Task 42 - Biorefining in a Future BioEconomy

Bioeconomy 2017

July 12, 2017

Borislava Kostova, Ph.D.

Technology Manager

U.S. Department of Energy

IEA Bioenergy

Task 42

Biorefining in a future BioEconomy

- Task42 provides an international platform for collaboration and information exchange between industry, SMEs, GOs, NGOs, and universities concerning biorefinery research, development, demonstration, and policy analysis.

- To facilitate the commercialization and market deployment of environmentally sound, socially acceptable, and cost-competitive biorefinery systems and technologies,

- To advise policy and industrial decision makers accordingly.

- This includes the development of networks, dissemination of information, and provision of science-based technology analysis

U.S. DEPARTMENT OF ENERGY

http://task42.ieabioenergy.com/

IEA Bioenergy

Task 42 Biorefining

Publications

Publications | Databases

- Brochures
- Country reports
- Factsheets
- Presentations
- Reports & Papers
- Newsletters
- Task Progress Meetings
- Webinars
- External publications

Assessing Biorefineries Using Wood for the BioEconomy – Current Status and Future Perspective of IEA Bioenergy Task 42 "Biorefining"

G. Jungmeier[1], R. Van Ree[2], E. de Jong[3], H. Stichnothe[4], I. de Bari[5], H. Jørgensen[6], M. Wellisch[7], G. Bell[8], J. Spaeth[9], K. Tor[10], S. Kimura[11]

[1]Joanneum Research, Elisabethstrasse 5, A-8010 Graz, Austria; gerfried.jungmeier@joanneum.at; +43 316 876 1313
[2]WUR, Wageningen, The Netherlands
[3]Avantium Chemicals BV, Amsterdam, The Netherlands
[4]vTI, Braunschweig, Germany
[5]ENEA C.R., Italy
[6]University of Copenhagen, Copenhagen, Denmark
[7]Agriculture and Rural Development, Edmonton, Canada
[8]Microbiogen Pty Ltd, Australia
[9]U.S. DOE, USA;
[10]SCION, New Zealand
[11]New Energy and Industrial Technology Development Organization (NEDO), Japan

ABSTRACT

The 11 member countries (A, AUS, CA, DK, G, I, IR, J, NL, NZ, USA) of IEA Bioenergy Task 42 "Biorefining" state: "Biorefining is the sustainable processing of biomass into a spectrum of bio-based products (food, feed, chemicals, and materials) and bioenergy (biofuels, power and/or heat)". Woods with its various assortments offers great opportunities for a broad product portfolio. The purpose is to assess various biorefineries using wood in a future BioEconomy based on the assessment framework developed by Task 42. The assessment covers technical, economic, environmental, social, infrastructural integration, implementing and R&D issues relevant for the realization of biorefinery concepts using wood.

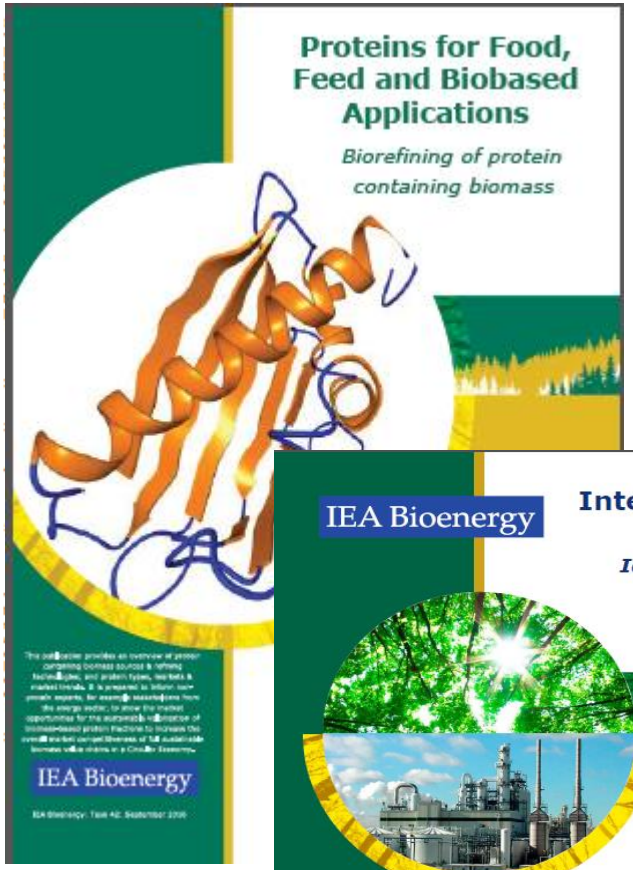
The 5 most interesting "biofuel-driven" biorefinery concepts until 2025 based on wood (e.g. wood chips, saw mill, bark) were analyzed in their value chains to produce transportation biofuels and biochemicals. The life cycle based assessment is developed to cover issues from the production, operation and end of life phase.

