IEA Bioenergy News

Bioenergy in Switzerland

Editorial by Sandra Hermle, ExCo Member for Switzerland

Switzerland's final energy consumption in 2016 amounted to 854,300 TJ of which 78% came from non-renewable resources and 22% from renewables (Fig. 1). Within the renewables, electricity production has the highest share (62%) which is mostly hydropower (57%) (Fig. 2). The remaining 5% comes from so-called new renewables which include waste-to-energy (40%), solar (42%), biomass (biogas as well as solid biomass; 15%) and wind (3%) (Fig. 2).

The situation will change in the years to come with a higher share of renewables due to the "energy strategy 2050 (ES 2050)". This strategy is the result of the Federal councils and Parliaments decision in 2011, following the Fukushima reactor disaster, to phase out nuclear energy production. The existing five nuclear power plants are to be shut down at the end of their technically safe operating life and will not be replaced. The first set of measures in the ES 2050 aims at increasing energy efficiency and promoting the development of renewable energies. In terms of renewable energies the following measures are to be implemented:

- Feed-in remuneration system: Actual production costs of electricity from solar, wind energy, geothermal and biomass energy are higher than the price at which this electricity can be marketed. Operators of such installations have been able to apply for feed-in remuneration since 2009. This remuneration is financed by the network surcharge.
- Investment subsidies: Operators of small photovoltaic installations of less than 30 kilowatts, can apply for a one-off subsidy towards the investment costs of the installation. This one-off investment grant covers a maximum of 30% of the investment costs of a comparable installation. With the ES 2050 larger photovoltaic installations may also benefit from this grants. In addition, large, new hydroelectric power plants of more than 10 megawatts, as well as large-scale renewals or extensions of hydroelectric power plants, are also to receive investment subsidies. The financing will come from the network surcharge payed by electricity consumers. Investment contributions (including one-off investment grants) will be available until 2030 at the latest.
- Existing large-scale hydroelectric power plants may claim a market premium for electricity that has to be sold for less than the cost of production.
- Energy research: The parliament approved the creation of eight national competence centres for an improved national research collaboration and for accelerating the time to market of innovative technologies. One of these competence centres is dedicated to bioenergy. Furthermore, increased financial resources are available for pilot and demonstration projects as well as for competitive project promotion.

In terms of biofuels the Federal Council clearly states that strengthening the promotion of biogenic fuels is not yet an objective. This is also based on two strategies (1) the Swiss biomass strategy (2009) and the strategy for the energy-related use of biomass (2010) which state that the use of biomass should cause no conflicts with foodstuffs and fodder. According to the strategies only extraction from waste and residual materials is unproblematic. There is an exemption from the oil tax for biogenic fuels (including bioethanol, biodiesel and biogas) in place, as long as they meet the minimum ecological and social requirements (applicable until 2020).

With regard to heat production for households there is a political mandate to replace fossil-based combustibles with renewables which could be biomass based (wood pellets, wood chips, thermal network on biomass),

With regard to electricity production from biomass there is a high potential foreseen for solid biomass (wood), and for biogas in industrial as well as agricultural applications.

A recently published study has shown that the Swiss sustainable biomass potential amounts to 97 PJ/a of which only 48 PJ/a are used so far. Unused potential comes mainly from forestry wood and manure (WSL, 2017).

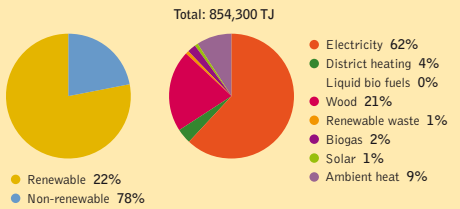

Figure 1: Final energy consumption 2016 with special focus on renewables

Source: Swiss Federal Office of Energy, 2017.

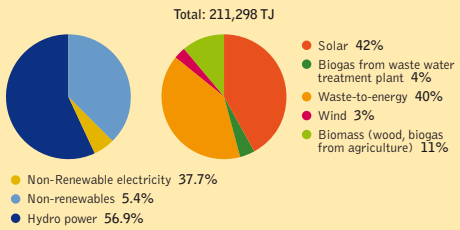

Figure 2: Total electricity production 2016 with special focus on renewables

Source: Swiss Federal Office of Energy, 2017.

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iea Energy Technology Network

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From the Secretariat


Pearse Buckley

ExCo80, Baden, Switzerland

The 80th meeting of the Executive Committee was held at the Trafo Hotel, Baden, Switzerland on 18-20 October 2017, with Kees Kwant as Chair, Jim Spaeth as Vice-chair and Pearse Buckley as Secretary. The meeting was hosted by the Swiss Federal Office of Energy. The Chair expressed the appreciation of the ExCo to Hermle and her colleagues for the excellent meeting arrangements. Some of the outcomes of the meeting are detailed below.

Changes to Executive Committee

A number of changes to the Executive Committee were noted including Australia – new Member Mark Brown and new Alternate Member Shahana McKenzie; Japan – new Alternate Member Shuji Namatame; United Kingdom – new Member Peter Coleman.

