



Bioenergy in Brazil

Guest Editorial by Dr Manoel Nogueira, Alternate Member for Brazil, and Paulo Cruz

Brazil produces well above the world average level of energy from renewable sources. Energy from biomass alone increased in absolute value from 53% of 74 Mtoe in the 1970s to the current 25.5% of 187 Mtoe. This was made possible by fast transition to commercial energy plantations, lower domestic utilisation and improvement in transportation and industry.



Harvesting of sugar cane. Courtesy J.G. Darcie, Zillo Lorenzetti

The current competitive bioenergy prices of less than US\$1.5/GJ require the use of advanced technologies such as gasification and combined cycles for electricity and hydrolysis and fermentation for ethanol production. The estimated prices for bioenergy from USA plantations in 2000, 2010 and 2020 are 2.4, 1.8 and 1.4 US\$/GJ respectively. Brazil currently produces bioenergy from *Eucalyptus* at US\$1.16/GJ and intends to bring the price down to US\$1.03/GJ in the near future. In a similar way to the sugar cane industry, Brazil has reached a high level of technology for establishment, management and utilisation of *Eucalyptus* forests.

Renewable energy has also reached the automobile industry. The National Alcohol Program – PRO-ALCOOL – was an incentive to encourage the production of fuel ethanol from sugar cane for automobiles. The aim was to make fuel prices less susceptible to international petroleum price oscillations. In 1986, 80% of Brazil's lightweight vehicles were powered by hydrous alcohol. In that same year, the price of a barrel of petroleum dropped to US\$10, which caused a major impact on the program. Nowadays, the sugar cane industry is strong enough to operate without governmental subsidies and alternates its focus between ethanol and sugar. Fuel ethanol continues to have an important effect on fuel consumption as it is added to gasoline on a 1:4 volume basis.

Pre-commercial initiatives for the production and utilisation of biodiesel have led to the establishment of the PRO-BIODIESEL program. In a similar way to anhydrous ethanol, it is to be added in gradual steps to fossil diesel. Efforts are being made by the academic, industrial and government sectors to define the proportions, routes and technologies to be employed.

PROINFA, the new 'National Program of Incentive to Electric Energy from Alternative Sources' will guarantee the purchase of 3,300 MW from small hydro, biomass and wind power plants. A minimum of 60% of national equipment is to be employed in the first phase and 90% in the second. It is thus both an opportunity to diversify the Brazilian energy matrix and to stimulate the national engineering industries.

Although it already demonstrates an outstanding level of renewable energy production, Brazil has not diminished its efforts to pursue further energy technologies that are more socially and environmentally friendly. For more information please contact Dr Manoel Nogueira at manoelnogueira@mme.gov.br



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From the Secretariat



John Tustin

ExCo52 Campinas, Brazil

The 52nd meeting of the Executive Committee was held in Campinas, Brazil on 29-30 October 2003, with Björn Telenius as Chairman and John Tustin as Secretary. The meeting was hosted by the National Department of Energy Development of the Ministry of Mines and Energy. The Chairman expressed the appreciation of the ExCo to Marcelo Poppe, Manoel Nogueira, Laercio Couto and their colleagues for the excellent meeting and study tour arrangements. Some of the outcomes of the meeting are detailed below.



Tasks in the New Triennium 2004-2006

A substantial part of the meeting was dedicated to discussing and finalising the programmes of work and budgets for the Tasks in the new triennium. Apart from Task 29 which was already approved, Tasks 30, 31, 32, 33, 34, 36, 37, 38 and 39 were all prolonged with new programmes of work and renewed participation by Member Countries. There was one new Task approved which is detailed below. Task 35 'Techno-economic assessments for bioenergy applications' will not continue. Thus 11 Tasks will be active in the upcoming period. For contact details, see page 8.

New Task 'Sustainable International Bioenergy Trade'

The vision of this Task is that global bioenergy trade will develop over time into a 'commodity market' which will secure supply and demand in a sustainable way. The Member Country participants, along with industrial partners, governmental bodies and NGOs will create an international platform for collaboration. The Task will investigate what is needed to create a commodity market for bioenergy. Outputs will contribute to the development of sustainable bioenergy markets in both the short- and long-term and also on different scales – from regional to global (more on page 4).

Strategic Workshop

Discussion of IEA Bioenergy's strategic role continued from ExCo51. There was agreement to increase the focus on outputs which would support policy development

in the Member Countries. As part of this process a whole day at ExCo53 will be dedicated to a workshop with the Task Leaders. The Chairman will convene a small group of ExCo Members and Task Leaders to plan this event.

