

Bioenergy in Canada

Guest Editorial by Dr Peter Hall, ExCo Member for Canada

Bioenergy use in Canada over the last century has reflected the country's emergence as a modern industrialized state. A hundred years ago, nearly half its energy consumption was biomass in the form of wood. By 1960, nearly 80% of Canada's energy came from fossil fuels (coal, oil and gas), 15% from hydro-electricity and the remainder from biomass sources. In 2004, energy from biomass constitutes a similar proportion, and projections for the next couple of decades are for a share of 6-9%. Bioenergy production comes from a wide range of bio-based sources: combined heat and power, gasification, pyrolysis, landfill gas, ethanol from grain and cellulose.

The Canadian bioenergy industry has been faced with a number of economic, social and infrastructural barriers. Economic barriers to the increased use of bioenergy include financing, high capital costs for installation, low buy-back rates, and access to the grid. Social barriers include the environmental costs of emissions, water pollution, and a general lack of awareness among users and the public. Infrastructural barriers include problems with feedstock reliability and conversion efficiency. These are all important barriers, but the greatest obstacle remains the ready availability of fossil fuels. The continued use of bioenergy in Canada has often required a 'hard sell' approach, as abundant and comparatively cheap sources of fossil fuels have dominated both the energy market and conventional thinking.

However, the energy world is changing and Canada is changing with it. The energy market now values a secure, reliable and safe supply, coupled with sustainable economic growth. Research initiatives address technical barriers; tax schemes the economic ones. The policy context is rapidly evolving as environmental awareness increases and the Kyoto Protocol begins to influence policy makers. Policy development also takes into account issues around climate change, acid rain and harmful emissions.

The federal governments' main energy department is Natural Resources Canada. This is the primary source of public funding for bioenergy at \$15 million annually. Funding of energy R&D is carried out in partnership with provinces, universities, the private sector and international organizations. Initiatives are addressing new and existing biomass sources, biomass conversion and utilization technologies, integrated bio-applications, policy support and market studies. Canada now has national targets of 1.4 billion litres of ethanol and 500 million litres of renewable diesel by 2010 and this will help drive the market.

Energy issues are influenced by increases in petroleum/gas prices, rising demand for fuel, finite supplies and social factors such as the need for rural development. The explosion in the number and nature of products that can be produced from bio-based sources, coupled with a vast land resource, position Canada for a bio-based future.

By 2025, we want to have a cleaner and more diversified form of bio-based energy, more bioprocesses substituting chemical and physical processes, and more biomass used as feedstock for chemicals and materials. In this way, Canada will address its policy, environmental and economic goals.

For more information contact Dr Peter Hall, Dept of Natural Resources, Canadian Forest Service at phall@nrcan.gc.ca



Agro-forestry biomass production, southern Ontario



Biomass cogeneration at Northland Power, Cochrane, Ontario



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IEA Bioenergy

IEA Bioenergy News



From the Secretariat



John Tustin

ExCo54 Ottawa, Canada

The 54th meeting of the Executive Committee was held in Ottawa, Canada on 6-7 October 2004, with Björn Telenius as Chairman and John Tustin as Secretary. The meeting was hosted by the Canadian Forest Service. The Chairman expressed the appreciation of the ExCo to Peter Hall and his colleagues for the excellent meeting and study tour arrangements. Some of the outcomes of the meeting are detailed below.

New Contracting Party

The Republic of South Africa has accepted the invitation to join the Implementing Agreement in 2004. The formal process of signing the Agreement is in train. The Contracting Party will be the Department of Minerals and Energy.

Changes in the Executive Committee

Professor Bernard Prior is the Executive Committee Member for South Africa and Mr Ed Hogan is the new Alternate Member for Canada. New announcements are expected for Belgium, Brazil, Denmark, New Zealand and the UK.

Election of Chairman and Vice Chairman

Dr Kyriakos Maniatis of the European Commission was elected Chairman and Dr Peter Hall of Canada was elected Vice Chairman.

Extension of the Implementing Agreement

At its meeting on 3-4 November 2004, the IEA Committee on Energy, Research and Technology (CERT) agreed to extend the term of IEA Bioenergy to 31 December 2009.

