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Joint Programme Coordinator's corner

Andrea Monti
EERA Bioenergy Coordinator

Dear EERA Bioenergy members, dear eebionews readers,

The COP26 UN Climate Conference saw two weeks of intense negotiations of over 190 Countries, giving us a chance of limiting global warming to 1.5 degrees Celsius, thus maintaining the upper end of ambition under the Paris Agreement.

The outcomes were partially positive, and -in some cases- disappointing or vague; but what was significantly impressive, was likely the enormous and increasing mobilization and pressure of young people from all over the world as also Ursula von Der Leyen herself pointed out. This was also one of the main reasons for the EU emission reduction target from 40 to 55%.

I would like to remind three points in connection with the COP 26 outcomes. First, world leaders expressed that the goal of supplying $100 billion a year in climate finance support for developing countries is within reach. Second, 1.5 degrees Celsius became the clear and only target (not 2 °C as in the Paris agreement); this is unquestionably an excellent hint in view of the next COP 27 in Sharm el-Sheikh next in 2022. Third, the last-minute replacement of wording "phase out" of coal-fired power, with "phase down" that upset 'climate activists' who called for an end to "inefficient" fossil fuel subsidies.

While it is true that we urgently need to change our energy production paradigm, and many people are disappointed with the last-minute change, on the other hand, it should be recognized that the oil and gas industry would need to invest over $600 billion a year until 2030 to meet expected demand. It is unlikely to expect, therefore, that "…we simply unplug from the energy system of today" (Sultan al-Jaber, Chief Executive of Abu Dhabi state oil company Abu Dhabi National Oil Co). The energy production of important countries such as India, China, South Africa, Australia, Poland, etc. depends on coal for 60-80%, and the transition towards renewable sources will be a complex process. A very emblematic statement, while commenting on the outlook for coal after COP26, was that "quitting coal is like quitting cigarettes".

Nevertheless, if we, on one hand, should accept a less decisive language on coal, backed in primis by India and China and other coal-dependent Countries, a fortiori, it is quite a paradox that the European Commission will not strongly support the most advanced decarbonizing tool for current EU's vehicles (biodiesel/bioethanol), especially without alternative fuels readily available for large-scale use. EV (Electric Vehicles) or FCEV (Fuel Cells Electric Vehicles powered by hydrogen) are very promising technologies to fuel the 'green future' transport (including aviation), but they will take time to reach large-scale commercialisation. At the same time, it is worth remembering that while overall GHG emissions declined in Europe by 22% (1990-2018), total transport emissions increased by more than 23%!

In the light of the above, and given the evidence of facts (countless operating biofuel plants and several others next to open), statements like "… biofuels are just agricultural subsidies by another name" (Sky News), seem totally meaningless and unacceptable. There are enormous interests at stake and not rarely public comments to enlarge the audience with a lack of secularity and objectivity.

Our contribution as EERA Bioenergy can be very important in making the discussion less toxic and the energy transition process more efficient, in the public interest. In a few days, we will have our usual year-end meeting where I hope we can pick this up and eventually write a position letter.

It is an epochal phase for the expansion of renewable energies

Andrea

EERA Bioenergy news in brief

EERA BIOENERGY LAUNCHES THE FIRST OPEN CALL "EERA BIOENERGY RESEARCHERS' EXCHANGE PROGRAMME"

On the 19th of October 2021, EERA Bioenergy launched the first call of the EERA Bioenergy Researchers' Exchange Programme. This programme has been designed by the Management Board as a Corona recovery measure for the EERA Bioenergy Community with the aim to support the exchange of researchers to promote excellent research in sustainable bioenergy and biofuels.

The applicants to the Researchers' Exchange Programme will be researchers (junior or senior) that belong to the staff of the associate or have any kind of legal link with the associate.

And proposals will be aligned with the latest version of the Strategic Research and Innovation Agenda (SRIA) of EERA Bioenergy, and make clear the interest of EERA Bioenergy in funding it.

The call was published on the EERA Bioenergy website and was announced by email.

SP4 ONLINE WORKSHOP ON STATIONARY BIOENERGY

EERA Bioenergy sub-programme 4 on Stationary Bioenergy, coordinated by Dr. Julien Blondeau, from the Belgian Energy Research Alliance (BERA), held an online workshop on the 16th of November 2021.

The main objective of this internal workshop was to update the latest trends and available information on stationary biomass uses and technologies to SP4 members.

Bioenergy highlights

BIOJETFUEL: INNOVATIVE VALUE CHAIN FROM POTATO RESIDUAL STREAMS TO AVIATION FUEL

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Summary

This project has mapped the value and production chain to produce biofuel for aviation (sustainable aviation fuel, SAF) using organic wet waste streams. The results of this project could be a first step in establishing new value chains in the Netherlands, where biomass and residual streams with high moisture content from primary agriculture and the food industry are used as a starting material for advanced biofuels.

The raw materials used as a model were waste and side streams produced during the processing of potatoes. These streams were used as a starting material for fermentation-based production of acetone, isopropanol, butanol and ethanol (ABE/IBE fermentation). These residual streams are inexpensive, plentifully available, and have a composition that lends itself well to fermentation. In view of their high moisture content, they are not very suitable for thermochemical-based biofuel production. The A/IBE fermentation mixture was chemically converted into hydrocarbons and then into aviation fuel after hydrogenation and fractionation. In this project, the technical aspects of the entire production and value chain for converting wet residual streams from agriculture into fuel were demonstrated through experimental research.

Biofuel production and properties

Figure 1. Potato residual streams used in the research. From left to right: steam peelings, grey starch, potato pieces. Photo: Wageningen Food & Biobased Research

The mix of alcohols and acetone produced from steam peels was used for condensation in a chemo-catalytic process after separation from the fermentation liquid, with mixtures of oxygenated hydrocarbons being the product (Fig. 2). For use as aviation fuel, an additional step is needed – hydrogenation, whereby the oxygen elements are removed to leave pure hydrocarbons. The hydrogenation of the condensation product was carried out under standard conditions for comparable biofuels. The result was a clear liquid that was analysed for relevant properties needed to allow for use as an aviation fuel (Fig. 2).

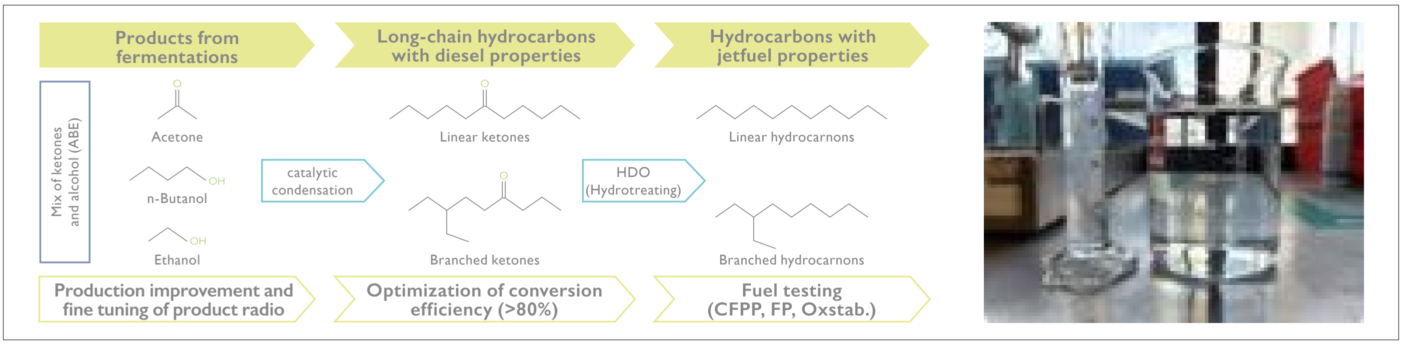

Figure 2. Diagram of the catalytic conversion of acetone, butanol, and ethanol mixtures in biofuel for aviation (left) and photograph of a sample of the end product after hydrogenation (right). Photo: Albemarle

The quality of the liquid produced was analysed according to the requirements of the American Society for Testing and Materials (ASTM) for new fuels. The analysis showed potential as a biofuel, without the addition of aromatic components. The product does not currently satisfy all requirements for aviation fuel, as the sample was produced on a laboratory scale and the limited volume could not be effectively upgraded as a result. Optimisation of some of the steps in the production process, and the addition of a final distillation step, are required in order to reduce the number of impurities and thus achieve a high-quality product.

Sustainability and economic aspects

The sustainability and economic feasibility of the new value chain were evaluated by means of an initial techno-economic analysis (TEA) of the different steps in the chain and lifecycle analysis (LCA). Two scenarios were studied for these analyses (Fig. 3):

a. Central processing of the biomass and production of the biofuel at a single location, i.e. transport of the feedstocks.
b. Decentralised processing of the biomass into ABE at the production location followed by further conversion of products to create biofuel at a central location, i.e. transport of the fuel precursors.

The Port of Rotterdam was chosen as the central location for the production of the biofuel as it possesses the infrastructure required for both the supply of raw materials and the distribution of the biofuel.

