

Jeju, Korea

Bioenergy in Korea

Guest Editorial by Dr. Jin-Suk Lee, Korea Institute of Energy Research

Korea consumed 0.276 billion tons of oil equivalent (toe) in 2011 and 70% of energy resources used in Korea were fossil fuels. In 2008, Korea announced the green energy vision for changing the energy paradigm from "energy economy" to "environmentally friendly energy economy". According to the vision, Korea will reduce CO₂ emission by 30% compared to business as usual and increase the supply of renewable energy from 2.75% (7.58 Mtoe) in 2011 to 11% (31.63 Mtoe) in 2030. The bioenergy supply in 2030 is projected to be 10.16 Mtoe, 11 times greater than that in 2011 (0.96 Mtoe – Fig. 1). The major obstacles to achieving this target are, the high cost of bioenergy, limited biomass resources in Korea, and a low stakeholder group acceptance of transport biofuels.

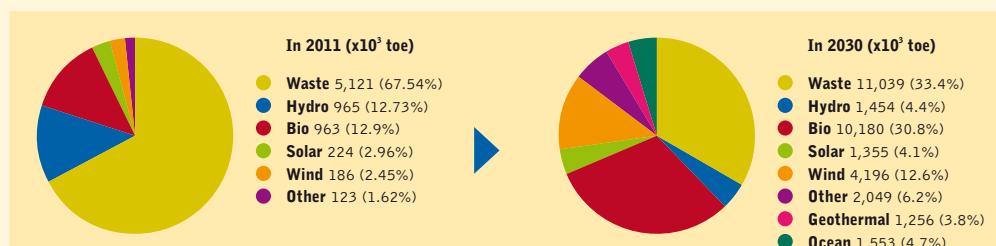


Fig. 1. Status and targets of renewable energy implementation in Korea

Korea instituted several policy measures to improve the cost competitiveness of bioenergy. For power generation using bioenergy, feed-in-tariffs were offered for 2008-2011. For biodiesel, fossil fuel tax exemption (\$0.5/L) was also offered from 2006 to 2010. The Korean government shifted policy from subsidy to mandatory use, with renewable portfolio standards (RPS) for biopower and Renewable Fuel Standards (RFS) for biodiesel. Under RPS, power generation by renewable energies will be increased to 10% by 2020 from 2% in 2012. The RPS and RFS initiatives take effect from 2012 and 2015 respectively. A Renewable Heat Obligation (RHO) is anticipated from 2016.

The limited extent of biomass resources in Korea is another barrier to the expansion of bioenergy supply. Available biomass for bioenergy production is only 30% of the biomass needed for achieving the 2030 target. The feasibility of several options is under investigation (Fig. 2).

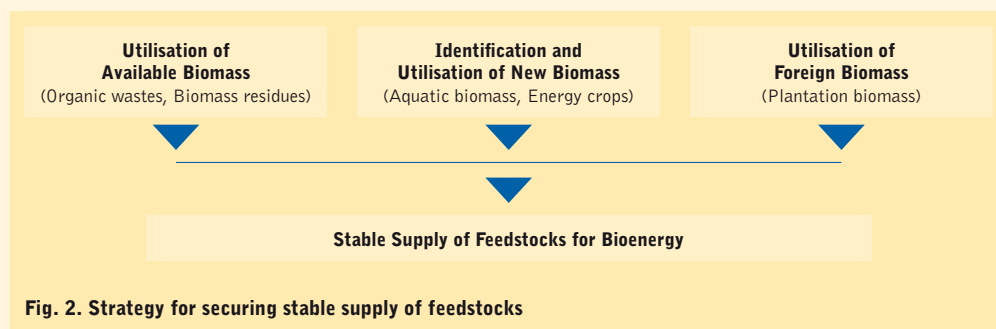


Fig. 2. Strategy for securing stable supply of feedstocks

Korea imports all its oil and since 2000 has recognised the importance of growing the indigenous supply of transport biofuels. A trial of biodiesel blended fuels in the transport sector, led to their implementation nationwide since 2006. Biodiesel use in Korea has steadily increased since then to 4.0 x 10⁵ kL in 2012 (2% of diesel consumption). Used cooking oil has also become a promising potential feedstock. Currently about 120,000 tonnes of it is used in biodiesel production.

Bioethanol use in Korea has also been investigated. To determine the compatibility of the established fuel distribution infrastructure with bioethanol blended gasoline (gasohol), a demonstration study on the supply of 3% (E3) and 5% (E5) ethanol gasohols was undertaken for 2006-2008. It was concluded that E3 and/or E5 gasohol supply is possible through the current fuel distribution infrastructure. The Korean government is currently considering when and how to supply gasohols.

Research in Korea is actively focused on making biofuels commercially viable and cost competitive with petroleum based fuels. These efforts include improvements to the feedstocks supply chain, as well as conversion technology enhancements, particularly those focused on the nonedible feedstocks.

Wood pellets are consumed mostly in greenhouses; however, a large demand is expected from thermal power plants that need to meet targets set in the RPS, with demand expected to grow from 0.75 to 5 Mtonnes between 2012 and 2020.

