



BIO-BASED CHEMICAL PRODUCTION

ECRN VISION



OVERVIEW

Demand for raw materials is increasing exponentially and there is a risk of resource depletion. In the last 100 years, the world's population has started using 34 times more materials, 27 times more minerals, 12 times more fossil fuels and 3.6 times more biomass. Demand for raw materials will increase further in the coming years.

The circular economy offers special opportunities for our prosperity and economy if we can reduce the use of primary raw materials and increase their reuse without sacrificing our comfort or prosperity.

Transformation into a low-carbon and circular economy in 2050 requires smart use of raw materials, energy, water, space and food and close circuits as much as possible. In 2050, the regions are recommended to develop into a fully-fledged bioeconomy that sustainably produces biomass and uses and re-uses biomass flows and residual flows for food, animal feed, materials, products, and energy. In 2050, agriculture will deliver from residual flows and the extraction of ingredients (and chemicals building blocks) high-quality raw materials for the industry, without competing with food production. In addition, the sector will also become an energy supplier. In 2050, the industry will switch from fossil (and critical) raw materials to renewable or generally sustainably available raw materials and the sector will use renewable energy. This ambition is supported by policy at all government levels and endorsed by the chemical sector itself.

The bioeconomy is estimated to amount to 2.1 trillion euros and representing over 18.3 million jobs. This number involves also the more 'traditional' bioeconomy sectors, like agro-food and paper. In the years to come, the bioeconomy is expected to rapidly expand by replacing non-biobased products by biobased alternatives. When excluding the traditionally biobased industries, like food, beverage, tobacco, forestry and agriculture, the 'biobased economy' represents €600 billion euro and 3.2 million jobs.

The chemical sector has expressed its ambition to be 100% circular by 2040. The chemical sector currently represents from only 5% of the biobased economy and 1% of biofuels. However, given the fact that the other sectors are significantly more biobased and offer less potential for additional use of biobased feedstocks, it is in particular for biobased chemicals and biofuels that there is significant potential for biobased growth.

ECRN PRIORITIES

- Sustainable bioeconomy cannot be achieved simply by optimizing products and processes. Structural changes are required in the systems that perform societal functions, such as the energy, materials, mobility, food and housing systems and more generally the consumption system. Transition management requires networks in which forward-thinking players from EU, government, business, civil society and science are involved. **The European Union is expected to play a facilitating and guiding role, among other things by stimulating policy integration in a targeted manner and on a larger scale than currently, creating experiment areas and investing in networks.**
- If we want to reduce our greenhouse gas emissions sustainably, we must also consider reducing the carbon footprint of our production and consumption. In order to make a correct estimate of the ecological impact, it is important to consider the entire life cycle of materials and goods. **There is a huge requirement of a coherent and integrated policy for the bioeconomy: a constructive collaboration between a policy for research and innovation, economy, agriculture, environment, the chemical industry, materials, raw materials, energy, education and taxation, and policy aligned as much as possible with European regulations and developments.**
- What is extremely challenging is the fact that biomass is highly heterogeneous in nature, with the result that a range of technologies is needed. New supply chains are needed that can handle the wide variety in quality but also the considerable variations in sources of the biomass streams: seasonal variation, less obvious residual streams, impure streams, etc. Biomass can be the raw material for chemicals, fine chemicals and specialties, such as plastic additives. Completely new chemicals with new, special properties can be produced from biomass. **We ask the EU to prepare the generally accepted sustainability criteria at European level for all the biomass used along the entire value chain to stimulate the market for sustainable biobased products with adequate policy-related and stimulating measures. The sustainability of imported biomass must be examined and guaranteed against criteria. These criteria must at least be developed at EU level.**
- Plant cultivation and seed production, efficient food processing technology and modern production procedures are important components of a plant-based value added chain. University and non-university research facilities are developing new possible uses for plants and plant components for the food sector, the pharmaceutical and cosmetic industries, and in order to supply raw materials to the industry, chemical industry included. **We call the EU to undertake the major efforts that are needed in the field of research, development and scale up to develop conversion techniques that convert biomass efficiently into biobased products, electricity, fuels and heat and to create the sphere for the multidisciplinary research and innovation that is supported across the entire value chain.**

