Bioenergy - the strongest renewable energy source in Finland

Guest Editorial by Kai Sipiliä, VTT and Marjatta Aarniala, Tekes, Finland

The Government of Finland approved the National Climate Strategy in 2001. Renewable energy plays an important role in this strategy. Implementation of the Action Plan for Renewable Energy Sources, together with the Action Plans for Energy Conservation and Waste Management, account for about half of the targeted emissions reduction. RD&D is one of the key activities to enable this target to be achieved.

The Action Plan has the objective of doubling the use of renewable energy sources by 2025, compared with 1995. The same target of doubling the output also applies to electricity generation using renewable energies. These targets mean that renewable energy sources would account for over one third of total energy consumption, and for an even higher proportion - about 40% - of electricity consumption by 2025. During the next decade, the increase in the use of renewable energy sources will be obtained almost entirely from bioenergy.

In 2001, bioenergy consumption was 6.3 Mtoe, being 19.5% of a total national primary energy consumption of 32.4 Mtoe. More than half of the bioenergy produced is from forest and mill residues: spent cooking liquors account for 3.19 Mtoe; industrial wood residues and by-products 1.99 Mtoe and traditional small-scale combustion 1.16 Mtoe. 'Industrial bioenergy' is the key driver for the large-scale, price-competitive and technologically advanced bioenergy industry. On top of bioenergy, the consumption of peat was 2.0 Mtoe, typically in co-firing applications with wood fuels. Peat and wood together produced 8.3 Mtoe, compared with oil 8.6 Mtoe, coal 3.9 Mtoe, and natural gas 3.7 Mtoe.

Bioenergy R&D is financed largely by the National Technology Agency - Tekes - and investment support for new technology is provided by the Ministry of Trade and Industry. The ongoing technology programmes in the area of bioenergy are Wood Energy; Climtech - Technology and Climate Change; Code - Modelling Tools for Combustion Process Development; and FINE Particles - Technology, Environment and Health. The annual Tekes bioenergy R&D funding is approximately 7m Euros.

International co-operation is important for Finnish industry and research organisations. Finland is currently participating in nine IEA Bioenergy Tasks. Each Task has a national mirror project in order to get the Finnish research groups committed to the co-operation. IEA Bioenergy networking provides an excellent platform for global perspectives.

Finnish bioenergy technology and R&D organisations are presented in the ‘Growing Power’ report which is available at www.tekes.fi. VTT is the largest research organisation, with 120 people working on bioenergy, including waste. For further information visit www.vtt.fi.
The 50th meeting of the Executive Committee was held in Helsinki, Finland on 23 and 24 October 2002, with Kyriakos Maniatis as Chairman and John Tustin as Secretary. The meeting was hosted by VTT Processes and Tekes. The Chairman expressed the appreciation of the Executive Committee to Kai Sipilä, Marrika Rossi, Marjatta Aarniala, Pentti Hakki and their Finnish colleagues for the excellent study tour and meeting arrangements. Some of the outcomes of the meeting are detailed below.

**New Contracting Party/Observers**
Ireland has rejoined the Implementing Agreement from 20 September 2002. They will initially participate in Tasks 29, 38 and 39. The new ExCo Member is Mr Pearse Buckley of Sustainable Energy Ireland.

An Observer from China, Professor Yuan Zhenhong, Secretary General of the China Biomass Development Centre, also attended the meeting and expressed the interest of China to join the Implementing Agreement.

**Changes in the Executive Committee**
New Members of the Executive Committee are: Denmark, Mr Jan Bünger; France, Mr Jean-Marc Merillot; Japan, Mr Masaki Tajima; New Zealand, Mr John Gifford; and Switzerland, Mr Bruno Guggisberg. There is also a new Alternate Member for Japan - Mr Mizuhiko Tanaka.

**Election of Chairman and Vice Chairman**
Dr Bjorn Telenius of Sweden was elected Chairman and Professor Kai Sipilä of Finland was elected Vice Chairman. A vote of thanks was proposed to the outgoing Chairman Dr Kyriakos Maniatis.

**Prolongation of Task 29**
The prolongation of Task 29 to 31 December 2005 was approved. The new title is ‘Socio-economic Drivers in Implementing Bioenergy Community Projects’. Canada, Croatia, Ireland, Japan, Norway, Sweden and the United Kingdom are the participants. In addition, the European Commission may also participate and will advise this by December 2002.