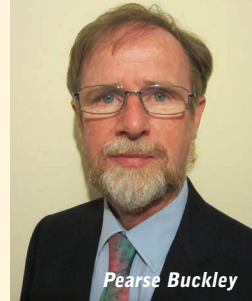
CONTENTS

Bioenergy in Korea	1
From the Secretariat	2, 3
Task Focus	4
Notice Board	5
Publications	6
IEA Bioenergy Events	7
Key IEA Bioenergy Contacts	8



From the Secretariat

ExCo72, Jeju, Korea



The 72nd meeting of the Executive Committee was held at the Lotte Hotel Jeju in Jeju, Republic of Korea from 11th to 13th November with Birger Kerckow as Chair and Pearse Buckley as Secretary. The meeting was hosted by MOTIE (Ministry of Trade, Industry and Energy) and KEMCO (Korea Energy Management Corporation). The Chair expressed the appreciation of the ExCo to Park and his colleagues for the excellent meeting and study tour arrangements. Some of the outcomes of the meeting are detailed below.

Changes to Exec Committee

A new Member for Korea is Mr Kwon-sung Kim; a new Alternate for the USA is Ms Corinne Valkenburg.

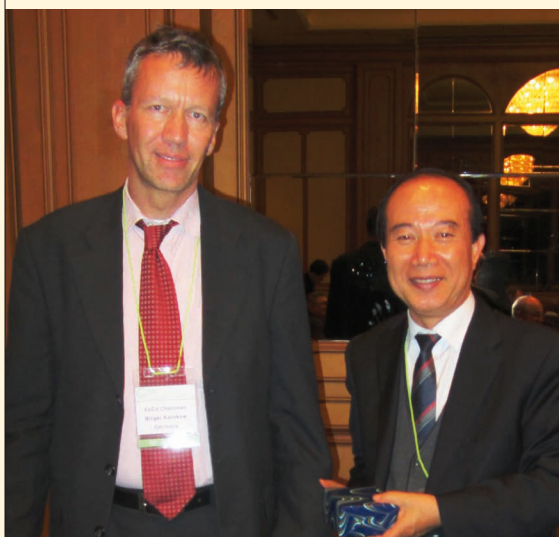
ExCo72 Workshop

A successful workshop on the topic of 'Electricity from biomass – from small to large scale' was well attended by ExCo Members, Task Leaders, and Observers from Korea. The workshop presentations are listed below:

- Medium-term outlook for renewable energy – what's next for bioenergy? – *Anselm Eisentraut, IEA Paris*
- Situation and strategy on biomass electricity in Europe – *AEBIOM presented by Arthur Wellinger*
- Situation and strategy on biomass electricity in North America – *Bob Cleaves; President Biomass Power Assoc*
- Situation and strategy on biomass electricity in Asia – *Gil Hyung-Bae, Korea Institute of Energy Technology Evaluation and Planning*
- Electricity generation using biogas from waste food in Korea – *Soon-Chul Park, Korea Institute of Energy Research*
- Gasification of wood – *Christian Aichernig Repotec-Renewable Power Systems*
- Co-combustion of biomass with coal – *Bill Livingston, Doosan Babcock*

For more detail please visit www.ieabioenergy.com/

Progress with current Initiatives



IEA Bioenergy Chair, Birger Kerckow with Professor Don-Hee Park of Korea

The Strategic Project *Mobilising Sustainable Bioenergy Supply Chains* continues to make good progress. The boreal and temperate forest template has been issued to collect data and there is a preliminary table of contents for the final report. Good progress has been made on the work on indicators for forest biomass and agricultural residues, which has also involved FAO, GBEP and the US DoE. The project is on schedule to be completed in 2015.

A report was presented on the very successful *Transatlantic Wood Energy Workshop* in Savannah, Georgia, organised by Tasks 40 and 43 in association with the Pinchot Institute for Conservation. There were five sessions as follows:

- Factoring the Big picture into notions of sustainability
- Measuring sustainability and risk
- International sustainability criteria for solid biomass
- Environmental risk mitigation and procurement practices
- GHG and forest carbon accounting.

The workshop summary is being prepared and will be published in the first quarter of 2014.

The Executive Committee approved funding for the development of a *Database for IEA Bioenergy* which would present bioenergy in an integrated way on the IEA Bioenergy website. Funding was also approved for a Scientific Workshop on the sustainability of bioenergy being organised by Tasks 38, 40 and 43. The workshop will be held in conjunction with ExCo73 in Copenhagen.

A decision was taken to establish a National Policy Strategy Update to which Executive Committee Members would provide data from their respective countries. A trial run will be completed by the end of February 2014.

Communication Strategy

The Executive Committee identified and approved initial actions to implement the communication strategy and charged the working group with responsibility to continue its development to meet the ongoing needs of the Agreement.

Extension of Implementing Agreement from 2015-2020

Two important documents required for the request for an extension of the Implementing Agreement were discussed at ExCo72. The Executive Committee reviewed the draft End of Term Report and agreed to provide input by the end of January 2014 so that the document could be finalised and signed off by the Chair and Vice-Chair.

