

Lignocellulosic **Biorefinery Democase** The Bioeconomy Pilot of the

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Biorefinery Definition

- Biorefinery, being the sustainable processing of biomass into a spectrum of marketable products (food, feed, materials, chemicals) and energy (fuels, power, heat)
- Biomass feedstock can be: vegetable oils, carbohydrates, wood, grass, lignin







Fossil oil value chain via oil refineries and crackers, naphtha, chemicals and plastics

Biobased value chain via biorefineries, intermediates, chemicals and bioplastics



Example of some Large Agro and Forestry Biorefineries in Europe



Biorefineries according to EC report 2018

Map of biorefineries producing bio-based chemicals, liquid biofuels and composites and fibres in the EU



Biorefineries distribution in the EU Research Brief

HIGHLIGHTS

- 803 biorefineries have been identified in the EU, of which 507 produce bio-based chemicals, 363 liquid biofuels and 141 bio-based composites and fibres (multi-product facilities are counted more than once).
- Of those facilities, 177 are reported as *integrated biorefineries* that combine the production of bio-based products and energy.
- The location of most biorefineries shows correspondence with chemical clusters and ports.
- Generally, the highest concentration of biorefineries is located in the central part of the EU, particularly in Belgium and the Netherlands.
- Agricultural resources are the feedstock source used by most biorefineries in all EU countries with the exception of Finland, Sweden and Portugal.
- Marine and waste resources are relevant in some countries but not yet highly exploited in biorefineries.



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Global Biorefinery Report 2022 – IEA Task 42



IEA Bioenergy: Task 42 Biorefining in a circular economy

Key Challenges for lignocellulosic biorefinery

- Lignocellulosic biomass is recalcitrant
- Total valorization of all streams is challenging.....LIGNIN !
- By-products impact the business case
- Only smart, integrated approaches will do!
- Scale-up to pilot and demo takes \$\$ and time
- Scale is a very important factor (small or large)
- Close to feedstock or close to market ?



Example 1: Lignin to High value chemicals – Ludo Diels



Example 2: Lignin to Bioasphalt – Chaplin Project



VANGUARD INITIATIVE



Thank you for your attention



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