

eebionews

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Joint Programme Coordinator's corner



Juan Carrasco
EERA Bioenergy Coordinator

Dear **EERA- Bioenergy Joint Programme (JP) members, dear eebionews readers,**

It is a pleasure to welcome you to this EERA-Bioenergy Joint Programme (JP) Newsletter new design edition that forms part of the present **effort to improve the image of the JP by implementing renewed dissemination and communication tools.**

The end of the year is always a good occasion to **review the activities carried out and the achievements along the period towards the accomplishment of the objectives of the JP, and the challenges ahead.** This is in fact what I will briefly try to do in this introductory article to this newsletter.

It is worth mentioning in first term some important positive news that have been received in the JP in 2016, which can be seen as the first successful results of the strategy started to be implemented last year to increase the level of integration of the activities in the JP:

In July 2016, it was confirmed the support to one of the two project proposals presented by EERA-Bioenergy to H2020 LCE33-2016-2017 topic call with the objective to address the European Common Research and Innovation Agenda (ECRIA). The title of the financed Project is **“Advanced biofuel production with energy system integration”** (AMBITION) and is co-ordinated by SINTEF and developed by a consortium totally integrated by EERA-Bioenergy JP participants. As stated in the Project workprogramme, the **AMBITION Project** is dedicated to the definition and initial execution of advanced research that will rely on three key unit operations in the production of next generation liquid biofuels: biomass pre-treatment and fractionation, gasification and syngas fermentation, and on subsequent linking of energy systems (grid electricity and biofuels in particular) to improve overall efficiencies. The specific advances achieved in AMBITION can be adapted to existing biofuel production schemes or integrated to enable new considerably improved, environmentally friendly and economically competitive processes. A more detailed information of the objectives and outcomes of this Project will be presented in further numbers of this Newsletter.

AMBITION represents therefore the most important integrated response of the JP towards developing disruptive solutions in order to tackle some of the most relevant technoeconomic barriers that affect to the viability of implementation of biofuels from lignocellulosic feedstocks.

Other positive news is the **favourable evaluation received of external experts to the work developed and the results achieved by the JP in the last years and the support to the overall strategy for the coming ones,** which I will refer below.

AMBITION Project is a milestone in the strategy towards highest levels of activities integration.

As in 2015, dedicated workshops have been the main instrument to promote the common understanding, align activities and assess JP priorities and strategic issues, and to explore possibilities of collaboration in joint projects. **A total of six workshops have been held in 2016,** generally with important participation of external stakeholders, including industry. To outstand the workshop entitled “Design and get involved in the next EU H2020 Bioenergy proposals“ that was held last April in Brussels in which a robust discussion and exchange of ideas took place among the participants distributed in several parallel sessions to explore the opportunities for joint collaborations, resulting in the identification of several potential proposals to different H2020 topics 2017. Information about the conclusions and other outcomes of the workshops held in 2016 will be published in our new web site shortly.

In addition to networking activities, the **JP Bioenergy has had an important role in 2016 in assessing the new SET-Plan priorities** with the elaboration, jointly with the Hydrogen and Fuel Cells EERA JP, of a position document in response to Issues Paper on Set-Plan priority action number 8 (“Strengthen market take-up of renewable fuels needed for sustainable transport solutions”) and with the participation in an ulterior related meeting with the CE, member states and other stakeholders. It is expected the work on assessing the Set-Plan priorities for 2018-2020 will continue in 2017.

In 2016 important documents depicting the strategy and priorities for development of RES and, in particular, the Bioenergy in the EU for 2020 and beyond have been elaborated by the EC. One of these documents^[1] describes the R&I targets set in each of the SET-Plan priorities in order to accelerate the efficient and sustainable decarbonized energy market deployment. Within the established targets, relevant for maximising the use of Bioenergy is the development of an efficient management of biomass resources, that include residues, wastes and energy crops on degraded lands, the development of advanced biofuels and the integration of the use of biomass resources in biorefinery systems. Moreover, a **significant role can also be envisaged for Bioenergy in the development of integrated and more flexible power energy systems, and in cross-cutting technologies to increase the RES output to supply heating and cooling demands in buildings.**

In line with SET-Plan actions and priorities is the Communication from the European Commission for accelerating Clean Energy Innovation^[2] approved on November 2016, that as the **SET-Plan emphasizes the essential role of the innovation to promote the decarbonized energy market deployment**, while announces an important financial contribution of 2 billion euros to support research and innovation in Horizon 2020 for the period 2018-2020 focused on four priority areas that strongly involve the development of RES resources and systems, including Bioenergy.

In the described context, a further effort towards adapting our JP to the new scenario seems of capital important in order to maximize its impact in boosting the development of the new SET-Plan targets. In this direction is the challenging initiative approved by the EERA-Bioenergy JP Steering Committee for definition of priorities and elaboration of the work programme for the period 2018-2020. **The goal is to create a robust instrument that reflects the JP view on advanced bioenergy research to be developed for 2020 and beyond to maximize the contribution of Bioenergy to decarbonization of energy production in the EU, in the SET-Plan context.**

While progressing towards the objectives of the strategy initiated in 2015, the priorities and targets of the new work programme will incorporate additional challenges:

- a To extend the scope of the present work programme to new fields where the contribution of Bioenergy can be of capital importance to increase the viability of different systems and technologies, as it is the case of biorefinery production systems in the context of circular economy, and the hybrid RES technologies.
- b To strengthen the co-operation to ETIPs and other relevant stakeholders, particularly industrial stakeholders, in defining priorities and strategies to promote the bioenergy deployment.
- c To improve the JP visibility, encompassing the creation of a more professional image based on the implementation of new, both, external as well as internal tools and procedures, including a newly designed web page and other dissemination material.

The new EERA-Bioenergy JP will rely on the increased co-operation with ETIPs and relevant stakeholders, the development of hybrid RES technologies and the integration of bioenergy resources into biorefinery systems.

An extense and stimulating work is therefore behind us in 2017 that is expecting to definitively contribute to optimise the potential and impact of our JP as an instrument co-ordinating the efforts and addressing and developing Bioenergy research and innovation priorities in the EU. **On behalf of the EERA Bioenergy JP Management Board I want to strongly encourage all JP members to actively participate in the different temporary Working Groups that are being formed for elaboration of the new EERA-Bioenergy work programme** and also warmly invite to external stakeholders, companies, universities and research organizations that might be interested to collaborate in such task to join us.