A draft of the Strategic Plan 2015-2020 was also tabled for review. The document included some important changes, with a greater emphasis on the sustainable production and use of biomass to optimise its economic and environmental value, including a focus on a biorefinery approach serving both the bio-economy and bioenergy. The Executive Committee committed to provide input by the end of January 2014 so that a final Strategic Plan could be approved at ExCo73 in Copenhagen.

Both documents will be submitted to IEAHQ in June 2014, together with the formal request for extension of the Implementing Agreement.

End of Triennium Conference 2015

The Executive Committee approved Germany as the host for ExCo76 in the 4th quarter of 2015. The End of Triennium Conference to be held in conjunction with ExCo76 was also approved and a Scientific Committee was established to facilitate the organisation of the conference.

ExCo72 Study Tour



Uri Farm Anaerobic Digestion Plant, Jeju, Korea



ExCo72 Study Tour Group at Korea Institute of Energy Research Centre

In conjunction with ExCo72 a total of 24 attendees participated in the study tour taking in two anaerobic digestion facilities, a Korea Institute of Energy Research centre on Jeju, and the Smart Grid Information Centre.

The first stop was at a publically operated anaerobic digestion facility for the treatment of animal manure from small farms in the region. The plant, which began operation in 2012, has a capacity to treat 200 tonnes per day from which it produces 3000 m³ of biogas. The biogas is used as a boiler fuel on site to provide process and space heating, while the digestate is separated into solids and clean water. The solids are transported to a composting plant and the water is discharged to the river.

The second stop was at a privately owned anaerobic digestion plant which treats the manure from the owners' 14,000 pigs. Some manure is also accepted from farms nearby at no cost. The plant began operating in 2010 and has a capacity of 50 tonnes per day producing 1000 m³ of biogas. The biogas is used to fuel a 100 kW CHP plant and the electricity generated is sold to the grid at a value of approximately US\$0.15/kWh. The digestate is spread on nearby land.

The third stop was at a Korea Institute of Energy Research centre on Jeju, which is part of the larger National organisation. The centre employs 50 people and has a range of activities in renewable energy R&D including offshore wind power generation and district heating from the latent heat in seawater. In the bioenergy area the centre is engaged in research activity on marine micro-algae with a focus on screening species.

The final stop was at the Jeju Smart Grid Information Centre where participants were given an overview of activity on smart grid development. The Smart Grid Test Bed building project was described and some of the technologies that were being applied were demonstrated in an interactive way.

Task Focus

Task 34 Pyrolysis

Fast pyrolysis of biomass is becoming increasingly important in some member countries of IEA Bioenergy. Six countries have joined the IEA Task 34 on Pyrolysis: Finland, Germany, Netherlands, Sweden, UK, and USA. Task 34 has as its main emphasis overcoming barriers to commercialisation of fast pyrolysis of biomass for liquid fuel production. Fast pyrolysis of biomass and related processing is a rapidly advancing field of technology. The six member countries of Task 34 are all active in the field with numerous participants in each country. Technology developers range from universities and government funded laboratories to start-up companies and well-established commercial entities. The elevated level of petroleum prices has clearly incentivised this recent development. Research is underway on numerous reactor configurations and scale-up to large demonstration units has been accomplished on a few already. Commercial implementation of fast pyrolysis for fuel oil production is on the brink of market deployment. Upgrading of the bio-oil to higher value transportation fuels is also being researched and is being scaled-up.

The overall objective of the Task in the new triennium 2013-2015 is to improve the rate of implementation and success of fast pyrolysis for fuels and chemicals (where this complements the energetic considerations) by contributing to the resolution of critical technical areas and disseminating relevant information particularly to industry and policy makers. The scope of the Task is to monitor, review, and contribute to the resolution of issues that will permit more successful and more rapid implementation of pyrolysis technology, including identification of opportunities to provide a substantial contribution to bioenergy. This is to be achieved by the activities listed in Table 1.

Table 1: Priority Topics for Task 34 (2013-2015)

Review of bio-oil applications
Bio-oil standardisation
Round robin for analytical methods validation
TEA of thermochemical liquefaction technologies
Collaboration with Tasks 32, 33, 38, 39, and 42

Within the Bio-oil Standardisation topic area, we are supporting the effort to develop European standards for bio-oil. The draft mandate has been issued to the CEN and has now been accepted allowing the effort to begin on formulating standards. Several grades of bio-oil product were specified in the mandate, including light and heavy burner fuel oil, internal combustion engine fuel and feedstock to gasification and petroleum refining. The task is focused on the European standards in the near term with the expectation to return to ASTM in North America after the European work is completed, at least in part. Technical support has also been offered to the SIEF organised around biomass pyrolysis bio-oil for the REACH registration effort. Clarification of the MSDS for bio-oil, including drafting a new version, is underway.

In the previous triennium, a Round Robin involving 15 laboratories within the participating countries in the Task was organised by the task members and undertaken to evaluate reproducibility of methods for measurement of viscosity of bio-oil and the accelerated aging test. The results, suggesting preferred methods for viscosity measurement and improvements to the accelerated aging test, were published in the journal, *Energy & Fuels*. A second phase of the Round Robin involved 3 members and resulted in a second technical publication in the same journal describing long-term aging of bio-oil over a range of temperatures.

