2000

2-4 July 2000, Brighton, UK

Contact: Rob Schulp, Renewable Energy 2000, Reed Exhibition Companies Ltd. Oriel House, 26

The Quadrant, Richmond, Surrey TW9 1DL, UK

Tel: +44 181 910-7976; Fax: +44 181 910-7989; Email: rob.schulp@reedexpo.co.uk

World Renewable Energy Congress VI: "Renewables - The Energy for the 21st Century"

1-7 July 2000, The Metropole Hotel, Brighton, UK

Contact: Prof. A Sayigh, WREN, 147 Hilmanton, Lower Earley, Reading, RG6 4HN, UK

Tel: +44 118 96 11 364; Fax: +44 118 96 11 365; Email: asayigh@netcomuk.co.uk; Web: www.wrenuk.co.uk/brighton/brighton.html

Fifth International Conference on Greenhouse Gas Control Technologies

13-16 August 2000, Cairns Convention Centre, Cairns, Australia

Contact: Colin Paulson, CSIRO Energy Technology, PO Box 136, North Ryde, NSW 1670, Australia. Tel: +61 2 9490-8790; Fax: +61 2 9490-8819; Email: Colin.Paulson@det.csiro.au

Progress in Thermochemical Biomass Conversion (New Date)

17-22 September 2000, Tyrol, Austria

Contact: Tony Bridgwater or Nina Ahrendt, Aston University, Birmingham B4 7ET, UK

Tel: +44 121 359 3611; Fax: +44 121 359 6814; Email: a.v.bridgwater@aston.ac.uk or ahrendtn@aston.ac.uk; Web: www.pyne.co.uk/PITBC2000/index.htm



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Task 16: Tech. Assessment of cellulosic materials to ethanol in Sweden
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Task 17: Short rotation crops for bioenergy

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Task 18: Conventional forestry systems for bioenergy

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Task 19: Biomass combustion

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Task 22: Techno-economic assessments of bioenergy applications

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Task 23: Energy from thermal conversion of MSW and RDF

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Task 24: Energy from biological conversion of organic waste

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Task 25: Greenhouse gas balances of bioenergy systems

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Task 26: Biotechnology for the conversion of lignocellulose to ethanol

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Task 27: Liquid biofuels

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Task 28: Solid biomass fuels standardisation and classification

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Task 29: Socio-economic aspects of bioenergy systems

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