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European Energy Research Alliance
BIOENERGY

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EERA BIOENERGY NEWSLETTER

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SPRING/SUMMER 2019

Joint Programme Coordinator's corner

Andrea Monti
EERA Bioenergy Coordinator

Dear EERA Bioenergy members, dear eebionews readers,

I would like to share with you the proudness and happiness of the EERA Bioenergy JP for the publication of our Strategic Research and Innovation Agenda 2020 (SRIA 2020). I have to congratulate all members and contributors, almost 100 people, as well as our JP's secretariat (Margarita, Paloma and Ana) for the extraordinary effort working on this SRIA. The result has been outstanding!

With this common SRIA, we have aligned our priorities and key performance indicators with those identified in the SET-Plan. Moreover, research recommendations from the European Technology and Innovation Platform (ETIP) Bioenergy, as well as from other international stakeholders and common research priorities agreed upon in other EERA Joint Programmes, have been integrated. The EERA Bioenergy SRIA supports the Innovation Challenges (ICs), which were endorsed at the United Nations Conference of Parties in Morocco (COP22). In particular, IC4 (Sustainable Biofuels), IC7 (Affordable Heating and Cooling of Buildings), IC3 (Carbon Capture) and IC8 (Renewable and Clean Hydrogen). The agenda provides extensive and well-founded guidance to policymakers and administrators at all levels who are deciding on and designing framework programmes for research and innovation. This SRIA 2020 define priorities and perspectives until 2030 and beyond to align national research, development and innovation efforts across borders and thereby unleash the full power of bio-based solutions in the energy transition.

I wish EERA Bioenergy Group every success in its studies and research projects!

In EERA Bioenergy JP, we aim to push the advance of high-level research in the field of biomass in Europe. The EERA Bioenergy nature is highly interdisciplinary, I'm glad to see with my own eyes that we are a very reactive and proactive group! After months of stoppage due to the preparation of the SRIA, the group is back on track very actively. Within the different Sub-programmes, collaborative proposals between EERA Bioenergy members on several call topics are beginning to come out. Since the publication of the agenda, almost 10 webinars have already taken place for the generation of proposals for different H2020 call topics. Finally, the Sub-programme 5 (Sustainability / Techno-Economic Analysis / Public Acceptance) was ultimate and structured into research areas and main challenges and fully integrated into the JP organization. I'm very pleased that SP5 is now full-fledged operative.

At the present time, I feel full of hope and expectation for what is going to happen in Europe in the coming years, and I sincerely expect our SRIA helps guide the European research towards a completely decarbonized Europe.

I wish EERA Bioenergy Group every success in its studies and research projects!

Andrea.

EERA Bioenergy news in brief

NEW STRATEGIC RESEARCH AND INNOVATION AGENDA 2020

The EERA Bioenergy Joint Programme on Bioenergy has released its Research and Innovation Agenda (SRIA 2020). The agenda defines priorities and perspectives until 2030 and beyond to align national research, development and innovation efforts across borders and thereby unleash the full power of bio-based solutions in the energy transition.

The SRIA includes the research areas determined by each Subprogramme - SP (Figure 1). The new SP5, is a horizontal Subprogramme focused on sustainability, techno-economic analysis and public acceptance. It was briefly described in the SRIA and it will be further developed in an update at mid-year.