New Task 'Bioenergy Systems Analysis' (Task 41)

Task 41 was approved to commence on 1 January 2005 for three years. The objective is to supply decision makers with scientifically sound and politically unbiased analyses and conclusions needed for strategic decisions related to research or policy issues. The target groups are decision makers in Ministries, national administrations and deploying agencies. The Task will provide the ExCo with a highly qualified team with the capability and resources to carry out carefully selected projects. Due to the character of the Task and its close contact with the other Tasks, it is expected to develop into a platform for joint work and to be a catalyst for policy-related proposals to the ExCo. The scope is defined as 'system analysis of bioenergy pathways and the links to policy and market issues'. Initially there will be four Participants, but the deliverables from the programme of work will be made available to all Members of IEA Bioenergy.



Peter Hall, Canada (left) with Solvar Klock, Norway and Marjatta Aarniala, Finland at the Ferguson Forest Centre Nursery

Strategic Outputs from the Tasks

A taskforce was created comprising four ExCo Members and four Task Leaders. The ExCo members are: Douglas Kaempf, Kyriakos Maniatis, Josef Spitzer and Kees Kwant. The Task Leader representatives will be selected and invited by this group. The mission is to "prepare and propose ExCo actions to increase the policy relevant output of IEA Bioenergy". It will facilitate the collection of information required to focus the ExCo's efforts on improving policy relevant outputs.

The taskforce will:

- collect suggestions for topics/issues from ExCo members, which are important for both their country and an international audience.
- explore with the Task Leaders represented in the taskforce, the availability of data/ information needed for the topics/issues.
- compare the above and define the need for further work in the Tasks, either through the ongoing Task work programme or through the 10% budget reserved for ExCo projects.
- make a priority list of topics/issues and associated work to present to the ExCo.

ExCo55

The next ExCo Meeting will be held in Copenhagen, Denmark on Wednesday 25 and Thursday 26 May 2005, with a study tour on Tuesday 24 May.



Study Tour group at Grenville Christian College, Brockville

ExCo54 Workshop

Following the decision at ExCo53 to create time for strategic topics at ExCo meetings, a very successful workshop was held on 'Liquid Biofuels from Black Liquor Gasification'. External contributions from technology developers and others provided a strong platform for discussion.

Presentations at the workshop were:

- The Case for a National Emphasis on Biomass Gasification Technology - Dr D. Kaempf, DOE, USA.
- An Introduction to ThermoChem Recovery International - Dr D. Burciaga, ThermChem Recovery International, USA
- CHEMREC Black Liquor Gasification Technology - Dr I. Landälv, Chemrec AB, Sweden
- Black Liquor Gasification and Bio-Fuel Production in Canada - Dr M. Byron and Dr F. Preto, CANMET Energy Technology Centre, Canada
- CHEMREC BLGMF Technology: System Impact on the Mill and the Biomass Usage at the Mill Site - Dr I. Landälv, Chemrec AB, Sweden
- BTL-Fuels for the Transportation Sector - Dr H. Heinrich, Volkswagen AG, Germany

It was generally agreed that such high-level input to the workshop was very stimulating and important to the Agreement. In his concluding remarks, Chairman Björn Telenius emphasised that the ExCo needed to bring this strategic information into the work of the collaboration. This would include on-going evaluation of biomass pathways and product opportunities. There was also a need to respond to drivers such as 'market pull'.

ExCo54 Study Tour

In conjunction with ExCo54, 20 attendees participated in an excellent study tour organised by the Canadian hosts. The first stop was to Iogen Corporation's pre-commercial 'cellulose ethanol' facility. Iogen is a leading industrial biotechnology company specialising in cellulose-based enzyme technology. Dr Jeff Passmore, Executive Vice President of Iogen Energy gave a most interesting presentation on the work of the company and in particular their leading work in 'cellulose ethanol'. Following his presentation, the group was given a comprehensive tour of their world-leading demonstration facility. The company is currently at the stage of commercial rollout and has been evaluating potential commercial plant sites using criteria such as feedstock availability, characteristics and cost, government policies, infrastructure issues, investment climate and ethanol/co-product sales prospects. Overall the message was that Iogen is a world leader in cellulose ethanol and that this technology is 'ready to go'.



