# Biobased economy scenarios for the EU28
# Advanced biomaterials production and respective biomass demand

**Keywords:** Transformation pathways, chemicals substitution, resource competition, long term and country specific scenarios
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## Introduction

Several position papers [1,2] of the European Commission aim for establishing a knowledge based bioeconomy in the upcoming decade within the European Union. In contrast to the discussion of possible relevant developments of bioenergy production and demand as well as food and feed production and consumption, advanced biobased materials are addressed incomprehensively in literature and politics.

Out of the three pathways allowing a phasing out of a fossil carbon based economy namely i) reducing the material and energy intensity of the economy through increases in efficiency, ii) the substitution of fossil fuels in energy supply, and iii) the substitution of fossil fuels currently used as materials, this poster therefore focuses on the latter.

## Objective and methodology

This poster aims at showing possible transition pathways with regard to the substitution of fossil based materials with advanced biomaterials.

Therefore this poster presents i) first of its kinds long term (up to 2050) substitution scenarios and ii) their respective biomass demands for the EU28. Discussed biomaterials, substitution targets, conversion pathways and respective factors are based on an extensive literature review and own calculations.

## Respective biomass demand

Additional demand for biomass resources is relatively low (3%-37%) compared to expected production for bioenergy purposes based on [4] in 2050 respectively. Only in case of an extensive increase ("High Scenario") of biolubricants production the supply of oil seeds could lead to a considerable competition with e.g. biodiesel production. However a direct substitution of fossil with biobased chemicals would probably lead to increased biomass imports for Belgium, Cyprus, Italy and the Netherlands. In Germany, France, the UK, Spain and Poland a partly rededication of biomass for bioenergy to biomaterials could be sufficient. **In Figure2** country specific biomass demands for advanced biomaterials are compared to the production of biomass for bioenergy in 2050 based on [4].

For the latter values exceeding the range of 60kt/year are illustrated using arrows (for France, Germany and Poland).

## Advanced biomaterials production scenarios

Substitution potentials for polymers, lubricants, solvents but also bitumen are considered due to advantages of advanced biomaterials including higher biodegradability, lower toxicity and emission reductions compared to their fossil based counterparts. Also biogenic carbon storage is outlined as an advantage to be expected to come along with lower degradable biomaterials. However a substitution goal of 30% for all chemicals to 2030 as set in [3] can only be achieved with higher growth rates than used in the "Medium Scenario".

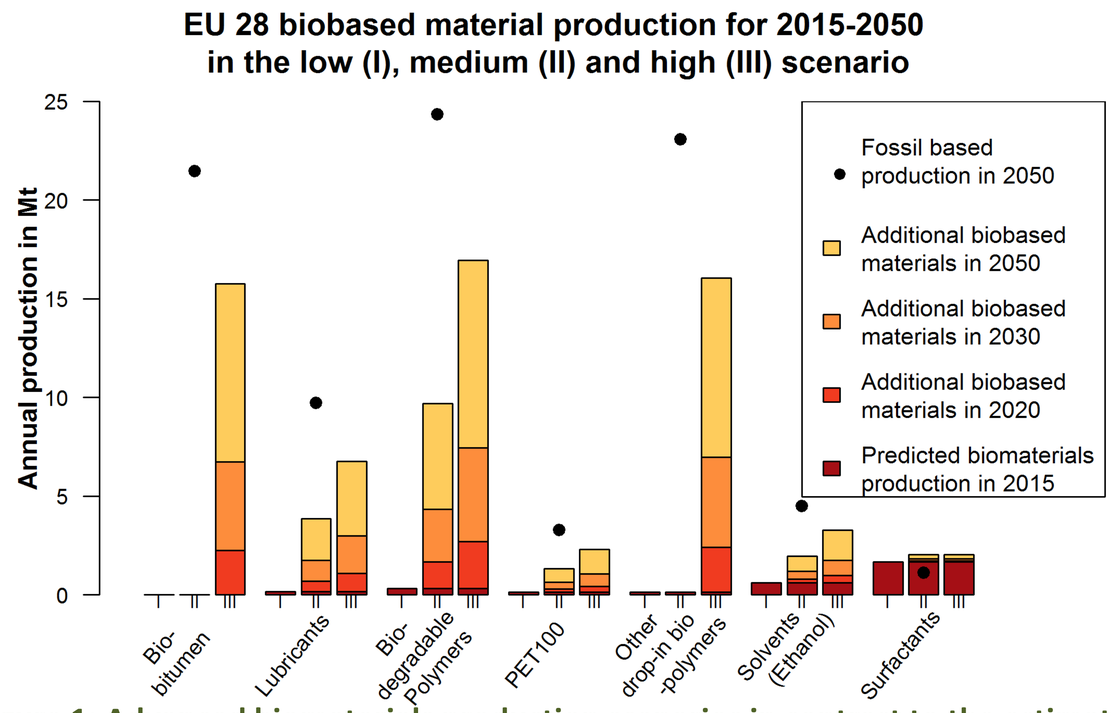


**Figure 1: Advanced biomaterials production scenarios in contrast to the estimated fossil based production (low, medium and high scenario)**

## Conclusions

A better understanding and documentation of the growing variety of biomass utilisation pathways and their increasing efficiency through technological development is necessary to facilitate the discussion of this part of the knowledge based bioeconomy. The development of an inclusive legal framework to establish a level playing field between the end uses with a focus on food security is recommended.

