

Bioenergy News

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Bioenergy in Canada



Editorial by Alex MacLeod,
ExCo Member for Canada



Canada has an abundant, diverse and reliable supply of renewable and non-renewable energy sources. Renewable energy sources provided 17.5% of Canada's total primary energy supply in 2016 (Fig.1). Bioenergy at 4.5% of total primary energy supply was the second largest form of renewable energy after hydropower. Solid biomass provides the largest share of bioenergy in Canada (435 PJ), followed by liquid fuels of bioethanol and biodiesel that total 71PJ, and biogas that contributes 17 PJ (Fig.2). Regarding biomass for bioenergy, Canada has the third largest total forest area and the sixth largest cultivated land area in the world. The large supply of biomass in Canada indicates that the potential contribution of bioenergy to Canada's energy supply could be considerably increased. Estimates of available biomass from forest harvest residues have ranged from 20 to 46 million dt/year. Agricultural residue estimates range from 9 to 48 million dt/year. Estimates of municipal solid waste of 5-7 million dt/year have been made.

On a volume basis, Canada ranked 5th in the world for liquid biofuels production in 2016. In 2016, Canadian production of biofuels reached 1,700 million L of ethanol and 430 million L of biodiesel. Ethanol is produced predominantly from corn and wheat, while biodiesel is produced from animal fats and vegetable oils. More information can be found in an industry map of production facilities (<http://ricanada.org/industry/industry-map/>).

By the end of 2016, Canada had 42 pellet plants with a total nameplate capacity of just over 4 Mt. Over 80% of Canada's pellet production was exported, mostly to the United Kingdom, Japan and the United States. There are 135 facilities in Canada with an electricity generating capacity of at least 0.8 MW that use biomass. Together these facilities have an aggregate capacity of approximately 3,000 MW. Additionally, there are 282 bio-heat facilities that use biomass to produce heat for largely industrial purposes.

In Canada, a major stimulus for liquid biofuels production was the creation of the national Renewable Fuels Strategy and Regulations. The federal renewable fuels regulations require 5% renewable content in

gasoline and it came into effect in 2010, followed in 2011 by a 2% renewable blend requirement in diesel. A number of provinces also developed biofuel policies with specific per cent volume mandates.

Recently Canada has developed a Pan-Canadian Framework on Clean Growth and Climate Change to support its commitment under the Paris Agreement to reduce its greenhouse gas emissions (GHG) 30% below 2005 levels by 2030. It includes a federal carbon pricing framework and measures to achieve reductions across all sectors of the economy. The Pan-Canadian Approach to Pricing Carbon Pollution was announced October 3, 2016 and the objective is to have all provinces and territories with some form of carbon pricing in place by 2018.

To contribute to the realization of its commitment under the Paris Agreement, Canada has also published a Regulatory Framework on the Clean Fuel Standard. The standard will be performance based, requiring a percentage reduction in carbon intensity for liquid, gaseous and solid fuel streams with the overall goal of reducing 30 Mt of GHGs by 2030. Draft regulations are scheduled to be published in late-2018 with final regulations to be published in 2019.

Federal and provincial governments are helping the development of a sustainable bioenergy industry with initiatives and programs targeting research, technology innovation, greenhouse gas (GHG) reductions, energy efficiency, and tax incentives. Programs support the development of biotechnologies at the R&D stage, and also help move demonstration projects through to commercialization. Links to some of the main federal programs that are supporting clean technology projects can be found at the Clean Growth Hub (<http://www.ic.gc.ca/eic/site/099.nsf/eng/home#p1>).

Canada has a large biomass supply, a strong innovation system and companies with globally leading bioenergy technologies. Bioenergy is an important component to Canada's commitment to reduce emissions 30% below 2005 levels by 2030.