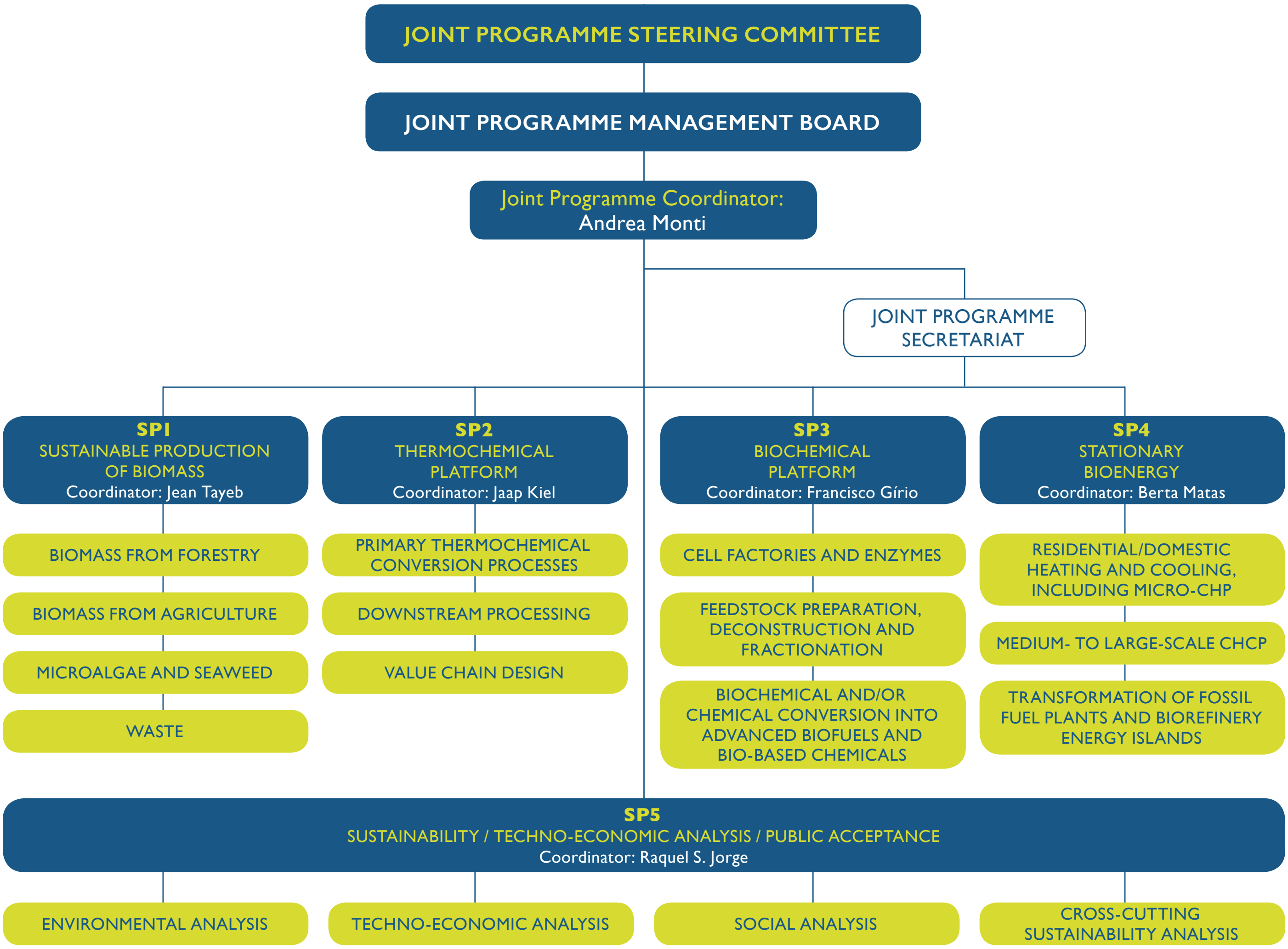

Figure 1: EERA Joint Programme on Bioenergy Subprogramme structure

For EERA Joint Programme on Bioenergy, the overall objective is to accelerate the implementation of SET-Plan priorities and actions in order to contribute to decarbonizing the energy sector, an issue where bioenergy is an essential component of a future low-carbon technologies basket in all climate change mitigation scenarios.

The Strategic Research and Innovation Agenda helps to:

- Align research priorities and activities of the many organisations participating in the Joint Programme, and thereby of the main European actors in the field to create a technical-scientific basis for further development of advanced bioenergy routes;
- Align research priorities and activities with other stakeholders, while also promoting international co-operation;
- Assess research and innovation priorities to accelerate the implementation of bioenergy and circular bioeconomy in Europe;
- Promote the possibilities for joint technology development, in order to help accelerate the implementation of the SET-Plan objectives;
- Create an entry point for other researchers and industry stakeholders for them to connect with the researchers in the Joint Programme. This will allow for further aligning priorities and establishing a mutually benefitting collaboration.

PDF

Figure 2: EERA Bioenergy Coordinator (Andrea Monti) and Adel El Gammal (EERA aisbl Secretary General) on the official announcement of the SRIA 2020 publication

Bioenergy highlights

FLEXCHX DEVELOPS FLEXIBLE COMBINED PRODUCTION OF POWER, HEAT AND TRANSPORT FUELS FROM RENEWABLE ENERGY SOURCES

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FLEXCHX is an EU Horizon 2020 project, which develops a flexible and integrated hybrid process combining electrolysis of water with gasification of biomass and catalytic liquefaction. FLEXCHX is a three-year project (2018-2021) with almost 4.5 million in EU funding and a consortium of 10 partners.

The project is aimed at creating a method for managing the seasonal mismatch between solar energy supply and the demand for heat and power that is highly pronounced particularly in northern and central Europe. The FLEXCHX concept constitutes a complete rethinking of how combined heat and power should be produced in variable renewable energy-dominated power grids, and how the use of excess solar and wind energy can be combined with effective use of biomass residues.

The FLEXCHX Process Concept

FLEXCHX is a flexible and integrated hybrid process that combines electrolysis of water with gasification of biomass and catalytic liquefaction. This process produces heat, power, and an intermediate energy carrier, Fischer Tropsch (FT) wax, which can be refined to transportation fuels using existing oil refining equipment. FLEXCHX plants can be integrated with various combined heat and power production systems, both industrial CHPs and communal district heating units.

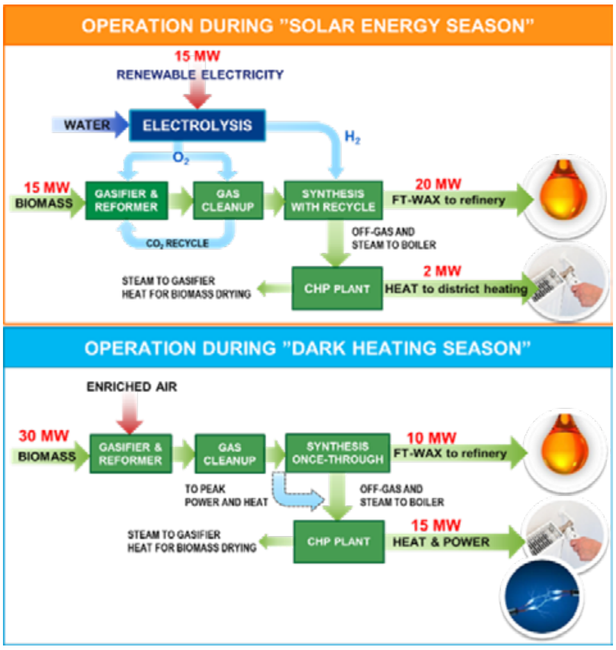

Figure 1: Scheme of the key idea of FLEXCHX project (VTT)

In the summer, renewable fuels are produced from biomass and hydrogen; the hydrogen is produced from water via electrolysis that is driven by low-cost excess electricity from the grid.

During the dark, winter season, the plant is operated with just biomass in order to maximize the production of much-needed heat, electricity and also FT wax. Most of the invested plant components are in full use throughout the year - only the electrolysis unit is operated seasonally.

Getting this type of flexible and integrated production concept to the energy production market requires the development of new conversion technologies, which is the focus point of the FLEXCHX project. The key enabling technologies include novel innovations. The new pressurized staged fixed-bed gasifier followed by catalytic reformer can be operated with a wide range of biomass residues and waste-derived feedstocks. Innovative recycling of carbon dioxide and tail gas from the FT unit will enable flexible operation with and without electrolysis hydrogen. Another key innovation of the project is based on using the compact and highly efficient FT technology, which can be economically realized at the target range of FLEXCHX plants corresponding to 10- to 50-megawatt biomass input.

