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Bioeconomy – Five Key Points from a Biorefinery Perspective

BIOECONOMY Policy Brief

crop energies

SÜDZUCKER GROUP

Bioeconomy

Introduction

Bioeconomy is a central approach that aligns industry and the economy with sustainable production methods using renewable raw materials. This puts **biomass production and its conversion into sustainable products** in the areas of food, feed, biobased materials, biobased chemicals and bioenergy in the spotlight.

The aim is to make better use of biotechnology, biomanufacturing, and circular economy. The main aspects are to improve resource efficiency and to tap the **significant growth potential of biobased materials substituting fossil-based materials**. This implies laying down priorities for biobased materials and for retaining them as long as possible in the economy.

At CropEnergies, we are firmly committed to the principles of the bioeconomy and actively implement them through our biorefineries. As a leading European producer of renewable ethanol, our vision is to **contribute to a climate-friendly world with sustainable products made from biomass.**

We operate biorefineries at six locations in Europe and are an integral part of agricultural value chains to produce food, feed, energy and much more out of plants. **From 2027 on, we will be expanding into the field of biobased chemicals as a new line of business.** As part of the Südzucker Group, we are also closely rooted in agriculture and are convinced of its strategic importance and valuable contribution to the sustainable transformation of our economy.

Regarding the bioeconomy, we believe that the following aspects are highly important. **Firstly: Our world needs carbon!** Especially in material use, such as in the chemical industry. But to protect our climate and to build a sustainable economy **we need to replace fossil carbon with renewable alternatives:** recycling, biomass and Carbon Capture and Utilisation (CCU). We need all three paths to be successful. To us, this defossilisation of the economy is a central point of the bioeconomy, this must to be the focus of our efforts.

Secondly**: Biomass is key!** As a biogenic raw material, biomass is a key source to replace fossil carbon. We call for this fact to be better recognised in the Bioeconomy Policy in Europe and we would highly appreciate **a serious consideration of crop-biomass as a contribution to a strong bioeconomy in Europe.** As a biomass expert who is very familiar with the opportunities and challenges in the cultivation and processing of biomass, we are happy to share our experience within the policy making process.

Thirdly: **Keep the fossils in the ground!** If we use biomass and other raw materials from sustainable sources and keep them in circulation for as long as possible, we ensure that carbon remains in the soil in the long term.

Against this background, we would like to provide the following input for the Bioeconomy Policy in the EU, based on the experience gained in our field.

1. Appreciaton of cultivated biomass

Appreciation of cultivated biomass

The defossilisation of the economy goes hand in hand with an increased demand for non-fossil raw materials. **Biomass production, recycling, and Carbon Capture and Utilisation (CCU)** are the key to meet this demand. At our biorefineries, each year we process up to 3 million tonnes of European-grown and sustainably certified cultivated biomass and convert it into high-quality products.

Referring to bioeconomy-policy, political strategies **differentiate between first- and second-generation biomass** (cultivated biomass, biomass based on residual and waste materials) – and favor the latter. The aim of the policy directions is to establish and expand the supply of raw materials and value chains on this basis.

As CropEnergies, **we support the idea of increasingly using waste and residual materials as a basis for new value creation**. This is in line with the core idea of the circular economy, which we implement in all our biorefineries. However, as we see in our daily business, **second generation biomass alone is not capable of supplying raw materials on an industrial scale** because the corresponding quantities are not available.

Referring to political regulation, we therefore advocate **treating first- and second-generation biomass as raw materials with equal status**. This also prevents incentives for fraud, which we have seen in the context of multiple counting of second-generation raw materials in the biofuel sector.

To us, all suitable raw materials and process technologies are equally necessary to master the challenges of industrial transformation. We believe that such a **broad approach** should also be anchored in EU-Bioeconomy Policy to accelerate transition and to secure biobased value chains at industrial scale level.

Harmonisaton of sustainability criteria

Biomass can make a significant contribution to defossilising the economy. However, this is only guaranteed if biomass is obtained in a sustainable way. Therefore, we believe that **biomass production must adhere to sustainability criteria**. We also think that **sustainability criteria should be harmonised across all biomass sectors** to ensure market consistency. Criteria that are based on specific applications should be avoided. To us, **the RED III criteria** are a good basis that could be further developed into sustainability criteria for material usage.

2. Defossilisation and Renewable Carbon

Bioeconomy aims to decarbonise industry and the economy. However, some industries, such as the chemical industry, cannot fulfill this aim without the use of carbon. Decarbonisation is not possible; but **defossilisation based on renewable carbon offers opportunities**. But how can this be done?

To discuss and advance these issues, we engage in various committees and networks, including the Renewable Carbon Initiative (RCI). According to the RCI[1], the defossilisation of the chemical industry can be managed if **enough sustainable material** (biobased, CO_2-based, recycling) **can be mobilised**.