Mr John Dodd, General Manager, KMW Energy Inc., talking to the ExCo Members.

The second stop was at the Grenville Christian College, Brockville. Here the participants were shown a long-established, biomass-fed heating system which is currently based on wood fuel from recycled pallets. In addition, Mr John Dodd, General Manager of KMW Energy Inc., gave a short presentation on 'recovering energy from biomass resources'. He outlined the history of his company and the KMW combustion technology design features that provide flexibility, customisation, reduced construction time, low maintenance, long term reliability and acceptance of a variety of biomass fuel mixtures. He also described a number of KMW's success stories.

The other main theme of the study tour was the Eastern Ontario Model Forest as an example of the 'Model Forest Concept'. This began to take shape in the early 1990's amid a wave of national and international commitments to sustainable forest management. Canada's Model Forest Program was launched in 1992 and is one of the world's largest experiments in sustainable forest management. Through Model Forests, a variety of partners address the challenge of balancing the extensive range of demands placed on forests today with the needs of tomorrow's generation. With primary funding and administrative support from the Canadian Forest Service, the partners donate their time, expertise and money to determine what sustainable forest management could look like in their Model Forests. Canada's 11 Model Forests range in size from just over 100,000 to nearly eight million hectares and cover the majority of Canada's forest regions.

The Eastern Ontario Model Forest

| | |
|-------------------------------|---------------------------------|
| Total Area: | 1.5 million hectares |
| Population: | approximately 1 million |
| Forest Region: | Great Lakes - St Lawrence |
| Land Ownership: | 88% private: 12% public |
| Current Forest Cover: | 34% |
| No. of Demonstration Forests: | 30 |
| Forest Stands: | majority less than 80 years old |

The Eastern Ontario Model Forest is a group of dedicated people working together to sustain and ensure the health of the forests of eastern Ontario. The Model Forest promotes sustainable forest practices through education; demonstration; facilitation of cooperative programs; addressing science and information gaps; reporting on the state of the forests to communities in eastern Ontario and by sharing knowledge and information beyond its boundaries.

Through a variety of partnership activities, the Model Forest is connecting forests and people. There were two stops within the Eastern Ontario Model Forest. The first was to DOMTAR Plantations at Two Creek Forest where Mr Martin Streit, Manager of Forestry Services, demonstrated short-rotation hardwood forestry, and the group saw some of the recent plantings. The other stop was at the Ferguson Forest Centre Nursery where the group were shown a wide variety of the species and stock types used within the Model Forest System. This nursery is permanently open to the public.

Throughout the study tour, interesting background commentaries on the Model Forest System and the communities within the forest were provided by Ms Sandra Lawn and Ms Peggy Taylor. The excellent information and hospitality provided by the study tour hosts was greatly appreciated.



The Secretary (left) with Josef Spitzer, Austria; Martin Streit, DOMTAR and Jim Richardson, Canada at Two Creek Forest

Task Focus

Task 38: Greenhouse gas balances of biomass and bioenergy systems

Task 38 brings together the work of the national programs of 11 participating countries on the greenhouse gas (GHG) balances of biomass and/or bioenergy projects and programs. This topic is particularly relevant with the Kyoto Protocol coming into force in February 2005 and the subsequent potential for increased use of bioenergy to reduce GHG emissions. The Task focuses on methodologies to estimate the GHG mitigation of biomass systems, bioenergy technologies and terrestrial carbon sequestration. It integrates and analyses information on greenhouse gases, bioenergy, and land use, thereby covering all components that constitute a biomass or bioenergy system.

Case studies

A number of case studies have been undertaken by task participants to demonstrate the use of the methodology developed by the Task (see www.ioanneum.at/iea-bioenergy-task38/projects/task38casestudies/ for the full reports and brochures). These have included heat and electricity production such as co-firing of biomass with coal and peat; a combined heat and power bioenergy system; woody biomass, and annual crops used for electricity production. In all cases studied, the biomass was from sustainably produced resources, and the bioenergy systems reduced GHG emissions in comparison to a fossil fuel reference system. The GHG mitigation potential of each of the systems varied between 0.15 - 0.32 kg CO₂e/kWh (heat and electric) and depended on a range of factors, the most critical being the bioenergy system boundaries and choice of fossil fuel reference system.