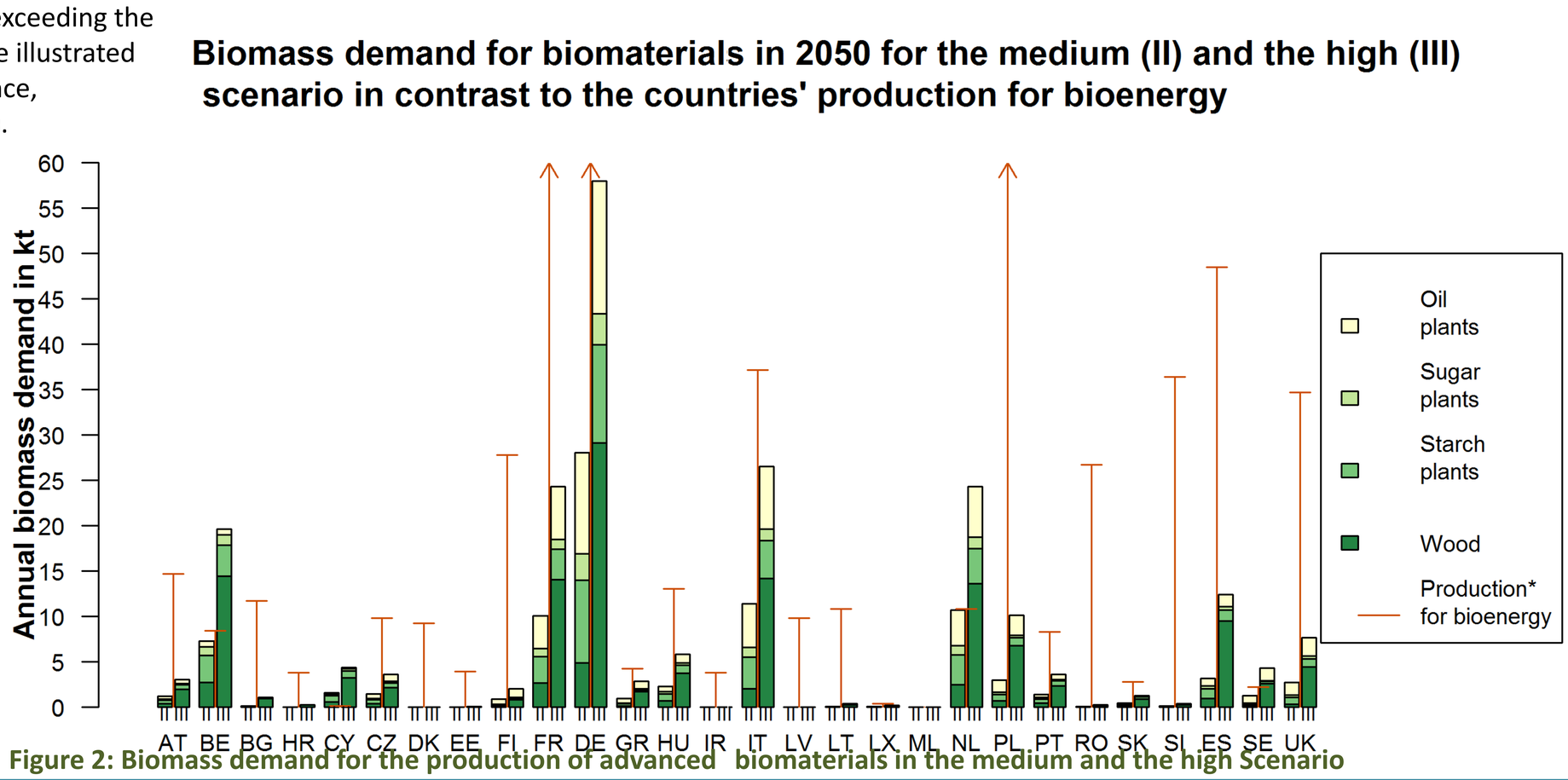


**Figure 2: Biomass demand for the production of advanced biomaterials in the medium and the high Scenario**

## References

[1] EU, 2007. Cologne Paper; En route to the knowledge-based bio-economy.
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[4] Capros, P., De Vita, A., Tasios, N., Papadopoulos, D., Siskos, P., Apostolaki, E., Zampara, M., Paroussos, L., Fragiadakis, K., Kouvaritakis, N., others, 2013. EU Energy, Transport and GHG Emissions: Trends to 2050, Reference Scenario 2013.

## Contact and further information

The research leading to the presented results was performed in the framework of 1) the project CC2BBE (Vulnerability of a biobased economy to global climate change impacts) for the ACRP (Austrian Climate Research Program) with the funding number KR12AC5K01355 as well as 2) the Young Scientists Summer Program (YSSP) at the International Institute of Applied Systems Analysis (IIASA) funded by the Austrian Academy of Science (ÖAW).

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