SUSTAINABLE BIOMASS FOR BIOPLASTICS

The EU's Bioeconomy Strategy vision[1] for 2040 is that "sustainable biobased materials and products such as [...] plastics are widely deployed in the EU. They provide fossil-free alternatives and create new, stable income streams in rural, coastal and industrial regions across Europe".

THE STRATEGIC IMPORTANCE OF BIOMASS

The EU's Bioeconomy is of strategic importance for Europe's resilience. In 2023, it was worth up to EUR 2.7 trillion, employed 17.1 million people (8% of EU jobs), and generated EUR 863 billion in added value (5% of EU GDP). The EU Bioeconomy Strategy notably lists biobased plastics as a lead market for materials[1].

CURRENT SITUATION

Current biomass use for plastics and chemicals: In 2023, 10% (global) and 5.5% (EU) of the chemical sector's carbon demand was biobased.
Globally, most biobased inputs for the plastics and chemicals sector come from[2]:

- Starch
- Sugar
- Vegetable oils

Together these feedstocks represent 71% of global biomass use in the sector[2]. They form the basis for fermentation-derived bioplastics (e.g., PLA, PHA), drop-in bioplastics (e.g., bio-PE, bio-PP), and biobased monomers and other biobased building blocks. Many alternative biobased molecules, that can replace fossil-based molecules, are available today.

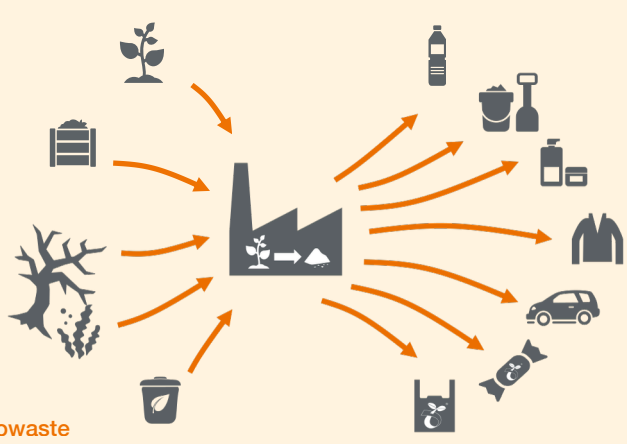
Biobased plastics can be made from a wide range of renewable biobased feedstocks

Agricultural
plants that are rich in sugar and carbohydrates, such as sugar-beet and corn

Ligno-cellulosic
- Agricultural byproducts, residues and wastes (e.g., cobs cleaned of kernels of corn; straw; bagasse, etc.)
- Forestry and forest industry byproducts, residues and wastes (e.g. wood pulp, bark, branches, lignin, etc)

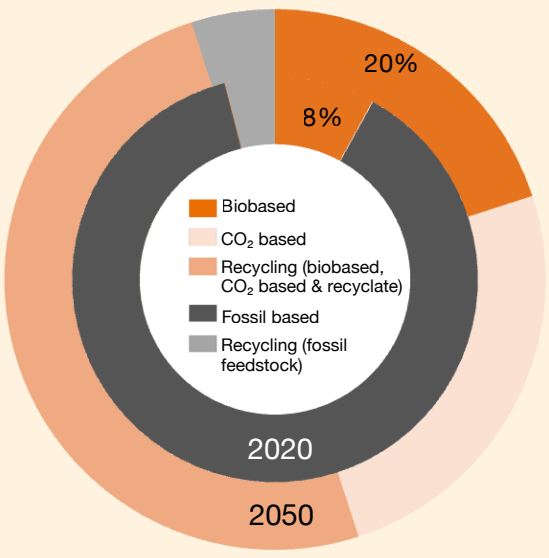
Aquaculture
e.g. algae

Other biowaste
e.g. municipal or other industrial biowaste



TARGET

Carbon Embedded in Chemicals and Derived Materials 2020 vs 2050[3]



In order to defossilise the global chemicals and materials industry by 2050[4], at least 20%[5] of the carbon embedded in chemicals and derived materials would need to be coming from biomass.
(Polymers/plastics and rubber currently represents 65% of the chemical and derived materials sector[4].)

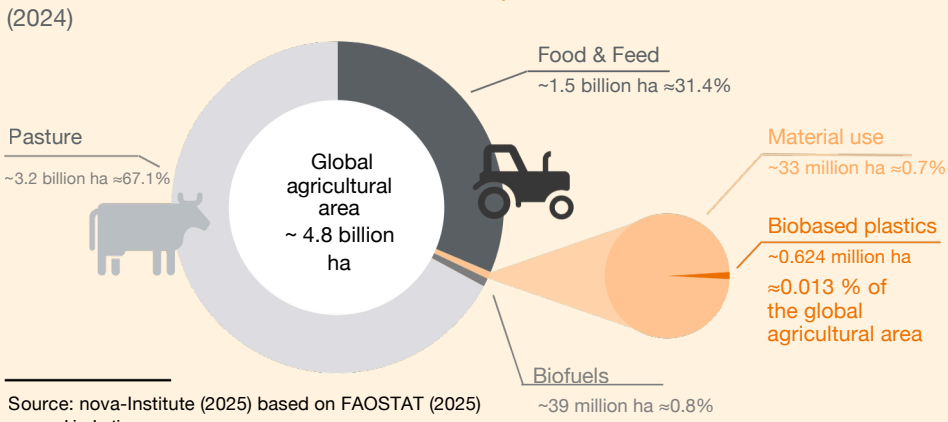
Under this scenario, overall demand for carbon embedded in chemicals and derived materials doubles by 2050, while biobased carbon demand would need to grow 5 times in the same period[5].

CAN THIS TARGET BE SUSTAINABLY MET?

Yes, sustainably meeting 20% of total carbon demand of the chemicals and derived materials (including plastics) sector in 2050 via biomass is realistic and achievable[2]. Biobased plastics will continue to play the major role in this growth.

How much land is required for agricultural biomass for bioplastics?

Land-use estimation for biobased plastics
(2024)



Source: nova-Institute (2025) based on FAOSTAT (2025)
europeanbioplastics

While the demand for biobased plastics is projected to grow significantly, the impact on land use is expected to remain minimal as we aim for the 2050 target. By 2030, land requirements are estimated at only ~0.03% of global agricultural area, with a similar proportion anticipated for Europe.

A strategic pillar of Europe's Bioeconomy vision, biobased plastics are enabling the transformation of industry - decoupling economic growth from fossil resources to build a more resilient Union.

Sources
1 COM (2025) 960 final, A Strategic Framework for a Competitive and Sustainable EU Bioeconomy.
2 Carus, M., Porc, O., vom Berg, C., Kempen, M., Schier, F. and Tandetzki, J., 2025: Is there enough biomass to defossilise the chemicals and derived materials sector by 2050. nova-Institut GmbH (Ed.), Hürth, Germany, 2025-02.
3 Derived from reference 5.
4 Defossilisation is an important part of achieving net zero emissions by 2050 in the EU.
5 Kähler, F., Porc, O. and Carus, M. 2023. RCI Carbon Flows Report: Compilation of supply and demand of fossil and renewable carbon on a global and European level. Editor: Renewable Carbon Initiative, May 2023. DOI No.: https://doi.org/10.52548/KCTT1279