Other case studies undertaken were:

- the use of annual crops for biodiesel production. Results indicated that the production of biodiesel from rapeseed reduced GHG emissions by 47.7 g CO₂e/MJ at an increased cost of between 0.0069 and 0.0112 Euro/MJ compared to conventional diesel.
- woody residues for 'bio oil' production.
- anaerobic digestion of livestock waste management. The use of anaerobic digestion reduced greenhouse gas emissions by 79%, equating to a reduction of 137 kg CO₂e per cow annually.
- a comparison of concrete and wooden framed houses. This showed that the production of materials for wood-framed construction required less energy, and emitted less CO₂ to the atmosphere. The GHG emissions advantage of wood over concrete construction depends strongly on the percentage of biomass residues recovered for fossil fuel substitution. The carbon stock of wood products in the building is of minor importance to the lifecycle net CO₂ emissions.



BIOMITRE

'BIOmass based Climate Change MITigation through Renewable Energy Systems' is a joint European Union/Task 38 project that has developed a standard, user-friendly software tool that can be used to analyse GHG balances and cost-effectiveness of different biomass energy technologies. The tool is able to accommodate a diversity of biomass technologies and data availability. The tool can be used by researchers, policy-makers and the energy industry to improve their understanding of renewable bioenergy projects. It also helps them to decide what type to invest in and develop to meet rising energy demands, while also meeting international commitments to reduce GHG emissions. The tool will be made freely available on the web in early 2005 at www.ioanneum.at/biomitre/



Biomass trade

Interest in bioenergy is growing across the Western world in response to mounting concerns about climate change and the international trade of biomass to meet energy demand is increasing. However, physical trade of biomass (or energy carriers derived from biomass, such as liquid fuels) is not always the optimal solution from both a cost and a GHG mitigation perspective. Local use of the bioenergy to replace fossil fuels, and subsequently trading electricity, CO₂ credits or Renewable Certificates may be important alternatives. These issues are discussed in more detail in a Task paper 'Should We Trade Biomass, Electricity, Renewable Certificates, or CO₂ Credits?' available at www.ioanneum.at/iea-bioenergy-task38/



Notice Board



Julije Domac (left) receives his award from Don Richardson, Member of the Executive Committee, Second World Biomass Conference

Julije Domac wins 'Biomass Junior Award'

In the last issue of Bioenergy News, we reported on the 2nd World Conference on Biomass. We did not mention that Julije Domac, Task Leader for Task 29, received the 'Biomass Junior Award' at this event. This award is jointly organised by WIP (Germany) and ETA (Italy), with the support of the European Commission. Its objective is to give recognition to and raise public awareness of young European biomass professionals, who have obtained significant scientific or entrepreneurial results in the field of Biomass. The Award Committee has been made up of prominent members in the fields of biomass research, development and industry.

Task 29. Socio-economic drivers in implementing bioenergy projects

Team leaders and guests met in October 2004 at Tsukuba City, Japan for a four day workshop on 'Biomass in Urban Communities'. This event included a technical seminar, Task 29 business session and a technical excursion to the National Institute of Advanced Industrial Science and Technology (AIST) where the group was shown photovoltaic installation projects, gasification of various biomass feedstocks and a new concept in municipal waste treatment through anaerobic digesters to produce hydrogen and methanol. The group also visited Sapporo Breweries, where the waste from beer production is anaerobically digested to produce a fuel that is utilised in fuel cells to produce electricity. This process currently covers 4% of electricity consumption in the Breweries. For more information on the Task and its outputs see www.iea-bioenergy-task29.hr



Task 29 Team and colleagues in Tsukuba

Task 29 have recently developed an educational website about biomass and bioenergy: www.aboutbioenergy.info They are keen to receive any feedback relating to its design, functionality, usefulness, etc. Please send any comments to Julije Domac at jdomac@eihp.hr

EC Action Plan for Bioenergy

In a recent communication from the European Commission 'The Share of Renewable Energy in the EU', COM(2004) 366final, the Commission identified the need to propose a new initiative for bioenergy. "By the end of 2005, the Commission will bring forward a coordinated biomass plan with a clear approach to securing adequate supplies of biomass through European, national and regional/local action across them all. This plan should ensure that the use of biomass for energy purposes does not lead to the undue distortion of competition. The plan will orientate and optimise Community financial mechanisms, re-direct effort within the policies concerned and tackle the obstacles to biomass deployment for energy purposes. Specific attention will be paid to the new Member States, taking into account the high and unexploited biomass potential that many of them have." The Action Plan is being developed and it is expected that a first draft for discussion with stakeholders and Members states will be ready by April 2005.