^[1]Transforming the European Energy System through INNOVATION. Integrated Strategic Energy Technology (SET-Plan). Progress in 2016. EU publication. ISBN 978-92-79-63468-0

^[2]COM (2016) 763 final and Annex. November 2016

Bioenergy highlights

CENER's commitment to waste valorization - the first step in the approach to circular economy



María Díaz Muruaga

*CENER - Strategy & Business Development
Manager*

CENER – National Renewable Energy Center of Spain – is committed to **Biorefinery** as key to sustainable growth and energy diversification of communities based on the effective use of wastes. Production of

Biomaterials and **Bioenergy** from renewable

feedstocks - such as agriculture and forestry residues, industrial byproducts or organic fraction from municipal solid wastes – is the first step in the approach to circular economy.

Circular economy promotes sustainably in processes and products both, in environmental and social terms and contributes to energy security and global economic growth.

Equally, **CENER** understands **international cooperation** as a relevant element that contributes and allows encourage, strengthen and accelerate the implementation of new routes for use and production of renewable materials and energy from biomass and wastes, as well as improving energy efficiency.

Since the last decade, CENER has been developing – individually or through cooperation with others research centers and private entities – many projects whose ultimate purpose was to obtain new materials and fuels from waste sources.

Examples of these are:

- **ButaNexT** focused on the development of a highly efficient production process for the conversion of sustainable feedstocks into biobutanol;
- **Biorefinery in Navarra**: a regional initiative for the development of a preliminary biorefinery project in Navarra;
- **Biopest** focused on the production of biopesticides;

- Or **Syn2ol** which aims at producing ethanol from syngas derived from biomass gasification.

CENER is continuously facing new challenges and as coordinator recently it has been awarded with funding for a new European project under the BBI European Joint Undertaking: **Biorescue** project which will create added value products from spent mushroom substrate.

In all these projects, **CENER** has made available its **Biorefinery Demo Plant** named “**CB2G: Second Generation Biofuel Center**”. The facility includes several Process Development Units as Pre-treatment, Torrefaction, Gasification and the Biochemical processes units. These units include flexibility to handle a wide range of feedstocks, ability to incorporate and test equipment from partners or third-parties into whole conversion processes and changing configurations and flexible scaling-up: from pilot to semi-industrial.

Today, **CENER** maintains its ambition to create value to stakeholder and makes available its Biorefinery Demo Plant to new bio-based start-up companies and other organizations interested in validating their bioprocesses at large scale (validation of **Process**) and/or interested in obtaining large amount of biomaterials to be delivered to new clients (validation of **Products**).

CB2G represents an important milestone that allows the creation and leverage of knowledge to research and industrial communities and it is the best tool to secure success for new innovative biorefinery concepts using alternative renewable and sustainable resources.

About CENER

The **National Renewable Energy Centre** of Spain is a highly rated technology center, with international prestige. It is specialized in applied research and the development and promotion of renewable energies. CENER has more than 200 researchers, carrying out activities on the five continents. The Board of Trustees is comprised of the Ministry of Economy and Competitiveness; the Research Centre for Energy, Environment and Technology (CIEMAT); the Ministry of Industry, Energy and Tourism; and the Government of

Navarra. CENER performs its activity in six areas (wind, solar thermal, solar photovoltaic, biomass, energy in buildings and renewable energy grid integration), and also participates as a technical specialist in Technical Committees at home and abroad.

→ More information: www.cener.com

CENER is partnering with the ADItech Technological Corporation as the Energy Unit since it was created at the end of 2013.

→ More information: www.aditechcorp.com



CB2G: Second Generation Biofuel Center (Pamplona, Spain)

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On-going projects in the Bioenergy Area at the I3a

Juan Ignacio Garcés

I3a - Director



The Aragón Institute of Engineering Research (I3A) of the University of Zaragoza (Spain) is involved in different projects in the bioenergy area, as follows:

Two new projects, continuation of the **BIOREFINER** project, aimed to the upgrading of natural gas and/or utilization of infrastructures for its distribution, will start.

In the first project (**INPROCOL**), new operation procedures will be applied to each of the two steps in the transformation of (CO+CO₂+H₂) mixtures to gasoline. In the first step, production of methanol from carbon oxides and hydrogen, a membrane reactor will be used to increase the conversion beyond that achievable in a conventional reactor. In the second step, transformation of methanol to gasoline, a two-zone fluidized bed reactor will be employed in order to counteract the catalyst deactivation.

The second project (**RECIOBIOHY**) can be considered as part of the Power-to-Gas initiative and will be devoted to establish the configurations (catalyst + reactor) for producing synthetic natural gas (SNG) of renewable origin (e.g. from biogas and electrolytic H₂ made through off-grid electricity). To achieve the goal of producing SNG, the performance of different advanced configurations of catalytic reactors (fixed and fluidized bed, polytropic and membrane reactors) as well as the best catalyst available will be studied.

Other projects ongoing are related to the production and use of biofuels, and include both national and EU funded projects.

The project **BIOLIGNING** deals with the use of lignin based materials as biofuel additives. The use of second-generation biofuels, coming from non-edible-biomass, often implies deterioration in its properties, as occurs in the case of biodiesel. In this context, the objective of this project is to capitalize lignin based compounds from three biomass treatment processes to produce biofuel additives, with stabilized properties. Specifically, the co-products considered are bio-oil from the fast pyrolysis of wood, spent liquor from the production of cellulose pulp and residue from production

of cellulose pulp and residue from production of cellulosic bioethanol. Furthermore the use of glycerin, as by-product of biodiesel production, will be assessed.

In the frame of H2020, the I3A is participating in the Waste2Fuels project (<http://www.waste2fuels.eu/>).

WASTE2FUELS aims to develop next generation biofuel technologies capable of converting agrofood waste (AFW) streams into high quality biobutanol. Butanol is one of the most promising biofuels due to its superior fuel properties compared to current main biofuels, bioethanol and biodiesel. In addition to its ability to reduce carbon emissions, its higher energy content (almost 30% more than ethanol), its ability to blend with both gasoline and diesel, its lower risk of separation and corrosion, its resistance to water absorption, allowing it to be transported in pipes and carriers used by gasoline, it offers a very exciting advantage for adoption as engines require almost no modifications to use it.