Experimental development and process validation

The main process development activities of FLEXCHX are focused on the five key enabling technologies: 1) Gasification 2) Hot gas filtration 3) Reforming 4) Final gas cleaning and 5) Compact FT synthesis.

The experimental development will be carried out using a one-megawatt, pressurized, fixed-bed gasification pilot plant (SXB-Pilot) located at VTT's piloting centre Bioruukki, Finland. At the moment, the existing SXB-Pilot is under modification to allow operation with various ratios of gasification agents. The gasification and gas cleaning test campaigns start in spring 2019 using various wood residues, straw, and some waste-derived feedstocks. Simultaneously, the FT technology is optimized for the purpose of the project at Ineratec's facilities in Karlsruhe, Germany.

Figure 2: VTT's one-megawatt pressurized fixed-bed gasification pilot plant (SXB-Pilot) in Finland (VTT)

Validation tests for the whole FLEXCHX concept will be carried out in 2020. The goal is that the process will be ready for industrial demonstration in 2021. Potential production sites are assessed together with the industrial partners especially in Lithuania and Finland, where biomass-based district heating plays an important role.

About FLEXCHX

The project (www.flexchx.eu) consortium comprises 10 entities from four different EU countries:
Research organisations: VTT (Finland); Lithuanian Energy Institute (Lithuania); DLR (Germany).
Industry participants: Enerstena (Lithuania); Johnson Matthey (UK); Neste Engineering Solutions (Finland); Kauno Energija (Lithuania); Helen (Finland).
SMEs: INERATEC (Germany); Grönmark (Finland).

VTT

The project is coordinated by VTT. The consortium of the FLEXCHX project combines chemical engineering, power plant technologies, construction and engineering knowledge as well as business understanding.

FLEXCHX project has received funding from the European Union's Horizon 2020 research and innovation Programme under Grant Agreement No 763919.

OPTIMISING THE BIOCARBON VALUE CHAIN FOR A SUSTAINABLE METALLURGICAL INDUSTRY (BioCarbUp)

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In the project BioCarb+ (Enabling the biocarbon value chain for energy; 2014-17, http://www.sintef.no/biocarb) a huge effort was made towards studying the biocarbon value chain and its different value chain elements with respect to improvement possibilities while satisfying end-user demands[1]. BioCarb+ was a broad competence buildings project, focussing both on energy applications and biocarbon as a reductant in metallurgical processes.

Now a new competence building project, Optimising the biocarbon value chain for a sustainable metallurgical industry (BioCarbUp), is starting and will run for 4 years. This time the focus is entirely on biocarbon as reductant in metallurgical industries. BioCarbUp is led by SINTEF Energy Research and 80% financed by the Research Council of Norway and 20% financed by a number of industrial partners.

The overall objective of this project is to optimise the biocarbon value chain for the metallurgical industry through 1) Production of biocarbon with sufficient quality satisfying the end user quality requirements while ensuring optimum utilisation of the by-products, 2) Optimised sourcing of Norwegian forest resources for biocarbon production towards the specific metallurgical processes, and 3) Maximising the energy and cost efficiency of the biocarbon value chain for the metallurgical industry. The sub-objectives are:

- Identifying optimum forest resources for the specific metallurgical processes.
- Identifying and optimizing carbonisation processes and conditions to produce optimum yields and qualities.
- Developing methods for upgrading and tuning biocarbon quality to increase its suitability for the specific metallurgical processes, and methods for upgrading the by-product tar to higher value products.
- Developing fundamental knowledge of biocarbon behaviour in and influence on the specific metallurgical processes and biocarbon impact on product quality.
- Increasing expertise throughout the biocarbon value chain for the metallurgical industry.
- Educating highly skilled candidates within this area and training of industry partners.
- Monitoring activities and state-of-the-art practice within this area and disseminating knowledge to industry partners, and other interested parties where applicable.

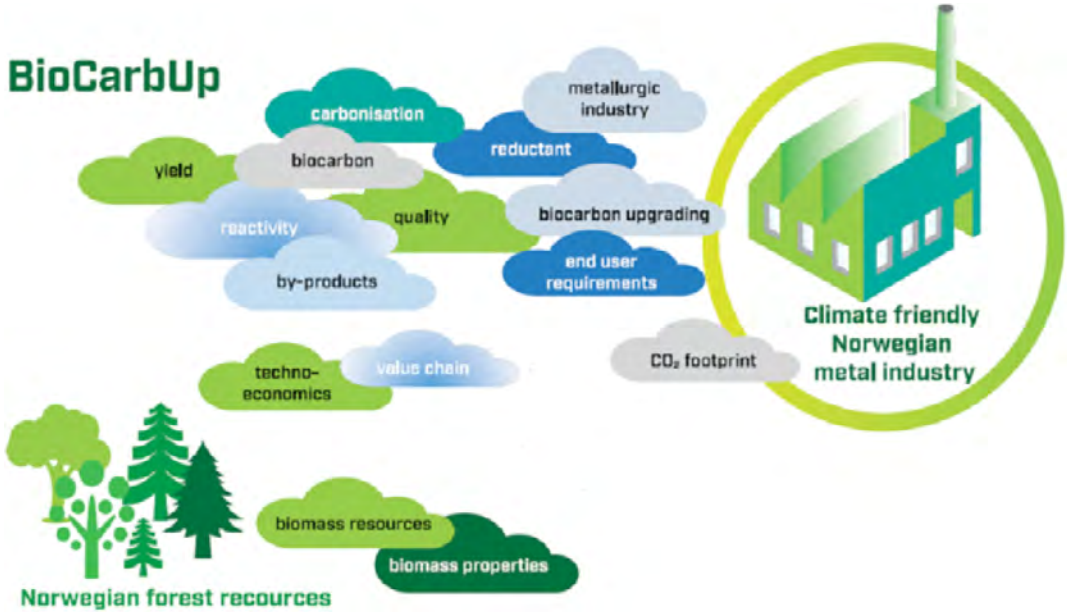

Figure 1: The biocarbon value chain for metallurgical industry

BioCarb+ pointed towards a very significant improvement potential throughout the value chain, providing guidelines for sustainable biocarbon value chains for both energy use and for the use as reductant in metallurgical processes, based on Norwegian forest resources.