Impact of biomass production on soil carbon

The use of biomass for energy has raised the issue of the risk of depletion of soil carbon stocks in biomass production systems, due to a higher proportion of the organic matter and nutrients being removed from the site compared with conventional agricultural and forestry systems. A study was conducted to look at the impact of bioenergy systems on soil carbon. Results indicated that although there may be some decline in soil carbon associated with biomass

production, this is negligible in comparison with the contribution of bioenergy systems towards greenhouse gas mitigation through avoided fossil fuel emissions. The full paper can be accessed at

www.joanneum.at/iea-bioenergy-task38/projects/task38casestudies/



Comparing and utilising the GHG benefits of different bioenergy systems

Task 38 is preparing a position paper on this issue. In many cases decision makers are faced with the need to choose among alternative bioenergy options, each with its own characteristics, and possibly its own fossil-based reference energy system. Also, there is often a need to make recommendations during the design phase of bioenergy systems, concerning their optimization with regard to GHG mitigation, eg. by testing different combinations of resource/conversion technology, etc. The paper will shed light on these issues and make recommendations on whether GHG benefits should be optimised with respect to biomass inputs into the system, land resources used or capital invested. The paper will also provide guidance on the optimal choice of system boundaries for these kinds of analyses.

For more information see www.joanneum.at/iea-bioenergy-task38 or contact Susanne Woess-Gallasch at Susanne.woess@joanneum.at



Publications

World Energy Outlook 2004

This publication presents the International Energy Agency's latest energy projections to 2030, including detailed statistics and in-depth analysis. It contains an exhaustive set of historical data and projections covering demand, supply, trade, investment and CO₂ emissions for all fuels for 20 major world regions and countries. It also includes a number of special features such as a focused study of the effects of persistent high oil prices; a detailed analysis of how oil and gas companies calculate their proven, probable and possible reserves, and a comparison of current estimates and a 'World Alternative Policy Scenario' which considers what would happen if governments decided to act much more vigorously to combat environmental problems and reduce energy-security risks. A copy of this book can be obtained from <http://library.iaea.org/dbtw-wpd/bookshop/add.aspx?id=180>

CO₂ Emissions from Fuel Combustion 1971-2002

In preparation for the Tenth Conference of the Parties (COP-10) meeting under the UN Climate Convention in Buenos Aires, Argentina in December 2004, the IEA has prepared this publication on CO₂ emissions from fuel combustion. The data are designed to assist in understanding the evolution of these emissions from 1971 to 2002, by geographic area, sector and fuel. Order this publication at <http://library.iaea.org/dbtw-wpd/bookshop/add.aspx?id=36>

Electricity from Renewable Energy Sources - Encouraging Green Electricity in Europe

Published by the EU's Directorate-General for Energy and Transport, this brochure explains the EU directive on electricity from renewable sources. Current technologies for green electricity generation are summarised and the directive is set in the wider context of European and international commitments on greenhouse gas emissions and the security of energy supply perspective. Download a copy at http://europa.eu.int/comm/energy/res/publications/doc/2004_brochure_green_en.pdf

Biomass and Agriculture: Sustainability, Markets and Policies

This OECD report, comprising a series of papers presented by international experts, argues that a significant shift could take place this century from a fossil fuel to a biomass-based economy if governments changed strategies. Governments should encourage technical innovation as a way of narrowing the price gap with oil and gas products, which would stimulate demand and boost the supply of bioproducts. To aid this process it suggests creating carbon markets which would provide credits to biomass producers for displacing fossil fuels. Download a copy of the report at http://www.oecd.org/document/63/0,2340,en_2649_33791_33701567_1_1_1_1,00.html or contact Kevin Parris, OECD at Kevin.parris@oecd.org