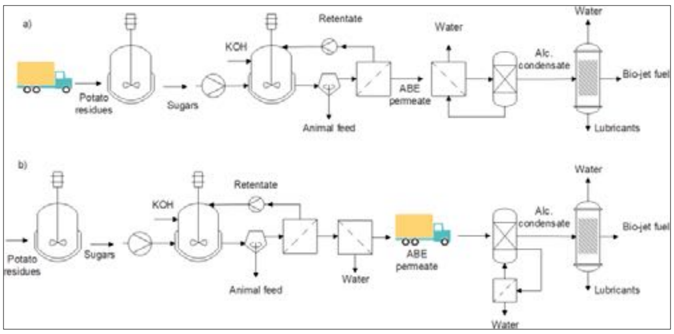

Figure 3. Diagrams of the value chains for production of biofuel. a) Central processing and production of biofuel; b) Decentralised processing of the biomass into ABE at the production location followed by production of the biofuel at a central location. Source: Moretti et al (2021)

From the techno-economic and environmental assessment performed, some conclusions are:

- The cost price is not yet competitive with existing SAFs produced using the HEFA process as the production process is more complex. Maybe replace sentence by The BIOJETFUEL concept(s) convert low grade relatively low-priced feedstocks into SAF. However, more processing steps are needed compared to a conventional HEFA process, resulting in higher overall production costs. The production costs are comparable to those of other types of alcohol-based biofuels produced using residual streams.
- The cost price of a biofuel produced with a 'central value chain' (Figure3a) is more favourable thanks to the option to use the hydrogen produced for hydrogenation, CO_2 storage, and a lower CAPEX thanks to upscaling. Reducing CAPEX costs by developing non-sterile low-cost fermentation systems will improve the economics of the process.
- Well-to-Wheel (WTW) estimation: a 50% GHG reduction when compared with conventional kerosene, we see potential to optimise the production process and to improve reductions in GHG so that a minimum GHG reduction of 65% can be achieved.

Publications

The public report of this project can be downloaded at www.wur.nl/wfbr (under Publications) or https://research.wur.nl/en/publications/innovatieve-waardeketen-van-aardappel-reststromen-tot-luchtvaartb

Moretti, C., et al (2021). From agricultural (by-) products to jet fuels: Carbon footprint and economic performance. Science of the Total Environment, 775, link: https://www.sciencedirect.com/science/article/pii/S0048969721009153

Funding

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Project partners

Fraunhofer Umsicht is a subcontractor of Wageningen Food & Biobased Research

GETTING MAXIMUM ENERGY OUT OF BIOMASS

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Researchers at the Paul Scherrer Institute PSI have started up the operation of a revolutionary pilot plant for the production of synthetic biogas. The HydroPilot project aims to produce methane in natural gas quality from wet biomass such as liquid manure, sewage sludge, or algae – much more efficiently than conventional biogas plants.

Figure 1. The HydroPilot system, which aims to increase the efficiency of biogas production. (Photo: Paul Scherrer Institute/Markus Fischer)

At the Paul Scherrer Institute PSI, a newly developed system went into operation that was able, in its first test runs, to utilise 60 to 75 percent of the energy contained in wet biomass – more than doubling the yield. Six years ago, with a small laboratory system called Konti-C, they demonstrated that it is possible to process one kilogram of biomass per hour with this technology. Since then, they have designed a larger pilot system that can handle 100 kilograms per hour. It went into operation in September 2021.

The special quality of the novel system lies in its handling of the water from the biomass. This is not seen here as an obstacle to energy utilisation but actually contributes to it, as a reaction medium. In a process called hydrothermal gasification, the sludge is put under a pressure of 280 to 300 bar and heated to 400 degrees Celsius. This hydrothermal breakdown prepares the biomass for the next step, in which a special catalyst comes into play as a reaction accelerator.

Another advantage of supercritical water is that no more salts can dissolve in it. This means that valuable nutrients such as phosphates and minerals contained in the biomass can be easily separated out with a salt precipitator and reused, for example in fertilisers. At the same time, this protects the catalytic component, which these substances would otherwise clog. To prevent other harmful substances from contaminating the tiny pores of the activated carbon filter, an additional filter has been installed upstream from the system that is now being put into operation: granules that react with sulphur and prevent it from causing problems.

At the end of this complex process, the HydroPilot system, like biogas plants, produces a mixture of methane, carbon dioxide, and hydrogen, from which the latter two are largely separated so that the methane can be fed into the natural gas network. Beyond that, only the recovered nutrients and pure water are produced. Remnants of minerals and heavy metals are processed in cement works or dumped. In terms of energy, the system is largely self-sufficient – it only needs power for the electrical operation of the pump.

Besides the usual types of biomass, HydroPilot can also process fermentation residues from biogas plants and extract their remaining energy content. The system could also be fed with high-energy algae, which, unlike maize, can be produced very efficiently without competing with food production.

The HydroPilot project is funded as part of the Swiss Federal Office of Energy SFOE's pilot and demonstration program, with additional significant contributions from TreaTech sàrl, KASAG Swiss AG, ExerGo sàrl, and Afry Schweiz AG. It is part of the Swiss Competence Centre for Energy Research BIOSWEET, funded by Innosuisse, and the Energy System Integration Platform at PSI.

Credits
Text: Jan Berndorff (adapted and shortened by F. Vogel)

UNDERSTANDING THE ASH TRANSFORMATION MECHANISM AND DEVELOPMENT OF NEW FUEL INDEXES TO PREDICT ASH BEHAVIOR DURING FIXED-BED COMBUSTION OF RICE HUSK AND RICE STRAW FOR BIOGENIC SILICA PRODUCTION

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Background

In order to meet the ambitious climate protection targets, biomass as a nearly CO_2-neutral energy resource needs to be considered to replace fossil fuels without competing with other material uses such as feed and fodder. Rice husk (RH) and rice straw (RS) as byproducts of rice production fulfil these requirements. RH and RS are widely available and while these residues are disposed by open field burning which causes regional environmental and carcinogenic health problems in rice harvesting areas. However, under controlled combustion conditions, pure silica (i.e. biogenic silica) can be generated from RH and RS in addition to the energy generation. High-quality silica has various industrial applications, such as adsorption of heavy metal ions, production of catalyst supports, zeolites, silica-based mesoporous material synthesis and drug delivery. For a specific application, the biogenic silica must fulfil dedicated requirements with respect to e.g. purity, crystallinity and porosity (Figure 1).

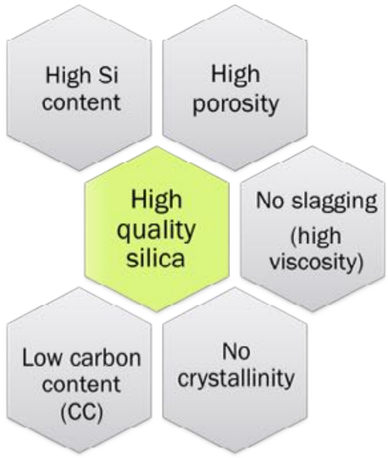

Figure 1. Parameters which are determining high-quality biogenic silica.

Besides process-related parameters, the composition of the biomass has a major impact and the limitation of critical ash forming elements is pivotal to obtain biogenic silica with high purity and to avoid ash melting that can hamper silica quality. Thus, in the 3 years Ph.D. project IRASIL, the ash chemistry of silica-rich biomass fuels was investigated to elucidate the ash transformation mechanism of Si-rich biomass fuels and to predict their slag formation as well as the biogenic silica quality simultaneously.

Ash transformation mechanism during fixed-bed combustion of rice husk and rice straw

The ash transformation of RH and RS during combustion was studied using both diffractometric and spectroscopic techniques, as well as viscosity and thermodynamic equilibrium calculations. Chemical pre-treatment and blending of RS with RH were considered to mitigate the ash slagging risk. These strategies improved the quality of the biogenic silica obtained after the combustion of these materials.

The results showed that the share of impurities in the biogenic silica alters the ash melting behaviour and viscosity of the silica-rich ashes. With an atomic structural model, the formation of different crystalline phases with lower melting points during the ash transformation of silica-rich materials can be described. Accordingly, the association of the silica network modifiers (i.e. alkali and alkaline earth metal cations), P, and Si cause the slag formation in the ashes at higher temperatures.

Furthermore, water washing, acid leaching, and blending of RS with RH strongly influenced the chemical composition of the ashes and improved ash melting behaviour. The analysis also revealed the correlation between the crystalline fraction and the porosity in silica-rich biomass ashes, as well as a crystallinity threshold.

New fuel indexes to predict ash behavior during fixed-bed combustion of rice husk and rice straw for biogenic silica production

Slagging indexes, which are calculated based on the fuel ash composition, can play an important role as simple tools to predict bottom ash slagging. However, in order to use a fuel index, it is pivotal to consider its relevant scope and its applicability according to its chemical background. Thus, a self-developed Python code was employed to find relevant fuel indexes for the prediction of slag formation based on experimental data from the combustion of RS and RH. Compared to the already existing fuel indexes found in the literature, a newly defined fuel index for the prediction of the slag formation between 800 and 1100 °C, i.e. (K+Na+Mg)/P in [mol/mol], is characterized by an average coefficient of determination of 0.9187 (Figure 2). The fuel index also resembles the behavior of typical modifiers of the Si network, such as K, Na, and P which are relevant for the ash transformation reactions which was described in the previous paragraph. With respect to the material application of silica-rich ashes, Si purity can also be classified with the new fuel index.