**Strategic Plan**
The new Strategic Plan 2003-2006 was approved for publication. It was printed and distributed in November. Extra copies are available from the Secretary on request.

**Position Papers**
The goal to produce well researched, policy orientated statements that could facilitate discussion of important issues and assist energy policy development in the Member Countries has made substantial progress. A position paper titled ‘Municipal Solid Waste and its Role in Sustainability’ has been finalised and will be published before the end of 2002. Another paper titled ‘Sustainable Production of Woody Biomass for Energy’ was also approved for publication. It was agreed that a third position paper would be prepared on ‘the benefits of bioenergy’ and that this would serve as a platform for a number of ‘awareness creation’ initiatives with various high level target audiences.

**Planning for the Next Triennium**
At ExCo49 it was decided to survey the existing Operating Agents, Task Leaders and Task participants to determine whether a tendering process was needed in planning for the next triennium. The survey indicated that the only tender required may be in the area of Task 30. In all other cases the existing Operating Agents and Task Leaders were available and willing to continue with their Tasks and no other Contracting Party wished to enter a bid. This means that at ExCo51 the process can focus on discussion of draft programmes of work and budgets for the period from January 2004. Such discussions fit well with the ExCo decision to have a ‘strategic’ ExCo meeting around April each year.
In conjunction with ExCo50, 18 Members participated in a study tour with the theme ‘Industrial Bioenergy in Finland’.

Professor Pentti Hakkila, Director of the VTT Wood Energy Technology Programme hosted the forest visits. These featured ‘residue handling technology’ in the context of large-scale production of forest fuels. Timberjack demonstrated mechanised harvesting of small diameter trees from thinnings using a multi-functioning, accumulating harvester head on a Timberjack 770 base machine. The harvester head can collect up to 10 trees at a time before stacking the bundle ready for further transportation/processing. See picture above.

The group also saw the harvesting of Compacted Residue Logs (CRL) from a cutover site. Up to 150,000 hectares of final harvest is carried out each year in Finland, so the collection of forest residues from the final harvest is a major biomass opportunity. The CRL system originated in Sweden but was transferred and further developed in Finland by Timberjack. The bundles are 3.2m long and 70cm diameter and contain 1MWh of energy. The system depends on a large stationary crusher at the processing plant. The target is to increase the use of forest chips in Finland from the current 1 million m³ to 2.5 million m³. This growth is underpinning the development of residue handling technologies.

A visit was then made to the Myllykoski Oy Paper Mill, including the Vattenfall Biofuel Power Plant. This mill produced magazine paper from mechanical pulp and also featured the modern fluidised bed boiler fired with bark and forest residues. The visit included presentations by Dr Erkki Peltonen and Mr Antti Surokivi of Myllykoski Paper, Mr Jari Rahtu of Vattenfall Oy and Mr Matti Hiltunen of Foster Wheeler Energia Oy.

Finally, the group visited Anjalankosken Klubi for a presentation by Dr Markku Karlsson, Senior Vice President, Technology, Metso Corporation. He provided a very interesting overview of Metso’s vision and technology strategy. A buffet dinner sponsored by Metso followed. This completed a most instructive and enjoyable study tour.

ExCo51 will be held in Sydney, Australia on Wednesday 30 April and Thursday 1 May 2003. There will be a study tour on Tuesday 29 April for those ExCo Members who wish to attend. ExCo Members please note - these dates are one week later than those previously announced.

The meeting will be held at the InterContinental Hotel, 117 Macquarie Street, Sydney. This is in the heart of Sydney’s business and professional district with panoramic views of Sydney Harbour, the Royal Botanic Gardens and the Sydney Opera House. Guests have convenient access to many activities within the area, including harbour cruises, museums and art galleries, shopping malls and the famous Rocks area.

The post-out deadline for agenda material sent by the Secretary will be 21 March 2003. For more details contact the Secretary or Dr Steve Schuck, Email: sschuck@bigpond.net.au
Task Focus

Task 35. Techno-economic assessments for bioenergy applications

International trading of biofuels is expected to increase significantly in the future. At present, the transportation distances for biofuels are generally less than 100 km. However, countries with limited biomass resources are under increasing pressure to reduce CO₂ emissions by importing and utilising bioenergy. Thus, in certain regions, biomass is already being transported over distances as great as 500 km. Furthermore, intercontinental transportation is being seriously evaluated as a future option.

