



Track 3: Bio-based Economy

Moderator: Thomas Dodd, European Commission, DG RTD

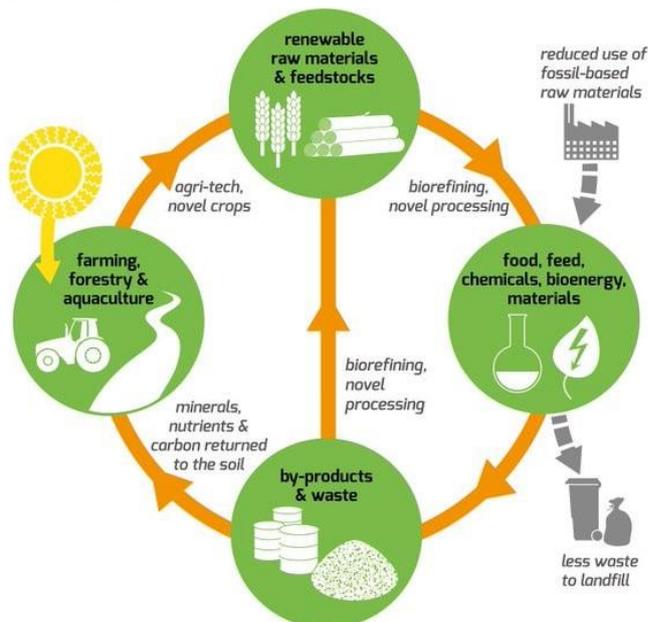
Showcase presentation: Professor Claus Felby (DK) on principles of the bio-economy and the Danish case (room 164).

The Bio-based Economy track is intended to initiate a deeper discussion on how EU and its member states (MS) can jointly promote a sustainable, cost-effective, and cross-state flexible bio-based economy that can foster GHG mitigation as well as growth, jobs, and environmental benefits. The Bio-based Economy track will consist of two breakout sessions, both of which will be conducted under Chatham House rules, meaning no one will be cited directly or mentioned for their expressed views outside of the session room. The last of the two sessions should produce 2-3 concrete policy measure ideas that could be incorporated into relevant EU legislation before 2030, to promote a bio-based economy.

Climate change, agriculture and the Bio-economy

An integral part of the transition to a future low-carbon economy is the phasing out of fossil fuels and materials where possible. This can be achieved via reduction in the use of fossil resources, but also from substitution of fossil based fuels and materials by bio-based fuels and materials. The latter part is

Figure 1 The link between primary sectors and the Bio-economy. The GHG emission reductions comes from the substitution of fossil based products with those produced in the right most green circle. Copyright by BioVale.



what constitutes the bio-economy. The bio-economy represents a paradigm shift delivering not only environmental and climate change benefits, but is also critical in maintaining and reinforcing the European industrial base and competitiveness. In that light, promoting the Bio-economy is a possible climate mitigation strategy that rely on agricultural and forest sectors, but chiefly delivers GHG emission reductions in other sectors, including in the non-ETS. Another key element of the shift is reducing the dependency on foreign oil and gas and the perceived increased demand for (EU) agricultural products, with added benefits for the trade balance. The link between agriculture and the Bio-economy is depicted in figure 1.

Within the EU, the Bio-economy is understood to be "the part of the economy that encompasses the production of renewable biological resources and the conversion of these resources and waste streams into value added products, such as food, feed, biobased products and bioenergy". The term



Bio-economy, being relatively novel, is still not well defined, and usage and definition differ depending on region or application. The renewable biological resources being utilized for the Bio-economy include conventional sources such as agriculture, forestry and fisheries, as well as waste products (industry and household) and novel feedstock, such as algae. The agro-industry plays a key part in the Bio-economy as the first converter of biological resources into raw materials, semi-finished or final products.

The Bio-economy produces a range of products (Bio-based products), which can be «bio-based versions» of traditional products called plug-in products (e.g. bio-based plastics) or novel products with entirely new and innovative functionalities and potentials for new and existing markets. For example, the fossil plastic in PET bottles can be substituted with bio-plastic and concrete and steel in many buildings can be substituted by wood-fibre-based construction-materials. In both cases, the GHG emission reductions are the result of lower energy intensity of the production of the bio-based materials as compared to e.g. steel or concrete, and the GHG benefits associated with the re-sequestration of carbon in the agriculture and forest production systems, which is not the case for the fossil system. Importantly, the emission reductions linked to substitution of bio-based products are contingent on the sustainable production of bio-materials and it is critical that the increased demand for bio-materials does not lead to a global depletion of carbon stocks in soil and vegetation. If the Bio-economy takes off and demand for biomass – primary, secondary and tertiary – multiply, then the pressure on forests, soils, water and biodiversity may very well multiply as well. The take home message is that we need to use our biological resources in an intelligent manner – despite renewable they are not unlimited.

The Bio-economy in Europe already makes a significant contribution to growth and employment. In 2014, the sector (incl. agriculture, forestry, fishery, food, and tobacco products) employed around 18.6 million people, generating a turnover of €2.2 trillion, however, the vast majority came from agriculture and food production. In comparison, the manufacture of bio-based chemicals, plastics, pharmaceuticals, and rubber had a turnover of merely €130 billion (2014), but the sector is growingⁱⁱ.