ExCo80 Workshops

Two half-day workshops were held in conjunction with the ExCo80 meeting – an internal workshop involving ExCo members and Task Leaders and an open workshop, which included a number of local stakeholders.

Internal Workshop – Planning for the new triennium

In this workshop the ExCo members and Task Leaders considered options for the upcoming triennium (2019-2021) work programme. The discussions were informed by the results of a stakeholder survey carried out by the Technical Coordinator. In the concluding session a framework for the work programme was developed and, based on this, proposals are to be prepared for consideration at ExCo81.

Open Workshop – Bioenergy Grid Integration

A successful and well attended workshop, which was jointly organised with the Swiss Federal Office of Energy, was held on the topic of '*Bioenergy Grid Integration*'. The workshop, with approximately 60 attendees, included IEA Bioenergy ExCo participants, participants from the Tasks, the workshop speakers and observers from Switzerland. The workshop presentations are listed below:

- Heat grid – District heating with biomass in Switzerland and in IEA Countries – *Thomas Nussbaumer, Verenum, Switzerland*
- How to build and integrate a district heating network – success story with hurdles – *Urs Ryner, Agro Energie Schwyz AG, Switzerland*
- District heating and cooling: environmental technology for the 21st century – *Robin Wiltshire, BRE Building Research Establishment, United Kingdom, Chair IEA DHC/CHP*
- Convergence of the grid – taking all different grids into account: "Hybridwerk Aamatt" – At the interface of the electricity, gas and district heating grid – *Andrew Lochbrunner, RegioEnergie Solothurn, Switzerland*
- The strategic integration of biomethane in the gas grid – *Andreas Kunz, Energie 360°AG, Switzerland*
- Potential of biogenic combined heat and power generation in Switzerland: Project CHPswarm for power-on-demand – *Gil Georges, Aerothermochemistry and Combustion Systems Laboratory, ETH Zürich, Switzerland*
- Power grid – Virtual Power Plant for demand responsive energy production from biogas plants – *Martin Schröcker, Fleco Power AG, Switzerland*

The workshop presentations are available here
http://www.ieabioenergy.com/publications/ws23-bioenergy-grid-integration/


Workshop on 'Bioenergy Grid Integration

Progress with current Initiatives

Task 41 Project 5: Bio-CCS/CCUS

The project (http://task41project5.ieabioenergy.com/) was pointing to an increasing focus on CCU, although it was important to consider whether CCU concerned an extension of the use of the carbon molecule, a climate change issue or a business opportunity. The final workshop, which was expected in early 2018, would focus on political and regulatory issues.

Inter-Task Project: Bioenergy Success Stories

Ten Success Stories had been selected to be drawn up in the template format. The ExCo requested that some additional material be included, such as CO_2 savings and job impacts. These would be considered before final approval and dissemination.

Inter-Task Project: Measuring, governing and gaining support for sustainable bioenergy supply chains

From the project (http://itp-sustainable.ieabioenergy.com/) workshop held in conjunction with ExCo79 in Gothenburg a 40-page summary had been prepared, which would be an information source for the public and a guide for the on-going work. Peer reviewed papers have been published and a workshop has been planned for Copenhagen in April 2018 with the theme *'Governing sustainability of bioenergy, biomaterial and bio-product supply chains from forest and agricultural landscapes'*. A major focus for 2018 would be dissemination and this would be discussed and agreed with the advisory board.


Incoming Vice-chair Paul Bennett and incoming Chair Jim Spaeth

Inter-Task Project: Fuel pretreatment of biomass residues in the supply chain for thermal conversion

For this project (http://itp-fueltreatment.ieabioenergy.com/) all reports were in draft form except for case study 1. With ExCo approval the original case study 4 on *'torrefaction for dry liquefaction'* has been replaced with a new case study on *'leaching of herbaceous biomass'*. All drafts would be finished by the end of 2017 at which point the focus would be on the policy report and the pretreatment database.

Communication Strategy

The final IEA Bioenergy webinar in the series of six dealt with 'Integrated Bioenergy Hybrids' (http://www.ieabioenergy.com/iea-publications/webinars/). The ExCo approved funding for an additional nine webinars by the end of 2018. Two-page summaries of reports are being posted to the website and the first item of pro-active material has been uploaded under the FAQ section (http://www.ieabioenergy.com/iea-publications/faq/). Over the coming months the Communication Team will be looking at options for using Twitter more efficiently.

Visit the FAQ section of the IEA Bioenergy website here (http://www.ieabioenergy.com/iea-publications/faq/)

Cooperation with International Organisations

IRENA

There is an agreement for on-going collaboration between IEA Bioenergy and IRENA. Some examples include the view on sustainability goals and bioenergy (http://www.ieabioenergy.com/publications/growing-sustainably-with-bioenergy/), which had been developed jointly with IRENA and the review of an IRENA document on biofuels by IEA Bioenergy Task 39.

SE4ALL

In the SE4ALL 'Below 50' initiative, Susan van Dyk of Task 39 is involved on behalf of IEA Bioenergy. Regarding wood fuelled cooking stoves, the ExCo has offered input on the resource assessment and Task 43 has discussed the matter internally, identifying a number of synergies.