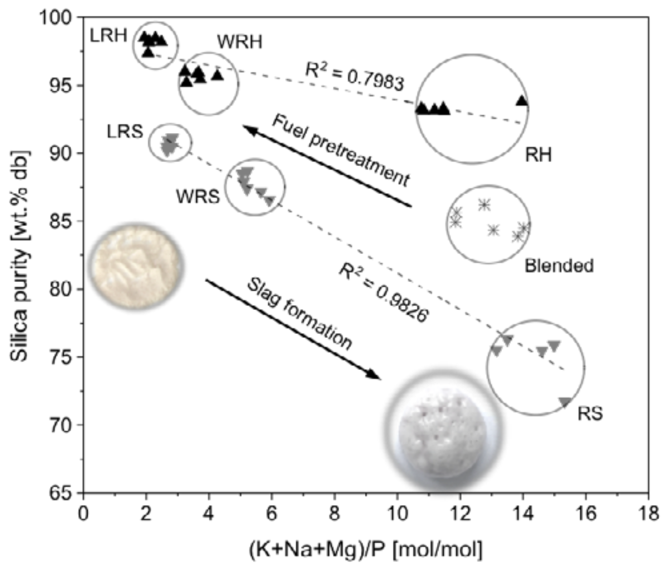

Figure 2. Silica purity as a function of the new new fuel index. Abbreviations: acid-leached rice husk (LRH), acid-leached rice straw (LRS), blended 50 wt.% db rice straw with 50 wt.% db rice husk (Blended), rice husk (RH), rice straw (RS), water-washed rice husk (WRH), water-washed rice straw (WRS).

Acknowledgements

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DBFZ

UNIVERSITÄT LEIPZIG

Bundesministerium für Ernährung und Landwirtschaft

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BOĞAZIÇI UNIVERSITY INITIATES EUROPE'S FIRST CARBON-NEGATIVE BIOREFINERY AND KICKS-OFF INTEGRATED BIOREFINERY CONCEPT FOR BIOECONOMY DRIVEN DEVELOPMENT PROJECT (INDEPENDENT)

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Project INDEPENDENT was developed to promote the international competitiveness of SMEs and entrepreneurs in the field of algal biotechnology, and it was built on the axis of transferring the R&D competence of Boğaziçi University, which has been working in the field of algae biotechnologies for many years, and the international experience of Boğaziçi University Technopark Inc. to commercial-scale production.

Figures 1. INDEPENDENT project team

The implementation process of Project INDEPENDENT began on December 18, 2019, supported by the EU Instrument for Pre-accession Assistance Programme (IPA) as part of the Competitive Sectors Programme conducted by the Turkish Ministry of Industry and Technology, Directorate-General for EU and Foreign Affairs, EU Financial Programmes Department.

Designed to create a competent Center of Excellence (CoE) in its own field in Turkey and Europe, Project INDEPENDENT focuses on the development of innovative, high value-added and eco-friendly products and technologies from algal biomass, which stand out as being distinctive and important among sustainable resources, for locomotive industries.

Project INDEPENDENT aims to obtain products and technologies for energy and health sectors, the main current account deficit items of Turkey, with an integrated production system based on a bioeconomy-oriented growth model, from entirely algae-based natural resources without being dependent on fossil resources.

The project's target groups are innovative SMEs in relevant sectors, R&D companies, start-ups, and technology development zones.

Biofuels such as notable bio-jet fuel, dietary food supplements, pharmaceutical ingredients, animal feed practices, and organic biofertilizers are being developed from algae cultivated in 80 m^3 outdoor ponds and 30 m^3 indoor production reactors installed at an R&D area and a production site of 2,500 m^2. The fully wind-powered plant is the first carbon-negative integrated biorefinery in Turkey and Europe.

Approximately 1,200 tons of wet algae mass per year will be processed at the plant. And as part of the Competitive Sectors Programme, R&D consultancy, project development, know-how and technology transfer, equipment design, test and analysis services will be provided to the SMEs operating in various sectors, particularly in food, energy, environment, and health sectors, and industrial development will be ensured by creating jobs.

Figures 2. Integrated Biorefinery Concept for Bioeconomy Driven Development (INDEPENDENT)

In line with these goals, three sectoral seminars, three workshops, two technical visits abroad, and an international conference will be held.

The project site already supports the EU and Turkey's Green Deal goals with its bioenergy practices developed based on zero waste while working with 100% renewable wind energy. Algae-based and highly nutritious food products directly contribute to the "farm to fork" strategy without using fertile agricultural land and offer innovative and sustainable solutions.

Project INDEPENDENT creates a center of excellence in the international arena while increasing the national R&D capacity in the field of algal biotechnologies. It's leading the way in the development of algae products and technologies that can directly contribute to the EU's blue growth and circular economy programmes with its integrated biorefinery model, and directly contributes to nine of the United Nations Sustainable Development Goals committed to being achieved by 2030.

MARKET UPTAKE SUPPORT FOR INTERMEDIATE BIOENERGY CARRIERS - MUSIC PROJECT RESULTS

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The MUSIC project is a HORIZON2020 initiative that aims to facilitate the market uptake of three types of intermediate bioenergy carriers (IBC's: torrefied biomass, fast pyrolysis liquid, and microbial oil) by developing feedstock mobilisation strategies, improved logistics and IBC trade centres.

Market Uptake Support for Intermediate Bioenergy Carriers

Scientific innovation and relevance - Biomass, such as agricultural or forest residues, can be processed into energetically denser, storable and transportable intermediary products analogous to coal, oil and gaseous fossil energy carriers. IBCs may replace fossil fuels in the energy (power & heat) production sector, the transport sector, within energy-intensive industries (e.g. steel production) and for the production of bio-based materials. IBCs contribute to energy security, reduce greenhouse gas emissions, and provide a sustainable alternative to fossil fuels in Europe.

The core actions in MUSIC include: Setting up case studies to determine the most cost-effective routes for biomass and IBC mobilisation. Evaluating policy framework conditions, technologies, and markets for IBCs.

Involving, engaging, and supporting stakeholders by sharing knowledge on intermediate bioenergy carriers. Assessing regional biomass flows, using supply chain and optimisation software and tools. Improving the trade of IBCs both regionally and on EU level. Wider dissemination of project results and findings, including white papers on IBC technology state of the art and studies on sectoral deployment perspectives. Results of MUSIC will be synthesised, and strategies and recommendations on supply chain development will be developed based on the results.

The MUSIC project is coordinated by BTG Biomass Technology Group, The Netherlands. The consortium consists of sixteen partners from seven European countries: Sweden, Finland, The Netherlands, Belgium, Germany, Italy, and Greece. The partnership has strong industrial participation, comprising three industry-driven network organisations and seven industry partners, including Europe's leading IBC technology developers, and is capable to achieve broad relevance and transferability of all results in the European bioenergy sector.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 857806

100% RENEWABLE HEATING AND COOLING IN EUROPE BY 2050 - IMPLEMENTATION OF BIOENERGY RESEARCH AND INNOVATION IN THE EYES OF RHC-ETIP STAKEHOLDERS

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The European Technology and Innovation Platform on Renewable Heating and Cooling (RHC-ETIP) has recently launched its Strategic Report on Implementation of Research and Innovation Priorities and Deployment Trends of the Renewable Heating and Cooling Technologies (https://www.rhc-platform.org/publications/). The report succeeds the Strategic Research and Innovation Agenda (SRIA) for 100% renewable heating and cooling (H&C) in cities, districts, buildings and industries in Europe by 2050 that was published in 2020, which was following up their Vision 2050 from 2019. This concludes the planned trilogy of strategic documents, where the overarching goal has been to showcase that, and how, 100% renewable-based and climate-neutral heating and cooling in Europe can be achieved within 2050. However, this demands a strong will from all actors within and connected to this very important energy sector in Europe, towards realising the possibilities that already are available at hand and to further research, innovate, develop and implement the whole array of renewable-based heating and cooling options to cover the actual future needs within the various and different sectors in a diversified Europe.

Figure 1. The RHC-ETIP trilogy on climate-neutral, 100% renewables-based, heating and cooling in Europe.

When it comes to bioenergy, it is by far the most important renewable energy source (RES) in Europe for heating purposes today (16.7%, in 2018), while solar thermal (0.5%), geothermal (0.2%) and ambient heat through heat pumps (2.3%) account for the bulk of the rest (Bioenergy Europe, Statistical Report 2018). About 80% of the heating and cooling is carried out using non-renewables and replacing this is the grand challenge of the future. Some believe that electrification is the solution to this grand challenge if considering electricity storage or conversion of excess intermittent electricity to e-fuels. However, the enormous scale of renewable-based electricity generation needed for this to happen implies great challenges with respect to electricity availability when needed or alternative storage capacity, electricity grid expansion and electricity transfer capacity between domestic regions and between countries in Europe.

Therefore, 100% renewable heating and cooling in Europe by 2050 should be based primarily on non-electricity options in combination with minimising the overall energy need for heating and cooling and utilising excess heat and ambient heat sources. This will reduce the need for costly electricity grid investments and improve the security of the energy supply. Due to the diversity in resources, possibilities and needs on local and regional levels in Europe, no solution fits all. This is also the case in the bioenergy area.

The role of bioenergy in reaching the envisioned 2050 targets is very important, and even if being the most important and implemented renewable-based heating and cooling technology today, there are still research and innovation needs connected to this sector. RHC-ETIP estimates that bioenergy could account for more than 50% of the total renewable heating and cooling need in a 100% renewable heating and cooling scenario and that this could be achieved already in 2040.

The RHC-ETIP Implementation report, where stakeholders have been actively engaged, states:
"This report offers an insight into the Renewable Heating and Cooling (RHC) community's research, development, and innovation activities and trends. Its findings indicate that priorities identified in the previously published RHC SRIA are well aligned with the RD&I priorities of the RHC stakeholders and are to a large extent being implemented."

"The report indicates a clear trend towards cross-cutting technologies, sector coupling, and integrated or hybrid systems, which would increase optimisation and efficiency. Findings also showed a trend towards greater inclusion of and cooperation with other renewable technologies, particularly hydrogen-based renewable energy systems but also encompassing waste heat recovery, district heating (DH) and district cooling (DC), and thermal energy storage. Finally, RHC sectors are looking to increase the digitalisation of their technologies, such as through smart control distribution systems."