Guiding questions:

- > In what way could the Bio-economy help reduce GHG emissions in your country and the EU?
- > How do we avoid overexploiting our biological resources?
- > What main barriers and challenges do you see for the realisation of the GHG emission reduction potential from the transition into a European Bio-economy in the next ten years?
- > What main knowledge gaps and research needs on the link between Climate Change Mitigation, Agriculture and the Bio-economy do you see for the next ten years?

Key policies and regulation

There is no EU Bioeconomy policy, but a number of policies that are relevant, and complemented by an EU Bioeconomy Strategy. The 2012 EU Bio-economy strategy (COM/2012/60) is not legislation,



but a strategy paper identifying a number of relevant actions for the sector, supported by facts presented in an accompanying report (SWD/2012/11). The actions presented evolve around dedicated research, the setting up of a Public-Private-Partnership, and the need for better data and standardization in bio-based markets and productsⁱⁱⁱ. The strategy, and the research funding supporting it, is well suited to drive innovation and to provide overall directions on the development of and transition towards a future EU Bio-economy. But the strategy is less clear on the climate benefits of the transition or the role of climate mitigation as a driver of the Bio-economy.

In addition to the Strategy, the current policy framework of the EU Bio-economy consists of regulations, incentives and legislation from different, but related policy areas, such as agriculture, forestry, fisheries, food, environment, energy, and industry, among others. It includes the new Energy Package, the Circular Economy Package, the Common Agricultural Policy and the Effort Sharing Regulation, incl. LULUCF, which is currently being negotiated. This policy development is unfolding in the context of an increasing global focus on a sustainable, low emission future and bolstered by the UN Sustainable Development Goals (SDGs), and the Paris Agreement and its related Nationally Determined Contributions under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC).

Guiding questions:

- > What type of policies and regulation can promote sustainable bio-based products over fossil-based equivalents?
- > How do we make sure we can protect the agricultural and forest ecosystems from overexploitation if demand for biomass from EU or outside increases?
- > What is the role and potential of the 2030 EU climate and energy package, in driving the bio-economy through GHG targets?
- > How can Members States (MS) climate change mitigation policies in the agricultural sector to promote the bio-economy?

Opportunities and barriers for climate mitigation

The Bio-economy “*offers a unique perspective to address the multidimensional challenges of food security, energy security, climate change, environmental protection and industrial renewal,*” as the European Council (2015)^{iv} expresses it. Multidimensional challenges are often complex and difficult to disentangle, but at the same time offer the opportunity to address several challenges at the same time if done properly. In the below, a number of opportunities and barriers for promoting and catalysing the Bio-economy, agriculture and climate change at the same time are discussed.

1. *Optimizing current systems*

A transition to a Bio-economy holds potential to contribute to mitigating climate change by reducing overall GHG emissions of the economy and of agriculture-based supply chains and industries. As demand for biological products is expected to increase significantly in coming years to meet food, fuel



and product needs, optimizing production systems to increase output, reducing input and minimizing impacts is key. Without this optimization, the pressure on resources can become problematic, but with ongoing take up of new technologies and practices, as well as reduced waste, optimization, climate change mitigation and the bio-economy can go hand-in-hand.

2. Behavioural change creating demand

Given the current lack of policies supporting demand for products within the Bio-economy, the success is largely dependent on fostering consumer demand (B2B and B2C) for these, i.e. both among consumers and companies. In this situation, GHG mitigation targets can help promote the shift, e.g. by increasing awareness among consumers and incentivizing substitution. A shift in consumer and industry behaviour towards demanding bio-based versions of traditional products, such as plastics, chemicals, lubricants, surfactants, and other feedstock, which are currently (mostly) produced from fossil fuels, is critical. At the other end of the supply chain, this shift broadens and diversifies the income base of the farmers, potentially making farmers less dependent on a limited number of crops and products. This in turn, could diversify the rural economy, and not least cater for new management practices and production system.

3. Cross-cutting: Steering the Bio-economy through

The EU Climate and Energy packages for both 2020 and 2030 consist of national GHG reduction targets and one policy instrument namely the EU-ETS. To achieve the actual emission reductions outside of the energy sector, the Climate and Energy Packages rely on sectoral policies, both at EU and MS level. In a similar manner, the bio-economy is dependent on a long list of sectoral policies serving many different purposes. This means that ensuring interplay between climate policy and bio-economy entails crosscutting policy coordination and coherence: Defining climate change policies that ensures GHG reductions while promoting a coherent Bio-economy is a challenge, and discussions have yet to unfold, leaving room for new ideas and suggestions to set the frame.

Guiding questions:

- > What changes in behaviour among consumers will support both climate change mitigation and the bio-economy?
- > How can we incentivize the use of products with lower GHG footprint than fossil-based equivalents?

ⁱ European Commission (2012) Innovating for Sustainable Growth: A Bioeconomy for Europe.

ⁱⁱ Ronzon, T. et al. (2017). Jobs and Turnover in the EU Bioeconomy – DataM. Available at:

https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html?sessionId=cBUvRiQXomwR7aGwnGdsl6eCilqzDPb5u3t0-Ht-r0guQLs4_dJI-897120521

ⁱⁱⁱ Philippidis, G., M'barek, R. and Ferrari, E. (2016) Drivers of the European Bioeconomy in Transition (BioEconomy2030): an exploratory, model-based assessment. EU Joint Research Centre. EUR 27563 EN, doi:10.2791/529794.

^{iv} European Council (2015), Agriculture and Fisheries Council, 14-15/12/2015, Brussels, 2 December 2015. 14927/15, [AGRI 635/RECH 300](#).