Election of Chairman and Vice Chairman

Dr Björn Telenius of Sweden was re-elected Chairman and Dr Kyriakos Maniatis of the European Commission was elected Vice Chairman.

Special Issue of the Open Energy Technology Bulletin

In conjunction with IEA Headquarters, a special issue of this Bulletin has been prepared and published. With a worldwide circulation of over 3,500 subscribers this gives excellent exposure to IEA Bioenergy. If you wish to receive this useful publication please subscribe at //weaver.iea.org/mailman/listinfo/open-mail

Collaboration with Headquarters

The strong working relationship with IEA Headquarters continues. Peter Tulej, the Desk Officer, tabled a comprehensive report proposing new collaborative initiatives with the ExCo. These included a seminar to discuss 'Renewable Energy (RE) R&D Priorities', development of the RE Website, and project work on 'Renewable Hydrogen', 'Implications of Intermittency on RE Market Potential' and 'RE Resource Potential'.

IEA Bioenergy News Goes Electronic!

The ExCo decided that from the next issue – Volume 16(1) – the newsletter will only be circulated in electronic format. Subscribers should ensure that the Editor has their email address. IEA Bioenergy News will also be available from the IEA Bioenergy website.

Pearse Buckley (centre), the Member for Ireland and others are briefed by Manoel Leal, Technology Management Resources Coordinator, Copersucar



Steve Schuck (left), Australia; Solvar Klokk, Norway; Kees Kwant, the Netherlands; and Arthur Wellinger, Switzerland learn about micropropagation of Eucalyptus spp. from a researcher at International Paper's Forestry Technology Centre



Bruno Guggisberg (left), the Member for Switzerland with Julije Domac, the Alternate Member for Croatia on the Copersucar study tour



ExCo52 Study Tour

In conjunction with ExCo52, 22 ExCo Members and Task Leaders participated in two excellent study tours organised by the Brazilian hosts.

The first tour was to International Paper at Mogi Guaçu. This provided valuable insight into the development of short-rotation forestry in Brazil based on *Eucalyptus grandis*. The tour began with overview presentations on the Brazilian economy, the Brazilian forestry sector and International Paper's forestry operations in Brazil.

These were followed by a presentation and tour of the Forestry Technology Centre which has advanced research programmes in such areas as genetic improvement, clonal strategies, molecular markers and micropropagation. The production nursery was also visited, with large-scale hydroponic production of *Eucalyptus* spp. a special feature. The research programmes into forestry protection and sustainable forestry were also presented.

International Paper nursery workers preparing material for hydroponic production of Eucalyptus spp.



International Paper's whole-tree harvesting of 6-year-old hybrid Eucalyptus spp. near Mogi Guaçu. (Solvar Klok, Norway in the foreground)

Following this, a stop was made to see a highly mechanised, whole-tree forest harvesting operation of six-year-old *Eucalyptus*. The growth rates were remarkable – see photo left. Brazil ranks fourth in the world as a forest products supplier and is a major producer and exporter of *Eucalyptus* pulp. Of the 4.146 million hectares of planted forests in Brazil, 64% is *Eucalyptus* spp. Pulp and paper represents 4% of total Brazilian exports.

Also visited was International Paper's Parque Florestal São Marcelo – a forest park with a major emphasis on environmental education. The group was able to see school children actively participating in programmes based on this facility.

The second tour was to Barra Grande Alcohol and Sugar Mill, established in 1946 and one of three mills of the Zillo Lorenzetti Group, part of Copersucar. The tour began with overview presentations on Copersucar: the sugarcane industry; the ethanol industry and operation aspects of the Barra Grande Mill. There was an interesting presentation on 'Sugarcane and Ethanol in Brazil'. Brazil leads the world in the production of ethanol – 12.5 million m³ out of a total of 33 million m³. At present, 46.1% of primary energy production in Brazil is sourced from renewable energy with 14.7% coming from sugarcane. Barra Grande is one of the most efficient mills in terms of sugar recovery and energy production in Brazil. In the last season (190 days) Barra Grande crushed 3,500,000 tons of sugarcane, produced 180,000 m³ of alcohol, 200,000 tons of sugar and co-generated 200,000 MWh. The group was impressed by the scale, efficiency and modernisation that was demonstrated at Barra Grande.

On both study tours, the company hosts provided excellent information and copies of their presentations for the participants. The friendliness and genuine interest in IEA Bioenergy shown by all these people was impressive, and made a very favourable impact with the Executive Committee.