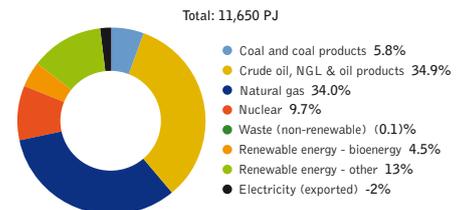


Figure 1: Total primary energy supply in Canada in 2016

Source: World Energy Balances © OECD/IEA 2017

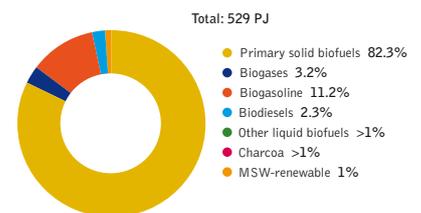


Figure 2: Total primary energy supply from bioenergy in Canada in 2016

Source: World Energy Balances © OECD/IEA 2017

IEA Bioenergy





EXC081, OTTAWA, CANADA

From the Secretariat

PEARSE BUCKLEY



The 81st meeting of the Executive Committee was held at The Lester B. Pearson Building, 125 Sussex Drive, Ottawa, Canada on 30 May – 01 June 2018, with Jim Spaeth as Chair, Paul Bennett as Vice-chair and Pearse Buckley as Secretary. The meeting was hosted by Natural Resources Canada. The Chair expressed the appreciation of the ExCo to MacLeod and his 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 Brazil – new Alternate Member, Mr Renato Domith Godinho: Denmark – new Member Dr Ane Katharina Paarup Meyer: Estonia – new Member Ms Liisa Ruuder and new Alternate Member, Mr Joel Peetersoo: Japan – new Member, Mr Seiji Morishima.

ExCo81 Workshops

A very successful internal workshop themed 'Planning for the new triennium' was held on the 30th May. Detailed proposals for programmes of work for the triennium 2019-2021 were presented for consideration by ExCo. Proposals for strategic projects which were seen as important accompanying actions were also presented and discussed. Several topics will be developed for presentation at ExCo82, at which final decisions on these and on Task participation will be made by the members.

Progress with current Initiatives

Task 41 Project 5: Bio-CCS/CCUS

The project (<http://task41project5.ieabioenergy.com/>) was nearing completion with a final report to ExCo81. The reports from all four workshops can be viewed at <http://task41project5.ieabioenergy.com/iea-publications/>. A two-page summary is in preparation and should be published on the IEA Bioenergy website in the near future.

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

This project (<http://itp-sustainable.ieabioenergy.com/>) was in its final year. A number of key messages were emerging from the three strands of the work, including the importance of continuous trust and legitimacy in the sustainability of bioenergy practices. All of the outputs were on schedule including 25 papers, 3 summary papers and a synthesis report. The project was scheduled to be completed by the end of 2018.

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

In this project (<http://itp-fuel-treatment.ieabioenergy.com/>) all of the case studies were being finalised. The policy report would be in draft form in September and would be finalised and ready for presentation at the IEA Bioenergy Conference 2018 in San Francisco – see below for more details. The database module was in operation and data was being added to it.

Task 41 Project 9: Potential Cost reduction for novel and advanced renewable and low carbon fuels

The aims of this project included (i) identifying the current and projected costs to produce a selection of relevant novel advanced biofuels and other low carbon fuels, (ii) identifying the scope for cost reduction for these, (iii) developing a model for likely cost reduction progress, (iv) comparing these costs and cost trajectories with likely trends in fossil fuels and conventional biofuels and (v) examining the impact of policy measures on their economic competitiveness. The project will be completed by the end of the year.

Communication Strategy

The IEA Bioenergy communication strategy was discussed in detail. It was agreed that a communications consultant should be engaged in order to further develop the strategy and following the meeting a Call for Tender was published at <http://www.ieabioenergy.com/publications/iea-bioenergy-call-for-tender-development-of-communication-strategy/> with a closing date of 13th July 2018. The IEA Bioenergy webinar series has been continuing with the latest in the series being held on the 20th June on the topic 'GoBiGas: an Industrial Relevant State-of-the-Art Reference for Advanced Biofuel Production via Gasification', which can be viewed at <http://www.ieabioenergy.com/publications/gobigas-an-industrial-relevant-state-of-the-art-reference-for-advanced-biofuel-production-via-gasification/>.

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

Cooperation with IEA and other TCPs

IEA Bioenergy continued to work closely with IEA Headquarters and welcomed the guidelines being developed to enhance collaboration between the TCPs. IEA Bioenergy was engaged in a number of collaborations with other TCPs

IEA AMF: The ExCo was informed of a number of AMF annex proposals that could involve collaboration, particularly for IEA Bioenergy Task 39.

IEA IETS & IEA GHG: IEA Bioenergy Task Leaders had been involved in a recent International Conference on Negative CO₂ Emissions 2018. Follow up conferences were being proposed for the 2nd quarter of 2020 and the 4th quarter of 2021 and it was hoped that the three TCPs could take a leading role in the latter of these. The ExCo appointed a working group to consider this and report to ExCo82 in San Francisco.

