IEA Bioenergy Experiences

California Bioresources Economy Summit

Jim Spaeth
Chair IEA Bioenergy Executive Committee
IEA Bioenergy Technology Collaboration Program

Mission:
To increase knowledge and understanding of bioenergy systems in order to facilitate the deployment of:

- environmentally sound
- socially acceptable and
- cost-competitive bioenergy systems

Key Role:
Independent collaborative body focused on delivering clear and verified information on bioenergy
Membership - 24 Contracting Parties

- EUROPE:
  - Austria
  - Belgium
  - Croatia
  - Denmark
  - European Commission
  - Estonia
  - Finland
  - France
  - Germany
  - Ireland
  - Italy
  - Netherlands
  - Norway
  - Sweden
  - Switzerland
  - United Kingdom

- ASIA/OCEANIA/AFRICA:
  - Australia
  - Japan
  - Korea
  - New Zealand
  - South Africa

- AMERICA’S:
  - Brazil
  - Canada
  - United States

In discussions:
- India
- China
- Mexico

2019 Budget: US$1.9 Million
Tasks: TBD – 13-16
Task participation: >150 persons
Tasks

Task 32 - Biomass **Combustion** and Co-firing

Task 33 - **Gasification** of Biomass and Waste

Task 34 - Direct Thermochemical **Liquefaction**

Task 36 - Material and energy valorisation of **waste** in a circular economy

Task 37 - Energy from **Biogas**

Task 39 - Commercialising Conventional and Advanced **Transport Biofuels**

Task 40 - **Deployment** of biobased value chains

Task 42 - **Biorefining** in a Future BioEconomy

Task 43 - Sustainable **biomass supply**

Task 44 - Flexible bioenergy and system **integration**

Task 45 – **Climate and sustainability effects** of bioenergy within the broader bioeconomy
6 European gas grids have committed to 100% green gas in the gas grid by 2050
- Includes biogas from macro and micro-algae; gasification of woody crops; and power to gas systems.
Case study: Biogas in Denmark
Four phases of policy and market development

Investment grants of 20-40% of the investment costs, funding of R&D projects, exemption from energy taxation, feed-in tariffs of 0.27 DKK/kWh², long term loans (20 years), at low interest rate.

Follow up and action programmes; collection, systematization and dissemination of the gathered experience among farmers, plant operators, consulting companies, plant constructors and authorities.

Energy Agency target to increase the biogas production fourfold by 2020, compared to the 1995 level.

Use 50% of the produced manure for energy.

Better framework conditions for biogas, and establishing a biogas Task force to ensure improved biogas deployment. Shift in biogas paradigm towards focus on energy policy goals. The supporting frameworks were adopted and approved by the EC in 2013. A restriction that the support cannot be given for both investments and operation was removed by the EC in 2014.

Policy focus on environmental sustainability and climate, following the Bruntland report. The goal is to reduce the CO₂ emissions with 20% by 2005 compared with the 1990 level.

Change in focus of energy policies to energy security, economic growth, and liberalization.

Fossil free economy by 2050, a 13% decrease in fossil fuels consumption by 2020, broad focus, especially climate.

Some uncertainty about contents of the upcoming agreement.

2018: New Energy Agreement expected by the end of 2018


Liberalization of the market for electricity production (2002)
Task 38:
Climate Effects Of Biomass And Bioenergy Systems

Quantifying the climate effects of bioenergy – Choice of reference system

Kati Koponen*a,f, Sampo Soimakallio*b,f, Keith L. Kline*c,f,l, Annette Cowie*d,f, Miguel Brandão*a,f

*a VTT Technical Research Centre of Finland, Vuorimiehenkatu 3, P.O. BOX 1000, 02044 VTT Finland
*b Finnish Environment Institute (SYKE), Mekelinkatu 34a, P.O.Box 140, FI-00251 Helsinki, Finland
*c Climate Change Science Institute, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN, United States
*d NSW Department of Primary Industries/University of New South Wales, Arncliffe, NSW 2205, Australia
*e Department of Sustainable Development, Environmental Science and Engineering, School of Architecture and the Built Environment, KTH - Royal Institute of Technology, Stockholm, Sweden
*f Department of Bioeconomy and Systems Analysis, Institute of Soil Science and Plant Cultivation, Pulawy, Poland

Reference system paper published in Renewable and Sustainable Energy Reviews
Task 39: Commercialising Conventional and Advanced Transport Biofuels

- Comparison of Leading LCA Models for Evaluating GHG Reduction and Environmental Performance of Biofuels
- Commercial Opportunity For Marine Biofuels
- Advanced Biofuels For Advanced Engines
- Algae 2017 State of Technology Review
Summarizing the lessons of 10 years
Solid & liquid biomass trade, logistics, sustainability, case studies, barriers & opportunities for trade, outlook trade flows & required investments, and more...
www.bioenergytrade.org
Task 42 Case Study:
Standards and Labels related to Biobased Products

Study of Standardisation approaches

- Biobased products
- Plastic products
- Wood plastic composite in Europe
- Ongoing/future standard developments
Case Study: Bioenergy - Renewable Energy Systems Hybrids

Key findings
- Technical potential for integrated bioenergy hybrids is considerable
- No significant limitations have been identified
- Hybrids already available for the domestic energy sector
- Lack of standardised interfaces between technologies requires multiple control systems and thus adds costs
“Reaching the full potential of modern bioenergy would complement the success already achieved for wind and solar technologies.

Modern bioenergy can significantly strengthen the renewables portfolio and – most importantly – aid the establishment of a more sustainable and secure energy system, something the world very much needs.”

Dr. Fatih Birol
Executive Director
International Energy Agency
Bioenergy
The overlooked Giant of Renewables

Dr. Paolo Frankl, Head Renewable Energy Division
ABLC, San Francisco, 7 November 2018

IEA
IEA Technology Roadmap: Delivering Sustainable Bioenergy

Cooperation between IEA and IEA Bioenergy

Published November 2017

Technology milestones and policy actions needed to unlock the potential of bioenergy in a sustainable energy mix

Links:

Other IEA Reports and Resources

- Renewables 2018 Market Report
- World Energy Outlook (WEO) 2018
- Technology Roadmap - delivering sustainable bioenergy
- How2Guide for Bioenergy (free)
- The Future of Trucks (free)
- Global EV Outlook (free)

For more information see: [www.iea.org/publications/](http://www.iea.org/publications/)

- Tracking clean energy progress in the transport sector: [www.iea.org/tcep/transport/](http://www.iea.org/tcep/transport/)
Opportunities for Growth: Linking Multi-lateral Efforts
Governing Sustainability In Biomass Supply Chains For The Bioeconomy

Workshop: May 23, 2019, Utrecht, the Netherlands

- New Task 45: Climate and Sustainability Effects Of Bioenergy Within The Broader Bioeconomy
  - Aims to identify approaches and implementation strategies for sustainable cross-sectoral supply-chain management
  - Together with international organisations and institutions

- Workshop
  - Present an overview of what relevant sustainability governance already exists and what more may be needed
  - Develop plans for how collaboration of policy and market actors could support a sustainable bioeconomy
Thank you for your consideration