Additionally, I3A is also an active member of the **SMARTCATS COST Action** (CMI404), which aims to set-up a Europe-wide network of leading academic and research institutions and key industries to promote the use of smart energy carriers on a large scale in order to increase fuel flexibility and carbon efficiency of energy production and to support distributed energy generation strategies.



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First book devoted to the catalytic production of synthetic natural gas (sng) and biomethane

T.J. Schildhauer

Paul Scherrer Institute



As a result of long years cooperation with European partners in the field of energetic biomass use and based on own research of groups within the SCCER BIOSWEET, the **first book devoted to the catalytic production of Synthetic Natural Gas (SNG) and biomethane was published in August 2016.**

The book contains contributions of research groups in Sweden, Austria, Italy, The Netherlands, Germany and Switzerland. The SCCER BIOSWEET groups contributed more than half of the content.

Synthetic Natural Gas from Coal, Dry Biomass and Power-to-Gas applications aims at a suitable overview over the different pathways to produce SNG. The first four chapters cover the main process steps during conversion of coal and dry biomass to SNG:

- **Gasification of coal and biomass:** the thermodynamic fundamentals and most important gasifier types are presented;
- **Gas cleaning:** covering filtration, sorption and catalytic steps as well as scrubbing;
- **Methanation of gasification derived producer gas and hydrogen-rich methanation within Power-to-Gas applications:** the largest chapter of the books discusses on i) the methanation reaction system, its kinetics and challenges with the thermodynamic equilibrium and catalyst deactivation, ii) different types of catalytic methanation reactors, and iii) modelling and simulation of methanation reactors and its experimental validation;
- **Gas upgrading:** focuses on the options for upgrading of biomass based SNG-processes.

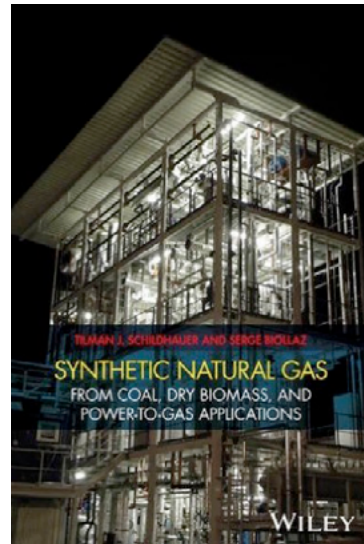
The main technology options are highlighted and the impact of a technology choice for the downstream processes as well as for the complete process chain.

The following chapters describe a number of novel processes for the production of SNG with their specific combination of process steps as well as the boundary conditions; these processes comprise those which are already in operation and processes which are still under development:

- The 20 MW wood-to-SNG plant in Gothenburg, Sweden (GoBiGas project),
- The Power-to-Gas plants in Stuttgart and Werlte, Germany, operating with CO₂ from biogas,
- The fluidised bed methanation process to convert wood gas to SNG, developed at PSI,
- The wood-to-SNG process developed by ECN, The Netherlands,
- The hydrothermal gasification and methanation process, developed at PSI, agnion's small scale SNG process concept,
- Integrated desulfurization and methanation concepts for SNG production.

T.J. Schildhauer, S.M.A. Biollaz (Eds.)
 Synthetic Natural Gas from Coal, Dry Biomass, and Power-to-Gas Applications
 Wiley & Sons, New York, 2016
 ISBN 9781118541814

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The Swiss Competence Center for Bioenergy Research (SCCER BIOSWEET) is a consortia of partners from academia and private or public sector organizations. It focuses on research and implementation of biomass conversion processes with a high level of technological readiness. For 2050, the Swiss Federal Energy Strategy foresees a contribution of 100 Petajoule from bioenergy

to the final energy consumption. To meet this ambitious goal the current energy consumption from biomass needs to be doubled. The SCCER BIOSWEET's research and development activities are designed accordingly.

→ Further information can be found here:
www.sccer-biosweet.ch

Biobased products innovation plant

Rene van Ree

*Theme Leader Biofuels & Bioenergy
Wageningen Food and Biobased Research*



The Biobased Products Innovation Plant (BPIP) is a large R&D facility used by Wageningen Food & Biobased Research scientists – together with industrial partners, SMEs, and other RTOs and universities – to develop innovative sustainable and economically viable processes to convert green raw materials (biomass) into biobased products (food and feed ingredients, chemicals, materials), bioenergy (fuels, power, heat) and other co-products (minerals, CO₂, H₂O).

The aim is to accelerate the development of the so-called Circular Economy, with a focus on the Bio (based) Economy.

In the BPIP we bring innovative ideas into reality, enabling R&D from laboratory towards pilot-scale. Depending on specific market requests, we are able to deploy an optimal combination of experts, technologies and equipment in the fields of biorefining, conversion and material processing.

Biorefining is the sustainable processing of biomass into a portfolio of marketable biobased products, bioenergy and other co-products. Technologies applied are: pre-treatment, fractionation, biochemical and chemo-catalytic conversion, separation and isolation. Conversion technologies enable us to turn the intermediates obtained after the pre-treatment and fractionation into an even broader range of products, with more applications and added-value. These products can be very diverse, varying from small organic molecules (chemicals) to large polymers and advanced biofuels. We use our expertise on chemical, microbial and enzymatic conversion, polymer chemistry and biotechnological conversion routes to develop solutions for products such as advanced biofuels, building blocks (monomers for polymer synthesis) and additives. Processing and compounding of biobased polymers enables us to create innovative biobased materials with desired properties. We use our expertise and facilities for processing biobased polymers into various materials, such as bioplastics, coatings and adhesives, resins and composites. We also work on materials based on vegetable fibres and other polymers made by plants, such

as paper, cardboard, paints and composites. The materials and products produced can be tested in our conditioned materials laboratory.



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BIOPLAT as EERA Bioenergy Joint Programme Secretariat

On September 2016, BIOPLAT was officially designated as Secretariat of the Joint Programme on Bioenergy of the European Energy Research Alliance (EERA), based on a decision of the Steering Committee of the JP.



The Spanish Biomass Technology Platform (BIOPLAT) is a public-private forum supported by the Spanish Ministry of Economy, Industry and Competitiveness -MEIC- for boosting the growth in the field of bioenergy through the research, development and innovation. **BIOPLAT mainly aims at determining the conditions and at identifying and developing viable strategies for the promotion and sustainable commercial development of biomass in Spain.** To accomplish this goal, BIOPLAT carries out a design of technological strategies for the settlement of guidelines which boost the sustainable development of bioenergy in accordance with national and European objectives.