Cooperation with International Organizations

The ExCo discussed the approach to collaboration with other international organisations based on a board paper that was presented to the meeting. The organisations that were particularly active in bioenergy included the Biofuture Platform, Mission Innovation, GBEP, FAO, IRENA and SEforALL. Each had a particular focus on aspects of bioenergy in which there could be greater collaboration with IEA Bioenergy. The mechanisms for collaboration could range from a memorandum of understanding (MoU) to an agreement to cooperate on a specific element of a project. In order to arrive at an improved structure for collaboration with these bodies the ExCo established a working group to investigate the optimal approaches and to report to ExCo82 in San Francisco.

Invitation to India

A presentation was made to ExCo81 by the observer from India. Following an internal discussion the ExCo unanimously approved an invitation to India to become a member of the IEA Bioenergy Technology Collaboration programme. The matter is being followed up by the Chair and Secretary on behalf of IEA Bioenergy.

Request for Extension (RfE) of TCP Term

The current term of the IEA Bioenergy TCP ends on the 29th February 2020. At ExCo81 a decision was taken to request an extension to the term to the end of February 2025. Draft RfE documents will be prepared by a working group for review at ExCo82 in San Francisco in November.

End of Triennium Conference 2018

The IEA Bioenergy Conference 2018 will take place on the 7th November 2018, as part of the three-day ABLC Global 2018 – <http://biofuelsdigest.com/ablcglobal/>. The other two days will include the ABLC Next and the USDOE Bioeconomy Summit. The full programme is available at <http://biofuelsdigest.com/ablcglobal/index.php/agenda/>.



▲ Participants in ExCo81



▲ ExCo81 Study Tour Group at Greenfield corn ethanol plant

ExCo81 Study Tour

Following the ExCo81 meeting a group of 21 IEA Bioenergy attendees participated in the study tour to the Greenfield corn ethanol plant and the National Research Council of Canada laboratories.

GreenField Global (<http://www.greenfield.com/>) is the largest ethanol producer in Canada. The Johnstown, Ontario plant is situated on the St. Lawrence Seaway and is adjacent to the Port of Johnstown grain terminal. With a capital cost of CDN\$185 million the plant began production in 2008. The feedstock is 'yellow' corn and the annual intake is 600,000 tonnes mostly from the local region, although some feedstock comes from as far away as 400 km. From each unit mass of corn one third is converted to ethanol, one third to DDGS, one third to CO₂ and about 1% is converted to corn oil. The annual output includes 254 million

litres of ethanol, 157,500 tonnes of DDGS and 4,500 tonnes of corn oil. Air Liquide, which has a facility on site, transports the CO₂ from the site in liquid form for subsequent use.

The National Research Council of Canada NRC has been a central pillar of Canada's science and a support for innovation for 100 years. The research facility campus located on Montreal Road in Ottawa contains some of the facilities associated with Low Carbon Fuels and Clean Combustion. Among the research activities are primary and secondary conversion of biomass feedstocks, including underutilised feedstocks.

Task Focus:

IEA Bioenergy Task 33 – Gasification of Biomass and Waste

Background

IEA Bioenergy Task 33 promotes commercialisation of gasification technology for conversion of biomass and waste to synthesis gas, a versatile energy carrier that can be used directly for production of electric power, heat and steam, or used as feedstock for production of biomethane, hydrogen and renewable transportation fuels. The specific objectives of the Task are to monitor, review and exchange information on biomass gasification research, development, and demonstration and to promote cooperation among the participating countries and industry to eliminate technological impediments to the advancement of thermal gasification of biomass.

Gasification is an established technology for conversion of fossil fuels where inexpensive feedstocks are readily available and economies of scale can be achieved. Gasification of biomass and waste is attractive, but feedstock cost, seasonality and availability, as well as technical challenges particular to biomass-based fuels, have limited successful large-scale deployment. Today there are hundreds of biomass gasifiers in operation, but most of those are small systems less than 200 kW for production of heat and/or power in a reciprocating engine. Several industrial-scale gasifiers with more than 10 MW biomass or waste input have been installed over the past two decades, mostly based on fluidized bed reactor technology. The largest biomass gasifier today is a 140 MW Valmet gasifier in Vaasa, Finland, that produces synthesis gas (producer gas) for replacement of coal in an existing power generation plant. The most advanced biomass gasification facility is Göteborg Energi's GoBiGas plant, which converts 32 MW of biomass to heat plus 20 MW of biomethane, which is injected into the Swedish natural gas grid, for an overall plant efficiency of nearly 90%. The GoBiGas plant demonstrates the potential for large-scale production of renewable fuels from biomass and waste.