ExCo Members on the mill tour at Barra Grande alcohol and sugar production plant

Next ExCo Meeting

ExCo53 will be held in Lucerne, Switzerland on Thursday 6 and Friday 7 May 2004. The first day of the meeting will be dedicated to a joint workshop with the Task Leaders. There will be a study tour on Wednesday 5 May. This meeting has been timed to immediately precede the 2nd World Conference and Technology Exhibition on Biomass for Energy, Industry and Climate Protection, 10-14 May in Rome.

The meeting will be held at the Hotel Continental-Park. The hotel is one hour (60 km) by car or direct train from Zurich Airport. It is centrally located, opposite the Lucerne Railway Station and close to the old city centre and the lake. For more information please visit www.continental.ch and www.luzern.ch

The post out deadline for agenda material sent by the Secretary will be Friday 26 March 2004. For more details contact the Secretary at jrtustin@xtra.co.nz



Courtesy J.G. Darcie, Zillo Lorenzetti

BRAZIL – Energy Statistics

Brazil Primary Energy Production (2002)

	%		%
Non-Renewable energy	53.9	Renewable energy	46.1
Oil	43.1	Hydraulic	14.2
Natural gas	9.0	Wood	14.4
Coal	1.4	Products of cane	14.7
Uranium	0.4	Other sources	2.8

Biomass

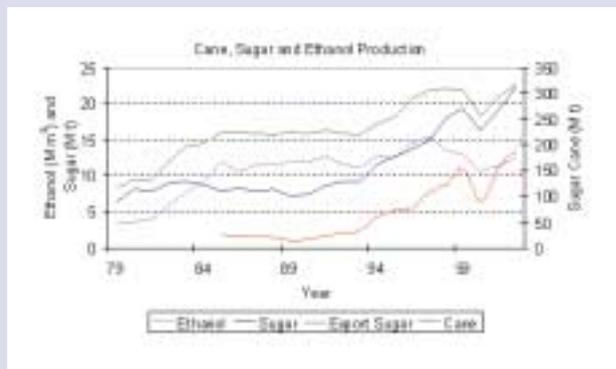
In 1970, biomass was 53% of 74 Mtoe
 In 2001, biomass was 25.5% of 187 Mtoe

The cost of biomass from Eucalyptus energy plantations in S. Brazil is US\$1.16/GJ
 The cost of biomass from cane trash is US\$0.6-1.0/GJ
 (cf. USA at US\$2.4/GJ in 2000; predicted US\$1.4/GJ in 2020)

1 t cane	0.14 t(DM) bagasse	- 90% used for energy
	0.14 t(DM) trash	- not used today
	0.15 t(DM) sucrose	- sugar + ethanol

Ethanol Production

- Brazil is the world's leading producer of ethanol, at 12.5 million m³;
- USA is the next biggest producer at 6.5 million m³;
- Of 318 Mt/yr sugar cane grown in 2002, 48% was converted to ethanol and 52% to sugar;
- Production cost of ethanol in S. Brazil is US\$0.16/l;
- Production of 1 mill litres of alcohol per year generates on average 38 direct jobs in Brazil; cf. 0.6 jobs generated in the country by production of 1 mill litres of gasoline.



Electric Power Generation Potential

Bagasse only (crushing season only)	Bagasse & trash (year round)
22 bar steam : 5 kWh/TC	22 bar steam : 50 kWh/TC
82 bar steam : 50 kWh/TC	82 bar steam : 150 kWh/TC
	Gasification : 250 kWh/TC

Statistics courtesy of Mr Marcelo Poppe and Mr Manoel Regis L.V. Leal
 For further information on sugarcane and ethanol in Brazil, contact Manoel Regis Leal at: regis@copersucar.com.br

Task Focus

A new Task has been approved for the period 2004-2006. It will be jointly coordinated by Utrecht University and Essent Sustainable Energy of The Netherlands.



Dr Andre Faaij,
Task Leader

Task 40: Sustainable international bioenergy trade: securing supply and demand

Biomass has long been considered an energy source to be used at a local/regional level because of limited availability and the assumed prohibitive cost of long distance transport. However, the international debate on the role of bioenergy has recently started to take a different direction and international biomass trade is not only discussed but also picked up by the market.

International biomass trade with Europe now amounts to some 50 PJ per year (mainly wood pellets, forest residues and increasingly agricultural residues). In the Netherlands, Essent is the major player with regard to bioenergy production. A few years ago they started importing biomass from all over the world. Another international player is Brazil who export biomass-derived ethanol to Japan and the US. Also, the Millennium Gel fuel (bio-ethanol based fuel units used for cooking) scheme supported by the World Bank has opened markets throughout Southern Africa.