Since it was launched in 2007, the entities participating in BIOPLAT amount to 317. The following table lists the entities currently registered.

- 174 companies
- 55 Technological Centres and Foundations
- 23 Associations and Cooperatives
- 34 Universities
- 27 Public Entities
- 4 Public Research Centres

What does Bioplat do for supporting the bioenergy sector in Spain?

- **Identifies the R&D priorities** of the Spanish biomass sector, including them in its position documents.
- Has an **active involvement** in the European Technology and Innovation Platforms: ETIP-Bioenergy and RHC-ETIP, besides the Bio-based Industries Consortium – BIC, collaborating in all the activities carried out within them and including the Spanish positioning in all their relevant publications (SIRA and so on).
- Acts as a **consultant agent** for the Spanish official representatives of SET-Plan and National Contact Points of the H2020 Program (Societal Challenges: Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the Bioeconomy; Secure, clean and efficient energy; Climate action, environment, resource efficiency and raw materials).
- **Cooperates and advises** the Spanish Ministries about several R&D plans and initiatives (from both national and international), such as the EIP Smart Cities and EIP Agricultural Productivity and Sustainability.
- **Continuously informs** all the relevant stakeholders about Spanish, European and international R&D programmes, in order to increase Spanish participation and, thereby, enhancing Spanish creation of knowledge, i.e. moving forward in the learning curve of biomass and bioenergy technologies.
- **Creates synergies** with other Technology Platforms, Spanish Ministries and the European Commission to increase the technological opportunities of the Spanish biomass sector.
- **Disseminates** its positioning, bioenergy R&D projects, programs and other relevant biomass technological information through conferences, emailing, BIOPLAT website and social networks (e.g. Twitter and blog), so the biomass sector is acknowledged in Spain and also at international level.

All the BIOPLAT actions aim to bring to the table the added value the biomass sector can provide, not only the relevant environmental benefits (as it has an enormous avoidance potential on forest fires, GHG emission and waste abandonment) **but also great socioeconomic benefits** (for its ability to create and maintain jobs in the whole supply chain of biomass, especially in rural areas, where it is more needed).

Main tasks of Bioplat

Collaboration with other public bodies and institutions with competences in the biomass/bioenergy sector.

- Synergies with the Spanish Ministry of Economy, Industry and Competitiveness -MEIC-:
- Close and continuous cooperation in the promotion of R&D support tools.
- Collaboration with the Spanish Ministry of Agriculture, Fisheries, Food and Environment (MAPAMA):
- Elaboration of the Spanish Strategy on Bioeconomy.
- Definition of the Spanish priorities in the European Innovation Partnership for Agricultural Productivity and Sustainability EIP-Agri.
- Close collaboration with the Spanish Centre for Industrial Technology Development (CDTI).
- Promotion of CDTI financing instruments for industrial technology development.
- Collaboration with public administrations and Autonomous Regions.
- Relations to other Spanish and European Technology Platforms.
- BIOPLAT and SusChem-Es (Spanish Technology Platform for Sustainable Chemistry) are working together on a specific guide about biorefineries in Spain, in order to set the basis for a new biorefineries industry in Spain that allows driving the Spanish biomass sector to higher levels of competitiveness.
- Active involvement in the European Technology Platforms: ETIP-Bioenergy (European Biofuels Technology and Innovation Platform) and RHC-ETIP (European Technology and Innovation Platform on Renewable Heating and

Cooling), besides the Bio-based Industries Consortium (BIC), collaborating in all the activities carried out within them and including the Spanish positioning in all their relevant publications.

- Members of the Spanish Inter-Platforms Group on Smart Cities (GICI).
- Members of the Spanish Inter-Platforms Group on Circular Economy.
- Members of the Spanish Inter-Platforms Group on alternative fuels.
- Active involvement in the Spanish Alliance for Energy Research and Innovation (ALINNE).

Activities at European level

- Horizon 2020 (EU Framework Programme for Research and Innovation):
- Definition of the Spanish bioenergy R&D priorities to be included in the Work Programmes of Horizon 2020. Mainly in the Energy challenge, but also providing inputs/comments on others challenges such as the Environment.
- European Strategic Energy Technology Plan (SET-Plan):
- Collaboration with CDTI and MEIC in the preparation of the European Innovation Partnership on Smart Cities and Communities (EIP-SCC).
- Participation in forums organized by CDTI to define the Spanish position.
- Acts as a consultant agent for the Spanish official representatives on SET-Plan.

Communication and dissemination

- Representation in national and international forums.
- Participation in the European Forum on Science, Technology and Innovation (Transfiere Congress).
- Development of the first Technological Capabilities Map of the Spanish bioenergy sector (<http://whoiswho.bioplat.org/en>).

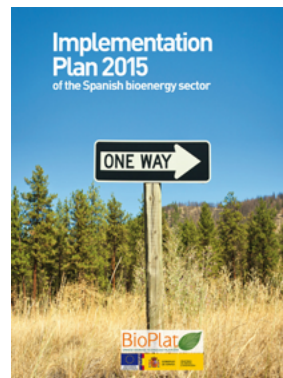
BIOPLAT position documents and reports



Bioenergy sector in Spain

BIOPLAT published in December 2015 a report that collects information about the bioenergy sector (production of electricity, heat and biofuels for transport) in Spain. According to the report, the economic value of the biomass energy production processes, strictly generating income and jobs, can be approximated by the contribution made to the Gross Value Added (GVA) and to the creation and maintenance of jobs in the Spanish economy.

→ http://www.bioplat.org/setup/upload/modules_en_docs/content_cont_URI_3913.pdf



Implementation Plan 2015 of the Spanish Bioenergy Sector

BIOPLAT published in 2011 an Implementation Plan in which are identified the priority biomass value chains whose implementation could act as an important catalyst for the achievement of renewable and environmental targets both in Spain and the EU.