GBEP

The GBEP AG6 on bioenergy and water project finishes at the end of 2017. Topics in the area of biofuels and biogas are being considered and the Technical Coordinator was planning to hold discussions with GBEP to ensure efficient collaboration.

BIOFUTURE PLATFORM/MISSION INNOVATION

A Biofuture Summit 17 took place in São Paolo in late October 2017 attended by the Chair of IEA Bioenergy (http://www.ieabioenergy.com/publications/biofuture-summit-17/).

Mission Innovation has planned a meeting in Canada on 27-29 November 2017, at which the Technology Roadmap on Bioenergy would be launched.

New Chair and Vice-chair for 2018

Following a decision at ExCo80, Jim Spaeth of the USDoE will take over as Chair of IEA Bioenergy and Paul Bennett of SCION will assume the role of Vice-chair for 2018.

ExCo80 Study Tour

Following the ExCo80 meeting a group of 17 IEA Bioenergy attendees participated in the study tour to the Coop Bakery and the REN AG Biogas Plant.

Coop is the biggest trade company in Switzerland and aims at a CO_2 neutral balance by 2023. The site of Schafisheim plays an important role in reaching this target, as it concentrates different bakery activities previously performed in various locations, thus enabling a considerable reduction of transport. The bakery produces 60,000 tonnes of bread and bakery goods annually and is supplied by process heat at roughly 300°C from a biomass boiler with a nominal load of 2.9 MW, supported by a gas boiler for peak load. The biomass boiler is supplied with 50% wood chips and 50% grain residues provided by Swissmill located in Zurich and owned by Coop. For logistic reasons, the grain residues are provided as pellets and mixed with wood chips prior to the boiler. To comply with the stringent emission limits, the boiler includes a SNCR system for NO_X abatement and an electrostatic precipitator for particle removal.

REN AG is one of the largest AD plants in Switzerland. In 3 digesters with a total volume of 7,000 m^3 the plant treats a total of over 20,000 tonnes/year of manure and green waste in addition to almost 20,000 tonnes/year of domestic and industrial food waste. Biogas production of 800 m^3 per hour is converted in two large CHP units to 18 million kWh of renewable electricity and some 47,000 kWh/day of heat, the latter being used in a local district heating network. More than 30,000 m^3 liquid digestate and 10,000 tonnes of compost are produced as agricultural fertilisers and soil conditioners. In addition to the biogas production at the plant, some 2 million litres of waste oil are processed to biodiesel.

ExCo80 Study Tour Group at REN AG Biogas Plant

Task Focus

IEA Bioenergy Task 38 – Climate change effects of biomass and bioenergy systems

Background

To address the challenge of climate change, it is critical that countries rapidly implement renewable energy and phase out fossil fuels. Bioenergy has been accepted as an important renewable energy source, and is promoted in many jurisdictions. However, confidence in bioenergy by policy-makers has waned due to the ongoing debate over the climate change mitigation value of bioenergy, partly due to conflicting messages in published literature. Scenario modelling by the Intergovernmental Panel on Climate Change (IPCC) shows that meeting the target to restrict global warming to 2°C will likely require large-scale implementation of bioenergy linked with carbon capture and storage – BECCS – to remove CO_2 from the atmosphere. IEA Bioenergy Task 38 works in this complex and often confusing arena, with the objective to enhance understanding by researchers and decision-makers about the climate effects of bioenergy. Task 38 develops, demonstrates and promotes methodology for the calculation of climate change effects of bioenergy, and contributes to policy development for renewable energy and greenhouse gas accounting.

Understanding the climate effects of bioenergy

Some people are puzzled about how bioenergy can contribute to climate change mitigation because burning biomass emits carbon dioxide. There have even been headlines in the media claiming that "biomass is worse than coal". In fact, it is perfectly true that more CO_2 is released per unit energy from biomass than from black coal – this is purely a function of the chemical composition of biomass and coal. However, statements like "the use of woody biomass for energy will release higher levels of emissions than coal" overlook the vital difference between energy supply from fossil fuels and from biomass: burning fossil fuels releases CO_2 that has been locked up for millions of years, while burning biomass simply returns to the atmosphere the CO_2 that was absorbed as the plants grew, and there may be no net release of CO_2 if the cycle of growth and harvest continues into the future (Figure 1).

Another issue that is raised is the asynchrony between the timing of emissions and sequestration, if biomass is obtained from long rotation forests, where a stand takes decades to regrow. In reality, a forest usually comprises stands of different ages, managed such that different stands are harvested each year. Thus, considered across the whole forest estate, stand level fluctuations in carbon stock are evened out. If the annual cut is equal to the annual growth, at estate level, the carbon stock of the whole forest will remain constant. If the annual cut is less than the annual growth, the forest will continue to sequester carbon, while also providing wood products including biomass. It is important to note that if a forest is converted to a new management regime where more residues are extracted or rotation length is reduced, the carbon stock of the forest estate may decrease, and this should be included as an emission of the bioenergy system. It is also possible that enhanced management (e.g. improved site preparation, advanced genetics) stimulated by the demand for bioenergy, will reduce or even negate any decline in C stock under the bioenergy scenario.