There are several stages that can be observed in biomass utilisation and market development in biomass supplies. All countries/regions seem to follow these stages over time:

- Waste treatment (eg. MSW and process residues) 'on site' at production facilities is generally the starting phase of a developing bioenergy system.
- Local utilization of resources from forest management and agriculture is generally next. Such resources are more expensive to collect and transport, but are usually still economically attractive.
- Biomass market development on regional scale. Increasing average transport distances improve economies of scale.
- Development of national markets with increasing number of suppliers and buyers. Creation of a market place; increasingly complex logistics.
- Increasing scale of markets and transport distances, including cross border transport of biofuels and international trade of biomass resources.
- A global commodity market. Complex interlinkages with existing markets; the existence of financial 'products' eg. derivatives swap, futures, options and forward prices on the traded products; global pricing, etc.

Existing markets are not developed to a 'commodity market' stage. The current trade activities are bilateral between companies. The experiences of commodity markets such as food, forestry/wood and fossil fuel can be used to develop a commodity market for bioenergy which will secure supply and demand in a sustainable way.

Given the high expectations for bioenergy demand on a global scale, the pressure on available biomass resources will increase. Without the development of resources, eg. energy crops, and a well functioning biomass market that can assure a reliable and lasting supply, those ambitions may not be met. The development of truly international markets for bioenergy may become an essential driver to develop bioenergy potentials, which are currently under-utilised in many countries. The possibility of exporting biomass derived commodities for the world's energy market could provide a stable and reliable demand for rural communities in developing countries, thus creating an important incentive and much needed market access.

For the parties involved, such as utilities, transport fuel companies and those involved in biomass production and supply (eg. forestry companies), high quality knowledge, clear criteria and identification of promising possibilities and areas are of key interest. Investments in infrastructure and conversion capacity rely on minimisation of risks of supply disruptions (in terms of volume, quality and price).

In relation to the demand for bioenergy, the GHG emission reduction potential is important. More important for a reliable demand is the guarantee that biomass produced in other parts of the world is supplied on a truly sustainable basis. This requires the development of criteria, project guidelines and a certification system which are supported by international bodies. This is particularly relevant for those markets that are highly dependant on consumer opinion eg. Western Europe.

Task 40 aims to investigate what is needed to create a commodity market for bioenergy. By means of the international platform of IEA combined with industrial parties, governmental bodies and NGOs, this Task will contribute to the development of sustainable bioenergy markets in the short and long term, on a regional and global basis.

For further information on this Task, contact Andre Faaij, Task Leader at: a.p.c.faaij@chem.uu.nl



Courtesy Copersucar

IEA Bioenergy News Goes Electronic

Attention all readers! This will be the last issue of the IEA Bioenergy newsletter distributed in hard copy. Starting in June 2004, the IEA Bioenergy News will be sent out in electronic format. Please send your email address to nikicarling@clear.net.nz to ensure you receive future electronic copies. The newsletter will continue to be posted at the IEA Bioenergy Website.

Canadian initiative on climate change - opportunities for renewables

Contribution by Peter Hall, ExCo Member for Canada

On 12 August 2003 the Canadian Government announced the details of a \$1 billion program towards the implementation of the Climate Change Plan for Canada. The program is expected to be an important step toward helping all Canadians reduce greenhouse gas emissions in the short-term, but will also open doors to tremendous economic opportunities over the long-term through research and technological innovations. The initiative will involve actions by individual Canadians; industry and business; and governments and communities.

A series of renewable energy initiatives are being supported through developing the growing market for reliable and cost-effective renewable energy technologies, including solar water and space heating systems, ground source heat pumps, and high-efficiency/low-emission biomass combustion systems. Other energy initiatives include incentives for wind power production, ethanol and biodiesel. New plants for the production of ethanol will be constructed, with a target of having at least 35% of gasoline containing 10% ethanol by 2010. Other parts of the initiative will provide incentives for the construction of industrial-scale biodiesel pilot plants to encourage wider use of this cleaner-burning diesel alternative.

Biofuels are considered crucial to the climate change plan and will be promoted through the development and demonstration of bio-based energy systems and technologies. These will include biomass and waste conversions; cellulosic ethanol from biomass and other biofuels; bio-processes; biomass production harvesting and transportation; and energy from biomass. These technologies have great potential to reduce the use of fossil fuels.

The development and demonstration of decentralized energy production systems is also a priority. These systems make more efficient use of locally available energy resources and renewable sources of energy, such as biomass, wind, solar and landfill gas. They can be used in residential, commercial and industrial applications and in combined heat and power applications.