However, especially for metallurgical industries, there is a need to optimize the value chain towards the needs of the specific metallurgical processes, i.e. quality criteria with respect to the biocarbon properties. This is a challenge, but also an opportunity, as the available and highly heterogeneous forest resources can be sourced and the biocarbon can be tuned towards a specific end-use, satisfying the end-user quality demands while at the same time maximizing the sustainability of the value chain.

The BioCarbUp project will be highly international, through both international partners and scientific collaborators, and has as well a significant integrated educational activity, through PhD and PostDoc candidates financed by the project, and connected graduate students as well.

The anticipated results of the project are reduced harvesting and logistics costs for woody biomass resources, maximised biocarbon yield and quality directly in the biocarbon production process or via secondary upgrading and maximised utilisation in biocarbon end-use applications, i.e. the metallurgical industry. Additionally, by-products utilisation and higher value products from tar are complementary foci.

More information about the BioCarbUp project, project partners, and results, will be available on the project homepage: http://www.sintef.no/biocarbup

1. EERA Bioenergy Newsletter 8 (2017), p. 15

PHOSPHOGYPSUM: A WASTE MATERIAL USEFUL IN THE VALORISATION OF BIOMASS DERIVED COMPOUNDS

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The use of residues and wastes as renewable raw materials for the production of energy, fuels, chemicals and materials is one of the main targets of the bio- and circular economy. Biomass residues derived from agricultural activities are essential feedstocks for novel biorefineries. Along crops growing, huge amounts of agro-chemicals (i.e. pesticides, herbicides) are employed, most of them based on phosphorous derived compounds synthesised by using phosphoric acid as the main reactant. Phosphogypsum (PG) is a waste by-product of the wet process for phosphoric acid production. About 5 tonnes of PG are generated per every tonne of phosphoric acid (H_3PO_4) manufactured, the need to find a suitable application for such a huge amount of waste being obvious.

At present, worldwide production of PG is over 100–280 Mt/year[1]. Only 14% of the worldwide production is reprocessed, 28% is dumped into water bodies, and 58% is being stockpiled and may cause huge environmental problems[2]. Studies have been conducted on the beneficial ways of utilizing PG in order to reduce the disposal problem and environmental implications. These include uses of PG as i) agricultural fertilizer or for soil stabilization amendments[3], and ii) as a setting regulator in place of natural gypsum in cement industry[4], among others. Chemically, PG consists primarily in calcium sulfate dihydrate, $CaSO_4 \cdot 2H_2O$. As it was above-mentioned, PG is a by-product of the production of wet phosphoric acid whereby phosphate rock (usually fluorapatite) is reacted with sulphuric acid: $Ca_5(PO_4)_3F + 5H_2SO_4 + 10H_20 \rightarrow 5CaSO_4 \cdot 2H_2O + 3H_3PO_4 + HF$. The possible chemical formulation should be $Ca(SO_4)_x (HPO4)_y \cdot zH_20$, with y<<x.

Figure 1: Schematic representation of PG-derived hydrotalcite-type catalysts for the valorization of biomass derivatives (i.e. sugars isomerization)

In this context, our approach consists in the use of this solid residue as the base for the preparation of catalytic materials for different biomass-derivatives transformations. To the best of our knowledge, there are no examples in the literature related to the use of this material as a catalyst itself. This strategy has been granted with a research project funded by the PhosAgro/UNESCO/IUPAC partnership and entirely developed at ITQ (UPV – CSIC) since 2018. Within the project activities, the synthesis of different solid catalysts based on PG that mostly contain CaO has been carried out. These basic catalysts showed superior activity on the catalytic transesterification of triglycerides with methanol to produce fatty acids methyl esters (FAMEs or biodiesel), and particularly, on the catalytic isomerization of sugars, a key process for the valorisation of cellulose-derived biomass[5]. A complete characterization of PG from an industry waste by means of different techniques (FESEM, XRD, ICP, TG, among others) has been done to evaluate its suitability to be used as raw material for catalysts synthesis. In addition, commercially available similar material has been used to optimize the synthesis of PG-derived catalyst. Therefore, investigations have been focused on the synthesis of PG-derived basic catalysts containing CaO and based on hydrotalcite-type structure (HT), these kinds of materials being able to catalyse the effective isomerization of glucose[6]. The objective has been successfully achieved, highlighting that these materials represent one of the few examples in the literature of Ca-hydrotalcite without the presence of $CaCO_3$ in the structure[7]. These catalysts have demonstrated their high activity in the isomerization of different sugars, getting high selectivity towards the desired products[8]. Currently, the synthesis of these PG-derived catalysts is being standardized at bench scale in our laboratories.