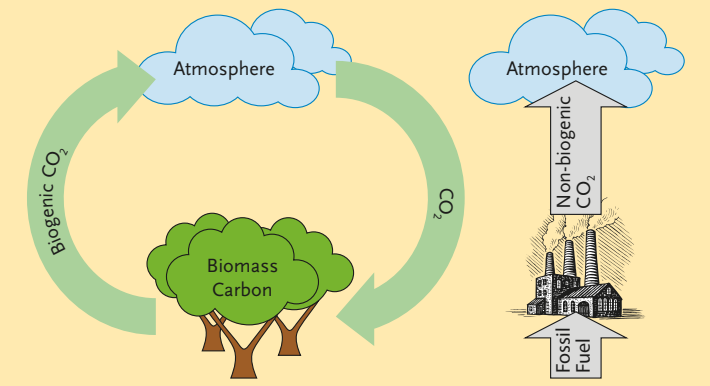


Figure 1: The Intergovernmental Panel on Climate Change (IPCC) distinguishes between the slow domain of the carbon cycle, where turnover times exceed 10,000 years, and the fast domain (the atmosphere, ocean, vegetation and soil), where vegetation and soil carbon have turnover times of 1-100 and 10-500 years, respectively. Fossil-fuel use transfers carbon from the slow domain to the fast domain, while bioenergy systems operate within the fast domain (Ciais *et al.*, 2013). Figure: National Council for Air and Stream Improvement.

If the bioenergy scenario does cause a reduction in forest carbon stocks, this carbon cost will be repaid as the biomass displaces use of fossil energy sources. Climate benefits will continue to accumulate with each successive harvest. The payback time can be almost immediate when biomass is obtained from annual plants or residues that would otherwise decay rapidly, and are used efficiently (such as in combined heat and power systems) to displace GHG-intensive coal. However, some studies have shown payback times of decades in other bioenergy systems.

"Carbon neutrality" of bioenergy

Bioenergy is commonly said to be "carbon neutral", but this is an unhelpful term because it is ambiguous, and used differently in different contexts. Within the biospheric carbon cycle, bioenergy can be carbon neutral because the carbon that is released during combustion has previously been sequestered from the atmosphere and will be sequestered again as the plants regrow. However, the full supply chain must be considered, and there are invariably emissions associated with the production, processing, transport and use of bioenergy that need to be included. Furthermore, it is important to include any changes in carbon stock in the forest that supplies biomass for bioenergy.

Figure 2 Workshop at Chalmers University of Technology in Gothenburg, Sweden, May 2017.

In national greenhouse gas reporting for the UNFCCC, bioenergy is counted as zero emissions in the energy sector, at the point of combustion, because carbon stock changes in the forest are counted in the land sector. Counting emissions from combustion would result in double-counting. Emissions from fossil fuels used in the supply chain are counted in the energy sector.

Task 38 standard methodology

IEA Bioenergy Task 38 has worked for two decades to develop and promote scientifically-sound approaches for quantifying the climate effects of different bioenergy systems. In 1997, Task 38 published its "standard methodology", which sets out guidance on how to quantify the climate effects of bioenergy systems. Task 38 is currently working on an update of the 1997 paper, refining the standard methodology to include recently emerging issues, such as the need to consider change in albedo (reflectance) from the land surface, which impacts global energy balance. Where evergreen trees are harvested for bioenergy in a climate that receives significant snowfall, the increased albedo is an added benefit for the bioenergy system; in other environments a change in albedo can reduce the climate benefits.

The essential features of the Task 38 standard methodology are:

- comparison of bioenergy with the appropriate reference scenario for energy and land use, which will vary according to the context, and the purpose of the study.
- inclusion of the whole system, across the life cycle
  - production chain emissions
  - co-products, which may displace other products, generating additional mitigation
  - end of life emissions
  - all climate forcers
  - a) greenhouse gases, that is, CO_2 and non-CO_2 (e.g. CH_4 from stored biomass, N_2O from soil), change in carbon stock in biomass and soil due to change in land use or land management, and indirect land use change
  - b) albedo effects
- expression of results as change in emissions per unit energy, and also per unit biomass or land
- choice of spatial boundary, which should be applicable to the purpose
- consideration of timing of emissions and sequestration
- awareness that the result is specific to each situation

Task 38 has evaluated the basis for divergent results between different studies and tools analysing similar systems. Key causes for differences are: system boundary delimitation (which determines whether specific supply chain processes and indirect effects are included); counterfactual scenario (alternative land use and energy system assumed to apply in the absence of bioenergy); spatial and temporal scale of assessment; performance assumptions (biomass yield, forest response to harvest, decomposition rates, efficiency of conversion of feedstock to product) which may be unrealistically optimistic or pessimistic); how co-products are handled; whether market responses are considered; modelling approach applied (e.g. product-based life cycle assessment, global scale integrated assessment). Some differences arise due to real differences between systems or valid decisions based on the purpose of the study, while others relate to subjective choices. Task 38 provides guidance on choosing methods and input data, suited to the context and intended application, and on interpreting results to derive valid conclusions consistent with the methods applied.