Despite improving technological success of biomass gasification, barriers to wide-scale commercial adoption still exist. Many of the industrial gasifiers have had to be shut down in recent years due to difficult market conditions. Feedstock availability and cost, material handling and fuel feeding, and cost-effective product gas conditioning and cleaning remain challenges. But there are new opportunities on the horizon associated with the growing interest in integrated biorefineries and renewable energy hybrid systems. Gasification is a relatively feedstock agnostic technology that can turn otherwise low-value waste materials into higher value products. The flexibility of gasification allows it to play a central role in utilization of waste streams, production of hydrogen for refining or fuel cells, and integration of heat, power, steam and chemicals.

Task Work Program

In the Triennium 2016-18 the nine countries that have participated in Task 33 are Austria, Denmark, Germany, Italy, the Netherlands, Norway, Sweden, Switzerland, and USA. The Task 33 work program for the triennium involves Task projects, meetings, workshops, reports and online dissemination of information relating to

biomass and waste gasification. All deliverables associated with these activities, including project reports, workshop summaries and country reports are available on the Task 33 web site at task33.ieabioenergy.com.

Task Projects

Gasification of waste. Sorted municipal solid waste, refuse derived fuel (RDF) and solid recovered fuel (SRF) are interesting feedstocks that can improve the economics of biomass gasification since there is often a tipping fee associated with disposal of waste. This project, led by Waldheim Consulting, explores opportunities for waste gasification, including historical development, reactor technologies and market opportunities. A report is in preparation and will be available later this year.

Biomass gasification for CC(U)S. This project is being carried out jointly by SINTEF (Norway) and ECN (Netherlands) and addresses the potential for biomass gasification to contribute to carbon capture, utilization and storage. Two cases are considered: indirect gasification for substitute natural gas production and entrained-flow gasification for production of biofuels via Fischer-Tropsch synthesis.

Gasification-based hybrid systems. This project is being led by the Austrian membership of the Task and evaluates opportunities for gasification to serve as a key component of renewable energy hybrid systems. The study considers the various products achievable through gasification and how those would best be utilized in an integrated hybrid system.

Hydrogen production via gasification. Hydrogen demand for e.g. oil upgrading and stabilization and industrial hydrotreating continues to increase, and bio-based hydrogen offers an attractive alternative. A report outlining technical options and economics of hydrogen production will evaluate the various options.

History of biomass gasification and lessons learned. This project looks back at the history of biomass gasification development, including different types of technologies, notable commercial plants, successes and failures. From the experiences of these efforts and plants, lessons of what works and what should be avoided are identified. A report will be published this year.

Valorisation of byproducts from small-scale gasification. There are hundreds of small-scale gasifiers in operation producing primarily heat and power. Economics of such systems can be improved if byproducts such as ash and residual char can be sold. A report evaluating opportunities for valorisation of such byproducts is being prepared.

Gas analysis for biomass and waste gasification applications. This project is being led by ECN, Netherlands and aims to document gas analysis so that others and future researchers can benefit from the experience of those who have operated lab or industrial gasification systems. In addition to a report on best gas analysis practices, the project includes development of video blogs describing analysis techniques prepared by experts in the field.

Gasification facilities database, map and status report. Task 33 maintains a database of gasification facilities in member countries, which is accessible through a map-based interface on the Task website. There are currently more than 140 facilities included, and detailed information such as feedstock type, gasification technology, products and plant size are available. This triennium a special status report is being prepared, which will provide an overview of the status of biomass gasification as well as a detailed list of actual thermal biomass gasification facilities worldwide.

Meetings, Workshops and Webinars

The Task members meet twice per year for project updates, to plan upcoming activities and to provide updates on biomass and waste gasification activities in member countries. A public workshop with an associated facility tour is held in conjunction with most Task meetings. The topics for the workshops and tour locations are listed below.