Figure 2: Images of CSIC-ITQ Facilities at Valencia (Spain)

INSTITUTO DE TECNOLOGÍA QUÍMICA · CSIC Consejo Superior de Investigaciones Científicas · UNIVERSITAT POLITÈCNICA DE VALÈNCIA · PHOSAGRO · UNESCO · IUPAC

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EFFICIENT USE OF BIOMASS RESIDUES FOR COMBINED PRODUCTION OF TRANSPORT FUELS AND HEAT - VTT TECHNOLOGY REPORT 347

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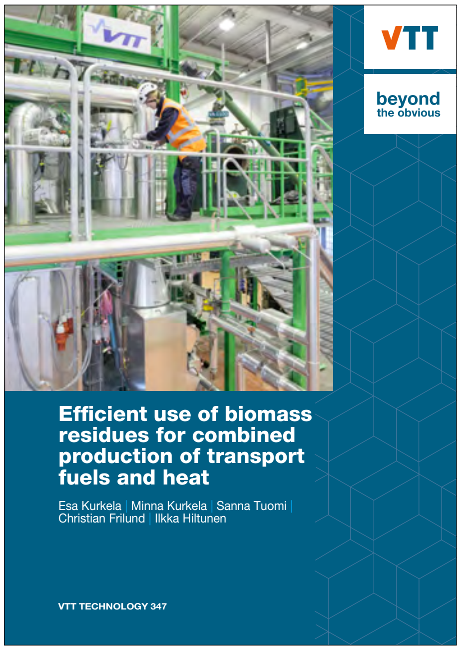
This report summarises the research results of the BTL2030 project, www.vtt.fi/sites/BTL2030/en. The target of this project was to develop a medium-scale biomass conversion technology (corresponding to 100-150 MW biomass input), which can be integrated into various energy-intensive industries and district heating power plants. The main focus of the project was in the production of Fischer-Tropsch liquids, which can be further processed to high-quality transport fuels at large central refineries. In addition, concepts producing renewable synthetic natural gas (SNG) and hydrogen were designed and evaluated in the project.

The central activity of the project was the development and testing of the new gasification and gas cleaning process, which was implemented at the Bioruukki Piloting Centre of VTT Finland during the years 2016-2018. The process was based on VTT's low-pressure, low-temperature steam gasification technology, simplified gas purification and small-scale industrial synthesis. In addition to the experimental development and testing activities, the BTL2030 project included design and feasibility studies for the combined production of FT liquids or synthetic natural gas and heat at plants integrated to district heating power plants or forest industry sites. This report summarises the studies on the effects of operating conditions of the gasification process on the efficiencies of FT liquid production. Detailed results of the techno-economic assessment work are presented in separate publications.

VTT Technology Report 347:



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Useful information

1. Fourth Report on the State of the Energy Union
European Commission

The fourth report on the state of the Energy Union shows that the Commission has fully delivered its vision of an Energy Union strategy that ensures accessible, affordable, secure, competitive and sustainable energy for all Europeans.

Beyond modernising Europe's climate and energy policy, the Energy Union boosts the transition of the European economy towards clean energy in key sectors, in line with commitments made under the Paris Agreement and ensuring a socially fair transition. Building a resilient Energy Union, endowed with a forward-looking climate and energy policy, has been one of the Juncker Commission's political priorities. The report is accompanied by two documents showing what progress has been made in renewable energy and energy efficiency.

The Energy Union has strengthened the internal energy market and increased the Union's energy security thanks to new intelligent infrastructures (also cross-border), a new, more advanced market design and a cooperation mechanism between the Member States to respond to possible crises in a more effective and efficient manner.

Link

2. EurObserv'ER Solid biomass barometer 2018: The gross inland consumption from solid biomass in the EU increased 1.7% between 2016 and 2017.

Since 1998, the EurObserv'ER barometer measures the progress made by renewable energies in each sector and in each member State of the European Union in an as up-to-date way as possible (with figures less than 12 months old). EurObserv'ER produces a series of figure-backed indicators covering energetic, technological and economic dimensions.

Last January EurObserv'ER released its last solid biomass barometer, showing 1.7% growth in primary energy production was observed in the EU in 2017, placing the gross consumption of biomass primary energy just below the 100 Mtoe threshold at 98.9 Mtoe. Heat consumption from solid biomass rose marginally by 1.4% over the past year to reach 79.9 Mtoe. This is mainly due to higher temperatures recorded over the year in the EU leading to lower demand for heating. According to EurObserv'ER, heat used by final consumers only increased by 1% as compared to 2016 levels while the gross solid biomass heat sold to heating networks has risen by 4.1%. The latter was driven in part by proactive biomass cogeneration policies in Finland, Denmark and Sweden.

Coal-fired power plant conversions, particularly in the UK, Finland and Denmark, have expanded by 2.9%. Combined to an increase in net electrical capacity in major producer countries and greater efficiency of existing capacities, this has led the production of biopower to reach 94.5 TWh. Primary energy production from biomass sourced from the EU also rose drastically by 10.5%. A slower pace of growth in terms of EU's wood pellet output (6.2%) caused an increased reliance on imports, especially from the USA and Canada. In 2018, 95% of the gross inland consumption of solid biomass sourced from the EU and 5% came from imports.

The top 3 countries in terms of solid biomass consumption are Germany (12,4 Mtoe), France (10,8 Mtoe) and Sweden (9,3 Mtoe). But in relative terms, the 3 largest consumers of energy from solid biomass in toe per inhabitant are Finland (1,519), Sweden (0,956) and Estonia (0,683).

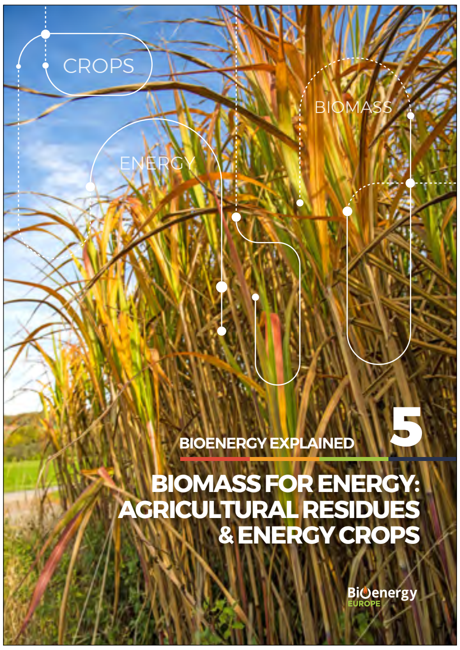
Link

3. Bioenergy Europe factsheet: Biomass for energy: Agricultural Residues and Energy Crops

Bioenergy Europe regularly publishes factsheets related to different fields on bioenergy. This factsheet #5 describes the capacity of agriculture to mobilise further unexploited potential that will be crucial to meet the EU long term emissions reduction target. To this end, bioenergy-oriented agriculture development will be a key driver to determine the long-term potential available. With 95% locally produced biomass, the growth potential of bio-energy relies essentially on the potential of sustainable biomass resources available in Europe.