[1] Is there Enough Biomass to Defossilise the Chemicals and Derived Materials Sector by 2050? – A Joint BIC and RCI Scientific Background Report (PDF) | Renewable Carbon Publications

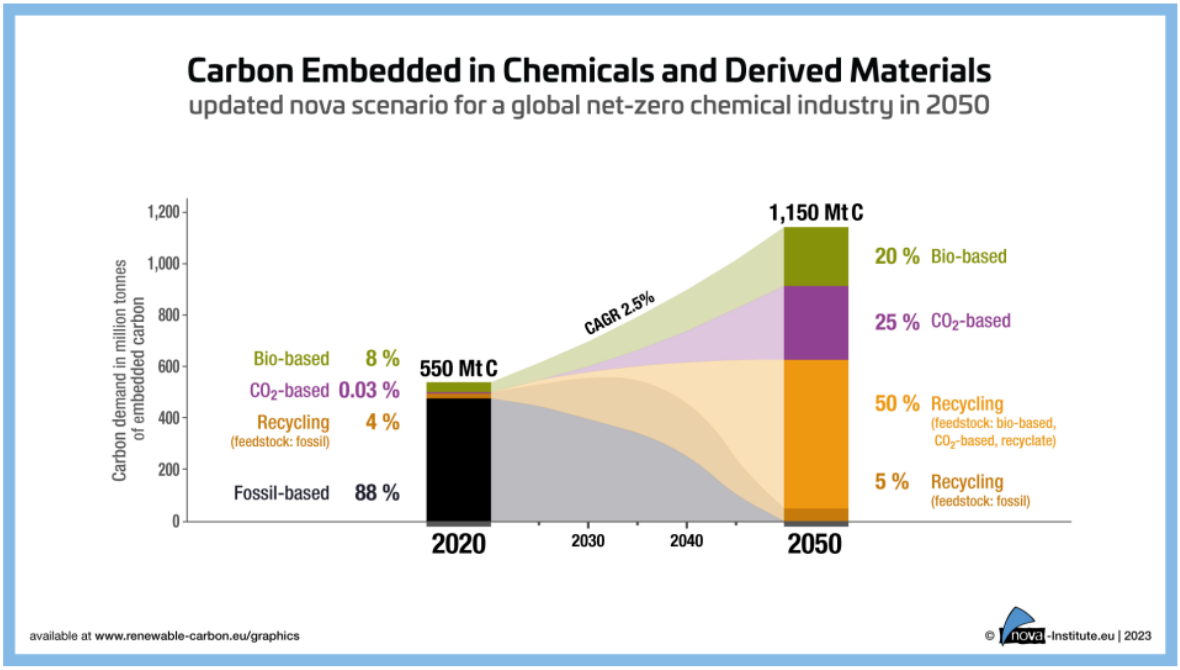

Figure 1: RCI/nova Scenario for the Renewable Carbon Demand of the Chemical and Related Industries in 2050 Worldwide

The RCI-study points out that this is **a feasible scenario - if the right course is set**. We therefore see the central task of EU-Bioeconomy policy in **setting a framework for achieving such scenarios**. Referring to biomass, for example, we must find answers to the following questions: How can unused or underutilised land be mobilized for sustainable biomass production? How can we publicly discuss land use in a constructive manner?

3. Demand for renewable carbon

Biobased Components

In addition to setting the right political course, the defossilisation of the chemical industry also requires **biobased materials that can replace fossil components**. As CropEnergies, we have accepted this challenge and invested up to 170 million EUR in the construction of a new plant to produce biobased chemicals in Elsteraue/Germany.

From 2027 on, the first product of our new biobased chemical-line will **be renewable ethyl acetate as a drop in solution**. Thus, we are ready to make an offer to the chemical industry to shift their products to a biobased basis on an industrial level (50.000 tonnes per annum).

However, what we can tell from our experience so far is that the **costs of biobased products are significantly higher than those of fossil-based products.** This is primarily due to the fact that the yield of carbon per unit quantity is naturally much lower than with fossil sources because biomass contains other components in addition to carbon (e.g. oxygen, water, etc.). Accordingly, biobased raw materials have a structural cost disadvantage because more of them must be used to obtain the same amount of carbon.

Thus, users of biobased products, such as those in the plastics, paints, and cleaning agents' industries, **are not predominantly seeking to transition from fossil-based to biobased products**, nor are they seriously engaging with their suppliers to shift away from a fossil-based supply chain. And as long as fossil carbon is available cheaply, this will not change.