The use of forest biomass will be promoted through the development of partnerships for the planting of fast-growing trees and the demonstration of the contribution these plantations make in absorbing CO₂, thus offsetting GHG emissions. There will also be an opportunity to work with private industry to assess the economic and technical feasibility of using private lands to grow and harvest fast-growing trees. This could lay the foundation for the development of extensive plantations and so contribute to reaching climate change targets. Additional benefits include demonstrating environmental stewardship, promoting innovation and creating new business opportunities in Aboriginal and rural communities. For further information contact Peter Hall at: phall@nrcan.gc.ca

Task 29. Socio-economic drivers in implementing bioenergy projects

The Task 29 educational website on biomass and bioenergy is under development and can be visited at: www.eihp.hr/task29.htm. The final product will contribute to the promotion of biomass and bioenergy and provide education to the non-expert population interested in learning more about the subject.

Task 31. Conventional forestry systems for sustainable production of bioenergy

The third annual workshop of Task 31 'Sustainable production systems for bioenergy: impacts on forest resources and utilization of wood for energy' took place in Flagstaff, Arizona, USA from 6-10 October 2003. It was attended by 45 participants from 11 countries. Presentations covered social and political considerations of using wood for energy; integrating bioenergy and forest fuels management; operations and economics of feedstock production and site productivity and environmental quality in bioenergy production. These presentations are being made available to participants on CD, and the proceedings will be published in an appropriate international journal.

Field visits during the workshop illustrated clearly the issues relating to fire risk in the ponderosa pine forests of the wildland-urban interface in Arizona. Wildfire is an integral component of the ponderosa pine ecosystem but has been more or less excluded for the past 100 years. The present forest has become overstocked with dense young trees and underbrush creating ideal conditions for very intense and extensive wildfires. Efforts to reduce the fire risk by thinning and prescribed burning have been limited by environmental regulations proscribing commercial harvesting of trees in National Forests. Bioenergy as a use for biomass removed in thinnings offers a potential solution and several biomass power projects are under development or being considered.

Obituary - Dr Louis Zsuffa (1927-2003)

We regret to announce the death of Louis Zsuffa on November 14, 2003 in Toronto, Canada. Born in the former Yugoslavia, Louis received his university education in forestry at the University of Zagreb.



With a doctorate in forest genetics, he moved to Canada to work in tree improvement and genetics for the Ontario Ministry of Natural Resources. He subsequently became a professor in the Faculty of Forestry at the University of Toronto, where he was a skilled educator and mentor of many graduate students. The author of more than 250 publications, Louis was known world-wide for his work on the selection and breeding of poplars and willows for forestry and bioenergy. During his career, he was actively involved in several national and international organizations including IEA Bioenergy and the International Poplar Commission. Since his retirement from the University of Toronto in 1993, he had remained active professionally and scientifically.

Louis Zsuffa was involved in the work of IEA Bioenergy from 1979 to 1997 as Operating Agent for a series of Tasks dealing with biomass production for energy. In that capacity, he was well-known to a wide circle of Activity Leaders, Technical Advisory Committee members and Executive Committee members throughout the world. As well as his considerable scientific achievements with poplar and willow breeding, Louis will be remembered for his quiet, unassuming nature. He was in every sense a gentleman and a scholar.

Louis leaves behind his wife, Mara, and one son, Tibor.

A sympathy letter was sent to the family on behalf of IEA Bioenergy.

Publications

Municipal Solid Waste and its Role in Sustainability

This is the second publication in the ExCo Position Paper series. MSW is a valuable source of renewable energy with associated environmental benefits and impacts. The paper is designed to facilitate discussion and energy policy development in the Member countries. Copies may be obtained from the Secretary or downloaded from the website.



Task 37 Report: Animal By-products and Anaerobic Digestion: Requirements of the European Regulation (EC) No 1774/2002

This very extensive regulation governs the collection, transport, methods and procedures of treatment, and the further disposal, use or trade in animal by-products not intended for human consumption. Task 37 looks at the implications this has for biogas plants processing animal by-products and identifies critical control points from a hygienic point of view for the operation of these plants. Copies of the report are available from Arthur Wellinger, NovaEnergie, Châtelstrasse 21, 8355 Aadorf, Switzerland, or from January can be downloaded at www.novaenergie.ch/iea-bioenergy-task37/index.htm