Bioenergy represents more than 60% of the renewable energy consumed in the EU28 and its contribution to the energy mix is pivotal to achieve a low carbon economy.

This factsheet aims at communicating the environmental and economic benefits of these agro-biomass types and points out at possible solutions to the existing barriers to increase their use.



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4. US Department of Energy factsheet: Bioenergy Technologies Office FY 2018 Successes
Office of Energy Efficiency and Renewable Energy

BETO (U.S. Department of Energy's Bioenergy Technologies Office) focuses on early-stage applied research and development (R&D) to enable sustainable and cost-effective technologies capable of producing bioenergy from non-food sources, such as cellulosic biomass, algae, and waste. National laboratories and industry partners receive BETO funds for R&D to reduce the price of drop-in biofuels, high-performance bioproducts, and renewable biopower.

By working with public- and private-sector partners to advance the domestic bioenergy industry, BETO ensures citizens more affordable, reliable, and domestically sourced energy and transportation options. In FY 2018, BETO achieved significant R&D advances in renewable fuels and bioproducts. This fact sheet highlights some of those successes.

U.S. DEPARTMENT OF ENERGY
Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Bioenergy Technologies Office FY 2018 Successes

The U.S. Department of Energy's (DOE's) Bioenergy Technologies Office (BETO) focuses on early-stage applied research and development (R&D) to enable sustainable and cost-effective technologies capable of producing bioenergy from non-food sources, such as cellulosic biomass, algae, and waste. National laboratories and industry partners receive BETO funds for R&D to reduce the price of drop-in biofuels, high-performance bioproducts, and renewable biopower to enable a thriving U.S. bioeconomy. By working with public- and private-sector partners to advance the domestic bioenergy industry, BETO ensures American families and businesses have more affordable, reliable, and domestically-sourced energy and transportation options.

In fiscal year (FY) 2018, BETO achieved significant R&D advances in renewable fuels and bioproducts. These successes help to increase U.S. energy supplies, reduce imports of foreign oil, enhance energy security, create domestic jobs, and secure the nation's global leadership in advanced bioenergy and clean energy technologies.

The world's first commercial flight using groundbreaking sustainable aviation fuel made from recycled waste carbon gases flew from Orlando, Florida, to London, England. *Photo courtesy of PNNL*

First Commercial Flight Using Fuel from Recycled Waste Carbon Gases

In 2018, the bioenergy and aviation industries realized the world's first commercial flight using groundbreaking sustainable aviation fuel made from recycled waste carbon gases. Virgin Atlantic Airlines flew a Boeing 747 from Orlando, Florida to London, England using fuel that was developed through a partnership between DOE's Pacific Northwest National Laboratory (PNNL) and LanzaTech. PNNL and LanzaTech developed a unique catalytic process and proprietary catalyst to upgrade ethanol to alcohol-to-jet synthetic paraffinic kerosene (ATJ-SPK), a type of jet fuel. The catalyst removes oxygen from ethanol in the form of water, and then combines the remaining hydrocarbon molecules to form chains. The resulting hydrocarbon chains are large enough for jet fuel but do not form aromatics, which helps reduce soot emissions when burned in a jet engine.

Based in part on the work done by PNNL and LanzaTech, in 2018 ASTM International—an international standards organization that publishes voluntary consensus technical standards—added ethanol to a list of approved feedstocks for producing ATJ-SPK when they revised the specification for synthetic jet fuel (ASTM D7566 Annex A5). The updated standard will enable increased adoption of new sustainable aviation fuels—including LanzaTech's alcohol-to-jet fuel—in blends up to 50% with traditional jet fuels.

More info at Biomass Magazine and Energy.gov

Collaborating with Industry to Convey Feedstock Value, Improve Biomass Conversion Processes

Recognizing the importance of enhancing biomass conversion processes for industry, a team of NREL scientists partnered with Forest Concepts—a leading manufacturer of precision woody and herbaceous feedstocks for bioenergy and bioproduct applications—to perform detailed thermochemical conversion simulations for biomass feedstocks. The simulations relate feedstock attributes to expected product yields and necessary pyrolysis conversion process conditions. The work by NREL will allow industry to better evaluate the value of biomass feed-stocks. Models based on mixed particle

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Publications

The European Energy Atlas 2018

European Renewable Energies Federation, Friends of the Earth Europe, Green European Foundation & Heinrich-Böll-Stiftung foundation

The European Energy Atlas is published at a time when the EU Member States are discussing sustainable energy and climate strategy up to 2030. It shows the situation of the various energy policy discussions in the European Member States and highlights the climate and energy challenges we are facing. It offers a clear alternative to how the energy transition can succeed: a national energy transition can only truly succeed if it is embedded in a larger European context.

Renewable energies will be the main pillar for the energy supply in Europe if we want to act decisively on fighting dangerous climate change. These are being produced principally from wind, sun and biomass. The energy supply from these sources has less severe impacts on the environment. Today, these renewable energy technologies are already a more cost-effective option than new fossil or nuclear energy.

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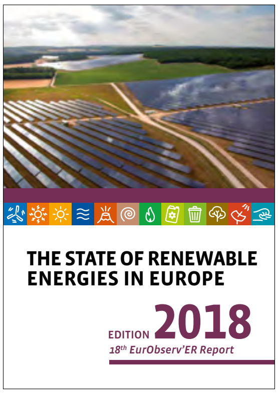

The State of Renewable Energies in Europe 2018

EurObserv'ER

EurObserv'ER has been gathering data on the European Union's renewable energy sources for eighteen years for its theme-based barometer reports on the state of the sectors and their momentum.