Achievements

Task 38 works at the science-policy interface. Since our establishment in 1995 as Task XV, we have contributed to i) the development of methods for reporting and accounting for national greenhouse gas inventories under the UNFCCC and Kyoto Protocol, ii) development of rules for project level accounting for emissions trading and product certification, and iii) national policies on renewable energy. We publish scientific papers, which contribute to the credible academic underpinning required to support policy development. We hold workshops with researchers to facilitate knowledge exchange, especially between different academic disciplines. Our topics often sound rather academic – metrics for climate change assessment, impacts of timing of emissions and sequestration, how to choose the right reference scenario for land use. But these are all important details – how these matters are handled has a huge impact on the bioenergy industry – it determines the demand for bioenergy, and which feedstocks and technologies are eligible in renewable energy schemes, for example. We work with other Tasks – such as Task 43, which focusses on sustainable biomass supply – so we can look into the impacts of different policy options on the relevant actors – the agriculture and forest industries, the energy sector – which is what will determine the ultimate effect on the climate. Recently, Task 38 members have led the revision of the IPCC guidelines for accounting for wood products, contributed to revision of the ISO standard for carbon footprint of products and life cycle assessment (LCA), and led a response by IEA Bioenergy to Chatham House's report "Woody Biomass for Power and Heat: Impacts on the Global Climate". Recent publications include a scientific paper on choosing the reference system, with focus on land use (Koponen *et al.* Renewable and Sustainable Energy Reviews. 81: 2271-2280).

Task meetings and workshops

In May 2017, Task 38 jointly organised a workshop with Chalmers University of Technology in Gothenburg, Sweden, that brought together a group of experts from a range of disciplines to discuss how bioenergy contributes to the global carbon budget, short-term vs long-term emission-reduction targets, and how climate effects of bioenergy should be assessed.

Findings from the workshop include:

- At current rate of global emissions – 10 GtC/year – the global carbon budget to avoid exceeding 2 degrees will be spent in 15-20 years.
- Most scenarios to stay below 2°C include negative emissions from BECCS. Wide-scale deployment of BECCS will have high economic and environmental costs
- Bioenergy can play a key role in energy system transition, allowing expansion of wind and solar without the large cost of energy storage. The quantity of available biomass is debated, but there is substantial potential of 100-300 EJ/year by 2050. 300 EJ is five times higher than current bioenergy use – this will have major implications for land use.
- CO_2 emissions and sequestration from bioenergy should not be considered in the global carbon budget, except when there is a long-term reduction in the biospheric carbon stock in biomass and/or soil.
- Bioenergy is carbon neutral in the long term (excluding supply chain emissions and permanent C stock decrease) but timing does make a difference to the temperature profile. This could be an issue with respect to climate tipping points, but evidence for tipping points is weak. Thawing of permafrost is likely to have a slow impact, releasing mostly CO_2.
- Integrated assessment models are not widely tested, nor robust for large-scale bioenergy, thus there is considerable uncertainty in estimates based on these models, and effort is required to refine these models.
- Various analytical methods (life cycle assessment – LCA, integrated assessment models, scenario analysis, energy system and economic modelling) should be used to inform policy development, as each gives different insights.

This article was prepared by Annette Cowie with support from Miguel Brandao.

Further information on Task 38: http://task38.ieabioenergy.com/

Task 32 – Biomass Combustion and Co-firing

Workshop on biomass cofiring at WPAC conference

Task 32 provided input to the Wood Pellet Association in the organisation of the annual **WPA Conference 2017** (https://www.pellet.org/wpac-agm/), held 19-20 Sept 2017 in Ottawa, Canada. This conference provided an overview of new developments in the area of wood pellet production and utilisation in both the domestic and industrial heat sectors and the utility scale power sector. Presentations from the conference are available here (https://www.pellet.org/wpac-agm/presentations/2017-presentations).

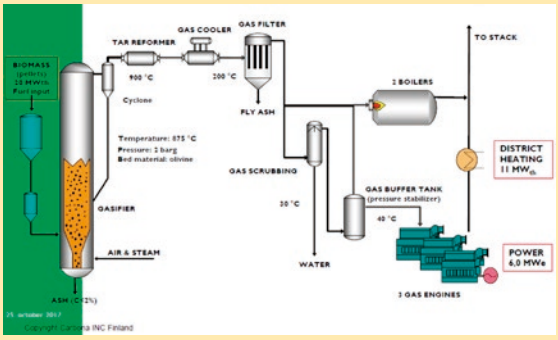
Task 33 – Gasification of Biomass and Waste

Workshop on Fluidised bed conversion of biomass and waste – 24-25 October 2017, Skive, Denmark

The workshop on Fluidised Bed Conversion of Biomass and Waste was jointly organised by IEA Bioenergy Task 33 (Gasification of Biomass and Waste) and IEA-FBC (Fluidised Bed Conversion) and included 15 presentations from experts on R&D, implementation, challenges and successes of fluidised bed processing. Over 40 experts from 16 countries from around the world participated in the workshop.

Participants were able to visit Skive gasification plant as well as Østerild – National Test Centre for Large Wind Turbines.