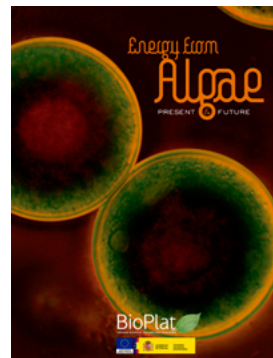
→ http://www.bioplat.org/setup/upload/modules_en_docs/content_cont_URI_2854.pdf



Biomass pellets in Spain

BIOPLAT published in 2013 a report in which the pellet market in Spain was analysed. It contains information about the Spanish energy mix, the pellet concept, description of the densification and pelletization processes, legislation, standardization, vision of the Spanish market, description of public support available and it also includes an inventory of all the facilities working in Spain.

→ http://www.bioplat.org/setup/upload/modules_docs/content_cont_URI_3387.pdf



Energy from Algae: Present & Future

BIOPLAT published in 2010 a roadmap to help steer and facilitate technical discussions on an R&D&I strategy to produce biomass as an energy source through the cultivation of algae. Such a strategy would need to meet a series of basic requirements in terms of sustainability, economic factors and scale.

→ http://www.bioplat.org/setup/upload/modules_en_docs/content_cont_URI_2103.pdf



Strategic Research Lines

BIOPLAT published in 2009 the Strategic Research Agenda of the Spanish biomass sector, which contains several high priority research lines, whose purpose is to indicate those areas or segments of the biomass sector in which it is considered that R&D investment would be a breakthrough in eliminating the barriers that are impeding the progress of the sector.

→ http://www.bioplat.org/setup/upload/modules_en_docs/content_cont_URI_1445.pdf



Also, with the aim to get the Spanish society closer to biomass and all its possibilities, BIOPLAT published in 2014 an animated video about bioenergy which has been already played more than 100,000 times in Youtube. In the video the different types of biomass are showed (agricultural, forestry, farm, industrial biomass and that which comes from municipal solid waste), which exists in Spain in a great amount, the transformation processes into heat, electricity of biofuels for transport, as well as the socioeconomic and environmental benefits that implies the production of bioenergy from biomass to the Spanish society.

→ <http://www.bioplat.org>



Vision for 2030

BIOPLAT published in 2009 a comprehensive biomass state-of-the-art analysis in Spain, including future challenges and opportunities (scenarios 2020 and 2030).

→ http://www.bioplat.org/setup/upload/modules_en_docs/content_cont_URI_626.pdf

BIOPLAT TEAM in charge of the EERA Bioenergy Joint Programme Secretariat



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New members

New Associate participants

EERA Bioenergy welcomes the following organisations for having recently joined the Joint Programme as Associate members:



NATIONAL INSTITUTE OF CHEMISTRY

National Institute of Chemistry (NIC) is a leading Slovenian research institution in the field of chemistry and related disciplines. Seven departments out of fifteen are going to contribute their knowledge and expertise to the EERA Bioenergy Joint Programme, as they hold a strong track record in the field of Bioenergy research. These departments are:

- Department of Computational Biochemistry and Drug Design
- Department of Polymer Chemistry and Technology
- Department of Inorganic Chemistry and Technology
- Department of Synthetic Biology and Immunology
- Department of Catalysis and Chemical Reaction Engineering
- Department of Biomolecular Structure
- Department of Molecular Modeling

They have been involved in several international as well as national projects in the field of low-carbon economy, biomass, bioenergy and materials for energy and engineering. Currently, NIC is active in ten Horizon 2020 projects, whereas some also relate to the bioenergy field, for example **HELIS** (H2020-NMP-GV) and Euroolis (FP7-NMP), which are both coordinated by NIC, **LiRichFCC** (H2020-FETOPEN), **MefCO₂**, **ADREM** (both H2020-SPIRE) and FReSMe (H2020-LCE). In addition, we are partners in ERA-MBT project **Mar3Bio** as well as in COST actions like **Valorisation of lignocellulosic biomass side streams for sustainable production of chemicals, materials & fuels using low environmental impact technologies** and **Food waste valorization for sustainable chemicals, materials**

and fuels. In the years from 2011-2014, we have also coordinated the project **STOREHEAT** (MATERA ERA-NET). Furthermore, we have successfully protected knowledge in the field of bioenergy with several patents, like "Preparation of nanocrystalline cellulose" (SI24656).

NIC is a founding member of **ENMIX - European Nanoporous Materials Institute of Excellence** as well as of two Slovenian Centers of Excellence (CoE): **PoliMaT** – CoE for Polymer Materials and Technologies as well as of **CONOT** – CoE Low-Carbon Technologies. The Institute has a collaborative network with top international groups and scientists, e.g., **Theory group, Max-Planck Institute for Polymer Research, Biotechnology Institute and Zernike Institute for Advanced Materials, prof. J.C. Smith, ORNL, Arieh Warshel, winner of Nobel Prize for Chemistry, 2013**, etc. Also, the Institute offers high-level research equipment which holds relevance for the Bioenergy Joint Programme, like: i) **reactors** (batch/autoclave reactors, continuous/tubular reactors, glass/steel reactors, etc.), ii) **separators** (extraction columns, distillation columns, absorption columns, adsorption columns, chromatography, etc.), iii) **analytics/chromatography** (HPLC, and several GC and GC/MS combinations with liquid and gas sampling, etc.), iv) **analytics/spectroscopy** (IR (RAMAN) and UV/VIS, MALDI-TOF MS, solid/liquid/gaseous samples, off-line and in-line spectroscopy and probes, etc.), v) **analytics/other** (NMR spectrometer, TG, several MS units, TOC/OC/IC for solid/liquid/gaseous samples, TEM SEM, AFM, BET, XRD, XPS, electro-analysis, etc.).



NIC's greatest contribution to the Joint Programme will definitely be to the subprogrammes **Thermochemical Conversion and Sugar Platform**, where we offer expertise in computational studies and methods, methods for liquefaction of lignocellulosic biomass and molecular simulations as well as in the area of the development of functionalized porous catalysts.



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NTUA is the largest and oldest engineering university of the country, also a first choice for undergraduate scientists and engineers. The Chemical Engineering School, at NTUA is the largest in Greece and one of the largest worldwide with 4 departments and 70 academics. Within the Process Analysis and Plant Design department of the School, Prof Kokossis's Industrial Process Systems Engineering Unit (IPSEN) brings twenty five years of knowledge and experience in high calibre applied research in biorenewables, with a sizeable extended team of researchers ranging from final-year students to seasoned industry executives.