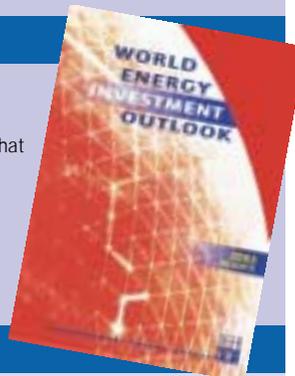
Task 29 Workshop: Socio-economic drivers in implementing bioenergy community projects: Education and Promotion

Proceedings of this workshop, held in Streatley, UK, on 18-20 June 2003, were published in November 2003. Copies are available from Velimir Segon, Energy Institute Hrvoje Pozar, Savska c. 163, 10001 Zagreb, Croatia or email: vsegon@eihp.hr



World Energy Investment Outlook 2003

This 500 page study analyses global energy investment needs fuel-by-fuel and region-by-region over coming decades. It looks at the implications of a range of alternative scenarios and policy options and concludes that the total investment requirement for energy-supply infrastructure worldwide over the period 2001-2030 is \$16 trillion. This investment is needed to expand supply capacity and to replace existing and future supply facilities that will be exhausted or become obsolete during the projection period. Obtain a copy from <http://library.iea.org/dbtw-wpd/bookshop/add.aspx?id=145>



Renewables Information 2003

Downloadable for free in PDF format, this is the latest edition of IEA's annual publication providing comprehensive information on the use of renewables and waste in the OECD countries. The report addresses a need for development of reliable statistics on this energy form and seeks to increase understanding of the current market and trends over recent years. Download a copy at: www.iea.org/stats/files/renew2003.pdf

Renewable Energy Export Strategy

EREC, the European Renewable Energy Council, has published this strategy document which calls for increased co-ordinated actions at EU level to strengthen the leading position of the EU renewable energy technology industry on world markets. It concludes that 'The promotion of European renewable energy technologies has a two-fold benefit for the EU industry on the one side and for the target export countries on the other side where RES can significantly improve living conditions and social welfare and is therefore a win-win strategy for all parties involved'. Copies of this document can be downloaded at: www.erec-renewables.org/documents/EURES/DEFINITIF_EXPORT.pdf

Renewable Energy Danish Solutions

Renewable energy is an important part of Denmark's energy supply, contributing to security of supply and management of environmental concerns. This publication provides an updated overview of the Danish renewable energy sector and describes a variety of solutions that meet the challenges of harnessing renewable energy. It also describes the results of new R&D towards promising future technologies. The publication can be downloaded at www.ens.dk



Networking

OPEN Energy Technology Bulletin

The OPEN Energy Technology Bulletin is a service providing on-line publication of energy-related news. Its particular focus is on news from entities under the guidance of the IEA's Committee on Energy Technology Research and Technology (CERT). The Bulletin circulates news of activities, findings, events and publications originating within the IEA community. It aims to stimulate the exchange of energy technology information and ideas among policy-makers and others concerned with energy technology issues around the globe. Its goal is to create wider awareness, within and outside the IEA, of advances in energy technology development and deployment associated with work within the IEA Community.

Issue No. 15 of the Bulletin (20 November 2003) highlights recent initiatives and achievements of IEA Bioenergy, one of around forty Implementing Agreements within the IEA's Framework for International Energy Technology Co-operation. Subscribe to the Bulletin at: <http://weaver.iea.org/mailman/listinfo/open-mail> or send your comments to: IEA-OPEN-Bulletin@iea.org

CADDET launches new Website

CADDET is a programme funded by countries that are members of the International Energy Agency (the European Commission also participates). Its aim is to provide the latest information on innovative energy efficiency and renewable energy technologies that have been applied in a commercial environment, in order to promote their widespread uptake by the market. The new CADDET website at www.caddet.org aims to provide the market with a 'one-stop shop' on sustainable energy projects and technologies. In addition to a database of over 1,600 projects (InfoStore), the website provides access to CADDET's quarterly newsletter (InfoPoint), case studies (Technical Brochures), detailed reports on a wide range of energy efficiency and renewables topics, as well as news, events and links to other relevant websites. CADDET provides a rich source of free, independent information for those wishing to implement clean energy projects.

The new website enables users to search the products listed above with flexibility, specifying individual technologies, countries or market sectors. The renewables technologies appear with a green icon whilst the energy efficiency ones are red. Project information includes contact details for the main organisations involved, as well as the CADDET National Team of the country that submitted the project. It is this network of National Teams in member countries that gives CADDET its unique ability to help the market implement new technologies.