The BFB gasification plant in Skive was designed to utilise wood pellets and/or chips. Fuel, initially pellets, is supplied from the indoor wood pellet storage site next to the gasification plant. The product gas generated by the plant contains about 20% CO, 16% H_2 and 4% CH_4 by volume as the main combustible components. It has a heating value of about 5 MJ/kg.



Energy production flow sheet for Skive gasification plant

Østerild – National Test Centre for Large Wind Turbines

In June 2010 the Danish Government passed a law in order to establish a national test centre for wind turbines at Østerild, The Technical University of Denmark was appointed to be head of the establishment and operation of the new wind turbine prototype test facility. Test Centre Østerild was established with seven test stands during 2012 and allows for the building of wind turbines of up to 210 and 250 meters respectively. During spring 2017, the Danish Government decided to expand at Østerild. In the future, there will be room for two more wind turbines with a height up to 330 metres.

The workshop as well as site visits' presentations can be found at the IEA Bioenergy Task 33 website (http://task33.ieabioenergy.com/) in the section "Workshops and Events".

Task 39 – Commercialising Conventional and Advanced Liquid Biofuels from Biomass

Task Business Meeting

IEA Bioenergy Task 39 held its second business meeting of 2017 in Brussels 25-26 September (see photo of delegates below). Twenty-six Task 39 members and visiting guests took part in an interesting and valuable two days of presentations and discussions about liquid biofuels developments around the globe. The meeting was enhanced by the participation of a distinguished visitor/observer delegation, which included representatives from India and China as well as from the Renewable Energy Group (REG), a large North American-based FAME biodiesel and HVO/renewable diesel producer, and (S&T)2 Consultants, a Canadian life cycle analysis (LCA) modeling consultancy. Invited Indian delegates included Mr. Sandeep Poundrik (Joint Secretary, Ministry of Petroleum and Natural Gas), Dr. Y.B. Ramakrishna (Chair, Biofuels Working Group, Ministry of Petroleum and Natural Gas) and Dr. Arvind Lali (DBT-ICT, Biofuels Advisor to Ministry of Science and Technology). Dr. Huili Zhang (Professor, Beijing University of Chemical Technology) represented China.

IEA Bioenergy Task 39 Business Meeting in Brussels 2017

Among the Task's highly informative activities are the annual country report presentations which highlight and provide insights on recent developments in biofuels production and deployment occurring in Task 39 participating countries and other countries such as China and India. The country presentations, which included excellent reports on China (by Prof. Zhang) and India (by Mr. Sandeep and Dr. Lali), took up almost the entire first day of the meeting.

The most recent IEA World Energy Outlook projects that, in the coming years, China and India will become major users of transportation fuels, including liquid biofuels. To build on this momentum, Task 39 will hold its next business meeting in Beijing, China, in early April 2018. Once finalised, details about this meeting will be communicated in the Task's end-of-year newsletter.

Task 40 – Sustainable biomass markets and international bioenergy trade to support the biobased economy

Task 40 has recently published a report on the Socio-economic assessment of forestry production for a developing pellet sector: The case of Santa Catarina in Brazil. This report assesses the forestry sector in a part of Brazil, where it has grown strongly and shows positive socioeconomic developments, explained by the close relationship between the forestry industry and the local communities. Selected criteria and indicators to assess the socio-economic impacts were applied in a selected region in Santa Catarina, Brazil. Data was gathered from industry and government sources and was combined with primary data gathered from in-depth interviews and visits to the region. The results show that in Santa Catarina, there is an availability of resources from their forestry production, but the pellet production sector is mainly for regional use. The full information can be found at http://task40.ieabioenergy.com/iea-publications/task-40-library/

Task 40 successfully organised a webinar on The Global Wood Pellet Market for Small-Scale Heating. The webinar presented the findings of an extensive quantitative wood pellet market analysis based on trade flow data, price developments over time, exchange rate fluctuations and temperature data. The focus lies on the main European small-scale heating countries including France, Germany, Italy, Sweden and Austria since January 2012 when bilateral trade data became available in the European statistics.

Task 40 organised a 2nd webinar on 1 December 2017, highlighting the main findings of the Task 40 Global Wood Pellet Industry and Trade Study 2017, focusing on the hotspots North America, Europe and Asia.

Details of the webinars can be found here (http://www.ieabioenergy.com/iea-publications/webinars/)

Publications

Global Wood Pellet Industry and Trade Study 2017

This Task 40 report provides an inventory of the wood pellet industries and markets for more than 30 countries with regard to regulatory framework, production capacities, consumption and price trends, trade, logistics and country specific standardisation aspects. The two-page summary and full report can be downloaded here (http://www.ieabioenergy.com/publications/two-page-summary-global-wood-pellet-industry-and-trade-study-2017/)

Aerosols from biomass combustion

This Task 32 report summarises the current knowledge on the health relevance of combustion generated PM, describes the mechanisms which can cause PM in biomass combustion, describes different particle types, and provides information on measures to reduce PM from biomass combustion. The two-page summary and full report can be downloaded here (http://www.ieabioenergy.com/publications/two-page-summary-aerosols-from-biomass-combustion/)