NTUA draws strength from its status as the primary technological institution of the country, able to turn knowledge into industrial practice, state law and regulation – as circumstances require - and transferring European and global trends to Greece.

IPSEN, the Industrial Process Systems Engineering Unit, cooperates within NTUA with several other centres of excellence in all disciplines of Engineering. Well networked in Greece, parts of Europe, the USA, Brazil, Turkey, Israel and China, IPSEN remains at the forefront of developments in its field, through joint supervision of research, projects, visits and lectures, exchanges of opinion and shared directions.

NTUA/IPSEN is leading the National Technological Platform for Sustainable Chemistry and runs the Secretariat of SusChem GREECE representing the interests of the country in EU research calls in the area. SusChem GREECE has been established with substantial industrial participation that endorses the doctrines of cyclical economy and biomass-based production of materials and energy. The platform has met support from collective bodies of professionals in bio-based industry, notably chemists, chemical engineers and bio-scientists. Lastly, the platform has been enthusiastically received by the Greek State and CEFIC, who runs the European equivalent. The broad aim of the platform is to enhance reliance of industry on bio-based materials and processes by encouraging collaboration, steering research effort and supporting EU-funded projects.

NTUA/IPSEN further coordinates a National Research Infrastructure (NRI, currently under the name of AGROHOL) that aims to support the holistic use of feedstocks aspiring to the valorisation of by-products and side-streams as they originate from the supply chains of agriculture, forestry, forage and livestock, the aquatic sector and fish farming. The RI connects the primary sector with process engineering aiming to strengthen the efficiency in the use of supplies, to reduce waste, and to scope for new opportunities in manufacturing. The RI supports innovative manufacturing from Greek virgin supplies and targets the manufacturing of products with a made-in-Greece trade-mark. It aligns with technological advances in bio-economy, important technological developments and ongoing EU investments in second and third generation biorefineries, as well as with the emerging concepts of industrial symbiosis and circular economy. In that respect, the NRI is connected with EU IBISBA, the EU initiative towards infrastructures of the sort and the Greek National Technology Platform of Sustainable Chemistry. The NRI will function as an incubator of novel production lines that originate from Greek biomass upgrading existing food supplies without competing with food production. The NRI will offer services to support and accelerate the development and testing of ideas, fostering collaboration between scientists and engineers and supporting an ailing agricultural sector in becoming competitive and profitable.

To achieve its purpose, the NRI mobilises a distributed and multi-disciplinary infrastructure bringing together researchers from the primary sector, engineers (chemical, biochemical, and mechanical), biologists and bio-scientists, social scientists, economists, and computer scientists. The NRI is intended to strongly connect its developments and services with farmers and stakeholders of the primary sector, also to actively involve processing industries (food, chemicals, and

specialties), local communities and societies. Researchers will operate distributed nodes sharing and exchanging knowledge with each other. Services will include access to experimental facilities, access to scientific and engineering knowledge (data, models, and tools), observatories to monitor supplies and logistics, LCA repositories, scale-up technology and a powerful communication platform to connect with non-researcher communities. More specifically, the NRI aims to offer access and support in the development of the following core services:

1 Experimental labs and pilots producing and processing biomass and organic feedstock. The service will coordinate access to the available facilities. The objective will be to (a) connect labs with third parties, offering facility access to other researchers, also to external end-users and stakeholders; (b) promote collaborative projects, as the holistic use of the organic feedstock is impossible by means of a single technology.

2 Data integration and process systems engineering. The service will set up a virtual environment to integrate labs using systems engineering technology as an integrator. Systems components will first involve data and models (intended to capture input/output relationships at the labs). System components will be next be integrated to set up a collaborative ICT platform sharing and exchanging information and knowledge across users. The service will offer access to (a) interactive and dynamic databases for material properties and LCA data, (b) libraries of engineering and unit operation models, (c) economic and marketing data, (d) other links with relevant national and EU repositories. The platform will foster collaborative studies and exchanges with non-researchers.

3 Scale-up and design technology. The objective will be to support the transition of research from the lower lab scale to the higher scale of pilots, demonstration projects and commercial plants. The service will provide access to design tools, synthesis and flowsheeting technology, techno-economic models, as well as links with engineering teams holding experience in advanced process design and process development. The service is expected to act as accelerator to process development projects incubating spin-offs and future investment.

4 GIS systems, logistics and observatories of biomass supplies including volumes and locations of stakeholders. The objective will be to monitor pertinent resources and developments using state-of-the-art ICT technology. The service capitalises on previous work but future research will have to involve in-situ measurements, links with GIS systems, and collaborative work in national and international projects in geosciences.

5 Standardisation services including access to harmonised data and properties.

6 Training.

NTUA/IPSEN has been active in numerous EU research and national projects that address biorenewables in ligno-cellulosics, oleochemicals, aquaculture, but also waste and the circular economy.



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Useful information

1 Commission launches plans to curb energy use in heating and cooling

The European Commission launched on 16 February 2016 its first ever plan to tackle the massive amount of energy used to heat and cool Europe's buildings, including households, offices, hospitals, schools, industry and food refrigeration throughout the supply chain.

Heating and cooling accounts for half of the EU's annual overall energy consumption and 68% of all its gas imports. Meanwhile, renewables only account for 18% of energy in the sector and a large amount of energy is wasted by industry. Taking action to curb energy use and boost renewables in the sector would reduce energy costs, help cut our dependence on imported fossil fuels and slash harmful carbon emissions.

The Heating and Cooling Strategy includes plans to make energy efficient renovations to buildings easier, to develop energy efficiency guidelines for public schools and hospitals and improve the reliability of energy performance certificates for buildings.

The Strategy also aims to better integrate the electricity system with district heating and cooling systems. District heating and cooling networks can use and store electricity powered by renewables and then distribute it to buildings and industrial sites, boosting the level of renewable heating and cooling.

→ <https://ec.europa.eu/energy/en/news/commission-launches-plans-curb-energy-use-heating-and-cooling>

2 Commission proposes new rules for consumer centred clean energy transition

The European Commission presented on 30 November 2016 a package of measures to keep the European Union competitive as the clean energy transition is changing global energy markets.



The Commission wants the EU to lead the clean energy transition, not only adapt to it. For this reason the EU has committed to cut CO₂ emissions by at least 40% by 2030 while modernising the EU's economy and delivering on jobs and growth for all European citizens. The proposals have three main goals: putting energy efficiency first, achieving global leadership in renewable energies and providing a fair deal for consumers.