- If we want to achieve in 2050 that only renewable or generally available raw materials will be purchased in products, governments have to be 100% circular: there is no more (residual) waste. Through its purchasing power, governments create sufficient scale to get the flywheel moving towards a circular economy. **We ask the EU to take efforts that are needed to develop these biobased products in a sufficiently high-quality and reliable way and also to provide consumers (citizens, businesses, governments) with clear and up-to-date information so that they are convinced to contribute to a more sustainable pattern of consumption in this way, with the necessary starting point being less use of materials and energy. The ECRN regions strongly support the idea to create the eco-design work program to promote reparability, durability and recyclability of products in addition to energy efficiency.**
- The chemical industry already plays an important role in the recovery of valuable raw materials from residual products. The chemical sector can play also a key role in the processing of residual flows and the high-quality use of renewable raw materials. The chemical sector can also contribute to sustainable energy generation and storage. For example, by producing intensively at peak moments in energy supply. **There is also the issue whether biomass (residual) material flows can be seen as a raw material or as waste. At this moment there is no uniform classification within the EU. This affects cross-border transportation of these substances, storage, and processing. A coherent and integrated policy is asked for.**
- The labour market must be versatile enough to adapt to the changes that a transition to sustainability will bring about. **A clear picture will be needed of the skills and talents that will be vital in the bioeconomy of the future to enable a proactive approach.**
- The development of bioeconomy at the regional level must be based on financial mechanisms dedicated in particular to waste management, the chemical industry, agriculture and forestry. **The bioeconomy is such a new concept that its development will be slow without simple mechanisms of financing from EU funds at the regional level. They should be included in the Regional Operational Programme, which the scheme of action is known, and the beneficiaries are able to navigate them. These may also be funds from the R&D area but strictly dedicated to the bioeconomy in its regional approach and specificity of supply sources.**

SUPPORTING THE INNOVATION POTENTIAL OF SMALL AND MEDIUM ENTERPRISES

Production plants based on newly developed processes - with inherent technology risks and a scale and learning curve disadvantage - compete with mature fossil based alternatives where externalities are not fully priced in. A level playing field needs to be created for demo- and flagship production plants.

A level playing field can be both realized by a CO2 taxation (in the EU and on imported goods) but also a mandatory percentage of the input to be biobased/circular. It is important to imply both measurements in the whole EU and for the import. Otherwise, firms will leave certain countries or the EU and will produce it somewhere else.

The ECRN supports the idea of the Shared Pilot Facilities for the Key Enabling Technology 'Industrial Biotechnology' that speed up sustainable innovation and help companies to bridge this 'valley of death' by reducing time, cost and risk substantially when scaling up innovations from lab scale to industrial scale. They are a crucial element in dealing with societal challenges such as developing a sustainable, innovative and knowledge-based economy in Europe, creating jobs and meeting climate targets.

The EU is asked to allocate EU funds to innovations aimed at preserving and developing new business models to stimulate the bio-based chemical production. An additional remark has to be placed by the time-consuming length of the procedure to allocate funds. Large companies/ multinationals have the 'power' to cope with this problem, but for SME's this a large obstacle. **Furthermore, the ECRN asks for allocation of the EU funds to scaling processes to production scale (demo and flagship plants) and developing mechanisms to mitigate risk associated with first-of-a-kind production plants (financial guarantees).**

Bioeconomy, to develop fully, needs support and cooperation between the public and private sectors, between business and science (R&D). It also obliges to interdisciplinary activities and connections. Change and the transition towards a circular economy require large investment outlays and attractive sources of financing. Good legal and formal conditions should be created to locate this type of activity and attract investors.