Two other technical journal articles were prepared by the collaboration of task members. A manuscript describing the state of the art of biomass pyrolysis technology in the participating countries was drafted by the national team leaders of the participating countries and published in a refereed technical journal. A journal publication on Guidelines for Transportation, Handling, and Use of Fast Pyrolysis Bio-oil Part 1 – Flammability and Toxicity was drafted by members of the Task and was published in the journal, *Energy & Fuels*.

Technical and economic assessments of biomass liquefaction technologies will play a key role in the new triennium efforts. Two of the participants are collaborating on a comparison of fast pyrolysis with hydrothermal liquefaction, each with subsequent hydroprocessing to produce infrastructure compatible transportation fuels. Technical assessments will be made in collaboration with other IEA Bioenergy tasks to inform the comparison of biomass combustion and gasification with bio-oil combustion and gasification. The process data generated in these assessments will be provided to Task 38 for life cycle assessment.

Development of a database of fast pyrolysis demonstration facilities will be undertaken with input from Tasks 33 and 39 as the basis for a web-based database either as a stand-alone effort on pyrolysis or in collaboration with other IEA Bioenergy tasks.

Pyrolysis-based biorefineries will be investigated in collaboration with Task 42.

Fast Pyrolysis for Bio-oil Production

Fast pyrolysis of biomass provides an effective method for transforming biomass resources into a useful liquid product for direct use or as an intermediate for further processing. In fast pyrolysis, biomass decomposes very quickly in the absence of oxygen to generate mostly vapors and aerosols and some charcoal and gas. After cooling and condensation, a dark brown homogenous mobile liquid is formed which has a heating value about half that of conventional fuel oil. A high yield of liquid is obtained with most biomass feeds low in ash. The essential features of a fast pyrolysis process for producing liquids are:

- Very high heating rates and very high heat transfer rates at the biomass particle reaction interface usually requiring a finely ground biomass feed of typically less than 3mm as biomass generally has a low thermal conductivity,
- Carefully controlled pyrolysis reaction temperature of around 500 °C to maximise the liquid yield for most biomass,
- Short hot vapor residence times of typically less than 2 seconds to minimise secondary reactions,
- Rapid removal of product char to minimise cracking of vapors,
- Rapid cooling of the pyrolysis vapors to give the bio-oil product.

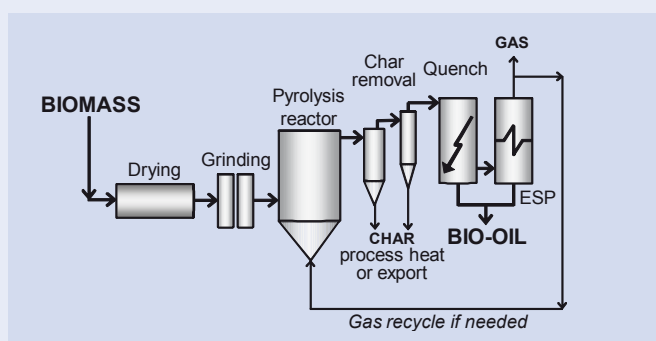


Task 34 National Team Leaders at task meeting held on 16-18 April 2013 at Karlsruhe Institute of Technology, Germany.

The main product, bio-oil, is obtained in yields of up to 75 wt% on a dry-feed basis, together with by-product char and gas which can be used within the process to provide the process heat requirements so there are no waste streams other than flue gas and ash. Liquid yield depends on biomass type, temperature, hot vapor residence time, char separation, and biomass ash content, the last two having a catalytic effect on vapor cracking.

A fast pyrolysis process includes drying the feed to typically less than 10% water in order to minimise the water in the product liquid oil, grinding the feed to give sufficiently small particles to ensure rapid reaction, fast pyrolysis, rapid and efficient separation of solids (char), and rapid quenching and collection of the bio-oil.

Fast pyrolysis process



The liquid is formed by rapidly quenching and thus 'freezing' the intermediate products of flash degradation of hemicellulose, cellulose and lignin. The liquid thus contains many reactive species, which contribute to its unusual attributes.

Bio-oil characteristics

Fast pyrolysis liquid has a higher heating value of about 17 MJ/kg as produced with about 25 wt% water that cannot readily be separated. Crude bio-oil approximates to biomass in elemental composition. It is composed of a very complex mixture of oxygenated hydrocarbons with an appreciable proportion of water from both the original moisture and reaction product. Solid char may also be present.

For any application, there are many particular characteristics of bio-oil that require consideration. The liquid contains varying quantities of water, which forms a stable single-phase mixture. Water addition reduces viscosity, which is useful; reduces heating value, which means that more liquid is required to meet a given duty; and can improve stability. The effect of water is therefore complex and important. Bio-oil is miscible with polar solvents such as methanol, acetone, etc. but essentially immiscible with petroleum-derived fuels. This is due to the high oxygen content of around 35-40 wt% that provides the chemical explanation of many of the characteristics reported. Removal of this oxygen by upgrading requires complex catalytic processes which are described below.