Renewable Energy, Third Edition

This book covers all aspects of renewable energy, from the processes on the sun and in the atmosphere that gives rise to solar radiation, to the economic and environmental impacts of using renewable energy. Along the way, it introduces technologies for energy management and storage, to show how demand can be met at all times despite the use of variable energy sources. Bent Sorensen, Academic Press, August 2004 (ISBN 0126561532)

Bioenergy's role in the EU energy market

This paper looks at likely developments in the EU energy market until 2020; discusses how public perception of bioenergy might be improved in the EU; looks at biomass availability in Europe and identifies the important players in the European biomass sector. Download a copy at http://europa.eu.int/comm/energy/res/sectors/bioenergy_publications_en.htm

Towards a European research area ERA bioenergy strategy - short term measures to develop the European research area for bioenergy RTD

Bioenergy is expected to make the biggest contribution to increasing the share of renewable energy sources in the energy supply of the European Union as required by the White Paper, and to meeting the obligations of the Kyoto Protocol by 2010. To accomplish the required increase, research and technology development (RTD) in bioenergy must be enhanced within the future European Research Area (ERA). To identify short term actions supporting this development, the ERA Bioenergy project was carried out by partners from 24 countries. Country surveys of the current and future status of bioenergy RTD policies, programmes and institutions provided the basis for identifying opportunities for short term actions leading to the ERA for bioenergy RTD. The findings from the survey are discussed in this publication. (ENK5-CT-2001-80526)

Promoting biofuels in Europe. Securing a cleaner future for transport

This brochure explains the EU directive on the promotion of biofuels or other renewable fuels for transport. The current types of biofuels are summarised and the directive is set in the wider context of European and international commitments and objectives on security of energy supply, greenhouse gas emissions and renewable energy sources. The development of biofuels so far, within Europe and the world, is described. The directive's targets for biofuel substitution for conventional fuels are presented and the possible support measures, including fiscal exemptions and setting technical standards are summarised, as are the reporting requirements from the Member States. Download from http://europa.eu.int/comm/energy/res/publications/index_en.htm

Networking

Promoting and sourcing clean energy capabilities

Two IEA programmes now provide unique opportunities to promote and source energy efficient, renewable energy and greenhouse gas mitigation technologies and services. Web sites for the IEA programmes CADET and GREENTIE provide technology case studies, a searchable directory of suppliers, and other valuable information for project managers, developers and policy makers.

CADET InfoStore

(www.caddet.org) is a free, on-line database that promotes innovative energy efficiency and renewable energy projects. It has details of over 1600 projects that have been independently verified, demonstrate good environmental benefits and have strong potential for commercial replication.

GREENTIE Directory

(www.greentie.org) is a searchable international directory of suppliers whose technologies help to reduce greenhouse gas emissions. It is particularly appropriate for project managers, resourcing contractors and policy makers wanting to mitigate the effects of these emissions for economic, social and environmental reasons.



Calendar of Events

IEA Bioenergy Meetings

Task 29 will hold its next international workshop in Croatia, in June 2005. The workshop will consist of a technical session, Task 29 business session and a technical excursion to visit Croatian and Slovenian biomass facilities. Contact Julije Domac, Task Leader
Email: jdomac@eihp.hr

Task 32 will next meet on 16-17 March 2005 in Graz, Austria. It will coincide with an international workshop on aerosols from biomass combustion. Contact Jaap Koppejan
Email: J.Koppejan@mep.tno.nl

Task 33 will hold its next meeting on May 18-20, 2005 in Stockholm, Sweden (jointly with the SYNBIOS Conference). Contact Suresh Babu, Task Leader
Email: suresh.babu@gasttechnology.org

Task 38 will be meeting in Dublin, Ireland in the week of 25-29 April 2005. A workshop in cooperation with Sustainable Energy Ireland, University College of Dublin and COST Action E31 'Management of Recovered Wood' is planned on the topic 'Greenhouse Gas Aspects of Biomass Cascading - Reuse, Recycling and Energy Generation'. Contact Susanne Woess-Gallasch
Email: susanne.woess@joanneum.at

Task 39 will hold a Task Meeting in Denver, USA in May 2005. This will be a Special Session of the 27th Symposium on Biotechnology for Fuels and Chemicals. It will also hold a workshop in November/December 2005 in Lund, Sweden. Contact Jack Saddler, Task Leader
Email: saddler@interchange.ubc.ca

Task 40 is planning to hold a combined meeting with Task 29 in March 2005 in Washington, USA. A further joint meeting is planned with Tasks 30 and 31 in Brazil for the second half of 2005.
Contact Rob Remmers, Joint Task Leader
Email: rob.remmers@essent.nl

ExCo55 will be held in Copenhagen, Denmark on Wednesday 25 and Thursday 26 May 2005, with a study tour on Tuesday 24 May.