Albedo Effects of Biomass Production: A Review

This joint IEA Bioenergy Task 38 and Task 43 report presents an overview of the drivers of albedo, reviews measured albedo changes linked to vegetation changes or to bioenergy production systems, and reports on studies that have calculated the relative contribution of change in albedo to the overall radiative forcing of bioenergy projects. The two-page summary and full report can be downloaded here (http://www.ieabioenergy.com/publications/two-page-summary-albedo-effects-of-biomass-production-a-review/)

Integrated Bioenergy Hybrids – Flexible renewable energy solutions

This Task 41 Project 7 report examines integrated bioenergy hybrids, which are energy conversion processes that have at least two energy inputs, one of which is bioenergy. The term RES (renewable energy source) hybrid can also be used, if all energy inputs are from renewable sources. The report finds that, in general, bioenergy technologies allow fairly wide operational windows and steep ramping gradients, which provide good starting points for integration with variable energy sources, although some additional costs can also be expected as a result of flexible operation. The two-page summary and full report can be downloaded here (http://www.ieabioenergy.com/publications/two-page-summary-integrated-bioenergy-res-hybrids-flexible-renewable-energy-solutions/)

Climate impact assessments of forest bioenergy affected by decomposition modelling – comparison of the Q and Yasso models

This Task 38 and Task 43 report analysed the importance of the choice of decomposition model for the estimate of the forest carbon and climate effects of extracting types of forest harvest residues, for example, stumps and branches of different diameters and using them for bioenergy. Further, differences in the model concepts and parameterisations were analysed. The climate effect was estimated based on a life cycle analysis (LCA) using radiative forcing metrics. The report can be downloaded here (http://task43.ieabioenergy.com/wp-content/uploads/2017/06/EXCO-2017-05.pdf)

IEA Bioenergy Annual Report 2016

The IEA Bioenergy Annual Report 2016 includes a special feature article 'Integrated bioenergy hybrids – Flexible renewable energy solutions' prepared by Task 41, Project 7. 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 Technology Collaboration Programme. The report is available here (http://www.ieabioenergy.com/wp-content/uploads/2017/04/IEA-Bioenergy-Annual-Report-2016.pdf)

Bioenergy's role in balancing the electricity grid and providing storage options – an EU perspective

The objective of this IEA Bioenergy Task 41 report is to identify those areas in the grid system where bioenergy in balancing the grid and providing storage options can play a strategic role, and to promote the commercialisation of a diverse set of such bioenergy applications and processes. In addition, the report seeks to identify and disseminate sound business models for practical, cost-effective and environmentally friendly ways to facilitate the transformation of the electricity grid based to a great extent on bioenergy technologies. Finally, in addition to market prospects, suggestions are put forward for policy and RTDD options. The two-page summary and full report can be downloaded here (http://www.ieabioenergy.com/publications/two-page-summary-bioenergys-role-in-balancing-the-electricity-grid-and-providing-storage-options/)

State of Technology Review – Algae Bioenergy

This IEA Bioenergy report provides an international update on the status and prospects for using microalgae and macroalgae as feedstocks for producing biofuels and bioenergy products. The report's scope covers algae-based options for producing liquid and gaseous biofuels, and also algae-based bioenergy in the more general context of integrated biorefineries. The IEA Bioenergy Executive Committee supported this report's compilation and it is co-authored by members of IEA Bioenergy Tasks 34, 37, 38, 39 and 42. The report can be downloaded here (http://www.ieabioenergy.com/publications/state-of-technology-review-algae-bioenergy/)

IEA Bioenergy Countries' Report 23.09.2016

This IEA Bioenergy publication presents a summary of the total primary energy supply (TPES) by resources and the contribution of bioenergy in the member countries of the IEA Bioenergy Technology Collaboration Programme (TCP). The report also includes information on research focus related to bioenergy, relevant funding programmes, major research institutes and recent important bioenergy developments in the member countries. The report can be downloaded here (http://www.ieabioenergy.com/wp-content/uploads/2016/09/iea-bioenergy-countries-report-13-01-2017.pdf)

The status of large scale biomass firing

This Task 32 report provides an overview of the current status of biomass cofiring. The report shows that the firing and co-firing of biomass as a replacement for coal in large pulverised coal boilers can be a very attractive option for the utilisation of biomass materials for power production, and for the delivery of renewable energy. The two-page summary and full report can be downloaded here (http://www.ieabioenergy.com/publications/two-page-summary-the-status-of-large-scale-biomass-firing/)

To view all IEA Bioenergy publications, which are available for free download visit http://www.ieabioenergy.com/iea-publications/.

Please visit the FAQ section of the IEA Bioenergy website at http://www.ieabioenergy.com/iea-publications/faq/.