The density of the liquid is very high at around 1.2 kg/litre, compared with light fuel oil at around 0.85 kg/litre. This means that the liquid has about 42% of the energy content of fuel oil on a weight basis, but 61% on a volumetric basis. The viscosity of the bio-oil as produced can vary from as low as 25 m²s⁻¹ to as high as 1000 m²s⁻¹ (measured at 40°C) or more depending on the feedstock, the water content of the bio-oil, the amount of light ends collected and the extent to which the oil has aged. Bio-oil cannot be completely vaporised once it has been recovered from the vapor phase. If the liquid is heated to 100°C or more to try to remove water or distil off lighter fractions, it rapidly reacts and eventually produces a solid residue of around 50 wt% of the original liquid and some distillate containing volatile organic compounds and water. While bio-oil has been successfully stored for several years in normal storage conditions in polyolefin plastic drums without any deterioration that would prevent its use in any of the applications tested to date, it does change slowly with time, most noticeably there is a gradual increase in viscosity.

Applications of bio-oil

Bio-oil can substitute for fuel oil or diesel in many static applications including boilers, furnaces, engines and turbines for electricity. There is potential for fast pyrolysis to be a pretreatment method i.e. for bio-oil to be an effective energy carrier. Recently there has been considerably greater interest in upgrading bio-oil sufficiently for it to be used for heat, power and other applications with greater confidence by users. There is a large effort in R&D in bio-oil as a precursor for second generation biofuels for transport. Finally, there is an awareness of the potential for fast pyrolysis and bio-oil to offer more versatile process routes to a wider range of products and contribute to biorefinery concept development.

This article was prepared by Doug Elliott.
For more information please visit <http://www.pyne.co.uk>

Task 32 – Biomass Combustion and Co-firing

Task 32 organised an expert workshop for equipment suppliers and researchers on CFD aided design of industrial biomass combustion installations as a side event of the EU Biomass Conference in Copenhagen. The workshop provided a platform to share recent practical experiences and address the current opportunities and limitations of CFD based design of industrial biomass combustion appliances. CFD tools can be very effective in the design of industrial biomass combustion installations. The approach can lead to much better combustion quality and avoid the need of a 'trial and error' approach for boiler design and reducing development expenses. The presentations can be downloaded from the Task 32 website.

On 13-14 November 2013, Task 32 co-organised a conference with the Biomass group of VGB Powertech on Challenges in Biomass Combustion. This was done in the framework of a collaboration agreement of Task 32 with this working group in VGB Powertech, in which most of the European operators of biomass power plants are represented. The conference covered various practical challenges of operating a biomass power plant, related to mitigating high temperature chlorine corrosion and fire and explosion prevention.

Task 33 – Thermal Gasification of Biomass

In June 2013, Kevin Whitty became the new leader for Task 33. Dr. Whitty is an associate professor in the Department of Chemical Engineering at the University of Utah (USA) with over 20 years experience in research and development of thermal gasification of biomass.

Dr. Whitty takes over the leadership from Dr. Richard Bain (National Renewable Energy Laboratory, USA), who led Task 33 in the previous Triennium. All Task 33 members would like to thank Rich Bain for his effort and progress within the Task, and wish him all the best in his future endeavours. At the beginning of September 2013, the Task 33 newsletter was published and can be found at the Task 33 website. The newsletter reviews the highlights of the Triennium 2010-12. Information about workshops, the IEA Bioenergy Conference as well as the new Task 33 website and worldwide database of biomass gasification facilities, is presented in the newsletter.

In November 19-20, 2013 a joint workshop between IEA Bioenergy, Task 33, and IEA Industrial Energy-related Technologies and Systems (IETS) on "System and Integration Aspects of Biomass-based Gasification" was held in Gothenburg, Sweden. The aim of the workshop was to initiate a dialogue across the technology/system interface, as well as on methods and results for technical, economic and environmental evaluations of integrated biomass-based gasification systems. The other aim was to identify topics for future international cooperation in these areas. Further information about the workshop can be found at Task 33 website www.ieatask33.org.

Task 36 – Integrating Energy Recovery into Solid Waste Management

A workshop was held in Milan on 20th November to examine the future for solid recovered fuels. It reported on the work that has been done to legislate to enable solid recovered fuels to be classed as a product, not a waste and on the use of solid recovered fuels in Italy. The workshop showed that:

- It is difficult to achieve 'end of waste' for solid recovered fuels in Europe, but it is possible. The legislation introduced in Italy (Ministerial Decree 22/2013, art. 184-ter) is aimed at enhancing consumers' confidence and encouraging the production of high quality SRF, while avoiding unnecessary barriers. The intention is to reduce pollution, increase the sustainable use of biomass in waste and reduce the environmental and economic burden of landfill. The basic principles are that only some SRF types can achieve end of waste and only under specific conditions; and that the production of SRF must be in compliance with the waste hierarchy.
- Experience with using SRF: in Italy most SRF is incinerated with energy recovery or used in other combustion plants, including co-combustion in coal power plants and cement kilns. In Germany its use in industrial power plants is increasing and dominating the market for SRF.
- The potential for the SRF market is much higher than is currently being realised in Italy.
- There is a need to create a direct relationship between the producer and user of end of waste SRF.