Calendar of Events

IEA Bioenergy Meetings

Task 29 will hold its first meeting of the new Task period on 13 May 2004 in Rome (to coincide with the 2nd World Biomass Conference). The major event in 2004 will be an international workshop in mid-October in Japan. Contact Julije Domac, Task Leader
Email: jdomac@eihp.hr

Task 30 will hold its next meeting in association with the Short Rotation Woody Crops Operations Working Group 8-11 November 2004. The venue is the historic Francis Marion Hotel, Charleston, South Carolina, USA. Contact Mark D. Coleman
Email: mcoleman01@fs.fed.us (also see www.woodycrops.org)

Task 31 is proposing to hold its 2004 workshop in Norway (with field visits in southern Sweden) mid September. Contact Jim Richardson, Task Leader
Email: jrichardson@on.aibn.com

Task 32 will meet in Rome from 10-14 May 2004 (to coincide with the 2nd World Biomass Conference). The second meeting of 2004 will be from 30 August to 2 September in Victoria, Vancouver Island, Canada. Contact Sjaak van Loo, Task Leader
Email: s.vanloo@mep.tno.nl

Task 36's next meeting will be in Norway in late May. Contact Grace Gordon
Email: grace.gordon@aeat.co.uk

Task 38 will hold its next internal meeting in Rotorua, New Zealand from 24-25 March 2004. This will follow a conference on 'The role of Carbon Sequestration and Bioenergy in National and International Greenhouse-gas Markets' (22-23 March 2004) which will be jointly organised with Force Consulting, the Ministry for the Environment and the New Zealand Climate Change Office. Contact Susanne Woess-Gallasch
Email: susanne.woess@joanneum.at

ExCo53 will be held in Lucerne, Switzerland on 6 and 7 May 2004. There will be a study tour on 5 May. A joint workshop with Task Leaders will be held on 6 May.

ExCo54 will be held in Ottawa, Canada in the week 4-8 October 2004.

ExCo55 will be held in Copenhagen, Denmark around May 2005.

ExCo56 will be held in Ireland around October 2005.

Other Events

European Conference for Renewable Energy 'Intelligent Policy Options'
19-21 January 2004, Berlin, Germany
Contact: European Renewable Energy Council
Tel: +32 2 546 1933
Fax: +32 2 546 1934
Email: berlin2004@erec-renewables.org
Web: www.erec-renewables.org/berlin2004.htm

Clean Energy Power 2004
22-24 January 2004, Berlin, Germany
Contact: Erneuerbare Energien, Unter den Linden 15, Reutlingen 72762, Germany
Tel: +49 7121 30 16 0
Fax: +49 7121 30 16 100
Email: redaktion@energie-server.de
Web: www.energie-server.de

POWER-GEN Renewable Energy Conference
1-3 March 2004, Las Vegas, Nevada, USA
Contact: Lisa Gasaway, Event Manager
Tel: +1 918 832 9245
Email: pgreconference@pennwell.com
Web: pgre04.events.pennnet.com

World Sustainable Energy Day 2004, including European Pellets Conference
3-5 March 2004, Wels, Austria
Contact: O.O. Energiesparverband, Landstraße 45, A-4020 Linz, Austria
Tel: +43 732 7720 14380
Fax: +43 732 7720 14383
Email: office@esv.or.at
Web: www.esv.or.at/aktuelles/pellets/index_e.htm

Technology Partnership for New & Renewable Energy
4-5 March 2004, Ho Chi Minh City, Vietnam
Contact: Regional Institute of Environmental Technology
Tel: +65 6777 2685
Fax: +65 6773 2800
Email: robertkoh@riet.org.sg
Web: www.riet.org/NRE/

Building Energy 2004
10-13 March 2003, Boston, USA
Contact: NESEA
Tel: +1 413 774 6051
Email: buildingenergy@nesea.org
Web: www.nesea.org/buildings/be/

Third European Conference on Green Power Marketing
18-19 March 2004, Lausanne, Switzerland
Contact: Green Power Marketing GmbH, Weberstrasse 10, 8004 Zürich, Switzerland
Tel: +41 1 296 87 09
Fax: +41 1 296 87 02
Email: info@greenpowermarketing.org
Web: www.greenpowermarketing.org/

EMA Second Annual International Greenhouse Gas Conference
21-24 March 2004, Brussels, Belgium
Contact: EMA Head Office
Tel: +1 414 276 3819
Fax: +1 414 276 3349
Email: info@emissions.org
Web: www.emissions.org/conferences/brussels04/

Bois-Energie 2004
1-4 April 2004, Lons le Saunier, France
Contact: Alain Pierre
Tel: +33 3 8 447 81 07
Email: alain.pierre@itebe.org
Web: www.itebe.org/portail/affiche.asp?num=57&arbo=1