1. Aviation biofuels through biomass gasification
 - May 2016, Trondheim, Norway
 - Tour to SINTEF laboratories and Statkraft Varne AS district heating plant
2. Gas sampling, measurement and analysis in thermal gasification processes
 - October 2016, Lucerne, Switzerland
 - Tour to Stans/Nidwalden biomass gasification CHP plant and Bern municipal solid waste incineration plant
3. Small scale gasification for combined heat and power generation
 - May 2017, Innsbruck, Austria
 - Tour to GE Jenbacher manufacturing facility and Syncraft biomass gasification CHP plant
4. Fluidized bed conversion of biomass and waste
 - October 2017, Skive, Denmark
 - Held jointly with IEA-FBC
 - Tour to Skive District Heating Company biomass gasification CHP plant and Østerild National Test Center for large wind turbines
5. Waste gasification
 - May 2018, Petten, the Netherlands
 - Tour to ESKA Sappemeer waste paper gasification plant and Torrgas gasifier in Groningen

Presentations and workshop summary reports are available on the Task 33 web site.

Task 33 also jointly organized a workshop on SRF (solid recovered fuel) utilization together with Task 32 (biomass combustion and cofiring) and Task 36 (integrating energy recovery into solid waste management systems). The 1-day workshop was held May 2018 in Copenhagen, Denmark, in conjunction with the 26th European Biomass Conference and Exhibition.

In June 2018, IEA Bioenergy, the Canadian Institute of Forestry and Task 33 hosted a webinar describing the GoBiGas biomass-to-biomethane project and presenting experience with development and operation of the commercial plant. The webinar was presented by Prof. Henrick Thunman of Chalmers University of Technology and Mr. Freddy Tengberg, GoBiGas site manager

for Göteborg Energi. It is estimated that over 300 participants attended the webinar. A recording of the webinar and a copy of the presentation slides are available on the IEA Bioenergy web site at <http://www.ieabioenergy.com/publications/gobigas-an-industrial-relevant-state-of-the-art-reference-for-advanced-biofuel-production-via-gasification/>

This article was prepared by Kevin Whitty, Task 33 Task Leader.

For more information please visit task33.ieabioenergy.com



▲ Participants of the May 2018 technical tour to the ESKA gasification facility in Sappemeer, the Netherlands.



▲ GoBiGas plant for conversion of biomass to biomethane through gasification and catalytic synthesis.



▲ Valmet 140 MW biomass gasifier at Vaskiluodon Voima for syngas production to displace coal firing.

Notice Board

Joint Task Workshop on Production and Utilisation Options for Solid Recovered Fuels

In the circular economy, the production and utilisation of Solid Recovered Fuel (SRF) is increasingly recognised as an important element in waste management practises. SRF is produced from non-hazardous waste from biogenic and fossil origins and is thus considered as partly renewable. SRF has usually undergone a sorting process and should meet strict quality requirements. Narrow specifications of the fuel allow for more targeted end user applications, thereby benefitting the economic, and environmental performance.

Recently there have been several new experiences in the production and use of SRF. The workshop covered a number of different topics such as:

- The role of SRF in general and in sustainable cement production in particular
- The ongoing work to develop international (ISO) standards on solid recovered fuels
- How does policy and legislation affect the economic viability of using SRF as a fuel
- Could SRF be a new feedstock for liquid fuels to be integrated with oil refineries
- The experiences from both combustion and gasification in large scale plants

The workshop included two topics where there will be new IEA Bioenergy task reports published in a near future.

Chairs: Jaap Koppejan (IEA Bioenergy Task 32) and Geert Cuperus (ERFO)

The workshop was co-organised by IEA Bioenergy Task 32, Task 33, and Task 36 together with ERFO, and was an official side event of the EUBCE Conference.

Location: European Biomass Conference, Bella Center, Copenhagen, Denmark

The presentations from the workshop are available at task32.ieabioenergy.com as well as at task36.ieabioenergy.com

Task 38 Climate Change Effects of Biomass and Bioenergy Systems

First international conference on negative CO₂ emissions

There is increasing concern that it will not be possible to meet the Paris Agreement – to limit global warming to well below 2°C, and to pursue efforts to limit the temperature increase to 1.5°C – unless large amounts of CO₂ are withdrawn from the atmosphere. Biomass is considered an important substitute for fossil fuels and other GHG intensive materials, and an option for atmospheric CO₂ withdrawal through BECCS. At the same time as “negative emissions” appear to be indispensable to meet climate targets decided, the large future negative emissions featuring in climate stabilization scenarios have been questioned and warnings have been raised about relying on very large and uncertain negative emissions in the future.

