

Bioenergy Smart Choices in Difficult Times

Biomethane for Europe's Energy Resilience: From Agricultural Residues to Energy Security

Concept note:

Europe is increasingly exposed to the impacts of climate change, with more frequent and intense droughts, heatwaves, floods and other climate-related extreme events placing growing pressure on natural resources, agricultural production and energy systems. These pressures can contribute to **declining agricultural productivity, increasing competition for and reduced availability of water resources, and growing risks to the stability and resilience of rural economies.**

At the same time, Europe continues to face challenges related to energy security, geopolitical instability and dependence on imported fossil fuels. Climate-related disruptions can further increase vulnerabilities across energy and agricultural systems, highlighting the need for **adaptation, diversification and greater resilience at local and regional level.**

This creates a need to look at agriculture not only as a sector affected by climate change, but also as a potential part of the response. The transition towards more resilient bio-based systems requires better use of available biological resources, more circular management of agricultural residues and organic by-products, and solutions that can generate additional value while reducing pressure on natural resources.

In this context, **biomethane represents one potential link between climate adaptation, energy security and the circular bioeconomy.** Produced from livestock manure, agricultural residues and other organic by-products, biomethane can transform locally available resources into renewable energy while supporting more circular resource management. Depending on the production model, biogas and biomethane systems can also be integrated with nutrient recovery, organic fertilisers and other forms of biomass valorisation, creating potential synergies between energy, agriculture and resource management.

These opportunities are particularly relevant for **Central and Eastern Europe and the BIOEAST macro-region**, where agriculture plays an important role in regional economies, while many rural areas are increasingly exposed to drought, water scarcity, extreme temperatures and other climate-related pressures. At the same time, the region has substantial biological resources that remain underutilised or are not fully integrated into circular value chains.

The challenge, therefore, is not simply to increase renewable gas production. It is to understand **how biological resources can be mobilised in a way that strengthens the resilience of agricultural and rural systems without increasing pressure on land, water and other natural resources.**

Against this background, the Science–Policy Dialogue will bring together policymakers, researchers, industry representatives, farmers and other stakeholders to discuss the role that biomethane could play at the intersection of **energy security, climate resilience, agricultural adaptation and the circular bioeconomy.**



The central question of the dialogue will be:

Can bioenergy, and biomethane in particular, help Europe address two converging pressures at once (dependence on imported energy and the growing climate vulnerability of agriculture), and what would this require in CEEE?

This **Science-Policy Dialogue**, organised under the **BIOEAST Initiative** and the **BOOST4BIOEAST project**, will bring together policymakers, researchers, industry representatives and stakeholders from across the BIOEAST region. They will discuss what is needed to turn the region's substantial biomethane potential into actual deployment: the opportunities, barriers and policy conditions that will decide whether biomethane can serve energy security and agricultural resilience at the same time.

Objectives

The Science–Policy Dialogue will explore whether and how biomethane, in particular, can respond to both Europe's energy security challenges and the growing climate pressure on agriculture. It will focus particularly on Central and Eastern Europe and the BIOEAST macro-region.

1. **Examine how climate pressures on agriculture and energy import dependence reinforce each other.** This includes how increasingly frequent and intense climate-related extreme events are affecting agricultural production, water availability and energy systems, and why these challenges are still rarely addressed together.
2. **Explore the role of biomethane in addressing both pressures.** The focus is on valorisation of livestock manure, agricultural residues and other locally available organic resources into domestic renewable gas, as well as into products that return nutrients and organic matter to soil.
3. **Identify opportunities for integrating biomethane development with climate adaptation and the circular bioeconomy,** including synergies between energy production, nutrient management, organic fertilization, water recovery and rural development.
4. **Discuss barriers and enabling conditions for biomethane deployment** in Central and Eastern Europe, including infrastructure, investment, regulation, feedstock availability, cooperation models and market conditions.
5. **Identify policy and research priorities** that can support sustainable biomethane development while avoiding additional pressure on land, water and other natural resources.



Innovation Focus

The dialogue will focus on innovative approaches that connect **biomethane development with climate resilience, energy security and the circular bioeconomy**.

Particular attention will be given to:

- **Valorisation of agricultural residues and livestock manure** as locally available resources for renewable gas production.
- **Farm-based, cooperative and regional biomethane models** capable of aggregating dispersed biomass resources and creating additional value for farmers and rural communities.
- **Integration of biomethane with circular nutrient management**, including the recovery and utilisation of nutrients and organic matter from agricultural and biogenic waste streams.
- **Diversification of rural value chains and income sources**, particularly in areas facing declining agricultural productivity and increasing climate-related pressures.
- **Integration of renewable gas into existing energy infrastructure**, supporting diversification of energy supply and reducing dependence on imported fossil fuels.
- **Adaptation-oriented bioeconomy solutions** that seek to increase resource efficiency and resilience while limiting additional pressure on land and water resources.

The dialogue will place particular emphasis on **innovation in business models, cooperation mechanisms, technologies and policy frameworks**, rather than focusing exclusively on technological innovation.

Expected Contribution

The Science–Policy Dialogue is expected to contribute to a better understanding of **how biomethane can support the combined objectives of energy security, climate resilience and rural development** in Central and Eastern Europe.

In particular, the dialogue is expected to:

- provide a **science- and evidence-based discussion** on the role and potential of biomethane in resilient energy and agricultural systems;
- identify **key opportunities and barriers** for sustainable biomethane deployment in the BIOEAST macro-region;
- highlight **innovative value-chain, cooperation and business models** that can enable the mobilisation of dispersed agricultural biomass resources;
- identify **research and innovation needs** related to biomethane, climate adaptation, resource efficiency and circularity;
- support the identification of **policy priorities and enabling conditions** for biomethane development;
- strengthen the dialogue and knowledge exchange between **researchers, policymakers, farmers, industry and other value-chain actors** across the BIOEAST macro-region.



The outcomes of the dialogue can also provide relevant input for ongoing discussions on **national and regional bioeconomy strategies, climate adaptation, renewable energy deployment and rural development.**