The workshop also reported on the findings of the RECOMBIO project to examine the use of SRF in heat and power generation plants. A summary of the workshop and the presentations are available from the Task 36 web site.

Task 39 – Commercialising Conventional and Advanced Liquid Biofuels from Biomass

On 9 October 2013, Beta Renewables opened the world's largest commercial-scale facility for advanced biofuels in Crescentino, Italy. Construction and development of other commercial and demonstration sized cellulosic ethanol facilities in the US (such as Abengoa, DuPont and POET-DSM) and Denmark (Inbicon) continue to make progress, while other advanced biofuel companies such as KiOR and INEOS Bio have delivered their first commercial volumes of advanced biofuels.

The Task also organised a special session entitled "International Demonstrations and Commercialisation Updates" within the 35th Symposium on Biotechnology for Biofuels and Chemicals which was held in Portland, USA in May 2013. This proved to be of immeasurable interest as the room was filled over its 400 capacity. Participation from industry was excellent as leading biorefining and cellulosic ethanol companies (Borregaard, Catchlight, Chemtex, DuPont and Lignol) presented their updates describing some of the world's first commercial and demonstration facilities.

In response to an invitation from colleagues in China working in the biofuels area, an informal Task 39 meeting was organised in October, 2013 in Nanjing, China. This Chinese government sponsored conference was entitled, the "International Conference on Biomass Energy and Chemicals" and was meant to both profile much of the R&D being carried out on biofuels in China but also provide a forum to show representatives from the Chinese government, industry and academia the benefits of being part of IEA Bioenergy. Several Task 39 members from Australia, Sweden, Denmark, Japan, Korea, USA, and Canada presented at the conference.



Nanjing conference: Task39 representatives with conference delegates

Task 40 – Sustainable International Bioenergy Trade: Securing Supply and Demand

Task 40 partnered with USIPA to organise a technical workshop at the 3rd Annual Exporting Pellets Conference on 29 October in Miami, Florida, USA. The workshop focused on safety issues on transportation and storage, as well as logistics of biomass supply chains. Speakers included all major European utilities, major U.S. producers, and experts in all areas of the supply chain.

A workshop on "The Transatlantic Trade in Wood for Energy: A Dialogue on Sustainability Standards" in Savannah, Georgia, USA, organised by Pinchot Institute and IEA Bioenergy brought together a diverse group of experts and stakeholders working on various aspects of the growing trade in wood biomass between the southeast US and Europe. It included presentations, facilitated dialogue, and field tours examining how global trade in renewable bioenergy, especially wood pellet exports from the US to Europe, can meet broad expectations for sustainability, biodiversity, water quality, greenhouse gas emissions, etc. Participants gained improved understanding of sustainable sourcing, and developed connections for future cooperation in establishing sustainability criteria and biomass supply chains.

Publications



Monitoring Sustainability Certification of Bioenergy – Short summary

To support sustainable bioenergy deployment and overcome some of the challenges associated with the current status of sustainability certification, this IEA Bioenergy strategic study examined what is actually known and what can be learned from the current development and implementation of voluntary certification systems, about the role of voluntary certification schemes in the governance of biomass/bioenergy/ biofuels sustainability and how this has affected actors along the supply chains and trade. <http://www.bioenergytrade.org/downloads/iea-sust-cert-summary.pdf>

On the Timing of Greenhouse Gas Mitigation Benefits of Forest-Based Bioenergy

This statement addresses a much debated issue – the timing of greenhouse gas (GHG) emissions and carbon sequestration when biomass from existing managed forests is used for energy to displace fossil fuels. The purpose of the statement, which is aimed at policy advisors and policy makers, is to explain the essence of the debate and propose a perspective that considers the broader context of forest management and the role of bioenergy in climate change mitigation. <http://www.ieabioenergy.com/publications/on-the-timing-of-greenhouse-gas-mitigation-benefits-of-forest-based-bioenergy/>



Health and Safety Aspects of Solid Biomass Storage, Transportation and Feeding

This publication has been compiled as a joint effort by experts active in Tasks 32, 36, 37 and 40 of the IEA Bioenergy Agreement. It focuses on the health and safety issues of the supply chain of solid biofuels with the objective to highlight commonly used mitigation methodologies to promote a better working environment when dealing with solid biofuels. With the growth of the bioenergy sector, it is important not only that opportunities for bioenergy are implemented in an efficient and economic manner, but also safely. This publication can be downloaded at <http://www.ieabioenergy.com/LibItem.aspx?id=7746>

The Science-Policy Interface on the Environmental Sustainability of Forest Bioenergy

This publication reports on the discussions and opinions expressed during and expert workshop on the environmental sustainability of forest bioenergy in Canada, held in Quebec on the 3-5 October 2012. The workshop was organised by the International Energy Agency Bioenergy, Task 40 (International Sustainable Bioenergy Trade) and Task 43 (Biomass Feedstocks for Energy Markets), the IEA Bioenergy Executive Committee, the Faculty of Forestry, Geomatics and Geography of Laval University (Quebec, Canada) and Natural Resources Canada, with the collaboration from the Global Bioenergy Partnership and the Canadian Council of Forest Ministers. Participants engaged in dialogue critical for the formulation of rational policy to achieve sustainable forest bioenergy production systems. This publication can be downloaded from <http://www.ieabioenergy.com/LibItem.aspx?id=7717>