Among the many recommendations in the report:

Technologies of heat and cold storage and distribution: "TES is a major aspect of successful RHC implementation and requires adequate support and funding to increase the market and upscale the solution"

Policy and Social Innovation: "Further implementation of RHC priorities also requires certain policy and social innovation measures, primarily through proper support measures."

Digitalisation, operation and system flexibility: "Digitalisation is also an important focus area for stakeholders, who support the engagement/dissemination of the use of open-source platforms to reduce the cost of secure, advanced control strategies for RE systems in buildings."

Innovative financing schemes and new business models: "Stakeholders also emphasised the need for innovative financing measures for RHC implementation. This not only includes funding availability but also strong dissemination and awareness-raising regarding technical assistance for project preparation."

Circularity: "Stakeholders also emphasised circularity across the value chain in the renewable energy system, from building capacity to financial support in demonstration projects to establishing businesses with waste heat around the district heating and cooling networks."

100 % RHC in Buildings: "Some stakeholders specifically pinpointed the applicability of RHC for cost-effective retrofitting of historical or special buildings as well as RHC integration in new buildings. The initial hurdle would concern appropriate incentivising, such as employing strong incentive programs for end-users to retrofit old existing solutions as well as effective communication of new RHC solutions to building owners and designers."

100 % RHC in Districts: "Stakeholders stressed the need for energy efficiency, sustainability, and circularity. On a district level, RHC planning is essential. District heating and cooling should integrate large-scale heat pumps, including those using geothermal and other low-temperature resources, and energy storage systems."

100 % RHC in Cities: "Stakeholders emphasized the importance of long-term storage facilities and the accompanying R&D needed to develop that capacity. Cities also require circularity, the interconnection of the renewable energy process to integrate all energies, prevent waste, and bring down total energy use."

100 % RHC in Industries: "Stakeholder feedback is essential for RHC integration across the wider industry. A prominent topic for stakeholders is absorption." - i.e. using waste heat for cooling

That mentioned, the bioenergy community should take note of a relatively moderate stakeholder engagement with respect to bioenergy, i.e. other renewable-based heating and cooling technologies are attracting more attention. This can be interpreted as bioenergy being very well established and developed, which is true, but it could also be seen as a drawback with respect to further bioenergy research, innovation, development and implementation needs in the heating and cooling sector.

The interested reader is encouraged to read the report and the detailed recommendations.

The main conclusion from the three reports can be simplified be said to be:

The heating and cooling needs of Europe in 2050 can be 100% covered by renewable energy through the increased implementation of existing technologies and continuous research and innovation efforts. It is a clear trend towards cross-cutting technologies, sector coupling, and integrated and hybrid systems, increased use of energy storage and increased digitalisation and smart systems.

Even though the role of bioenergy is believed to remain very important in the foreseeable future, there is a significant improvement potential throughout the many bioenergy value chains to increase performance, reduce emissions and reduce costs. But, important, there is also a great need to showcase that bioenergy should take such an important role in a 100% renewable-based heating and cooling sector in the future. In this aspect maximising sustainability through the many bioenergy value chains is key. After all, our limited biomass resources should in the future cover many needs, and biomass is our only renewable carbon source. It then becomes a matter of substitution effect (fossil-based energy and material substitution) and/or vacuum cleaning effect (net removal of CO_2 from the atmosphere, e.g. putting biocarbon in the soil and bioenergy CCS).

In this picture, EERA Bioenergy should have a very important role to play, through facilitating needed research, as defined in its SRIA, and bringing key research actors in Europe together in a joint effort to develop and optimise the use of biomass for various energy purposes, including heating and cooling.

However, this should be done complementary to and in companionship with an increasing number of other actors within a wide range of sectors working towards the same overall goal, a 100% climate-neutral Europe within 2050. COP26 in Glasgow has shown a continued will to go there, but there are many hurdles to overcome in the less than 30 years now remaining. The clear and present danger of global warming is today evident for all, and it is a global dilemma. It requires global action on an unprecedented scale, where the efforts and achievements in Europa will show the path forward also outside Europe.

EERA Bioenergy has an important role to play towards this future through research and development as a key in optimising the sustainability of bioenergy technologies and value chains, and in the search for new technologies of the future, while in parallel increased implementation of current bioenergy technologies will be very important to reach the 100% climate neutrality goal.

To get there, there is no time, or biomass, to waste.

IEA BIOENERGY TASK42 – BIOREFINING IN A CIRCULAR ECONOMY

Major results 2019-2021 & workplan 2022-2025

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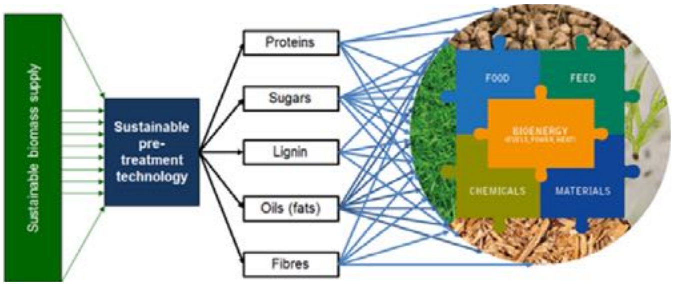
Objective – The aim of IEA Bioenergy Task42 'Biorefining in a Circular Economy' is to facilitate the commercialisation and market deployment of environmentally sound, socially acceptable, and cost-competitive biorefinery systems and technologies, and to advise policy and industrial decision-makers accordingly. Task42 provides an international platform for collaboration and information exchange between industry, SMEs, GOs, NGOs, RTOs and universities concerning biorefinery research, development, demonstration and policy analysis. This includes the development of networks, dissemination of information, and provision of science-based technology analysis, as well as support and advice to policy makers, involvement of industry, and encouragement of membership by countries with a strong biorefinery infrastructure and appropriate policies. Gaps and barriers to deployment will be addressed to successfully promote sustainable biorefinery systems market implementation.

IEA Bioenergy Technology Collaboration Programme

Work scope – Biorefining is one of the key enabling strategies of the Circular Economy, closing loops of raw biomass materials (re-use of agro-, process- and post-consumer residues), minerals, water and carbon. Therefore, biorefining is the optimal strategy for large-scale sustainable use of biomass in the BioEconomy. It will result in cost-competitive co-production of food/feed ingredients, biobased products and bioenergy combined with optimal socio-economic and environmental impacts (reduced GHG emissions, efficient use of resources, etc.).

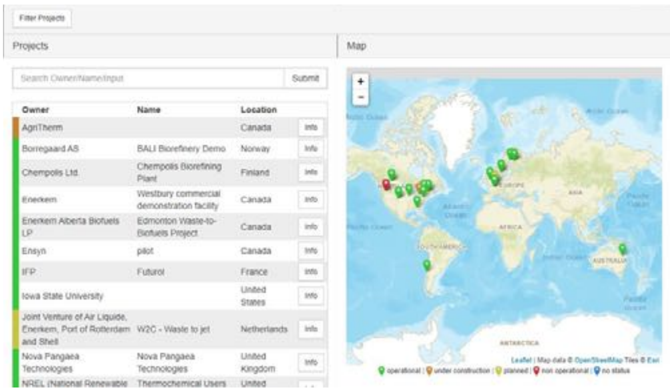


Major results 2019 – 2021 triennium
Reports:

- Technical, Economic and Environmental Assessment of Biorefineries https://task42.ieabioenergy.com/publications/tee-2019/
- Biorefinery country reports: Australia, Austria, Denmark, Germany, Italy, Netherlands, Sweden https://task42.ieabioenergy.com/document-category/country-reports/
- Biorefinery country updates: https://task42.ieabioenergy.com/document-category/countryupdates/
- Bio-Based Chemicals: A 2020 Update: http://task42.ieabioenergy.com/publications/bio-based-chemicals-a-2020-update/
- Alternative sustainable carbon sources as substitutes for metallurgical coal: http://task42.ieabioenergy.com/publications/alternative-sustainable-carbon-sources/

Factsheets:

- Factsheets of Biorefinery Concepts http://task42.ieabioenergy.com/document-category/factsheets/
- Global mapping system and database on biorefineries: https://task42.ieabioenergy.com/databases/



Various lectures at international conferences:
https://task42.ieabioenergy.com/document-category/presentations/

Various webinars:
https://task42.ieabioenergy.com/document-category/webinars/

Coming up soon, please check the Task42 website on their availability:

- **Global Biorefinery Status Report (GBRSR):** Q1 2022; see also the already published linked **Biorefinery Outlook project** report published by the EC that used and builds further on former Task42 results: **https://www.e4tech.com/biorefinery-outlook.php**
- **Report on Sustainable Lignin Valorisation**
- Slide deck **"Case studies on Barriers and Incentives for Biorefinery Market Diffusion"**

Workplan 2022 – 2024

In the 2022-2024 triennium, the following 8 countries will cooperate in Task42: Australia, Austria, Denmark, Germany, Ireland, Italy, Netherlands (coordinator) and the USA. The Task activities will focus on:

- Techno-Economic Environmental (TEE) assessment of biorefinery value chains
- Update and maintain the Global Biorefineries Atlas portal (WEB GIS), i.e. add new features to allow privileged users to insert new biorefineries and update them, and provide Web Map Service (WMS) and Web Feature Service (WFS) facilities
- Current status of biorefinery deployment and best practice identification
- BIOCarbon-to-Chemicals by Integration of biorefineries and green hydrogen (BIOCCI), i.e. integration of biorefineries with renewable electricity systems
- Systems perspective lignocellulosic waste and side streams based biorefineries in a circular economy

Major deliverables will be: biorefinery factsheets, an operational GMS-based Global Biorefineries Atlas portal, WMS and WFS services, biorefinery country reports, green biorefineries status report, case study on biorefinery bottlenecks and solution strategies, report on a techno-economic assessment of the integration of green hydrogen and biorefinery processes, synthesis report on biorefineries based on lignocellulosic waste and side streams and their potential contribution to a circular economy, visual communication materials illustrating 1-3 key messages and biorefinery myth-busting.

