Bringing research and industry closer: accelerating innovation and uptake of Biomethane.

The workshop "*Bringing Research and Industry Closer: Accelerating Innovation and Uptake of Biomethane*" took place on 7 June 2023, in Bologna, Italy, as part of the European Biomass Conference and Exhibition (EUBCE).The event included presentations from renowned experts from the research community, industry and policy makers. It provided an opportunity for 70 participants, 45 onsite and 25 online to engage in fruitful discussions to further enhance the collaborative efforts in bioenergy sector.

Welcome and objective of the workshop

Ivan Matejak kicked off the workshop by explaining the crucial role of research and innovation in driving industry uptake. He introduced SUPEERA and the SET Plan underscoring their significance in advancing sustainable energy solutions. He mentioned the Repower EU and he brought to the attention to the Net Zero Industry Act (NZIA), Critical Raw Materials and to the I.R.A acts. In this context, he emphasised the need to act effectively in implementing the knowledge gained from research efforts. Finally, to showcase the Commission's commitment to utilising innovative technologies, Ivan mentioned the priority of sustainable biogas and biomethane as part of the overall sustainability agenda presented in the Net Zero Industry Act.

Maria Georgiadou, European Commission, Directorate-General for Research and Innovation, and Biomethane Industrial Partnership Task Force 5, provided insights into the European political framework at large. She discussed the REPowerEU plan and introduced the Biomethane Industrial Partnership (BIP) and its five Task Forces in which members collaborate at expert level on specific topics on the basis of the partnership's Work Programme. She touched upon the recent Green Deal Industrial Plan adopted to build the industrial capacity for Clean Tech including the biomethane sector and the Delegated Act to RED II: Update of list of sustainable biofuel feedstock. Maria finally invited to take a look at the HORIZON program Cluster 5, Destination 3 of Bioenergy, encouraging the participation in Horizon Europe Info Days and in high-quality Horizon Europe proposals.

Collaboration between Research and Industry for identifying R&I needs to accelerate biomethane production.

Marion Maheut, Pyrogasification and GAYA R&I Project leader from LAB CRIGEN at Engie provided an overview of Engie research and industry programs, clarifying that the collaboration between industry and research is exemplified by the GAYA project on the production of biomethane covering the whole value chain, where the research community's insights were also presented. Through this project, Marion showcased how Engie works on upscaling of a gasification technology, moving from R&D lab concept in 2010 through Pilot/Demo and up to Industrialisation. Despite the successful implementation so far (up to demo scale), she highlighted that one of the main challenges now is offering a complete solution to remove all the pollutants from the syngas before methanation. In conclusion, Marion presented the Salamander project as the first business venture for gasification-based SNG in France.

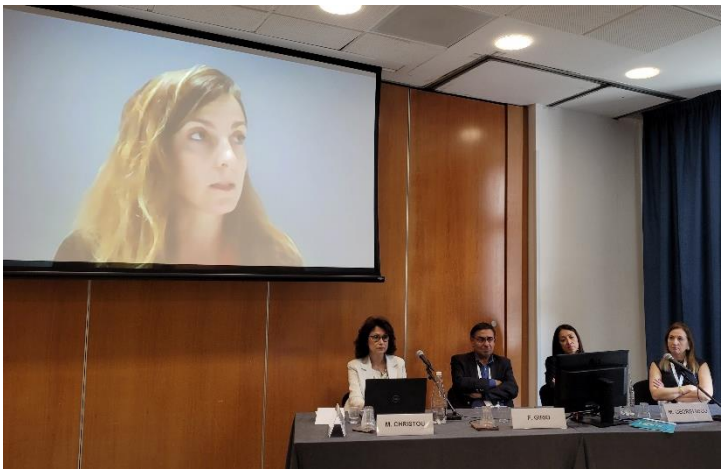
Luisa Brega, is a chemical engineer specialised in bio-digestion systems. She presented the products and services related to Biogas and Biomethane upgrading and emphasised the effective industry and research collaboration within Prodeval's R&D department. She indicated that Prodeval represents 17% of the biogas membrane upgrading market share worldwide and thereafter she presented innovative products and services related to Biogas and Biomethane upgrading. Furthermore, she presented Prodeval's standardised solution for large-scale deployment, confirming a huge replicability potential across Europe to deliver the REPowerEU biomethane volumes by 2030. According to her, this collaboration facilitates the development of technologies, analysis of plant data, and addressing of environmental concerns, driving advancements in adapting biomethane production to meet country-specific requirements.

Francisco Girio, president of the Board of CoLAB BIOREF, from The National Laboratory of Energy and Geology (LNEG). He introduced and discussed the biogas and biomethane market in EU, followed by the evolution of biomethane production technologies over the past decade. He emphasised the need to overcome limitations and consider gasification as an alternative to anaerobic digestion. He rounded up his presentation by introducing the project HYFUELUP which demonstrates an innovative pathway for the efficient and cost-effective production of biomethane in industrial environment and aims to deploy a first-of-its-kind value chain for biomethane production from low-grade biomass and sludge digestate from AD plants.

Myrsini Christou from the Centre for Renewable Energy Sources and Saving (CRES) and EERA Bioenergy Joint Programme Coordinator discussed the current utilisation of feedstock in biomethane production and convincingly showed the geographical dependence of biomass feedstock across Europe, the need for biomass diversification, and the correlation between feedstock and biomethane production technologies. She explained that the variation in feedstocks reflects the differences among Member

States (MS) in their respective biomass resources and therefore R&I objectives. She also indicated that over time, from 2030 to 2050, there will be a trend change in feedstock availability for biomethane production, where sequential cropping will gain attention, particularly when using AD. She further outlined the R&I challenges and recommendations related to bioenergy feedstocks. In this context she introduced the concept of "BiogasDoneRight" versus conventional agriculture practices which rely heavily on chemical fertilisers and pesticides. Finally, she concluded by providing some highlights of Magic Project and GreenMeUp project[1].

