

Technology factsheet: Competitiveness of clean energy technology – Advanced Biofuels

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Key technologies

Conventional biofuels are already used commercially in some contexts, such as blending ethanol with gasoline for transport use. Several technologies for advanced biofuels are progressing and are close to commercialisation. EU legislation prioritizes the use of such fuels for hard-to-abate sectors, considering the eligible (b1og-ILUC risk) biomass sources reported in the Annex IX (and update) REDII.

tech 1

Technological Readiness Level (TRL) 3-4 Biofuels though: Aquatic biomass to advanced biofuels

tech 2

TRL 4-6 Biofuels though: Hydrothermal liquefaction to bio-crude; oil extraction from algae to triglycerides; fermentation of syngas to biomethane; aqueous phase reforming

tech 3

TRL 6-7 Biofuels though: Thermo-catalytic reforming to drop-in fuels; lignocellulosic biomass to Fischer-Tropsch (FT) fuels

tech 4

TRL 7-8 Biofuels though: Fast pyrolysis of biomass to pyrolysis oil; gasification of biomass and pyrolysis oil to syngas; bio methanol synthesis; methanol to gasoline synthesis; catalytic methanation of syngas for synthetic natural gas (SNG) production; lignocellulosic biomass to ethanol

tech 5

TRL 8-9 Biofuels though: Pre-treatment and enzymatic hydrolysis to sugars; hydroprocessing of oils, fats, and bio-liquid intermediates; gas fermentation through microorganisms to alcohols; transesterification of triglycerides; biomethane from biogas upgrading



Key value chain figures

- **Sector turnover:** EUR 12.1 billion (2021) – largest turnover in France, Germany and Spain.
- **Employment (biofuels overall):** 148 300 (direct and indirect) – largest in Poland, France and Romania.

Key facts

Fact 1

As biofuels rely on local biomass resources and short supply chains, they offer excellent opportunities to reduce energy poverty and increase the security of supply and resilience of the EU energy system. Advanced biofuels are the single option today to decarbonise aviation and maritime sectors and hard-to-abate sectors such as heavy duty transport on short term.



Fact 2

Costs are currently higher than first-generation biofuels due to higher processing complexity. Higher energy prices will make advanced biofuels more competitive and help them to achieve broader commercial production and cost-effectiveness. Higher prices are also related to slow rate of investments due to unstable long-term regulatory framework and volatile market conditions.

Fact 3

The sector should ramp up production to achieve EU targets as the number of commercial plants is still relatively low. The EU is the world leader, with 19 out of 24 operational commercial plants, with Sweden and Finland having the highest number (12 in total).



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