REAsia 2004, incorporating Bioenergy Asia
7-9 April 2004, Beijing, China
Contact: Vivian Li, Grace Fair Intl Ltd
Tel: +8610 6439 0338
Fax: +8610 6439 0339
Email: vivian@gracefair.com
Web: www.gracefair.com/reasia_home.htm

2nd World Conference and Technology Exhibition on Biomass for Energy, Industry and Climate Protection
10-14 May 2004, Rome, Italy
Contact: Christine Lyon, ETA - Renewable Energies
Tel: +39 055 5002174
Fax: +39 055 573425
Email: eta.fi@etaflorence.it
Web: www.conference-biomass.com/

World Renewable Energy Forum: Global Benefits and Policies
30-31 May 2003, Bonn, Germany
Contact: World Council for Renewable Energy
Tel: +49 228 36 23 73
Fax: +49 228 36 12 13
Email: info@wcre.org
Web: www.world-council-for-renewable-energy.org/conevents/conevents.html

International Governmental Conference on Renewable Energy
1-4 June 2004, Bonn, Germany
Contact: Secretariat of the International Conference for Renewable Energies, Bonn 2004, Postfach 5180, 65726 Eschborn, Germany
Tel: +49 6196 794404
Fax: +49 6196 794405
Email: info@renewables2004.de
Web: www.renewables2004.de

World Bioenergy Conference & Exhibition
1-5 June 2004, Jönköping, Sweden
Contact: Karin Haara, Svebio
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Email: karin.haara@svebio.se
Web: www.svebio.se/worldbioenergy

International Conference on New and Renewable Energy Technologies for Sustainable Development - RENEWABLES 2004
28 June - 1 July 2004, Evora, Portugal
Contact: Maria Fernandes Afonso, Instituto Superior Tecnico, Mechanical Eng. Dept., Av. Rovisco Pais, 1049-001 Lisbon, Portugal
Tel: +351 21 841 7378/7186
Fax: +351 21 847 5545
Email: renewables@navier.ist.utl.pt
Web: navier.ist.utl.pt/renewables2004

World Renewable Energy Congress
28 August - 3 September 2004, Denver, Colorado, USA
Contact: Ivilina Thornton
Tel: +1 303 275 3781
Email: ivilina_thornton@nrel.gov
Web: www.nrel.gov/wrec/

Science in Thermal and Chemical Biomass Conversion
30 August - 2 September 2004, Victoria, British Columbia, Canada
Contact: Emma Wyld, Bio-Energy Research Group, Aston University, Birmingham B4 7ET, UK
Tel: +44 121 359 3611
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Email: e.wyld@aston.ac.uk
Web: www.stcbc.com/

19th World Energy Congress and Exhibition: Delivering Sustainability
5-9 September 2004, Sydney, Australia
Contact: 19th World Energy Congress Managers
Tel: +61 2 9248 0800
Fax: +61 2 9248 0894
Email: energy2004@tourhosts.com.au
Web: www.tourhosts.com.au/energy2004

The Seventh International Conference on Greenhouse Gas Control Technologies
5-9 September 2004, Vancouver, Canada
Contact: Ted Morris, GHGT-7 Secretariat, Suite 150, 10 Research Drive, Regina, SK. S4S 7J7, Canada
Tel: +1 306 337 2290
Fax: +1 306 337 2301
Email: secretariat@ghgt7.ca
Web: www.ghgt7.ca/

2nd International Ukrainian Conference on Biomass for Energy
20-22 September 2004, Kyiv, Ukraine
Tel: +380 44 456 9462
Fax: +380 44 484 8151
E-mail: info@biomass.kiev.ua
Web: www.biomass.kiev.ua

Industrial Applications of Renewable Resources - A Conference on Sustainable Technologies
11-14 October 2004, Chicago, USA
Contact: AOCs
Tel: +1 217 359 2344
Fax: +1 217 351 8091
Email: meetings@aocs.org
Web: www.aocs.org/meetings/ia/index.htm

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

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 29: Socio-economic drivers in implementing bioenergy projects
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Task 30: Short rotation crops for bioenergy systems
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Web: www.shortrotationcrops.com

Task 31: Biomass production for energy from sustainable forestry
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Task 32: Biomass combustion and co-firing
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Task 33: Thermal gasification of biomass
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Task 34: Pyrolysis of biomass
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Task 36: Energy recovery from municipal solid waste
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Task 37: Energy from biogas and landfill gas
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Task 38: Greenhouse gas balances of biomass and bioenergy systems
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Task 39: Liquid biofuels from biomass
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Task 40: Sustainable international bioenergy trade: securing supply and demand
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