The main objective of Task 35 is to carry out techno-economic evaluations of selected bioenergy trade chains and to identify the most economically competitive alternatives for detailed carbon-impact analysis. The chains in question encompass transportation of bioproducts over both regional and intercontinental distances. The carbon-impact analysis of the most promising chains will be undertaken in close collaboration with Task 38.

The countries participating in the Task are Austria, Canada, Finland, the Netherlands, Sweden and the USA. Of particular significance for the Task is the active involvement of Essent Energy, one of the major producers of electricity in the Netherlands. Essent Energy is currently producing a significant amount of ‘green power’ from imported biofuels and intends to increase the amount considerably in coming years.

The above figure shows the bioenergy trade chains under consideration. Preliminary screening is being undertaken to limit the number of chains for detailed evaluation. One example of a chain under consideration is where forest residues are collected in the Karelia province of Russia and converted to pellets or pyrolysis oils in conversion plants which are integrated with local energy-production plants. The pellets or pyrolysis liquids are shipped to Holland where they are co-fired with coal in large utility boilers. Longer-term options for utilising the imported biofuels, e.g. conversion to automotive fuels, are also included.

For further information email Yrjö Solantausta yrjo.solantausta@vtt.fi

Task 29. Socio-economic aspects of bioenergy systems

The aim of Task 29 is to identify and quantify the socio-economic and environmental impacts of bioenergy production systems. In particular, the Task is seeking to investigate the effects of bioenergy generation - both feedstock production and energy conversion - on the surrounding economic (financial, local industry creation, infrastructure development, regional value added, etc.), social (employment, education, health, etc.), and environmental climate.

Although the Task is focused mainly at a local/regional level, full account has been taken of the overall national and international framework within which the region must work. Key objectives have been to have a significant impact on research and development practice in participating countries (to achieve the goals of I.E.A. Bioenergy), and to support other connected international initiatives on sustainable development. Each participating country has identified one region for which to assess all the socio-economic effects of using biomass for energy. Regions for study were chosen which are complementary in nature and which have a particular broad socio-economic challenge or focus.

Biomass utilisation, bioenergy technologies and their market share, and research interests in these issues vary considerably between different countries. However in most of the countries, socio-economic benefits of bioenergy use can clearly be identified as a significant driving force in increasing the share of bioenergy in the total energy supply. In most countries, regional employment created and economic gains are probably the two most important issues regarding biomass use for energy production.

Socio-economic impact studies are commonly used to evaluate the local, regional and/or national implications of implementing particular development decisions. Typically, these implications are measured in terms of economic indices, such as employment and monetary gains, but in effect the analysis relates to a number of aspects, including social, cultural and environmental issues. The problem lies in the fact that these latter elements are not always tractable to quantitative analysis and thus have been precluded from the majority of impact assessments in the past, even though at the local level they may be very significant.

The 1990s have seen a substantial diffusion of many renewable energy technologies, often showing two-digit growth rates. In most cases, however, this growth is not self-sustained. Apart from a lack of cost competitiveness, for which policy-makers try to compensate by means of subsidies or quota targets, there are numerous socio-economic and institutional barriers that need to be identified and tackled, and a plethora of external net benefits that are not accounted for in the decision-making process. These issues are recognized as an important part of Task 29 activities, within the overall aim of I.E.A Bioenergy.

For further information email Julije Domac jdomac@eihp.hr
Does biomass harvesting affect forestry site productivity?

**Contribution from Peter Hall, ExCo Member for Canada**

Biomass for energy is often produced as a byproduct of conventional forestry. When young stands are thinned, or older stands cut for timber or pulpwood, tops and branches can be used for bioenergy. As residues usually constitute 25-45% of the harvested wood, their use may be an important part of forest management decision-making. Stands damaged by insects, disease or fire may also yield biomass for energy. In some forestry systems, biomass for energy is produced as a primary product.

How does the harvesting of this biomass affect the productivity of a forest? On the plus side, intensive harvesting may provide the benefit of improved access for site preparation for future planting. It may also reduce the likelihood and cost of damage from fire, insects and disease. However, there are also some potential risks associated with biomass removal, including the chance that soil nutrients, organic matter and moisture-holding capacity may be depleted. Impacts on site fertility are a function of harvest intensity and rotation period. As biomass harvesting becomes more intensive, care must be taken to manage soil characteristics and to maintain water quality and quantity.