The energy indicators drawn from these barometers have been updated with Eurostat and SHARES 2017 and supplemented by data on the sectors for which no individual barometers were published – small hydropower, biogas, geothermal energy, concentrated solar power, household refuse incineration and renewable marine energy sources.

PDF

Bioenergy Europe Statistical Report 2018

Bioenergy Europe

Every year since its debut release in 2007, Bioenergy Europe's Statistical Report has provided an in-depth overview of the bioenergy sector in the EU-28 Member States. Bioenergy Europe's Statistical Report has been enriched each year with new figures and information, collecting unique data on the developments of the European bioenergy market from a growing number of international contributors.

Bioenergy accounts today for 63.3% of the renewable energy consumption, representing, therefore, the main renewable energy source by far. While the other sources of renewable energy are growing, bioenergy will remain the most important renewable source of energy for the decades to come and will be essential to keep the global rise of temperature below critical levels.

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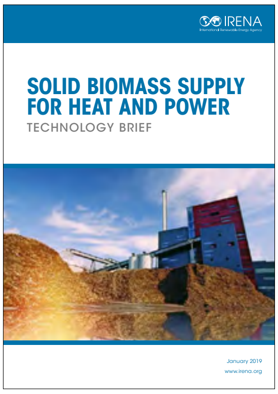

Solid Biomass Supply for Heat and Power: Technology Brief

International Renewable Energy Agency (IRENA)

Solid biomass from forests, farms and cities provides a major energy source for heat and power generation, potentially accounting for a fifth of global energy consumption by 2050 amid accelerated adoption of renewables. But wood and crop residues need to be collected from widely dispersed sites and stored for use at the optimal time, and at a cost-effective scale, in district-heating systems, power plants, and combined heat and power plants.

This technology brief from the International Renewable Energy Agency (IRENA) examines the multi-dimensional logistical challenges of establishing a steady supply chain for solid biomass.

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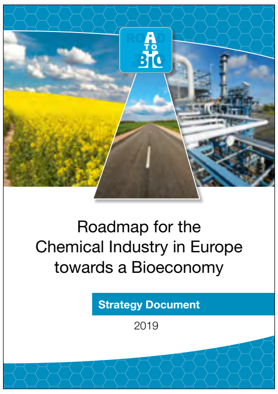

Roadmap for the Chemical Industry in Europe towards a Bioeconomy

RoadToBio – Biobased Industries Consortium (BIC)

This roadmap written for the chemical industry has the aspiration to show a way on how to increase the share of bio-based or renewable feedstock to 25% of the total volume of organic chemicals raw materials/feedstock used by the chemical industry in 2030 (as compared to 10 per cent in 2016). This refers to the volume of the starting material used, as an analysis product based definition is not possible. The roadmap is to be implemented and accepted by the chemical industry in the future. Therefore, the consortium has also decided to refer to the raw materials volume for the definition of the bio-based share as well.

This Roadmap Strategy Document is intended to provide an evidence-based foundation for the EU chemical industry upon which future policy can be implemented and actions delivered.

PDF

Save the date! International bioenergy events

JUNE 2019

10-12 June 2019
2019 International Fuel Ethanol Workshop & Expo (FEW)
Indianapolis, USA
link

12-13 June 2019
Expo Biogaz 2019
Lille, France
link

17-21 June 2019
EU Sustainable Energy Week
Brussels, Belgium
link

JULY 2019

3-7 July 2019
UK AD and World Biogas Expo 2019
Birmingham, UK
link

10-11 July 2019
Biomass to power North America
Raleigh, USA
link

17-18 July 2019
Biofuels, Energy and Economy 2019
Abu Dhabi, UAE
link

22-24 July 2019
5th International Congress on Water, Waste and Energy Management
Paris, France
link

AUGUST 2019

16-18 August 2019
8th Asia-Pacific Bioenergy Exhibition
Guangzhou, China
link

26-27 August 2019
14th Global Summit and Expo on Biomass and Bioenergy
Vienna, Austria
link

SEPTEMBER 2019

11-13 September 2019
Bioenergy International Conference
Portalegre, Portugal
link

19 September 2019
EBA Annual Conference: 10th anniversary
Brussels, Belgium
link

24-26 September 2019
Expo Biomasa
Valladolid, Spain
link

24-26 September 2019
2019 European Research and Innovation Days
Brussels, Belgium
link

OCTOBER 2019

22-23 October 2019
12th Biofuels International Conference & Expo
Brussels, Belgium
link

22-23 October 2019
International Biomass Congress & Expo
Brussels, Belgium
link

22-23 October 2019
International Biogas Congress & Expo
Brussels, Belgium
link

28 October 2019
100% Renewable Heating & Cooling for a Sustainable Future
Helsinki, Finland
link

EERA Bioenergy in Europe

Table 1: Full and Associate Members of EERA Bioenergy Joint Programme.

Aalborg University
Department of Energy Technology (Denmark)

web

AICIA
Asociación de Investigación y Cooperación Industrial de Andalucía (Spain)

web

BERA
Belgian Energy Research Aliance (Belgium)

web

CAMPUS IBERUS
Campus de Excelencia Internacional del Valle del Ebro (Spain)

web Campus / web Universidad

CEA
French Alternative Energies and Atomic Energy Commission (France)

web

CENER
National Renewable Energy Centre – Biomass Department (Spain)

web

CIEMAT
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain)

web

CNR
Istituto Motori del Consiglio Nazionale delle Ricerche (Italy)

web

CNRS
Centre National de la Recherche Scientifique (France)

web

CSIC
Agencia Estatal Consejo Superior de Investigaciones Científicas (Spain)

web

DTU
Technical University of Denmark (Denmark)

web

ECN part of TNO
Energy Research Centre of the Netherlands (The Netherlands)

web

ENEA
Italian National Agency for New Technologies, Energy and Sustainable Economic Development (Italy)