ExCo68 – Environmental Sustainability of Biomass – Summary and Conclusions

This publication provides the summary and conclusions from the workshop 'Environmental Sustainability of Biomass' held in conjunction with the meeting of the Executive Committee of IEA Bioenergy in Twin Waters, Queensland, Australia on 24 November 2011. The purpose of the workshop was to provide the Executive Committee with perspectives on sustainability aspects such as GHG emissions, feedstock production, certification, soil conservation and governance. The aim was to stimulate discussion between the Executive Committee, Task Leaders and invited experts and thereby enhance the policy-oriented work within IEA Bioenergy. This publication can be downloaded from <http://www.ieabioenergy.com/LibItem.aspx?id=7706>

2012 IEA Bioenergy Annual Report

The IEA Bioenergy 2012 Annual Report includes a special feature article 'Biomass Feedstocks for Energy Markets' prepared by Task 43. The Annual Report also includes a report from the Executive Committee and a detailed progress report on each of the Tasks. Also included is key information such as Task participation, Contracting Parties, budget tables and substantial contact information plus lists of reports and papers produced by the Implementing Agreement. The publication can be downloaded from <http://www.ieabioenergy.com/LibItem.aspx?id=7602>

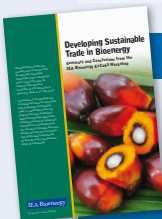


Future Biomass-based Transport Fuels

The summary and conclusions publication from the workshop held in conjunction with ExCo67 in Helsinki, Finland, on May 10th has been published and can be downloaded at <http://www.ieabioenergy.com/LibItem.aspx?id=7459>

Using a LCA Approach to Estimate the Net GHG Emissions of Bioenergy

This strategic report was prepared by Mr Neil Bird, Joanneum Research, Austria; Professor Annette Cowie, The National Centre for Rural Greenhouse Gas Research, Australia; Dr Francesco Cherubini, Norwegian University of Science and Technology, Norway; and Dr Gerfried Jungmeier, Joanneum Research, Austria. The report addresses the key methodological aspects of life cycle assessment with respect to greenhouse gas balances of bioenergy systems. It includes results via case studies, for some important bioenergy supply chains in comparison to fossil energy systems. The purpose of the report was to produce an unbiased, authoritative statement aimed especially at practitioners, policy advisors, and policy makers. This publication can be downloaded at <http://www.ieabioenergy.com/MediaItem.aspx?id=7099>



Developing Sustainable Trade in Bioenergy

The 'summary and conclusions' publication from the workshop held in conjunction with ExCo65 in Nara City, Japan in May 2010 has been published and is available to download at: <http://www.ieabioenergy.com/MediaItem.aspx?id=6880>

Thermal Pre-treatment of Biomass for Large-scale Applications

The summary and conclusions publication from the workshop held in conjunction with ExCo66 in York, United Kingdom, on 12 October 2010 has been published and can be downloaded at <http://www.ieabioenergy.com/LibItem.aspx?id=7190>



IEA Bioenergy Events

Executive Committee

ExCo73 will be held in Copenhagen, Denmark in May 2014.

ExCo74 will be held in Brussels, Belgium in October 2014.

ExCo75 will be held in Dublin, Ireland in May 2015.

ExCo76 will be held in Germany in Q4 2015.

Task Events

Task 32's schedule of upcoming events is

- January 17, 2014, Graz, Austria
Task 32 is involved in the organisation of a workshop on developments in the production and utilisation of torrefied fuels. At the workshop, recent developments in R&D of torrefaction technologies as well as the first full scale utilisation experiences will be shared. This workshop will be held as part of the Central European Biomass Conference.

Task 33's schedule of upcoming events is

- May 2014, Italy
Task 33 meeting and associated workshop "Feed Systems for Biomass Gasification."

Task 34's schedule of upcoming events is

- May 15-16, 2014, Birmingham, UK
Task 34 Meeting in coordination with the 20th International Symposium on Analytical & Applied Pyrolysis, which begins on the 19th May. Subjects to be discussed will be the round robin on biomass pyrolysis, progress within CEN for standards development for bio-oil in Europe, intra-task collaborations with Task 32 and 33, and the development of an on-line database as a task-only effort or as part of an IEA Bioenergy effort.

Task 36's schedule of upcoming events is

- May 8, 2014, Stockholm, Sweden
Task 36 will hold a workshop on the Interface between anaerobic digestion and energy from waste.

Task 37's schedule of upcoming events is

- April 2-4, 2014, Itaipu Bionacional, Brazil
Task business meeting.

Task 38's schedule of upcoming events is

- May 19-20, 2014, Copenhagen, Denmark
Joint meeting between IEA Bioenergy Tasks 38, 40, 43 and the European Commission's Joint Research Centre on the topic "Quantifying climate effects of forest-based bioenergy".
- May 21, 2014, Copenhagen, Denmark
Task 38 business meeting, to be confirmed.