Careful harvesting practices will reduce physical soil compaction and disturbance and the removal of layers of organic matter from the soil surface. Compaction affects the extent and rate of root growth; organic matter is essential to maintain soil structure and aeration. Soil compaction can be minimized by harvesting when soils are dry or frozen and by avoiding repeated passes of heavy equipment. Where roads and extraction tracks do disturb organic layers, there is a need to manage water flows and runoff to reduce contamination of streams and waterbodies by soil and silt. Regulations governing harvesting practices are well-established and can be readily implemented in natural or planted forests.

Nitrogen and other elements are abundant in twigs and foliage so that harvesting all above-ground biomass could potentially remove a large proportion of nutrients. In practice harvesting removes only a small portion of the branches and tops, leaving sufficient biomass to decompose on the site. Soil fertility in nutrient-poor areas can be maintained by returning nutrients to the forest as ash from the combustion of residues. Sites which are low in nutrients should not be harvested completely, or harvesting should be limited to removal of stemwood. Avoiding harvesting on drought-stressed sites, and limiting removals to once per rotation also minimizes the degree of nutrient loss. Science-based studies of site productivity and harvesting have allowed the development of operational guidelines. By using these, the intensity of harvesting operations can be adjusted to the biological requirements of the site.

Summary: Although biomass harvesting can potentially impact site productivity, there are a number of preventative and ameliorative measures that can be taken to ensure that the long-term productivity of forest sites is not harmed. The key factors are careful planning and appropriate operational management.
Publications

IEA Bioenergy Strategic Plan

The new Strategic Plan for 2003-2006 has recently been published and will be distributed by ExCo Members and Task Leaders. Further copies are available from the Secretary on request. This document has been prepared for a wide range of audiences so participants in IEA Bioenergy will find it very useful.

Biogas Upgrading and Utilisation

Alternative fuels may help considerably to reduce the green house effect, particularly in the transport sector. Biogas is the cleanest fuel available today. This paper by Task 24 looks at its composition and utilisation and the upgrading technologies that have been developed for its treatment. Download a copy at www.nouwagenerie.nl/iea-bioenergy-task-22

Handbook of Biomass Combustion and Co-firing

This handbook, edited by Sjaak van Loo and J aap Koppesjan of Task 32, is the first publication to cover both the theory and the application of biomass combustion and co-firing. It covers the entire field from basic principles and fuel supply to industrial combustion and environmental aspects in a clear and comprehensive manner. It has been very well received, being suited to a wide audience. For more information visit the Task 32 website: www.ieabioenergy-task32.com

Biogas Flares: State of the Art and Market Review

A topic report by Task 24, this paper reviews the technology of flares as applied for the combustion of biogas and summarises the suppliers and costs of flare equipment. For further information contact Pat Wheeler at E-mail: patrick.wheeler@aeat.co.uk


This handbook is an edited version of the first report of the Pyrolysis Network that officially finished is 2001. It provides a companion volume to the first handbook published in 1999 and is a useful guide to both newcomers to the subject area and those already involved in research, development and implementation. Contact CPL Press on +44 1635 817408 or purchase online at www.cplbookshop.com/contents/C15.htm

Zeltweg Power Station Biomass Gasification Project

This case study, written by David Granatstein of CANMET for Task 36, looks at the development, operation and performance of the Biococomb Biomass Gasification Project at the Zeltweg Power Station in Austria. Email Grace Gordon at grace.gordon@aeat.co.uk

Sustainable Energy Innovation - New Era for Australia

Dr Stephen Schuck has edited a 160 page 'coffee table' book which profiles Australia’s capabilities in a broad spectrum of sustainable energy technologies, including biomass, and provides a directory of projects and market participants. The book may be ordered from CL Creations Pty Ltd, E-mail: carolen@clcreations.com.au Web: www.energycentral.com.au

Energy Consumption in the UK

This booklet describes the key trends in energy consumption in the UK since 1970 with a particular focus on trends since 1990. It includes an analysis of the factors driving the changes in energy consumption, the impact of increasing activity, increased efficiency, and structural change in the economy. The information is presented in five sections covering firstly overall energy consumption, then energy consumption in the transport, domestic, industrial and service sectors. Download a copy at www.dti.gov.uk/energy/energy_consumption/index.shtml