Depending on the specific deliverable concerned, target groups will vary from industry/SMEs to UNIs/RTOs to GOs/NGOs to the general public to Task42/ExCo members. The goal is to involve more stakeholders in Task42 and to increase its platform role (central international scientific platform for information exchange).

https://task42.ieabioenergy.com/

WaysTUP! PROJECT – TRANSFORMING URBAN WASTE INTO VALUABLE PRODUCTS



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WaysTUP!
VALUE CHAINS FOR DISRUPTIVE TRANSFORMATION OF URBAN BIOWASTE INTO BIOBASED PRODUCTS IN THE CITY CONTEXT

The world today is facing a severe environmental crisis that is questioning the very fundamentals of our production and consumption systems. Circular economy emerges in this context as a possible solution, establishing a more sustainable framework for new productive models. Prevention and reduction of waste through reuse and recycling is one of the pillars of this philosophy, as well as the idea of waste as a resource.

Organic matter accounts for a large fraction (about 50%) of municipal waste and can be used as feedstock for the production of high added value bioproducts, in line with the EU Bioeconomy Strategy. This is the idea behind WaysTUP!, a project funded by the European Union under the Horizon 2020 programme (Grant no. 818308). This project is being developed by a multi-disciplinary consortium of 26 members from 9 different European countries, coming from both the academic and the industrial sectors.

In WaysTUP! project, several potentially interesting biowastes (i.e.: meat and fish by-products, spent coffee grounds, source-separated biowaste from households, used cooking oils, cellulosic rejection material and sewage sludge) are identified and characterised. The objective is to find the best valorisation technology for each of them, being the targeted end products food and feed additives, active peptides and proteins, coffee oil, biosolvents, bioethanol, bioplastics and biochar. The developed processes are being demonstrated at a pilot scale in facilities located in eight different European cities from Spain, Italy, Czech Republic, United Kingdom and Greece.

One of those pilot demonstrations is taking place at PERSEO Bioethanol® plant in L'Alcudia (Spain). The feedstock chosen for this pilot case are the cellulosic rejection streams coming from waste and wastewater treatment plants, which are provided by Area Metropolitana de Barcelona (AMB). The Advanced Biofuels and Bioproducts Unit from the Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) works in close collaboration with the owners of the plant, PERSEO Biotechnology S.L., to design and optimise a biochemical transformation process able to convert these cellulosic rejections into bioethanol, a product that could be later marketed as biofuel, used for industrial applications or be employed as a chemical platform to build other interesting compounds. In this regard, the last partner involved in this pilot case, TBW Research, investigates the production of ethyl lactate from the bioethanol produced in the plant.

However, the implementation of circularity cannot be done exclusively from the productive sector, but it must involve citizens and policy makers too, in order to drive a real change. The project WaysTUP! takes into account the multiple facets of the problem and aims not only at the demonstration of innovative technologies that can lead to new profitable business models, but also tries to promote a change of mindset among policy actors and the general public that results in regulatory and cultural changes.

More information about the project and all the relevant updates can be found on its webpage (https://waystup.eu/about/) or through social media.

Figure 1. Cellulosic rejections from waste and wastewater treatment plants upon their arrival at CIEMAT

Figure 2. PERSEO Biotechnology semi-industrial plant L´Alcúdia (Valencia-Spain)

TURNING THE POLISH ŁÓDZKIE REGION (BIO)CIRCULAR: LAUNCH OF THE PROJECT FRONTSHIP

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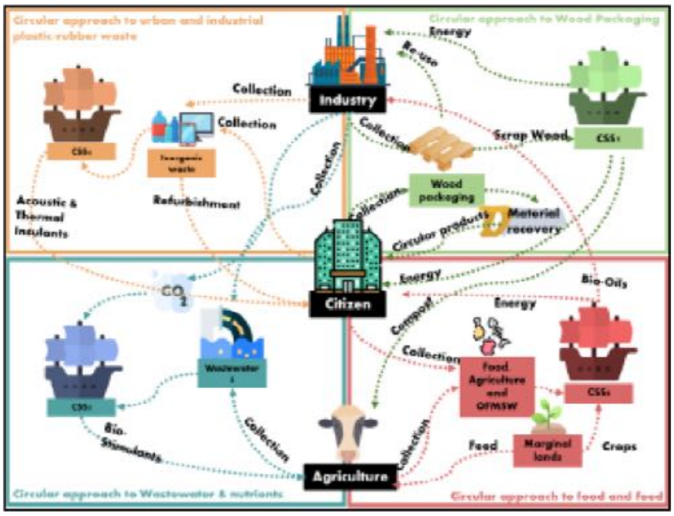
Together with a European consortium of 34 partners from 9 European countries, LNEG will be contributing to the ongoing transformation of the Łódzkie region in Poland into one of Europe's leading regions in the field of circular (bio)economy in the framework of the project FRONTSHIP (acronym for: A FRONTrunner approach to Systemic Circular, Holistic & Inclusive Solutions for a New Paradigm of Territorial Circular Economy). Out of 92 circular economy projects that applied under a recent call of the Horizon 2020 programme, FRONTSHIP is one of the only four projects approved. It will be funded by the European Union with a grant of up to €16 112 118,01 over the next four years.

The project has its central point in the Polish region of Łódzkie, a region which, on the one hand, has traditionally heavily relied on coal extraction and, on the other hand, has pioneered circular (bio)economy since the early 2000s. FRONTSHIP will contribute to furthering the green transition of the Łódzkie region away from its current linear economic foundation, towards the region's decarbonisation and territorial regeneration. It will do so by demonstrating four Circular Systemic Solutions (CSSs) in the region. It is the project's vision to manifest how circular (bio)economy models can act as catalysts for regional socio-economic growth. Each Circular Systemic Solution targets an economic sector that is aiming to decarbonise: Wood Packaging, Food & Feed, Water & Nutrients, and Plastic & Rubber Waste.



The first CSS focuses on the valorisation of wood packaging waste through refurbishment, reuse, recycling, energy recovery, and material valorisation, thus creating a new value chain. Low-quality wood and wooden residues will be gasified to produce heat through gas combustion, as well as char. Flue gases will be treated, and CO_2 captured. Char, pigment/filler, and CO_2 will in turn be used in the other three CSSs as compost, in the plastic industry, and decarbonising foaming processes respectively. The second CSS aims to transform food, agricultural, and municipal biowaste into circular bioproducts (biodegradable bio-lubricants, compostable bioplastics, bio-oils, animal feed, lignin, compost, and biomethane). CSS number three will demonstrate a closed water cycle with the goal of reusing wastewater more than once and cleaning it before giving it back to the environment, all the while extracting nutrients and producing bio-stimulants from the wastewaters. The fourth and final CSS will promote and apply a circular approach to industrial and urban plastic waste to produce sustainable insulating materials, increasing energy efficiency at affordable costs and decarbonising the foaming processes by utilising neutral CO_2 instead of fossil-based blowing agents.

Each developed circular systemic solution will furthermore be highly replicable. A feat that will be proven during the project by their implementation in four other European regions: Campania (Italy), Sterea Ellada (Greece), Norte (Portugal), and Friesland (the Netherlands). Through the development of the circular systemic solutions, FRONTSHIP will create Circular Regional Clusters that involve a wide range of local, regional, and national stakeholders, both from the public and private spheres.

The project consortium is comprised of public regional authorities, both large and small and medium enterprises, research institutions and technology centres, NGOs, and European associations. Therefore, the consortium itself represents key stakeholders within the value chain of circular economy and the identified fields targeted by circular systemic solutions.

More information is soon to be found on the project's website: www.frontsh1p.eu

For more information, feel free to contact EURADA, the project's communication partner: frontsh1p@eurada.org

CIP - COMPETITIVE INSECT PRODUCTS

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Insects are a valuable alternative protein source for livestock-, aquaculture- and pet feed production and can also supply raw materials for numerous technical applications. The large-scale production of insects is a new technology. There are only a few companies in the world with insect production capacity on an industrial scale. The most commonly farmed insects are mealworm, cricket and black soldier fly (BSF). The BSF is a feed generalist and able to convert a wide variety of biomass and organic residues into high-quality insect protein and fat. Insect farming represents a promising building block of a future bioeconomy because, against the background of limited resources, the multiple-use and recycling of biomass in utilization cascades are increasingly coming into focus. The carbon footprint of insect products is particularly favorable when residual materials are used as insect feed and the process heat requirement is covered by excess heat or by renewable energy. Another advantage of insect protein production is that the water and land requirements and the use of feedstuffs for insect farming are relatively low, and residual materials can be returned to the nutrient cycle as biogas substrate or farm fertilizer.

Ways to improve the competitiveness of insect-based products are for example the utilization of sustainable and cost-effective raw materials, the implementation of cost-efficient and sustainable production processes, the utilization of renewable energies in the production process and the economic use of residue materials and by-products from insect farming.

The **Competitive Insect Products** (CIP) project aimed at: (1) - optimization of the Black soldier fly (BSF) rearing process and reduction of substrate-side production costs, (2) development of new utilization paths for insect products, (3) optimization of the material flow and energy and residue management of BSF rearing through an integrated plant concept as an add-on for existing biogas plants.