Task 39's schedule of upcoming events is

- January, 22-23, 2014, Berlin, Germany
Task 39 will hold a business meeting in conjunction with the "Fuels for the Future" conference. The meeting will include a joint Task 39-Task 42 workshop to reinforce and facilitate these tasks' on-going close collaboration.
Task 39 has also helped to organise two sessions within the Fuels of the Future conference. One session will focus on policy tools to help develop biofuels and the other will focus on technical and/or commercialisation progress for advanced biofuels. These sessions will comprise presentations by Task 39 members.
- May, 2014, Lund, Sweden
Task 39 will hold a meeting as well as participate in an ExCo workshop on transportation fuels in Denmark, Copenhagen.

Task 40's schedule of upcoming events is

- January 15-16, Graz, Austria
Task 40 internal meeting.

Task 42's schedule of upcoming events is

- January 20-23, 2014, Berlin, Germany
Task 42 business meeting.

Task 43's schedule of upcoming events is

- February 20-21, 2014, Paris, France (tentative date).
Workshop: Bioenergy and water. Organisers are Task 43, UNEP, IINAS, and Winrock Int.
- May 19-20, 2014, Copenhagen, Denmark
Workshop: Bioenergy, land use and GHG balances. Organisers are Task 38, 40, 43 and JRC

Other Events

Central European Biomass Conference

January 15-18, 2014, Granz, Austria
E-mail: office@biomasseverband.at
Website: <http://www.cebc.at/>

11th International Conference on Biofuels "Fuels of the Future 2014"

January 20, 2014, Berlin, Germany
E-mail: Hartmann@bioenergie.de
Website: <http://www.fuels-of-the-future.com/>

World Future Energy Summit

20-22 January 2014, Abu Dhabi
Website: www.worldfutureenergysummit.com

4th International Forest Biorefinery Symposium

February 3-4, 2014, Montreal, Canada
Website: <http://www.paperweekcanada.ca/>

Tomorrow's Biorefineries in Europe

February 11-12, 2014, Brussels, Belgium
Website: <https://colloque.inra.fr/eubiorefineryprojectsfinalconf>

World Sustainable Energy Days

February 26-28, 2014, Wels, Austria
E-mail: office@esv.or.at
Website: <http://www.wsed.at/en>

World Bio Markets

4-6 March, 2014, Amsterdam, Netherlands
Website: <http://www.worldbiomarkets.com/>

WASTE MANAGEMENT & RECYCLING Exhibition & Conference for South-East Europe

March 5-7, 2014, Sofia, Bulgaria
E-mail: office@viaexpo.com
Website: www.via-expo.com

International Biomass Conference

March 24-26, 2014, Orlando, FL, USA
E-mail: service@bbiinternational.com
Website: <http://www.biomassconference.com/>

European Biomass to Power 2014

01-02 April, 2014, Copenhagen, Denmark
Website: <http://www.wplgroup.com/aci/conferences/eu-ebp4.asp>

SolarExpo

07-09 May 2014, Milan, Italy
Web: <http://www.solarexpo.com/eng/>

5th AEBIOM European Bioenergy Conference

May 12-14, 2014, Brussels, Belgium
E-mail: olaru@aeblom.org
Website: <http://www.aebiom.org/conference/>

20th international Analytical and Applied Pyrolysis Conference

May 19-23, 2014, Birmingham, UK
E-mail: e.wylde@aston.ac.uk
Website: <http://www.pyro2014.co.uk/>

1st International Conference on Renewable Energy Gas Technology, REGATEC 2014

May 22-23 May, 2014, Malmö, Sweden
E-mail: jorgen.held@renewtec.se
Website: www.regatec.org

Renewable Energy World Conference & Expo Europe

3-5 June, 2014, Cologne, Germany
Website: <http://www.renewableenergyworld-europe.com/>

22nd European Biomass Conference and Exhibition

June 23-26, 2014, Hamburg, Germany
E-mail: biomass.conference@etaflorence.it
Website: www.conference-biomass.com

3rd European Biorefining Training School

July 7-10 2014, Budapest, Hungary
E-mail: biorefineryschool@climatekic.hu
Website: <http://www.klimainnovacio.hu/en/biorefineryschool>

TCS 2014: Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products

September 2-5, 2014, Denver, Colorado
E-mail: jeuken@iastate.edu
Website: <http://www.tcs2014.org/>

XXIV IUFRO World Congress 2014 – "Sustaining Forests, Sustaining People: The Role of Research"

October 5-11, 2014, Salt Lake City, UT, USA
Website: www.iufro2014.com

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 achieve a substantial bioenergy contribution to future global energy demands by accelerating the production and use of environmentally sound, socially accepted and cost-competitive bioenergy on a sustainable basis, thus providing increased security of supply whilst reducing greenhouse gas emissions from energy use.

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Task 36: Integrating Energy Recovery into Solid Waste Management

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Task 38: Climate Change Effects of Biomass and Bioenergy Systems

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Task 39: Commercialising Conventional and Advanced Liquid Biofuels from Biomass

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Task 40: Sustainable International Bioenergy Trade – Securing Supply and Demand

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Task 42: Biorefining – Sustainable Processing of Biomass into a Spectrum of Marketable Bio-based Products and Bioenergy

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