World Energy Outlook 2002

This IEA flagship publication projects trends in energy supply and demand, prices, trade and carbon emissions from now until the year 2030. Its projections are recognised as authoritative throughout the energy world. Copies can be ordered from IEA Books, 9 rue de la Fédération, 75739 Paris Cedex 15; Fax: +33 1 40 57 65 59; Email: books@iea.org Web: www.iea.org/books
Calendar of Events

IEA Bioenergy Meetings

Task 30 is planning its End of Task M meeting for late 2003, in Australia and New Zealand. Contact Theo Verwijst, Task Leader Email: theo.verwijst@cto.su.se

Task 31 will hold its next workshop in October 2003 in Flagstaff, Arizona, USA with optional pre- and post-workshop tours to Phoenix and the Grand Canyon. First announcement with dates and theme will be available by January from Jim Richardson, Task Leader Email: jimrichardson@enrl.com.au

Task 32 is arranging its next Task M meeting for March 2003 in Clearwater, USA. It will also be holding a seminar on waste wood combustion in Sweden in Autumn 2003. Contact Sjak van Loo, Task Leader Email: s.vanloo@mp.tno.nl

Tasks 32, 33 and 36 will be holding a joint Task Meeting in Yokohama, Japan on 28-30 April 2003. The meeting will include seminars on energy utilisation from MSW and RDF and visits to MSW energy recovery plants. Contact Suresh Babu, Task Leader Email: suresh.babu@gotechonology.net

Task 34 will hold a joint meeting with GasNet in Spring 2003. There will also be an Autumn meeting for Pylene alone. Contact Tony Bridgwater, Task Leader Email: a.bridgwater@aston.ac.uk

Task 36 will be holding their next meeting in Sweden from 7-9 April 2003. Contact Grace Gordon Email: grace.gordon@aaat.co.uk

Task 37 is planning a Task M meeting for spring 2003 in conjunction with the EU working group AD-Net. Contact Arthur Wellingr, Task Leader Email: arthur.wellingr@novanergie.ch

Task 38 will hold a meeting in England in early 2003. Contact Susanne Woes-Gallisch Email: susanne.woes@ioann.at

ExCoS1 will be held in Sydney, Australia on 30 April - 1 May 2003. There will be a study tour on 29 April.

ExCoS2 will be held in Brazil around October 2003.

Other Events

Environment & Energy 2003 Conference and Exhibition 2-5 February 2003, Abu Dhabi, UAE Contact: GC General Exhibitions, P O Box 5546, Abu Dhabi Tel: +971 2 4446900 Fax: +971 2 4446135 Email: gc@gc.co ae Web: www.gcuae.com/index.html

3rd International Slovak Biomass Forum 3-4 February 2003, Bratislava, Slovakia Contact: Miroslav Miklova, E Energy Centre Bratislava, Bakalsalova 27, 821 01 Bratislava Tel: +421 2 258 2448 472 Fax: +421 2 258 2448 470 Web: www.ech.sk

Envienergy 2003 12-13 February 2003, Bolton, UK Contact: Nicola Washington Tel: +44 1257 276176 Email: nicola@washingtondwirling.com Web: www.envienergy.co.uk/

Renewable Energy 2003 14-16 February 2003, Böblingen, Germany Contact: Informationsservice GmbH, Unter den Linden 15, D-72762 Reutlingen Tel: +49 7121 30 16 - 0 Fax: +49 7121 30 16 - 100 Email: celeb@energie-server.de Web: www.energie-server.de

Global Alternative Fuels Forum for Automotive Applications 18-20 February 2003, Munich, Germany Contact: Claire Palien, The Energy Exchange Ltd, 25 St George’s Road, Cheltenham GL50 3 DT, UK Tel: +44 1242 529 090 Fax: +44 1242 570 820 Email: c.palien@theenergyexchange.co.uk Web: www.theenergyexchange.co.uk

CLEAN 2003: India International Clean Energy Expo 20-23 February 2003, Bangalore, India Contact: Pradep Dewiath & Associates Pvt. Ltd, PDA House, 32/2 Spencer Road, Frazer Town, Bangalore 560 005 Tel: +91 80 5547434 Fax: +91 80 5542258 Email: p.datr@pvnri.com Web: www.gptradefair.com