ExCo56 will be held in Ireland on 11-13 October 2005, with a 1 day study tour.

ExCo57 will be held in Paris, France on 17-19 May 2006.

ExCo58 will tentatively be held in South Africa around October 2006.

Other Events

Clean Energy Power 2005
26-27 January 2005, Fairground Berlin, Germany
Contact: Sanna Takanen
Tel: +49 7121 3016 - 0
Fax: +49 7121 3016 - 100
Email: sanna.takanen@energie-server.de
Web: www.energiemessen.de/

Central European Biomass Conference 2005: Bioenergy for Central and Eastern Europe
26-28 January 2005, Graz, Austria
Contact: Austrian Biomass Association
Tel: +43 1 533 0797 - 0
Fax: +43 1 533 0797 - 90
Email: office@biomasseverband.at
Web: www.biomasseverband.at

Summit for the Future 2005: Energy
26-28 January 2005, Amsterdam, The Netherlands
Contact: Club of Amsterdam
Tel: +31 20 615 4487
Fax: +31 20 408 0733
Email: Summit2005@clubofamsterdam.com
Web: www.clubofamsterdam.com

Environment, Water & Energy 2005
30 January - 2 February 2005, Abu Dhabi, UAE
Contact: General Exhibitions Corporation
Tel: +971 2 444 6900
Fax: +971 2 444 6135
Email: ee@gec.co.ae
Web: www.ee-uae.com

10th Annual National Ethanol Conference: Policy & Marketing
7-9 February 2005, Scottsdale, Arizona, USA
Contact: BBI International
Tel: +1 719 942 4353
Fax: +1 719 942 4358
Email: conferences@bbi biofuels.com
Web: www.ethanolrfa.org/necreg05.shtm

RIO 5 - World Climate & Energy Event
15-17 February 2005, Rio de Janeiro, Brazil
Contact: RIO 5 Organising Committee
Tel: +55 21 22 33 51 84
Fax: +55 21 25 18 22 20
Email: info@rio5.com
Web: www.rio5.com

erneuerbare energien 2005
25-27 February 2005, Boeblingen, Germany
Tel: +49 7121 3016-0
Fax: +49 7121 3016 100
Email: redaktion@energie-server.de
Web: www.erneuerbareenergien.com

European Pellets Conference
2-3 March 2005, Wels, Austria
Contact: O.Ö. Energiesparverband
Tel: +43 732 7720 14380
Fax: +43 732 7720 14383
Email: office@esv.or.at
Web: www.esv.or.at/esv/index.php?id=77&L=1

World Sustainable Energy Days 2005
2-4 March 2005, Wels, Austria
Contact: O.Ö. Energiesparverband
Tel: +43 732 7720 14386
Fax: +43 732 7720 14383
Email: office@esv.or.at
Web: www.esv.or.at/esv/index.php?id=217&L=1&contUId=0

Global Alternative Fuels 2005 Exhibition and Forum
8-10 March 2005, Berlin, Germany
Contact: The Energy Exchange Ltd
Tel: +44 1242 529 090
Fax: +44 1242 529 060
Email: c.pallen@theenergyexchange.co.uk
Web: www.theenergyexchange.co.uk/energy201overview.html

Cairo 9th International Conference on Energy & Environment (EE9)
13-19 March 2005, Cairo and Sharm El-Sheikh, Egypt
Contact: Ralph H. Kummeler, College of Engineering, Wayne State University
Tel: +1 313 577 3775
Fax: +1 313 577 5300
Email: rkummeler@chem1.eng.wayne.edu
Web: ee9.sat-eng.com/index.htm