IEA Bioenergy was one of the organizers of the first international conference on negative CO₂ emissions at Chalmers University of Technology, Sweden, May 22-24 2018. The conference brought together around 250 researchers at Chalmers University of Technology to discuss the different ways to remove CO₂ from the atmosphere and store it on land, underground or in the oceans. Topics presented and debated ranged from “natural” solutions to the technologically advanced, through to the potential limitations and risks. Running parallel to the scientific discussions was a focus on the policy challenges.

A follow-up is planned for around 18 months’ time, with a view to the conference becoming a regular event.

Conference link: <http://negativeco2emissions2018.com/>

Task 39 Commercialising Conventional and Advanced Liquid Biofuels from Biomass

Task 39 held a business meeting and workshop in Beijing, China, hosted by Professor Tianwei Tan from the Beijing University of Chemical Technology (BUCT) on April 7-9, 2018. The workshop was organized as an open workshop to provide Chinese observers with a broader view of the IEA Bioenergy TCP. It included an impressive line-up of guest speakers with panel discussions on: a) Sustainability and Life Cycle Assessment; b) Aviation Biofuels Development; c) The status of biofuels in China; and d) The broader work of the IEA Bioenergy TCP. International experts from academia and industry provided insights into a variety of topics at the forefront of biofuels development

Task 41 Project 5 – Bio-CCS and Bio-CCU: Climate change mitigation and extended use of biomass raw material

Between May 2016 and January 2018 IEA Bioenergy organized four specific workshops concentrated on various aspects of Bio-CCS and Bio-CCU. From a climate perspective, the most important applications of Bio-CCS and Bio-CCU identified in this project are:

- Indirect electrification of sectors which are otherwise difficult to decarbonize
- Boosting the output of biomass based processes, such as gasification, fermentation or anaerobic digestion with renewable electricity
- Applications where high concentration CO₂ is captured and stored, simultaneously with energy/product generation

A two-page summary is available at <http://www.ieabioenergy.com/publications/two-page-summary-bio-ccs-and-bio-ccu-climate-change-mitigation-and-extended-use-of-biomass-raw-material/> and the full workshop summaries are available at <http://task41project5.ieabioenergy.com/iea-publications/>

Publications



INTEGRATED BIOGAS SYSTEMS – Local applications of anaerobic digestion towards integrated sustainable solutions

This report produced by IEA Bioenergy Task 37, addresses local applications of integrated biogas concepts. Through case studies, examples of technical solutions, concepts, and strategies, which pertain to sustainable biogas production, are provided. Data has been gathered on anaerobic digestion facilities from seven countries with a focus on developing countries or countries with an emerging biogas sector which are not dependent or have little reliance on financial support. The case stories demonstrate that there is no 'ideal' integrated solution, as each anaerobic digestion application has different feedstocks available, constraints and end products. http://www.ieabioenergy.com/wp-content/uploads/2018/06/Integrated-biogas-systems_WEB.pdf

IEA Bioenergy Annual Report 2017

The IEA Bioenergy Annual Report 2017 includes a special feature article 'BIO-CCS and Bio-CCUS in climate change mitigation and extended use of biomass raw material' prepared by Task 41, Project 5.

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. <http://www.ieabioenergy.com/wp-content/uploads/2018/04/IEA-Bioenergy-Annual-Report-2017-R1.pdf>



Green Gas – Facilitating a future green gas grid through the production of renewable gas

This Task 37 report outlines the various substrates and technologies for green gas production and examines how much natural gas can be replaced by green gas in specific countries. An indigenous biomethane resource can potentially replace significant amounts of natural gas. Particularly in countries with well-established and closely linked gas grids, there are good opportunities to create a market for biomethane, thus lowering dependency on fossil fuels. http://www.ieabioenergy.com/wp-content/uploads/2018/04/green_gas_web_end.pdf

ExCo80 – Bioenergy grid integration – Summary and Conclusions

This workshop on 'Bioenergy grid integration', which was organised by the IEA Bioenergy Technology Collaboration Programme (IEA Bioenergy) in collaboration with the Swiss Federal Office of Energy, demonstrated a number of cases and strategies of bioenergy grid integration and provided an opportunity to further discuss the role bioenergy could play in greening energy grids. <http://www.ieabioenergy.com/wp-content/uploads/2018/02/ExCo80-Bioenergy-Grid-Integration-Summary-and-Conclusions.pdf>