Panel discussion and Q&A - Berta Matas Güell, SINTEF



Marion Maheut explained the need of standardised equipment, favourable political support, and cost reduction to replicate and commercialise their plants. **Maria Georgiadou** outlined the energy dependency as an important challenge that R&I is facing in biomethane production. For anaerobic digestion she suggested that R&I efforts should focus on the biological fermentation process. **Luisa Brega** reiterated the importance of R&I and industry collaboration in identifying the country's specific technology requirements while prioritising environmental considerations. **Francisco Girio** highlighted the mutual advantages of a consortium consisting of industry and research, which enables industries to stay competitive, share risks, and reduce costs. **Myrsini Christou** added that optimising the supply chain is one of the challenge for biomass potential. **Maria Georgiadou** included that countries which rely on anaerobic digestion systems must use this resource for the domestic use, as the overall biomass potential will help to push down the supply chain costs. In this context, **Marion Maheut** drew the attention to the innovative supply chain approach of the flagship project Salamander. She emphasised the importance of collaborating with R&I partners to identify and overcome potential obstacles, enabling the implementation of this innovative supply change on a large scale. **Luisa Brega** pointed out that expanding production is a

[1] For further readings:
https://www.becoolproject.eu/
https://magic-h2020.eu/
https://www.gold-h2020.eu/
https://www.bike-biofuels.eu/the-project/
https://www.midas-bioeconomy.eu

crucial factor in effectively contributing to the REPowerEU mission. **Francisco Girio** emphasised the need to integrate different technologies and he made the point on the importance of moving beyond small pilot projects by implementing larger-scale demonstration facilities. Replying to a question from the audience Maria underlined the importance of EU Taxonomy as a financial framework.

Cross-sectorial dialogue to facilitate the biomethane market deployment.

Erik Büthker from TotalEnergies and the European standardisation committee for biomethane, CEN PC 408 highlighted that there are currently no significant technical barriers to biomethane standardisation. The necessary standards are already available, although improvements can still be made. He listed up current ongoing research in this filed related to maximum content of hydrogen, sulphur, silicon; and oxygen in biomethane and their impact on different elements of the value chain. He emphasised the impact of these standards on producers and gas operators and outlined the next steps in the standardisation process.

Marlies Hrad, researcher from the University of Natural Resources and Life Sciences Vienna (BOKU), focused on the methane emissions and their impact on the overall greenhouse gas balance. She stressed the importance of reducing methane emissions highlighting its greater warming potential compared to CO_2. She drew the attention on feedstock selection in relation to substrate supply and technology-specific emission sources. The presentation also included the EvEmBi project, which evaluates methane emissions. To reduce methane emissions, she recommended the following actions: selecting appropriate feedstocks, choosing optimal technology options for new biogas plants, and ensuring regular maintenance and leak detection through self- and external inspections.

Giulia Cancian from the European Biogas Association (EBA) discussed various legislative acts which impacts the whole biomethane/biogas value chains, from feedstock through technology to outputs including Annex IX and VI in the RED III for feedstock, WFD UWWTD for feedstock, INMP FPR Revision Soil Health Law, the Sustainable Carbon Cycles for conversion technologies, and FIT for 55 packages + EPSs HDV for the outputs. She also mentioned the positive progress in renewable gas adoption over the years**.** She focused on the top 10 EU MSs[2] in biomethane production

[2] Austria, Denmark, France, Germany, Italy, the Netherlands, Norway, Switzerland, Sweden and the United Kingdom

in 2020, highlighting their best practices and areas for improvement on national biomethane supportive policies. The analysis work presented by Giulia was elaborated by EBA in the context of the GreenMeUp project. Yet she showcased a long list of best-practices at national level, she also indicated that measures on substrate sectors and permitting issues have been left outside of the policy mix. She concluded by inviting the audience to participate to The European Biomethane Week.

Myriam Röder from Aston University discussed the current scenario characterised by a poly-crisis (climate, ecological, cost of living and energy emergencies) which requires addressing interconnected problems relevant to all stakeholders. In this context, she emphasised the importance of considering multiple stakeholders' perspectives, recognising the interconnections between industry, markets, public collaboration and thus the need of engagement to build resilient systems. Myriam advocated for a community or stakeholder-based approach to maximise benefits for all and improve overall system performance.

Panel discussion and Q&A – Moderator, Myrsini Christou, Centre for Renewable Energy Sources and Saving (CRES) and EERA Bioenergy

Marlies Hrad highlighted the need to find a compromise in addressing the methane losses from small biogas facilities, while **Erik Büthker** suggested that in determining compliance with specifications the focus should be on specific tests and assessing the source of biogas. Regarding the significant volume of biogas, **Giulia Cancian** acknowledged the existence of targets and political indication at the EU level. However, she pointed out the absence of specific recognition of strong drivers for the feedstock. In terms of the institutionalisation of the carbon farming model, **Giulia Cancian** highlighted the significance of addressing emissions by adopting a holistic approach over the next seven years and considering waste management in a comprehensive manner. **Myriam Röder** underlined the need to understand different stakeholders' perspectives. The EU has a responsibility to communicate and find a middle ground that aligns with stakeholders' goals while considering costs. Clear messaging is crucial for both investment and public understanding.