2005 Australian Energy Summit
17-18 March 2005, Sydney, Australia
Contact: IIR Conferences
Tel: +612 9923 5090
Fax: +612 9923 5000
Email: info@iir.com.au
Web: www.iir.com.au/conferences

Enex - New Energy 2005
21-23 March 2005, Fairground Kielce, Germany
Contact: Sanna Takanen
Tel: +49 7121 3016 - 0
Fax: +49 7121 3016 - 100
Email: sanna.takanen@energie-server.de
Web: www.enex-expo.com/

Mondial Bioenergie
31 March - 3 April 2005, Paris, France
Contact: ITEBE
Tel: +33 384 47 81 00
Fax: +33 384 47 81 19
Email: virginie.sauvage@itebe.org
Web: bioenergie.dyndns.org/mondial/

2nd Asian International Renewable Energy Equipment & Technology Exhibition
7-9 April 2005, Beijing, China
Contact: Vivian Li, Grace Fair International
Tel: +86 10 8225 2695
Fax: +86 10 8225 2651
Email: vivian@gracefair.com
Web: www.gracefair.com/reasia_home.htm

Renewable Energy World Africa 2005
19-20 April 2005, Midrand, South Africa
Contact: Chris Raubenheimer, Terrapinn
Tel: +27 11 463 2802
Fax: +27 11 463 6000
Email: chris.raubenheimer@terrapinn.com
Web: www.powergenerationworld.com/2005/renew%5Fza/

Green Power Mediterranean
26-27 April 2005, Rome, Italy
Contact: Green Power Conferences
Tel: +423 663 029 144
Email: nadim.chaudhry@greenpowerconferences.com
Web: www.greenpowerconferences.com

Sustainable Energy 2005
27-29 April 2005, Melbourne, Australia
Contact: Australian Business Council for Sustainable Energy
Tel: +613 9530 6777
Fax: +613 9349 3049
Email: general@bcse.org.au
Web: www.bcse.org.au/home.asp

5th Asia Pacific Conference on Sustainable Energy and Environmental Technologies
9-11 May 2005, Wellington, New Zealand
Technical contact: apsceet@massey.ac.nz
Registration: evenements@xtra.co.nz
Web: www.apcseet.org

5th Global Forum on Sustainable Energy
Enhancing International Cooperation on Biomass
11-13 May 2005, Vienna, Austria
Contact: Irene Freudenschuss-Reichl, Austrian Ministry for Foreign Affairs Development Cooperation
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2nd China International Renewable Energy Equipment & Technology Exhibition and Conference
25-27 May 2005, Beijing, China
Contact: NRE 2005 Secretariat
Tel: +8610 6429 0047
Fax: +8610 8425 5706
Email: qvic2005@vip.bbn.cn
Web: www.nre2005.com/

CLEAN AIR 2005 - Eighth International Conference on Energy for a Clean Environment
27-30 June 2005, Lisbon, Portugal
Contact: Maria Fernanda Afonso, Instituto Superior Técnico
Tel: +351 21 8417378/8417186
Fax: +351 21 8475545
Email: cleanair2005@vianw.pt
Web: navier.ist.utl.pt/cleanair

Bioenergy in Wood Industry 2005 Conference, in connection with the International Bioenergy and Wood Exhibition
12-15 September 2005, Jyväskylä, Finland
Contact: Prof. Dan Asplund, Jyväskylä Science Park Ltd
Tel: +358 14 4451 100
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Email: dan.asplund@isp.fi
Web: www.finbioenergy.fi/bioenergy2005

14th European Biomass Conference and Exhibition: Biomass for Energy, Industry and Climate Protection
17-21 October 2005, Paris, France
Contact: ETA - Renewable Energies
Tel: +39 055 5002174
Fax: +39 055 573425
Email: eta.fi@etaflorence.it
Web: www.etaflorence.it

Objectives of IEA Bioenergy

IEA Bioenergy is an international collaborative agreement set up in 1978 by the International Energy Agency (IEA) to improve international cooperation and information exchange between national bioenergy RD&D programmes. IEA Bioenergy aims to accelerate the use of environmentally sound and cost-competitive bioenergy on a sustainable basis, and thereby achieve a substantial contribution to future energy demands.

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Task 37: Energy from biogas and landfill
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Task 38: Greenhouse gas balances of
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