Scottish Energy and Environment Conference 27 February 2003, Glasgow, UK Tel: +44 1257 276176 Email: rachel@washingtondwirling.com Web: www.seecon.org.uk/

Waste to Energy 2003 Symposium 27 February - 3 March 2003, Sydney, Australia Contact: Christine Wardle, Meinhardt, Ground Floor, 601 St Kilda Road, Melbourne Tel: +61 3 8350 1241 Fax: +61 3 9510 4123 Email: christine@meinhardt.com.au Web: www.meinhardtgroup.com

World Sustainable Energy Day 5-7 March 2003, Wels, Austria Contact: O. O. Energiegartenverband, Landstraße 45, A-4020 Linz Tel: +43 732 7720 14380 Fax: +43 732 7720 14383 Email: office@wser.or.at Web: www.wser.or.at/index_e.htm

The Aspen Clean Energy Roundtable X 26-28 March 2003, Aspen, USA Contact: Montreux Energy Tel: +1 303 534 0193 Fax: +1 303 534 0195 Email: abern@montreuxenergy.com Web: www.montreuxenergy.com/index.htm

Transdisciplinary International Conference on Decision Support for Multiple Purpose Forests 23-25 April 2003, Vienna, Austria Contact: Manfred Lecer or Harald Vacki, Institute of Silviculture, University of Agricultural Sciences, A-1190, Vienna Tel: +43 1 47654 4056 Fax: +43 1 47654 4092 Email: liker@edu1.boku.ac.at Web: www.waldbau.boku.ac.at/lufr/4th Asia Pacific Conference on Sustainable Energy and Environmental Technologies 8-10 May 2003, Yokkaichi, Mie,Japan Contact: Japan M aco-Engineers Society Fax: +81 3 5717 0852 Web: www.jmacro.com/offices/meetings.html

Sustain 2003: The World Sustainable Energy Exhibition and Conference 13-15 May 2003, Amsterdam, The Netherlands Contact: Amsterdam RAI, P O Box 7777, Amsterdam 1070 Tel: +31 20 54 91 212 Fax: +31 20 54 38 43 Email:sustain2003@rai.nl Web: www.sustain2003.com

2003 International Conference on Energy and Environment 22-24 May 2003, Shanghai, China Contact: Dr. Daoping Li, Executive Secretary of IEC, University of Shanghai for Science and Technology, P O Box 224, No. 516, Jun Gong Road, Shanghai 200093 Tel: +86 21 65689564 or +86 21 65680843 Fax: +86 21 65692958 or +86 21 65680843 Email: dpili@online.sh.cn

Renewable Energy Sources for Islands, Tourism and Water Desalination 26-28 May 2003, Crete, Greece Contact: European Renewable Energy Council Tel: (+332) 546 1933 Fax: (+332) 546 1934 Email: erc@erec-renewables.org Web: www.erec-renewables.org/

The 20th Anniversary Windsor Workshop on Transportation - Towards Sustainable Transportation 2-5 June 2003, Toronto, Canada Contact: Windsor Workshop Secretariat, Natural Resources Canada, 580 Booth Street, 1385 Ottawa, ON K1A 0E4 Fax: +1 613 996 9416 Email: windsorworkshop@nrcan.gc.ca Web: www.windsorworkshop.ca

2nd Dubrovnik Conference on Sustainable Development of Energy, Water and Environment Systems 15-20 June 2003, Dubrovnik, Croatia Contact: University of Zagreb & Instituto Superior Técnico, P O Box 224, No. 516, Jun Gong Road, Shanghai 200093 Tel: +86 21 65689564 or +86 21 65680843 Fax: +86 21 65692958 or +86 21 65680843 Email: dubrovnik2003@irs.dnr.sh.cn Web: www.dubrovnik2003 fis.hr

Energy 2003 17-20 August 2003, Lake Buena Vista, Florida, USA Tel: +1 800 395 8574 Email: energy@geopointe.com Web: www.energy2003.xoe doe.gov

Bioenergy 2003: International Nordic Bioenergy Conference and Exhibition 2-5 September 2003, yskalga, Finland Contact: M S Maa Sauvainen, FINBIO, P O Box 27, FIN-40101, yskalga Tel: +358 14 445 1115 Fax: +358 14 445 1199 Email: bioenergy@sypp.org.fi Web: www.finbioenergy.fi

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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