Methane emissions from biogas plants – Methods for measurement, results and effect on greenhouse gas balance of electricity produced



This IEA Bioenergy Task 37 report addresses methane emissions from biogas applications. Methane is a potent greenhouse gas and therefore any fugitive methane emissions from a renewable energy production system are not conducive to the ambition of reducing Greenhouse Gas (GHG) emissions. Within the biogas sector methane emission quantification is becoming a significant topic for the scientific community but is still under development for the industry sector. This report addresses:

- methods used for emission quantification
- presents selected results of measurements
- proposes mitigation measures and
- puts methane emissions in a context of a standard greenhouse gas balance

http://www.ieabioenergy.com/wp-content/uploads/2018/01/Methane-Emission_web_end_small.pdf

Sustainability of Bioenergy Supply Chains Workshop Summary

The Inter-Task Project on Measuring, governing and gaining support for sustainable bioenergy supply chains organised an international workshop themed Sustainability of Bioenergy Supply Chains in Gothenburg, Sweden on 8-9 May, 2017 to present and reflect on preliminary results of its ongoing work. The workshop audience consisted of both IEA Bioenergy members and informed stakeholders from industry, policy, academia, the NGO community and others. It was decided to prepare this workshop summary to share the outcomes with the broader audience who could not attend the event. <http://www.ieabioenergy.com/wp-content/uploads/2017/12/Intertasks-Sustainability-Workshop-summary-05.12.2017.pdf>



Biofuels for the marine shipping sector

The objective of this report is to provide an introduction and overview of the current maritime shipping sector and describe how biofuel developers can introduce alternative fuels, in light of the sector infrastructure and how it is regulated. To describe and analyze the potential of biofuels for the maritime sector, a technical assessment of biofuels for marine engines, taking into account the entire supply chain from field to ship, is performed. <http://www.ieabioenergy.com/wp-content/uploads/2018/02/Marine-biofuel-report-final-Oct-2017.pdf>

Technology Roadmap: Delivering Sustainable Bioenergy

Bioenergy has an essential and major role to play in a low-carbon energy system. For instance, modern bioenergy in final global energy consumption should increase four-fold by 2060 in the International Energy Agency's 2°C scenario (2DS), which seeks to limit global average temperatures from rising more than 2°C by 2100 to avoid some of the worst effects of climate change. Plotting a path for bioenergy, the International Energy Agency's new "Technology Roadmap: Delivering Sustainable Bioenergy" provides the technology milestones and policy actions needed to unlock the potential of bioenergy in line with a long-term low-carbon and sustainable global energy mix. The work was carried out in close association with the IEA Bioenergy Technology Collaboration Programme (TCP), who provided information and helped develop many of the insights it contains. http://www.iea.org/publications/freepublications/publication/Technology_Roadmap_Delivering_Sustainable_Bioenergy.pdf



ExCo79 – The role of industrial biorefineries in a low-carbon economy – Summary and Conclusions

This workshop on 'The role of industrial biorefineries in a low-carbon economy' was organized by the IEA Bioenergy Technology Collaboration Programme (IEA Bioenergy) in close collaboration with the IEA Technology Collaboration Programme on Industrial Energy-related Technologies and Systems (IETS). <http://www.ieabioenergy.com/wp-content/uploads/2017/10/IEABioenergy-IETS-Industrial-Biorefineries-Workshop-Report.pdf>

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. <http://task43.ieabioenergy.com/wp-content/uploads/2017/06/IEA-Bioenergy-EXCO-2017-02.pdf>



IEA Bioenergy Events

Executive Committee

ExCo82 will be held in San Francisco, USA, 5-6 November 2018

ExCo83 will be held in The Netherlands in May 2018 – location and dates TBC

End of Triennium Conference 2018

The IEA Bioenergy Conference 2018 will take place on the 7th November 2018, as part of the three-day ABLC Global 2018 – <http://biofuelsdigest.com/ablcglobal/>. The other two days will include the ABLC Next and the USDOE Bioeconomy Summit. The full programme is available at <http://biofuelsdigest.com/ablcglobal/index.php/agenda/>.

Task 32's schedule of upcoming events is

A Task meeting will be held in San Francisco, USA, 5 November, 2018

Task 33's schedule of upcoming events is

A Task meeting will be held in San Francisco, USA, 5 November, 2018

Task 34's schedule of upcoming events is

Task meetings TBC

Task 36's schedule of upcoming events is

A Task meeting will be held in San Francisco, USA, 5 November, 2018

Task 37's schedule of upcoming events is

A Task meeting will be held in Cork, Ireland, 5-7 September, 2018.