→ <https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition>

Publications

Proteins for Food, Feed and Biobased Products

Biorefining of Protein Containing Biomass



This report provides an overview of protein containing biomass sources & refining technologies; and protein types, markets & market trends. It is prepared to inform non-protein experts, for example stakeholders from the energy sector; to show the market opportunities for the sustainable valorisation of biomass-based protein fractions to increase the overall market competitiveness of full sustainable biomass value chains in a Circular Economy.

→ Proteins for Food, Feed and Biobased Products. Biorefining of Protein Containing Biomass

Published by IEA Bioenergy Task 42
 ISBN: 978-1-91015-29-8
 Published: September 2016

REPORT: Impacts and achievements of bioenergy projects supported under the EU programme Intelligent Energy – Europe II.

This report provides a summary of the review of the support for bioenergy projects delivered under the Intelligent Energy – Europe II (IEE II) programme in terms of measurable outputs and impacts. It shows how IEE II bioenergy projects resulted in an increased uptake of bioenergy in Europe, beyond that that would have been achieved by EU and national Member State policy alone, and how they will continue to influence the sector now and into the foreseeable future.

→ Impacts and achievements of bioenergy projects under IEE II - Summary Report.

→ Review of bioenergy projects implemented under IEE II Final Report.

ITAKA Final Workshop

Initiative Towards sustainable Kerosene for Aviation (**ITAKA**) is a collaborative project framed in the implementation of the European Union policies, implementation of European Industrial Bioenergy Initiative (EIBI) and specifically aims to contribute to the fulfilment of some of the short-term (2015) EU Flight Path objectives. The ITAKA project supports the development of aviation biofuels in an economically, socially, and environmentally sustainable manner, improving the readiness of existing technology and infrastructures. This will be achieved through a first of its kind collaborative project in the EU, which has started the development of a full value-chain in Europe to produce sustainable drop-in Hydroprocessed Esters and Fatty Acids at large scale.



ITAKA Final Workshop took place on 13-14 September in Madrid, Spain. Project partners and key stakeholders discussed the final results, shared and exchanged best practices, evaluated emerging issues and jointly took the next steps towards the successful development of biofuels for aviation. The presentations are available in www.itakamadrid2016.eu

Save the date! International bioenergy events

JANUARY 2017

18-20 January 2017

5th Central European Biomass Conference

Graz, Austria

<http://www.cebc.at/en/home>

23-24 January 2017

Fuels of the Future - 14th International Conference on Renewable Mobility

Berlin, Germany

<http://www.fuels-of-the-future.com>

25-26 January 2017

Biogaz Europe 2017

Bruz, France

<http://en.biogaz-europe.com/index.asp?SK=skin-01-uk>

31 January – 2 February 2017

PELLETS 2017

Kalmar, Sweden

<https://www.svebio.se/english/kalendarium/pellets-2017>

FEBRUARY 2017

1-2 February 2017

Lignofuels 2017: Advanced Biofuels & Materials

Bruxelles, Belgium

<http://www.wplgroup.com/aci/event/lignocellulosic-fuel-conference-europe>

9 February 2017

BIOENERGY 2017

Castleknock, Dublin, Ireland

<https://www.eventbrite.ie/e/bioenergy-2017-the-irbea-national-bioenergy-conference-tickets-28765963772>

16-17 February 2017

Wood Biomass Heating – Success Factors and Technology Solutions in Practice

Tampere, Finland

https://www.lyyti.fi/reg/study_tour_february2017

MARCH 2017

1-3 March 2017

World Sustainable Energy Days

Wels, Austria

<http://www.wsed.at/en/world-sustainable-energy-days.html>

29-31 March 2017

Nordic Baltic Bioenergy Conference 2017

Helsinki, Finland

<https://nordicbalticbioenergy.eu>

APRIL 2017

10-12 April 2017

International Biomass Conference & Expo 2017

Minneapolis, United States

<http://www.biomassconference.com/ema/DisplayPage.aspx?pageId=Home>

MAY 2017

14-17 May 2017

38th Euroheat & Power Congress

Glasgow, Scotland

<http://www.ehpcongress.org>

22-23 May 2017

REGATEC 2017: 4th International Conference on Renewable Energy Gas Technology

Pacengo (Verona), Italy

<http://regatec.org>

JUNE 2017

12-15 June 2017

European Biomass Conference and Exhibition

Stockholm, Sweden

<http://www.eubce.com/home.html>

29-30 June 2017

World Bioenergy Congress and Expo

Madrid, Spain

<http://bioenergy.conferenceseries.com>

EERA Bioenergy in Europe

Participants and Associate Participants of EERA Bioenergy Joint Programme.



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

<http://aicia.es>



BERA
Belgian Energy Research Alliance (Belgium)

<http://bera.ulb.ac.be>



CEA
French Alternative Energies and Atomic Energy Commission (France)

<http://www.cea.fr>



CENER
National Renewable Energy Centre – Biomass Department (Spain)

<http://www.cener.com/en/areas/biomass-energy-department>



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

<http://www.ciemat.es>



CNR
Istituto Motori del Consiglio Nazionale delle Ricerche (Italy)

<http://www.im.cnr.it>



CNRS
Centre National de la Recherche Scientifique (France)

<http://www.cnrs.fr>



CSIC
Instituto de Tecnología Química - Consejo Superior de Investigaciones Científicas (Spain)

www.csic.es
itq.upv-csic.es



CTAER
Advanced Technology Centre for Renewable Energies (Spain)

<https://ctaer.com/es>



DTU
Technical University of Denmark (Denmark)

<http://orbit.dtu.dk>



ECN
Energy Research Centre of the Netherlands (The Netherlands)

<https://www.ecn.nl/home>



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

<http://www.enea.it/it>



I3A UNIZAR
Instituto Universitario de Investigación de Ingeniería de Aragón – Universidad de Zaragoza (Spain)

<https://i3a.unizar.es/en/rd-divisions/processes-recycling>



IMP PAN
Institute of Fluid-flow Machinery - Polish Academy of Sciences (Poland)

<http://www.imp.gda.pl>



LNEG
Laboratório Nacional de Energia e Geologia (Portugal)

<http://www.lneg.pt>



IEN
The Institute of Power Engineering (Poland)