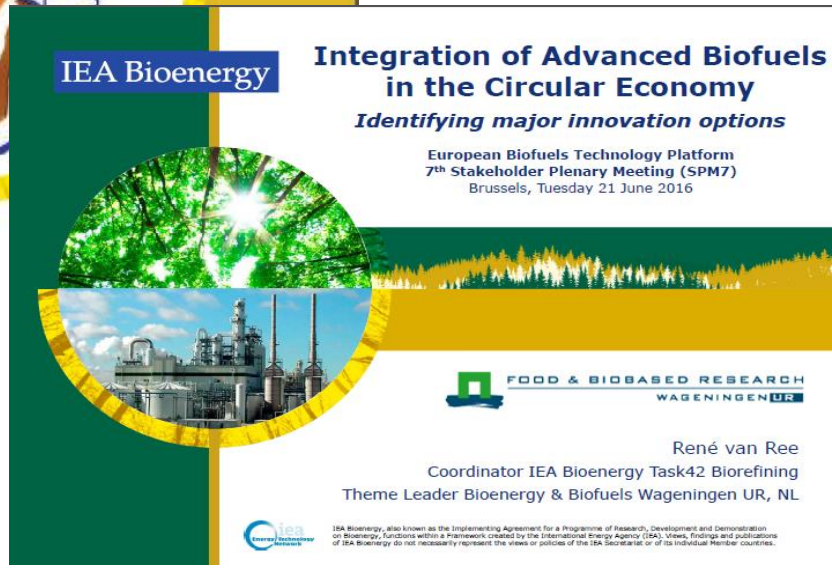
The assessment of the 5 wood biorefineries is done in the "Biorefinery Fact Sheet" including technology readiness level, biorefinery classification, Biorefinery Complexity Index, economic assessment, environmental assessment, social assessment, sustainability assessment with SLCA and implementation in existing industrial infrastructure.

The results assist various stakeholders in finding their position on biorefining in a future biobased economy while minimizing unexpected technical, economic and financial risks by significantly contributing to the development of a BioEconomy.

KEYWORDS
Assessment, BioEconomy, Biorefinery, Sustainability, Technology Readiness Level, Wood

INTRODUCTION





U.S. DEPARTMENT OF ENERGY

http://task42.ieabioenergy.com/publications/

Biorefining in a future BioEconomy

- Continue to further contribute to the market deployment of sustainable Biorefineries, focus of 2016 -2018 Triennium will be on:
  - International and national networking activities,
  - Standardization and certification of biobased products
  - Policy advice,
  - Increased co-operation with other IEA Collaboration Programmes (i.e. IEA-IETS), IEA Bioenergy Tasks, and international organizations (FAO, OECD, EC DG JRC, EU ETIP and EERA Bioenergy, etc)

News

- Canada
  - January, 2017: Bioenergy La Tuque partners with Neste Corporation to study feasibility of converting the forest harvest residues to renewable diesel
  - March, 2017: Ministry of Natural Resources announced $800,000 investment in G4 Insights, Inc. to convert forestry waste to RNG, 85% GHG reduction
  - March, 2017: Edmonton's Forge Hydrocarbon begins construction of $25 million biodiesel plant near Sombra, Ontario
  - April 2017, Enerkem Alberta Biofuels – fully operational
- Australia:
  - Queensland Government increases support for bio-energy through the Queensland Biofutures Industry program. The Government has recognized its competitive advantage in the area of potential bioenergy and is looking to leverage the state's natural advantages.
  - The Government is looking to develop a A$1B Biofutures industry over the next 10 years

News

- Netherlands
  - plant Zambezi process, Avantium, AkzoNobel, Chemport Europe, RWE and Staatsbosbeheer report on cost-effective process for the production of high-purity glucose from non-food biomass
  - LIBBIO: laboratory facility of the semi-industrial biorefinery with supercritical CO2 technology in the Zernike Advanced Processing facility of the Hanze University of Applied Sciences Groningen takes off preparatory treatment in the supercritical extruder, to first extract the fatty components from the biomass
    - built in the first instance for the European Horizon 2020 project LIBBIO:
    - based on the Andean Lupin plant, that contains high--quality proteins and highgrade oil
- Italy:
  - NOVAMONT Projects:
    - New fermentation plant (30.000 ton/y) in the site of a previous plant (Adria) for the production of 1.4 butanediol from renewables. Important partnership with Genomatica. Started in July 2016
    - Biorefinery in Porto Torres (Sardinia) - Joint venture between Novamont and Polimeri Europa. The biorefinery will produce monomers (40kton/y) and lubrificants (30kt/y)
    - Piana di Monte Verna (Caserta): Recent Novamont ‘s Reserch Centre derived from ex-Tecnogen. The Centre is focused on the development of biotechnological processes for the production of biobased monomers for bioplastics.
  - Biobased chemical company GF-Biochemicals has started in 2016 the commercial production at its 10,000 MT/a capacity levulinic acid plant in Caserta. GFBiochemicals is the first company to produce levulinic acid at commercial scale directly from biomass.
  - ENI-Versalis and Genomatica have advanced to pilot-scale the production of bio-butadiene (bio-BDE) from renewable feedstock to make bio-rubber, namely, bio-polybutadiene (bio-BR). The project started with the establishment of a technology joint venture between Versalis and Genomatica in early 2013.