Important outcomes of this project are a feedstock database with information on the feedstock suitability of a variety of different raw materials for BSF rearing and an overview of the substrate side production costs. Based on the results of rearing tests in the laboratory and pilot-scale, the most favorable raw materials tested were sugar beet leaves and distillery stillage which resulted in substrate side production costs between 400 and 700 € / t dry BSF meal. However, transport and storage costs were not considered.

Further, a feasibility study was carried out ve integrated concept of biogas plant and insect farm. Insect farming requires process heat for heating and product processing. Residues of the production process such as feed leftovers and insect dung still have a high organic content. The combination of insect farming and biogas production enables several synergetic potentials as can be seen in Figure 1. Anaerobic digestion tests confirm the basic suitability of insect farming residues as feedstock material for biogas production.
The anaerobic digestion process also represents a way of hygienization. In laboratory digestion tests insect farming residues showed similar digestion characteristics as other residual materials from animal husbandry.
The results of the CIP project regarding the characterisation of the individual insect raw products led to the follow-up project **BioLube (FKZ: 031B1111A/B)**, which aims at the development of biobased and biodegradable lubricants from insect fat.

Acknowledgments

The CIP project was conducted in close collaboration with Hermetia Baruth GmbH, Pilot Pflanzenöltechnologie Magdeburg e. V. and Danico GmbH and was funded by the Federal Ministry of Education and Research (FKZ: 031B0338A/B).

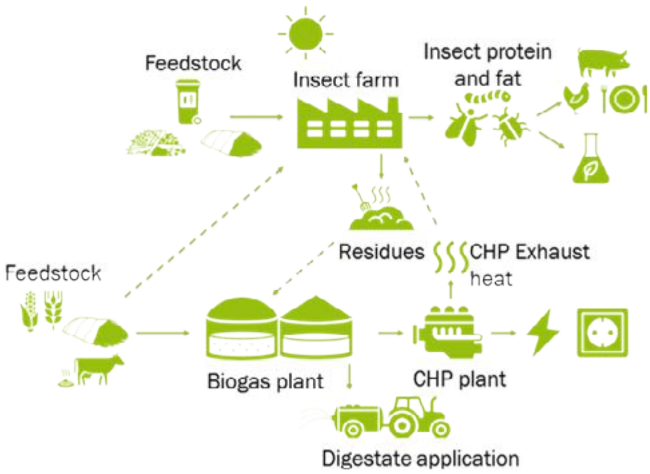


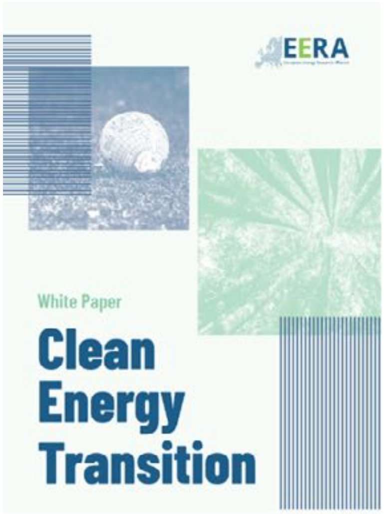
Figure 1: Integrated concept of insect farming and biogas production

Project consortium:

For further information:
https://www.dbfz.de/CIP
https://www.dbfz.de/BIOLUBE

Useful information

EERA's White Paper on the Clean Energy Transition launched at a high-level event in Brussels



On 20th October 2021, EERA launched its [White Paper on the Clean Energy Transition], in the company of policymakers, energy and climate experts, members of the research community and other relevant stakeholders.

This White Paper on the Clean Energy Transition constitutes EERA's landmark contribution to advancing understanding of the profound implications such a transition will have beyond technology for our economy and our society. It builds on existing knowledge and provides an instrumental conceptual framework to support policymakers in defining robust, actionable and efficient pathways towards a socially fair, environmentally sustainable, competitive and climate-neutral society.

The paper proposes that the "Clean Energy Transition" (CET), a concept central to EU energy and climate policies, extends well beyond climate neutrality to incorporate the essential dimension of social fairness and link it more broadly to the concepts of global sustainability and societal resilience. Consequently, beyond its core technological aspects, the transition entails socio-economic elements and calls for an interdisciplinary approach to policymaking.

The framework proposed in this paper adopts a holistic approach, based on addressing the sources of greenhouse gas emissions across all economic sectors. It reminds us that while energy use represents about 75% of anthropogenic greenhouse gas emissions, only a third of those originate directly from the energy sector. Achieving climate neutrality thus entails a much broader challenge than decarbonising the energy sector alone. Such an approach contrasts starkly with a more traditional, technology-centric approach to the CET. It suggests that decarbonising the energy sector should be regarded as an integral part of a broader transformation of the entire economy. Because of the profound societal implications of the transition, this White Paper stresses the critical role of social sciences and humanities in ensuring the CET is designed for and driven by citizens. It highlights the crucial importance of building collective support and the commitment of all stakeholders to a new co-created societal model.

Biogas sector launches 1st overview on European biogas and gasification technologies

The European Biogas Association (EBA) is launching the first comprehensive categorization of European Biogas and Gasification Technologies, aimed at giving visibility to high-quality European products and services from the biogas sector. Global leaders are now discussing the next steps in the climate agenda at the COP26 summit and the urgent need for deep and sustained reductions of greenhouse gas emissions. The EU biogas sector is strongly committed with climate-neutrality and is ready to deploy increased shares of renewable gas, supported by recognised technology applications and services.

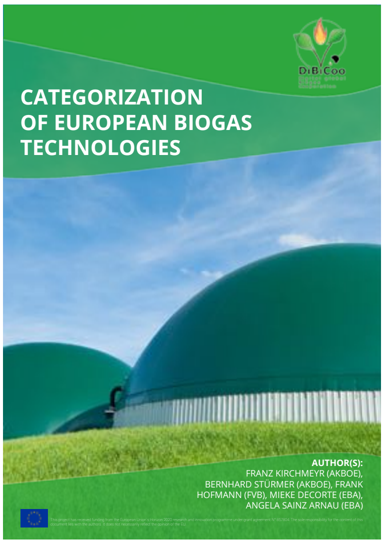
The sector is well developed in Europe and is ready to scale up. According to data from the European Biogas Association, the combined production of biogas and its upgraded from, biomethane, could cover today 4.6% of the whole EU gas demand. By 2050, about 30-40 % of EU gas needs can be met by biogas/biomethane. As one of the global leaders in biogas production, European producers are now seeking new ways to cooperate with third countries to support the deployment of biogas outside EU borders.

The EBA, together with the German Biogas Association (FvB) and the Austrian Compost and Biogas Association, are already working on this direction in the framework of the DiBiCoo EU Project. One of the fruits of this cooperation is the Categorization of European Biogas and Gasification Technologies presented today. The overview is divided into 2 different publications, one dedicated to anaerobic digestion (AD) and the other one focused on gasification. These guides are intended as a solid starting point in learning about anaerobic digestion and gasification.

After the introductory section about Anaerobic Digestion (AD), the first publication follows the logic of the biogas production process, progressing from on-site feedstock storage options and pretreatment requirements to the various digester technologies. Special, detailed chapters are included on issues of particular relevance for all biogas plants (including, for example, a chapter on measurement, control and regulation technologies). The upgrading of biogas to biomethane quality is introduced, along with other biogas applications, such as its GHG mitigation potential and use in Combined Heat & Power (CHP) plants.

The second publication, tackling gasification, provides an introductory section on biomass conversion processes. The text follows the logic of the wood gas production process, progressing from the various gasifier technologies to feedstock specifics, storage, and necessary pre-treatment. Special, detailed chapters on issues of particular relevance for all gasification plants are included (e.g. on measurement, control and regulation technologies).

The deployment of renewable energy, including biogas, to reduce greenhouse gas emissions at a global level is urgent. Global cooperation in the framework of projects such as DiBiCoo is essential to speed up this process with the implementation of new renewable energy projects, ensuring the best possible future for our next generations. The value of biogas is heightened in scenarios such as the IEA Sustainable Development Scenario (SDS), which meets in full the world's goals to tackle climate change, improve air quality and provide access to modern energy.



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Introducing IRODDI - Driving the shift towards circular bioeconomy

IRODDI (Innovative Refining process for valorization of vegetable Oil Deodorizer DIstillates) is an ambitious project, funded by the Bio-Based Industries Joint Undertaking (BBI JU) under the European Union's Horizon 2020 Research and Innovation programme, aimed to develop new biobased products using Free Fatty Acids (FFAs) contained in the residual side streams of the refining process of oils and fats, as well as develop innovative technologies for isolation of valuable minor compounds contained in them using softer operational conditions. It represents a clear example of the application of circular bioeconomy, as a sustainable production model opposed to the linear economy based on fossil fuels.

The objective of IRODDI project is to valorize the residual streams from the refining processes of vegetable oils by turning them into higher added value bio-based products with specific properties. IRODDI is a benchmark in boosting a change focused on new sustainable and circular processes based on the bioeconomy, optimization of the use of resources, and "doing more with less."

BIOPLAT, the Spanish Technology and Innovation Platform "Biomass for the Bioeconomy", is in charge of the Communication, Dissemination and Exploitation Work Package and has been in charge of the introductory video of the project, which has been developed with the most innovative 3D techniques on the market. It has been a great challenge to explain and contextualize such a scientific-technical project in a friendly language, understandable to the whole of society. However, the result has been very satisfactory, even exceeding the expectations of the members of the consortium.

Learn more here about IRODDI.

Launch by the United States, the European Union, and Partners of the Global Methane Pledge to Keep 1.5C Within Reach

On 2nd November 2021, the United States, the European Union, and partners formally launched the Global Methane Pledge, an initiative to reduce global methane emissions to keep the goal of limiting warming to 1.5 degrees Celsius within reach. A total of over 100 countries representing 70% of the global economy and nearly half of anthropogenic methane emissions have now signed onto the pledge.