IEA Bioenergy Events

Executive Committee

ExCo81 will be held in Ottawa, Canada, 30 May - 1 June 2018

ExCo82 will be held in San Francisco, USA, 6 November 2018

Task Events

Task 32's schedule of upcoming events is

A Task meeting in conjunction with a joint workshop on SRF with Tasks 33 and 36 and ERFO will be held in Copenhagen, Denmark, 14-18 May 2018

A Task meeting will be held in San Francisco, USA, November 2018

Task 33's schedule of upcoming events is

Task 33 meeting, May 2018; The Netherlands

Workshop topic will be Waste Gasification

A Task meeting will be held in San Francisco, USA, November 2018

Task 34's schedule of upcoming events is

Task meetings TBC

Task 36's schedule of upcoming events is

A Task meeting in conjunction with a joint workshop on SRF with Tasks 32 and 33 and ERFO will be held in Copenhagen, Denmark, 14-18 May 2018

A Task meeting will be held in San Francisco, USA, November 2018

Task 37's schedule of upcoming events is

A Task 37 meeting with be held in Jyvaskyla, Finland, 7-9 March, 2018

Final Task meeting TBC

Task 38's schedule of upcoming events is

Task meetings TBC

Task 39's schedule of upcoming events is

A Task meeting will be held in Beijing, China, April 2018

A Task meeting will be held in San Francisco, USA, November 2018

Task 40's schedule of upcoming events is

A Task meeting will be held in San Francisco, USA, November 2018

Task 42's schedule of upcoming events is

A Task meeting will be held in Canada, February 2018

A Task meeting will be held in San Francisco, USA, November 2018

Task 43's schedule of upcoming events is

A Task meeting will be held in San Francisco, USA, November 2018

Other Items

Fuels of the Future – 15th International Conference on Renewable Mobility
Date: 22nd Jan 2018 - 23rd Jan 2018
Location: CITYCUBE, Berlin, Germany
Email: info@bioenergie.de+
Website: http://www.fuels-of-the-future.com/

Bioenergy 2018 – IrBEA National Bioenergy Conference – Dublin
Date: 4 February, 2018
Location: Dublin, Ireland
Website: http://www.irbea.org

Lignofuels 2018 – Advanced Biofuels and Materials Conference
Date: 7th Feb 2018 - 8th Feb 2018
Location: Amsterdam, The Netherlands
Contact: Samanta Fawcett
Email: sfawcett@acieu.net
Website: http://www.wplgroup.com/aci/event/lignocellulosic-fuel-conference-europe/

F.O. Lichts Sugar and Ethanol Asia Conference
Date: 6th Mar 2018 - 8th Mar 2018
Location: Sheraton Grande Sukhumvit, Bangkok, Thailand
Website: https://energy.knect365.com/sugar-ethanol-asia/

Gasification 2018
Date: 28th Mar 2018 - 29th Mar 2018
Location: Frankfurt, Germany
Website: http://www.wplgroup.com/aci/event/gasification/

Governing sustainability of bioenergy, biomaterial and bioproduct supply chains from forest and agricultural landscapes
Date: 17th Apr 2018 - 19th Apr 2018
Location: Copenhagen, Denmark
Contact: Inge Stupak
Email: ism@ign.ku.dk
Website: http://ign.ku.dk/bioenergy-conf-2018/

ICBB 2018: 20th International Conference on Bioenergy and Biorefineries
Date: 23 April, 2018 – 24 April, 2018
Location: Boston MA, USA
Website: https://www.waset.org/conference/2018/04/boston/ICBB

8th European Algae Industry Summit
Date: 25th April 2018 - 26th April 2018
Location: Vienna – Austria
Website: http://www.wplgroup.com/aci/event/european-algae-industry-summit/

5th International Conference on Renewable Energy Gas Technology
Date: 3rd May 2018 - 4th May 2018
Location: Radisson BLU in Toulouse, France
Email: info@regatec.org
Website: http://regatec.org/

26th European Biomass Conference & Exhibition
Date: 14th May 2018 - 18th May 2018
Location: Bella Centre, Copenhagen, Denmark
Website: http://www.eubce.com/home.html

11th International Conference on Bio-based Materials
Date: 15th May 2018 - 16th May 2018
Location: Cologne, Germany
Email: contact@nova-institut.de
Website: http://bio-based-conference.com/

International Conference on Negative CO_2 Emissions
Date: 22nd May 2018 - 24th May 2018
Location: Chalmers University of Technology, Gothenburg, Sweden
Contact: Anders Lyngfelt
Email: Anders.Lyngfelt@chalmers.se
Website: http://negativeco2emissions2018.com/

Canadian Bioeconomy Conference and Exhibition 2018
Date: 6th Jun 2018 - 8th Jun 2018
Location: Prince George, Canada
Contact: Cam McAlpine
Email: cmcalpine@prmedia.ca
Website: http://bioeconomyconference.com/

GreGreen Energy Congress – 2018
Date: 14th Jun 2018 - 16th Jun 2018
Location: London, UK
Website: https://greenenergy.conferenceseries.com/europe/

11th World Bioenergy Congress and Expo
Date: 2nd Jul 2018 - 4th Jul 2018
Location: Frankfurt, Germany
Website: http://bioenergy.conferenceseries.com/

BIO World Congress on Industrial Biotechnology
Date: 16th Jul 2018 - 19th Jul 2018
Location: Philadelphia, Pennsylvania, USA
Contact: Sandy Hower
Email: worldcongress@bio.org
Website: https://www.bio.org/events/bio-world-congress

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 39: Commercialising Conventional and Advanced Liquid Biofuels from Biomass
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Task 40: Sustainable Biomass Markets and International Trade to support the biobased economy
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