Task 38's schedule of upcoming events is

A workshop titled "Consequences for Climate and Bioenergy of Land Sector Carbon Accounting Under the Paris Agreement" will be held in Uppsala, Sweden, 29-30 August, 2018.

Task 39's schedule of upcoming events is

A Task meeting will be held in San Francisco, USA, 5 November, 2018

Task 40's schedule of upcoming events is

A Task meeting will be held in San Francisco, USA, 5 November, 2018

Task 42's schedule of upcoming events is

A Task meeting will be held in San Francisco, USA, 5 November, 2018

Task 43's schedule of upcoming events is

A workshop titled "Consequences for Climate and Bioenergy of Land Sector Carbon Accounting Under the Paris Agreement" will be held in Uppsala, Sweden, 29-30 August, 2018.

Other Items

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>

7th Asia-Pacific Biomass Energy Exhibition (APBE2018)

Date 16th Aug, 2018 – 18th Aug, 2018

Location Guangzhou, China

Contact Jenny Xiong

Email jenny0124@aliyun.com

Website <http://www.apbechina.com/index.php?lang=en>

1st Summer School ZELCOR: Zero waste biorefineries: technical advances and sustainability assessment

Date 2nd Sep, 2018 – 6th Sep, 2018

Location Wageningen, The Netherlands

Website <https://www.vlagrgraduateschool.nl/en/courses/course/ZELCOR18.htm>

13th World Congress on Biofuels and Bioenergy

Date 4th Sep, 2018 – 6th Sep, 2018

Location Zurich, Switzerland

Website <https://biofuels-bioenergy.conferenceseries.com/europe/>

IEA Clean Coal Centre's 8th Workshop on Cofiring Biomass with Coal

Date 11th Sep, 2018 – 13th Sep, 2018

Location Admiral Hotel in Copenhagen, Denmark

Contact Xing.Zhang@iea-coal.org

Advanced Biofuels Conference

Date 18th Sep, 2018 – 20th Sep, 2018

Location Gothenburg, Sweden

Email info@svebio.se

Website <https://www.svebio.se/en/events/advanced-biofuels-conference/>

GBEP – Bioenergy Week 2018

Date 1st Oct, 2018 – 5th Oct, 2018

Location Buenos Aires, Argentina

Website <http://www.globalbioenergy.org/>

Biofuels International Conference & Expo

Date 10th Oct, 2018 – 11th Oct, 2018

Location Berlin, Germany

Website https://biofuels-news.com/conference/biofuels/biofuels_index.php

International Biomass Congress & Expo

Date 10th Oct, 2018 – 11th Oct, 2018

Location Berlin, Germany

Website https://www.bioenergy-news.com/conference/biomass/biomass_index.php

2018 ALGAE BIOMASS SUMMIT

Date 14th Oct, 2018 – 17th Oct, 2018

Location Houston, Texas, USA

Website <https://www.algaebiomasssummit.org/default.aspx>

7TH INTERNATIONAL SYMPOSIUM ON ENERGY FROM BIOMASS AND WASTE – VENICE 2018

Date 15th Oct, 2018 – 18th Oct, 2018

Location SCUOLA GRANDE DI SAN GIOVANNI EVANGELISTA, VENICE, ITALY

Website <https://www.venicesymposium.it/>

Bioenergy Australia 2018 Conference: BIOENERGY STRONG 2018 Conference – Driving Commercial outcomes

Date 17th Oct, 2018 – 18th Oct, 2018

Location State Library of Brisbane, Brisbane, Australia

Website <https://www.bioenergyaustralia.org.au/bioenergy-events/annual-conference/>

ABLC Global 2018

Date 6th Nov, 2018 – 9th Nov, 2018

Location San Francisco, USA

Website <http://biofuelsdigest.com/ablcglobal/>

Future of Biogas Europe 2018

Date 7th Nov, 2018 – 8th Nov, 2018

Location London, UK

Website <http://ibbk-biogas.de/future-of-biogas-europe-2018>

Global Congress & Expo on Biofuels and Bioenergy

Date 3rd Dec 2018 – 5th Dec 2018

Location Valencia, Spain

Website <https://scientificfederation.com/biofuels-2018/index.php>

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