Support market competitiveness

Therefore, we believe in the necessity to implement **effective policies aimed at enhancing the market competitiveness of biobased products**. For example, EU regulation should be further developed so that it differentiates between the origin of the raw material (fossil or renewable origin). Moreover, **market-based instruments should be introduced** to compensate for structural cost disadvantages (e.g., pricing fossil carbons in products similar to the EU ETS).[2]

To us, these are **important topics EU-Bioeconomy Policy needs to deal with**. As set out in the Clean Industrial Deal, the aim is to **create reliable framework conditions and stable business cases for products made from sustainable raw materials**. We are convinced that this would lead to corresponding product demand and more industrial investment in this field.

4. Climate objectives and Greenhouse Gas emissions

Contribution of biofuels

The EU aims to be climate-neutral by 2050. To achieve this goal, every year many tonnes of Greenhouse Gas (GHG) emissions must be saved or captured from the air.

Regarding CO_2 savings, we would like to point out that in the EU, the **transport sector is one of the biggest emitters of GHG.** The EU responds to this with a strategy focused on electrification to defossilise road transport. That has proven politically and logistically complicated, as combustion engines continue to play a significant role in people's everyday mobility.

As long as this is the case, the EU needs more than one solution for reducing GHG emissions from vehicles. **We therefore advocate that any EU-approach on regulation to emissions-reduction in the transport sector should be open to all technologies.** This includes EU sustainable renewable fuels that deliver proven results now and that work in today's petrol and hybrid cars and infrastructure. Regarding the climate targets, this seems particularly expedient because renewable ethanol reduces GHG emissions by more than 79% on average compared to fossil petrol.

Acceleration of Carbon Capture and hydrogen

Carbon Capture and Utilisation/Storage (CCU/S) is an integral part of our production. Firstly, we process **biogenic raw materials that have absorbed carbon from the air**. This is the natural way to reduce GHG, which is supported by the cultivation of sustainable biomass.

Secondly, in terms of technical CCU, we **capture CO_2 in our biorefineries** and make it available for liquefication. The main consumers of liquefied CO_2 are from the beverage industry.

In our biorefineries, ethanol production generates around one million tonnes of pure biogenic CO_2 per year, which we could capture and reuse. At present, we are able to process up to 400.000 tonnes.

[2] RCI Policy Proposals for Facilitating the Transition to Renewable Carbon (PDF) | Renewable Carbon Publications

In addition, biogenic CO_2 can be used as a sustainable source of renewable carbon in even more advanced value chains. But other business areas, such as e-methanol for e-fuels, are not yet viable due to **a lack of hydrogen and missing CO_2 infrastructure**. CCS is also not an option for us at present, also due to lack of infrastructure.

Thus, despite existing technologies and possibilities, the CO_2 remains in the air. Based on this experience, the EU-Bioeconomy Policy should focus on the **importance of hydrogen for the decarbonisation of the economy**.

Together with other policy areas, the **ramp-up of the hydrogen industry**, including the necessary infrastructure measures, must be given priority. In addition, EU regulations on hydrogen should be simplified and **expanded to ensure that green and other forms of sustainable, non-fossil hydrogen**, i.e., hydrogen produced with significant CO_2 savings ("low carbon hydrogen") are treated equally to make the hydrogen market more flexible.

5. Value chains and biorefinery sector

Reduction of dependencies

The current economic and political situation is characterized by **geopolitical tensions, uncertain alliances, and volatile markets.** The "America-first"-policy of the USA exerts influence on global trade. Wars are taking place in Europe and the Middle East, affecting existing trade flows and trade agreements in Europe and beyond.

In view of these developments, we believe that the EU needs to make greater use of **EU biomass and other EU-raw materials to prevent dependencies on external influences**. To achieve this, the new Bioeconomy-Strategy should foster the awareness of the **strategic importance of renewable raw materials in the EU**.

The biorefineries of CropEnergies, for example, provide food, feed, biofuel and biobased chemicals within the EU **from European raw materials**. We mainly source our feedstocks in the vicinity, strengthening regional economic structures and promoting value creation within the EU.

Therefore, we believe that **biorefineries that produce solely and sustainably in Europe are ready to play a key role in securing Europe's economic resilience**. This aspect should be anchored in EU-Bioeconomy Policy with the corresponding priority.

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About CropEnergies AG

CropEnergies is a leading producer of renewable ethanol and operates biorefineries at six locations in Europe. Its core business is the production of bio-based products in the sectors of fuel, energy, food and feed, neutral alcohol, biogenic CO_2, and bio-based chemicals. CropEnergies is part of the Südzucker Group and employs more than 500 people.

About the Südzucker Group

The Südzucker Group is a globally active group of companies dedicated to the development, production, and supply of plant-based solutions across five segments: Sugar, Specialties, CropEnergies, Starch, and Fruit. Its focus is on the production of food, feed, and other products in the food and non-food sectors. The Südzucker Group has over 19.000 employees and over 90 production sites worldwide, processing more than 30 million tons of renewable agricultural raw materials annually.