<https://www.ien.com.pl>



INRA
French National Institute for Agricultural Research (France)

institut.inra.fr



LUND UNIVERSITY
(Sweden)

<http://www.lunduniversity.lu.se>



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

<http://www.ifk.uni-stuttgart.de/index.en.html>



IREC
Catalonia Institute for Energy Research (Spain)

<http://www.irec.cat/es>



NIC
National Institute of Chemistry (Slovenia)

<https://www.ki.si/en>



IMDEA
Instituto Madrileño de Estudios Avanzados (Spain)

<http://www.energy.imdea.org/research/research-lines>



KIT
The Research University in the Helmholtz Association (Germany)

<http://www.kit.edu>
www.bioliq.de



NTUA
The National Technical University of Athens (Greece)

<http://www.ipsen.ntua.gr>
<http://www.ipsen.ntua.gr/suschem-greece>



PSI
Paul Scherrer Institut
(Switzerland)

<https://www.psi.ch/lbk/bioenergy-and-catalysis-laboratory-lbk>



SINTEF
(Norway)

<http://www.sintef.no>



SP
Technical Research
Institute of Sweden
(Sweden)

<https://www.sp.se>



TECNALIA
(Spain)

<http://www.tecnalia.com/en/energy-environment/index.htm>



TÜBITAK

TÜBITAK
Scientific and Technological
Research Council of Turkey
(Turkey)

<https://www.tubitak.gov.tr>



UKERC
UK Energy Research Centre
(United Kingdom)

<http://www.ukerc.ac.uk>



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

UNIBO
Università di Bologna
(Italy)

<http://www.unibo.it/en/home-page>



**Università degli Studi
di Perugia**
(Italy)

<http://www.unipg.it>



Aston University
Birmingham

ASTON UNIVERSITY
(United Kingdom)

<http://www.aston.ac.uk/eas/research/groups/ebri>



VŠB
Technical University
of Ostrava (Czech Republic)

<https://www.vsb.cz>



SUPERGEN
Bioenergy Hub
(United Kingdom)

<http://www.supergen-bioenergy.net>



VTT
Technical Research Centre of
Finland Ltd (Finland)

<http://www.vttresearch.com>



WUR
Wageningen University
& Research
(The Netherlands)

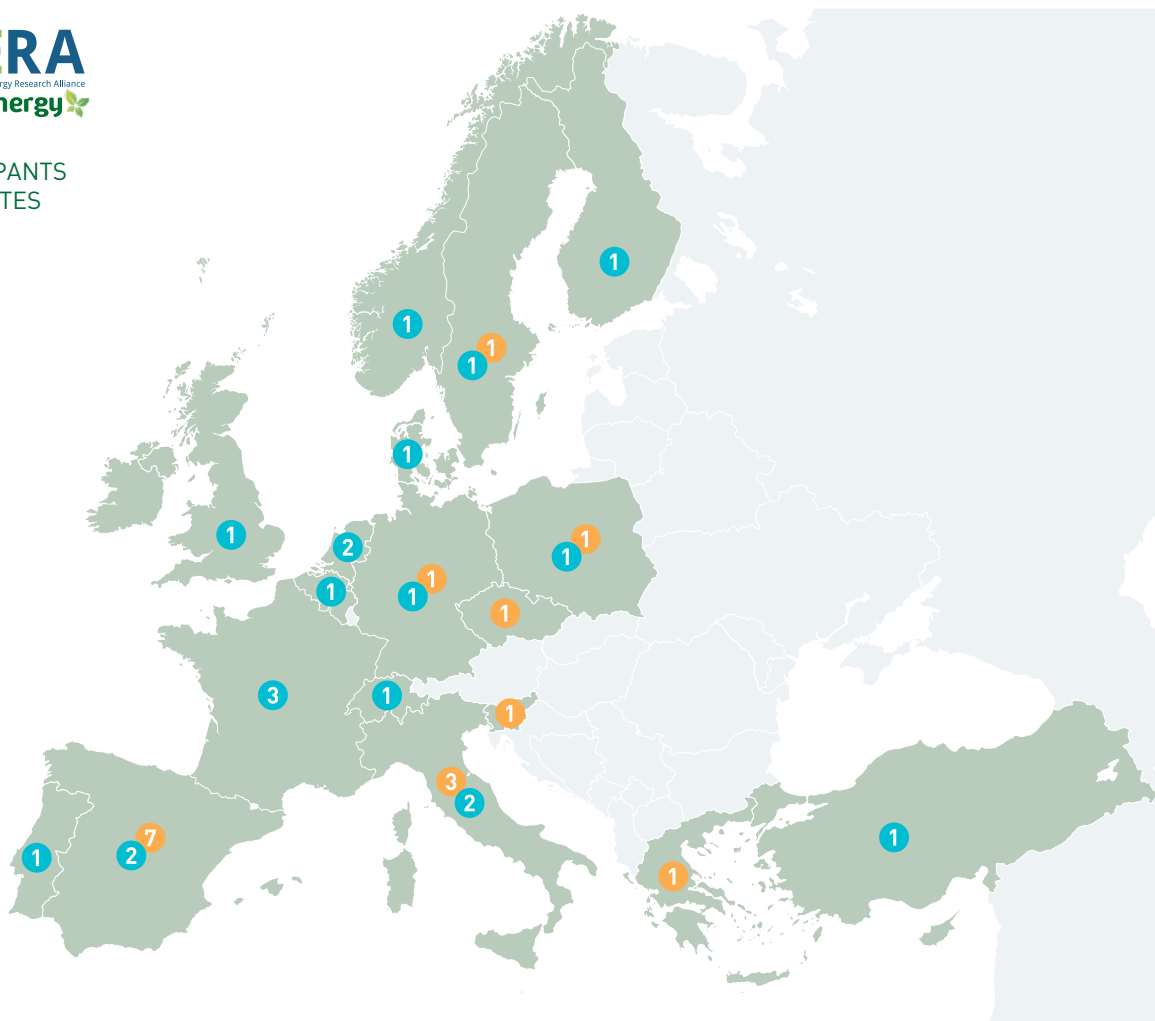
www.wur.eu/fbr

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



- PARTICIPANTS
- ASSOCIATES



The EERA Bioenergy Joint Programme consists of 20 participants and 16 associate participants from a total of 17 countries.
www.eera-bioenergy.eu

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