The strong global support for the Pledge illustrates growing momentum to swiftly reduce methane emissions-widely regarded as the single most effective strategy to reduce global warming. Countries joining the Global Methane Pledge commit to a collective goal of reducing global methane emissions by at least 30 percent from 2020 levels by 2030 and moving towards using the best available inventory methodologies to quantify methane emissions, with a particular focus on high emission sources. The countries who have joined the Pledge represent all regions of the world and include representatives from developed and developing nations.

The U.S. and EU were also proud to announce a significant expansion of financial and technical support to assist implementation of the Pledge. Global philanthropies have committed $328 million in funding to support the scale-up of these types of methane mitigation strategies worldwide. The European Bank for Reconstruction and Development, the European Investment Bank, and the Green Climate Fund have committed to support the Pledge through both technical assistance and project finance. The International Energy Agency will also serve as an implementation partner.

Delivering on the Global Methane Pledge would reduce warming by at least 0.2 degrees Celsius by 2050, providing a crucial foundation for global climate change mitigation efforts. In addition, according to the Global Methane Assessment from the Climate and Clean Air Coalition (CCAC) and the United Nations Environment Programme (UNEP), achieving the 2030 goal would prevent over 200,000 premature deaths, hundreds of thousands of asthma-related emergency room visits, and over 20 million tons of crop losses a year by 2030.

The supporters of the Global Methane Pledge include the U.S., the EU, and the following 103 countries: Albania, Andorra, Argentina, Armenia, Barbados, Belgium, Belize, Benin, Bosnia and Herzegovina, Brazil, Bulgaria, Burkina Faso, Canada, Central African Republic, Chile, Colombia, Republic of the Congo, Cameroon, Costa Rica, Cote D'Ivoire, Croatia, Cyprus, Democratic Republic of the Congo, Denmark, Djibouti, Dominican Republic, Ecuador, El Salvador, Estonia, Ethiopia, Federated States of Micronesia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Grenada, Guatemala, Guyana, Honduras, Iceland, Indonesia, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Korea, Kyrgyzstan, Kuwait, Liberia, Libya, Luxembourg, Malawi, Mali, Malta, Marshall Islands, Mexico, Monaco, Montenegro, Morocco, Nauru, Netherlands, Nepal, New Zealand, Nigeria, North Macedonia, Nuie, Norway, Pakistan, Palau, Panama, Papua New Guinea, Peru, Philippines, Portugal, Rwanda, Saudi Arabia, Senegal, Serbia, Singapore, Slovenia, Spain, Kitts & Nevis, Suriname, Sweden, Switzerland, Togo, Tonga, Tunisia, Ukraine, United Arab Emirates, United Kingdom, Uruguay, Vanuatu, Vietnam, Zambia.

Circular Bio-Based Europe Joint Undertaking to be launched at the end of November 2021

The Council of the EU has adopted on 19th November the regulation establishing Circular Bio-based Europe Joint Undertaking (CBE JU), the successor of BBI JU. The €2 billion partnership between the European Union and the Bio-based Industries Consortium (BIC) will build on the success of BBI JU to advance competitive circular bio-based industries in Europe. CBE JU will enter into force at the end of November and will take over all the activities of BBI JU.

Bio-based industries are a key enabler of the green transition towards a resilient and environmentally sustainable EU economy. CBE JU will fund projects that are building strong, resource-efficient and competitive bio-based industries in Europe by combining financial support of Horizon Europe, the EU's research and innovation programme, and contributions from the private sector.

CBE JU will enter into force on the day when the Council regulation is published in the Official Journal of the European Union, currently expected on 30 November 2021. The CBE JU Programme Office will also be established on this day.

The CBE JU's founding partners - the European Commission, on behalf of the European Union, and the Bio-based Industries Consortium (BIC) - will then nominate members to the Governing Board, and the Board will convene for the first time by mid-December.

In the first and second quarter of 2022, two CBE JU's advisory bodies - the States' Representatives Group and the Scientific Committee - will be established, and the Strategic Research and Innovation Agenda (SRIA) adopted.

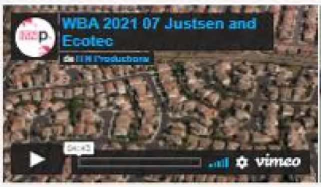
Based on the SRIA, a consultation on the first CBE JU Work Programme will start, and the Governing Board will adopt the programme in the second quarter of 2022. The first CBE JU's call for project proposals will then open.

See the indicative timeline of CBE JU operations and read more about the CBE JU governance.

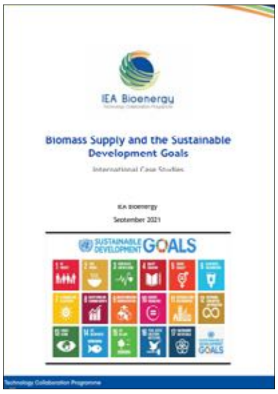
World Bioenergy Association and ITN Productions Industry News launch new co-production 'Bioenergy for the Future'

In the face of climate change, providing reliable supplies of renewable energy has become one of the biggest developmental challenges of our time. Bioenergy has a significant role to play in carbon removal, emissions reduction as well as in the development of bioenergy-based fuel alternatives for fossil fuels. World Bioenergy Association (WBA) has partnered with ITN Productions Industry News to make Bioenergy for the Future, a programme looking at the innovations and developments in the Bioenergy sector:

1. Intro
2. Christian Rakos interview
3. Standard Gas
4. Marsh Commercial
5. News Item
6. Severn Trent Green Power
7. Justsen and Ecotec
8. ABSL
9. Goodbye



Publications



Biomass Supply and the Sustainable Development Goals. International Case Studies

IEA Bioenergy

Bioenergy is the largest source of renewable energy in the world and is expected to grow substantially as one of many complimentary pathways to support decarbonization initiatives to limit global warming by 1.5 degrees Celsius. Given this anticipated trend, 37 best practice case studies from 18 countries were selected by members of the IEA Bioenergy Technology Collaboration Programme to demonstrate how biomass supply chains could be implemented to support sustainable bioenergy production, while simultaneously contributing to the United Nations Sustainable Development Goals (SDGs)*.

Case studies covering the four most common biomass supply chains (forest biomass, agriculture residues, energy crops, waste) across different end-uses (transport fuels, heat, electricity) were used to assess the methods, practices and technologies used to sustainably grow, harvest, transport, process and use biomass for bioenergy. To summarize these supply chains, two-page summaries were prepared to summarize each case study's supply chain, contributions to the SDGs, and supporting policies.

PDF

Policiy Briefs - Bioenergy Europe Statistical Report 2021

Bioenergy Europe

Biogas Statistical Report 2021

The report focuses on the biogas sector in Europe and its upgraded version, bio-methane. This report takes a look at the biogas consumption and production in the EU and provides an in-depth and up-to-date analysis on the sector's state of play. The reader will be able to get data on the number of biogas plants in the EU countries and the time of feedstock that they use.

PDF

Biofuels for Transport Statistical Report 2021

The report focuses on the biogas sector in Europe and its upgraded version, bio-methane. This report takes a look at the biogas consumption and production in the EU and provides an in-depth and up-to-date analysis on the sector's state of play. Includes data on the number of biogas plants in the EU countries and the time of feedstock that they use.

PDF

Bioheat report 2021

The report brings forth up-to-date statistics on the current situation of bioheat, looking at the renewable energy share in the heating and cooling sector but also the dynamics and market trends of the final consumption in residential and industrial heat processes.

PDF

Pellets report 2021

The report brings forth 2020 and 2021 statistics on the current state of play of the pellet market in Europe and beyond. It explores the production and the different uses for heating and electricity, covering a variety of different sectors (residential, commercial and industrial).

PDF

Biomass Supply report 2021

The report provides accurate and up-to-date information on the current state of play of biomass supply, from forests through agriculture to waste.

PDF

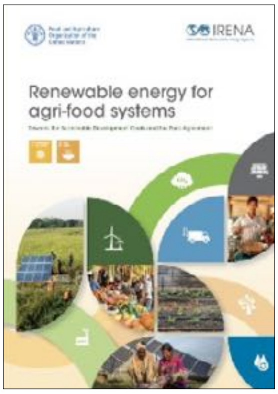
World Energy Outlook 2021

IEA – International Energy Agency

Against the backdrop of turbulent markets and a crucial meeting of the COP26 conference on climate change in Glasgow, the 2021 World Energy Outlook (WEO) provides an indispensable guide to the opportunities, benefits and risks ahead at this vital moment for clean energy transitions.

The WEO is the energy world's most authoritative source of analysis and projections. This flagship publication of the IEA has appeared every year since 1998. Its objective data and dispassionate analysis provide critical insights into global energy supply and demand in different scenarios and the implications for energy security, climate targets and economic development.

PDF



Renewable Energy for Agri-food Systems. Towards the Sustainable Development Goals and the Paris Agreement

IRENA – International Renewable Energy Agency

This report jointly developed by the International Renewable Energy Agency and the Food and Agricultural Organization of the United Nations analyses the role of renewable energy in agri-food systems and the opportunity they offer to advance energy and food security objectives as well as contribute to the achievement of the Sustainable Development Goals and the Paris Agreement.

The joint report outlines an 8-point action agenda to scale up renewable energy use in the agriculture sector. This report is part of the continuing collaboration between IRENA and FAO to accelerate the deployment of renewable energy in agri-food, fisheries and forestry chains, and sustainable bioenergy.