web

FCiências.ID
Associação para a Investigação Desenvolvimento de Ciências (Portugal)

web

IEN
The Institute of Power Engineering (Poland)

web

IFK Stuttgart
Institute of Combustion and Power Plant Technology (Germany)

web

IMDEA
Instituto Madrileño de Estudios Avanzados (Spain)

web

INRA
French National Institute for Agricultural Research (France)

web

KIT
The Research University in the Helmholtz Association (Germany)

web KIT / web BIOLIQ

LNEG
Laboratório Nacional de Energia e Geologia (Portugal)

web

NIC
National Institute of Chemistry (Slovenia)

web

NTNU
Norwegian University of Science and Technology (Norway)

web

NTUA
The National Technical University of Athens (Greece)

web IPSEN

PSI
Paul Scherrer Institut (Switzerland)

web

RISE
Research Institutes of Sweden (Sweden)

web

SINTEF
(Norway)

web

TÜBITAK
Scientific and Technological Research Council of Turkey (Turkey)

web

UKERC
UK Energy Research Centre
web

ASTON UNIVERSITY
web

SUPERGEN Bioenergy Hub
web
(United Kingdom)

UNIBO
Universitá di Bologna (Italy)

web

UNIMORE
University of Modena and Reggio Emilia (Italy)

web

UNITO
Università di Torino (Italy)

web

Università degli Studi di Padova
Universitá di Bologna (Italy)

web

Università degli Studi di Perugia
CRB - Biomass Research Centre
(Italy)

web UNIG / web CRBNET

VŠB
Technical University of Ostrava (Czech Republic)

web

VTT
Technical Research Centre of Finland Ltd (Finland)

web

WUR
Wageningen University & Research (The Netherlands)

web

EERA Bioenergy in Europe

EERA Bioenergy is open to new complementary RTD organisations.
Please contact the Joint Programme Secretariat for further details at secretaria@bioplat.org

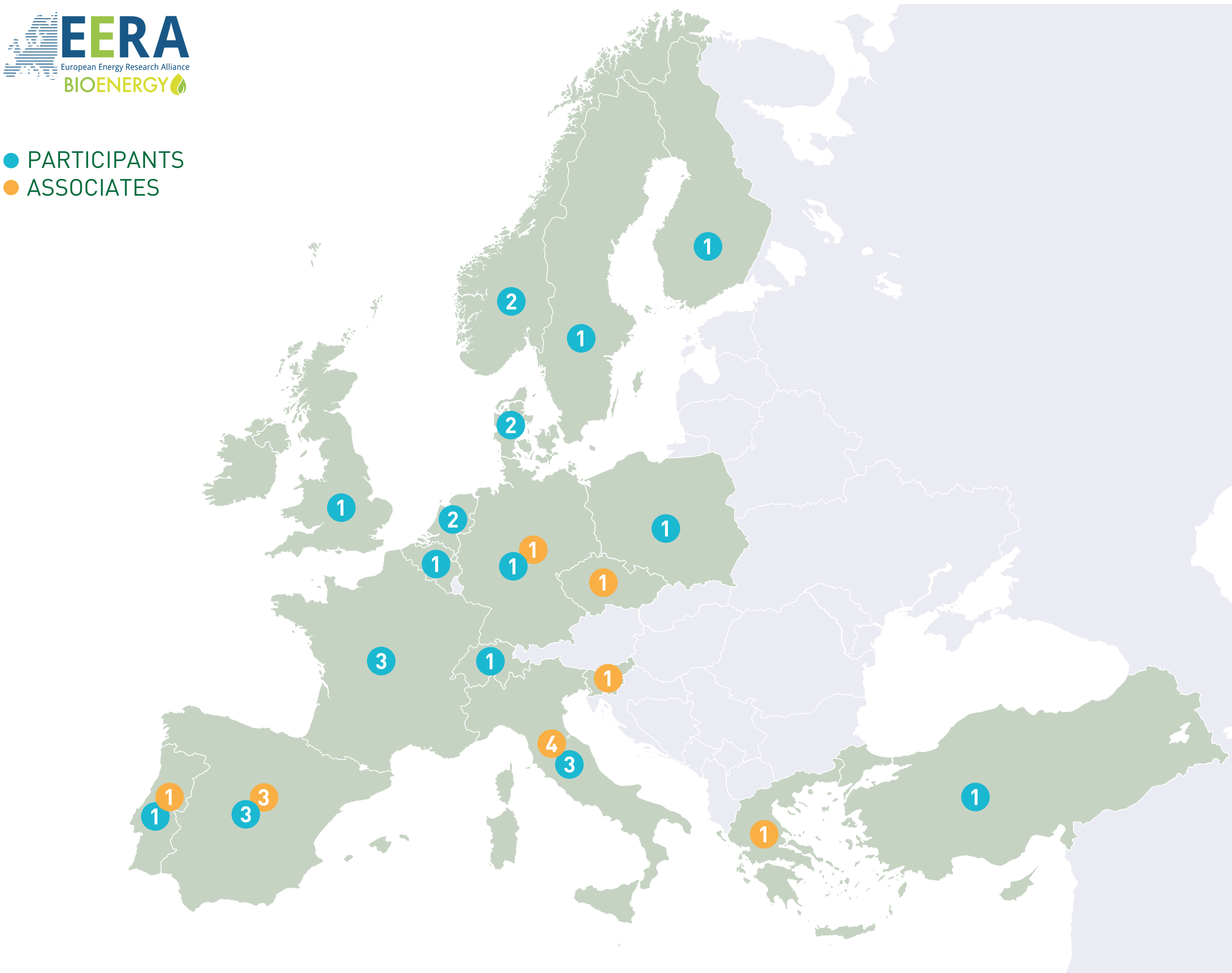

Figure 1: The EERA Bioenergy Joint Programme consists of 24 participants and 12 associate participants from a total of 18 countries.
www.eera-bioenergy.eu

Contacts

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