PDF

EurObserv'ER Renewable Energy in Transport Barometer 2021

EurObserv'ER

The EU27 Member States' 2020 deadline for meeting their renewable energy targets for the transport sector passed in an exceptional context overshadowed by the COVID-19 pandemic which dramatically reduced mobility requirements. Nonetheless, the initial available estimates point to the fact that biofuel consumption in the EU of 27 contracted only slightly in 2020 (by 1.5% year-on-year) because its use was supported by the increase in incorporation rates required to achieve the year's 10% target for renewable energy in transport. The drop-in renewable electricity consumption by railway transport was partly offset by the sharp rise in the number of electric vehicles on the road.

PDF

Trends and Projections in Europe 2021 (EEA Report No 13/2021)

European Environment Agency (EEA)

The European Environment Agency (EEA) report 'Trends and Projections in Europe 2021' estimates that the EU achieved its three 2020 climate and energy targets of reducing greenhouse gas emissions by 20% compared to 1990 levels, increasing the share of renewable energy use to 20%, and improving energy efficiency by 20 %. According to preliminary EEA data, EU greenhouse gas emissions decreased by 10 % from 2019 to 2020. The large drop was strongly related to the Covid-19 pandemic, but the magnitude of this effect is uncertain in comparison with the role of climate policies. By comparison, from 2018 to 2019, EU emissions have already fallen by 4 %. The EEA analysis is based on final climate and energy data for 2019, and preliminary data for 2020. The analysis is complemented by a new website to explore climate and energy data and country profiles, as well as a technical annex on data and targets.

PDF

Save the date! International bioenergy events

NOVEMBRE 2021

29 November – 9 December 2021
IEA Bioenergy Conference 2021
Online
link

DECEMBER 2021

6 – 8 December 2021
Conference Circular@WUR: Living within planetary boundaries
Wageningen, The Netherlands
link

9 December

Bioenergy Europe 2021 Statistical Reports: The Overview
Online
link

15 – 16 December 2021
Linking Science and Industry: Renewable Energy Research, Innovation and Higher Education in Africa
Online
link

JANUARY 2022

24 – 28 January 2022
Fuels of the Future
Online
link

26 – 27 January 2022
Bio360 Expo 2022
Nantes, France
link

FEBRUARY 2022

2 – 3 February 2022
Lignofuels 2022
Helsinki, Finland
link

18 - 19 February 2022
14th International Conference On Biofuels And Bioenergy
Rome, Italy
link

MARCH 2022

2 – 3 March 2022
European Pellet Conference 2022
Wells, Austria
link

9 – 10 March 2022
Gasification 2022
Lyon, France
link

15 – 16 March 2022
International Biomass Congress & Expo Brussels
Brussels, Belgium
link

APRIL 2022

19 – 21 April 2022
TCBIOMASS
Denver, Co, USA
link

27 – 28 April 2022
10th European Algae Industry Summit
Reykjavík, Iceland
link

MAY 2022

9 – 12 May 2022
30th European Biomass Conference & Exhibition
Online & Marseille, France
link

17 – 18 May 2022
CO_2 Capture, Storage & Reuse Conference
Copenhagen, Denmark
link

18 – 19 May 2022
Oleofuels 2022
Marseille, France
link

JUNE 2022

13 – 15 June 2022
2022 International Fuel Ethanol Workshop & Expo
Minneapolis, Minnesota
link

14 – 17 June 2022
IEA Bioenergy - 2nd International Conference on Negative CO_2 Emissions
Göteborg, Sweden
link

EERA Bioenergy in Europe

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

Aalborg University
Department of Energy Technology
(Denmark)
web

Agricultural University of Plovdiv
(Bulgary)
web

BERA
Belgian Energy Research Aliance
(Belgium)
web

BESTMER
Ege Üniversitesi Biyokütle Enerji Sistemleri ve Teknolojileri Merkezi
Ege (Turkey)
web

BOUN
Boğaziçi University
(Turkey)
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 Depårment (Spain)
web

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

CIRCE
Centro de Investigación de Recursos y Consumos Energéticos (Spain)
web

CNR
Istituto Motori del Consiglio Nazionale delle Ricerche
(Italy)
web

CNRS
Centre National de la Recherche Scientifique
(France)
web

CRES
Center for Renewable Energy Sources and Saving
(Greece)
web

CoLAB BIOREF
Collaborative Laboratory for the Biorefineries
(Portugal)
web

CREA
Italian Council for Agricultural Research and Economics
Location (Italy)
web

CSIC
Agencia Estatal Consejo Superior de Investigaciones Científicas
(Spain)
web

DFBZ
Deutsches Biomasseforschungszentrum gemeinnützige GmbH (German Biomass Research Center gGmbH)
web

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

ETA-Florence Renewable
Energies
(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

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 / web

PSI
Paul Scherrer Institut (Switzerland)
web

RE-CORD
Renewable Energy Consortium for Research and Demonstration (Italy)
web

SINTEF
(Norway)
web

TNO
(Netherlands)
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

UNICT
Università degli studi di Catania (Italy)
web

UNIMORE
University of Modena and Reggio Emilia (Italy)
web

UNIPD
Università degli Studi di Padova (Italy)
web

UNITO
Università di Torino (Italy)
web

UNL
Universidade NOVA de Lisboa, Faculdade de Ciências e Tecnologia (Portugal)
web

UPV/EHU
University of Basque Country (Euskal Herriko Unibertsitatea) (Spain)
web

UWM
University of Warmia and Mazury in Olsztyn (Poland)
web

VŠB
Technical University of Ostrava (Czech Republic)
web

VTT
Technical Research Centre of Finland Ltd (Finland)
web

WIP
WIP Renewable Energies (Germany)
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

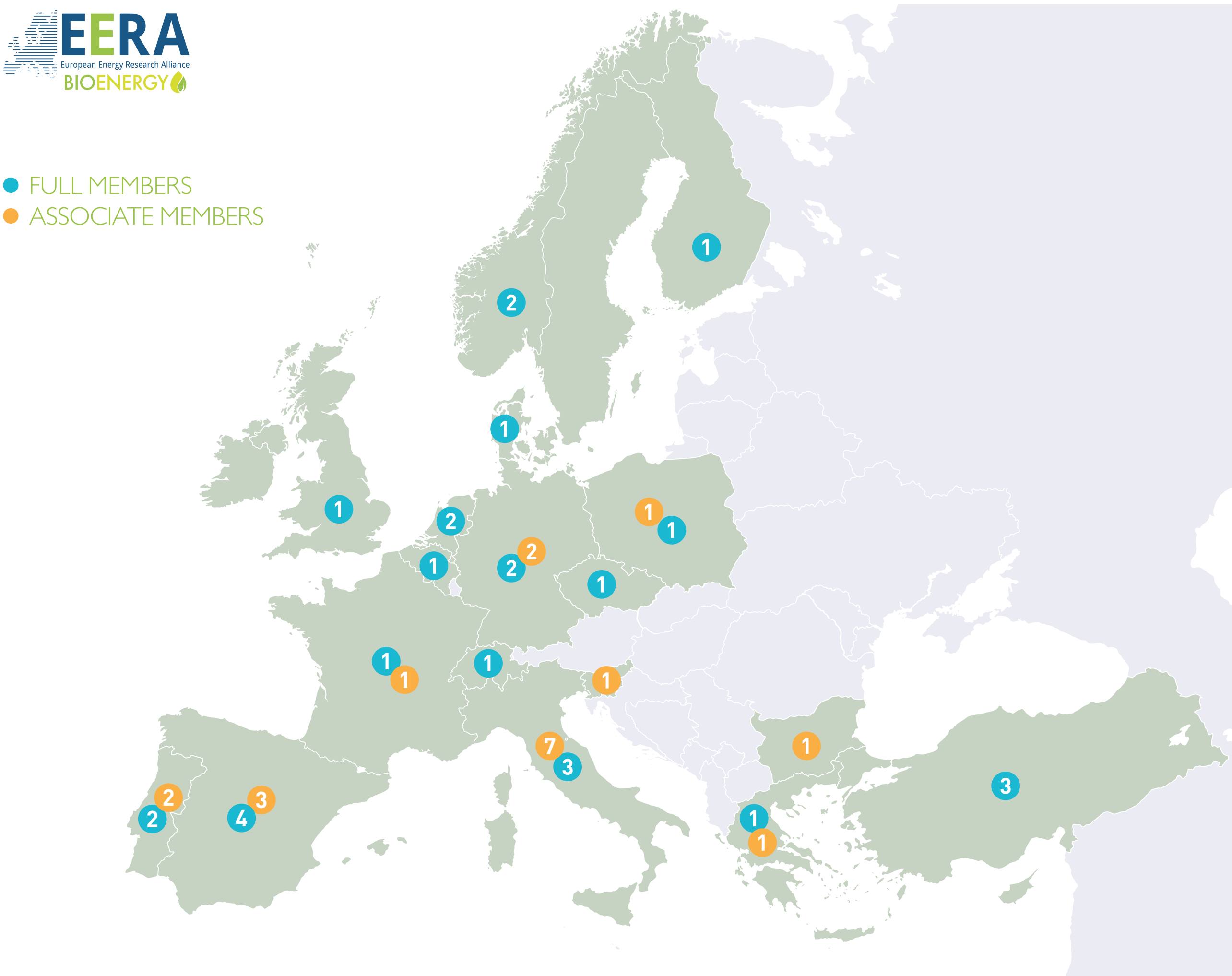


Figure 1: The EERA Bioenergy Joint Programme consists of 46 members (26 Full members and 20 Associate members) from a total of 18 countries. Link

www.eera-bioenergy.eu

Contacts

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