Synthetic fuels offer great opportunities for the sustainability transition of the European energy system and the decarbonisation of the transport sector

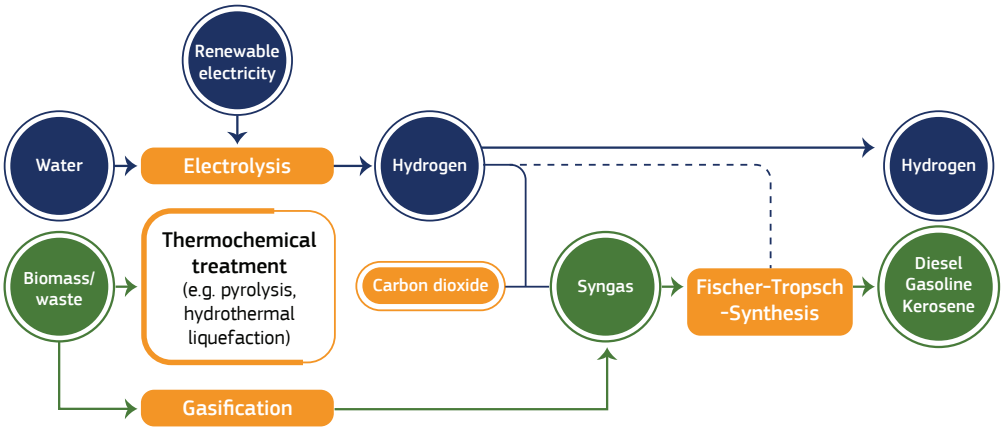
Product Watch: Synthetic fuels

Decarbonising transportation is considered crucial for a sustainability transition of the European wider energy system. Within the EU the transport sector accounted for almost 1/4 of greenhouse gas emissions. One promising solution is the use of synthetic fuels. Different synthetic fuel types exist, such as hydrogen generated via electrolysis (PtG-hydrogen), biomass-to-liquid fuels (BtL) and power-to-liquid fuels (PtL). Following the Hydrogen Roadmap Europe, the ambitious deployment of green and low-carbon hydrogen can translate to a €130 bn industry for EU fuel and equipment companies by 2030 that could reach €820 bn by 2050.

Three types of synthetic fuels (synfuels) are promising:

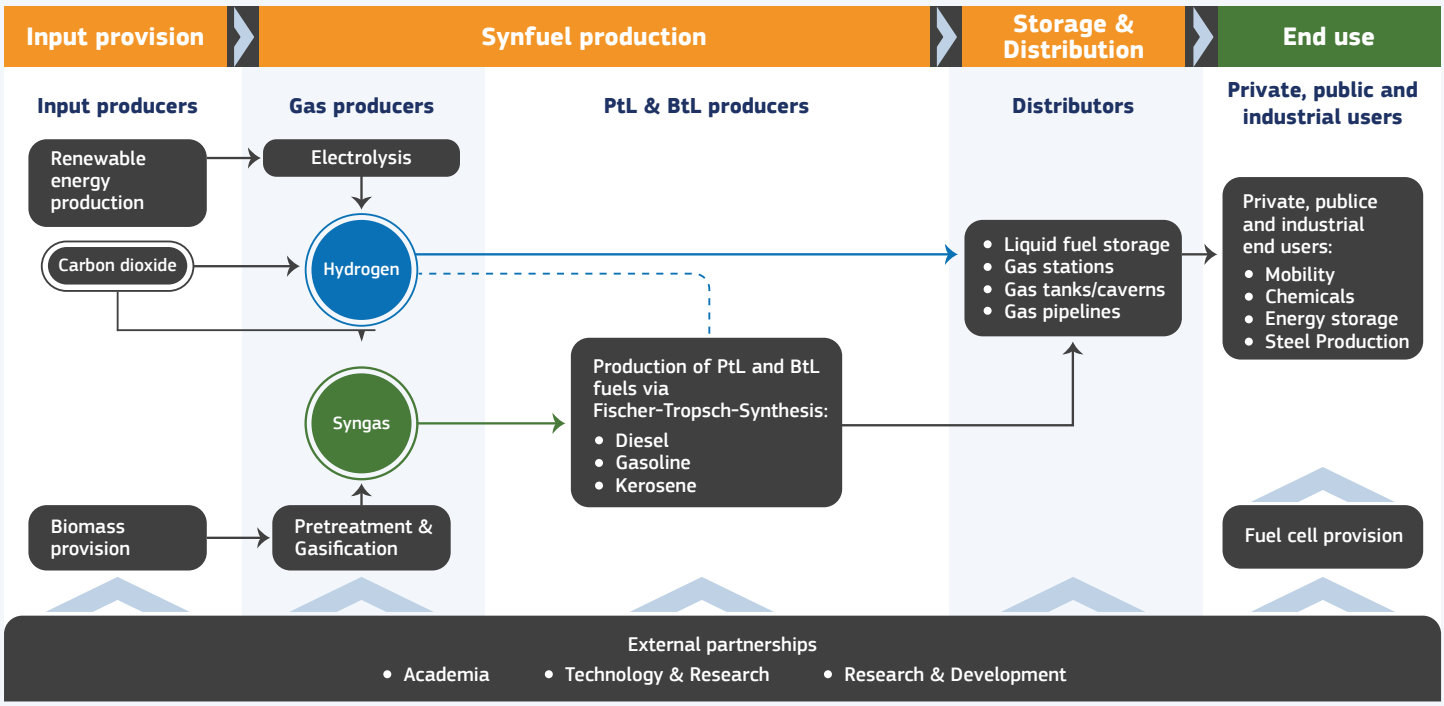
- Hydrogen can be created with electrolysis and be used directly
- Hydrogen can be combined with carbon dioxide ultimately leading to syngas
- Biomass or waste can be processed in such a way that it produces syngas

Syngas can be transformed into regular fuels such as gasoline and kerosene.



From input to end use; technological innovation is needed throughout the whole value chain

The core of the EU hydrogen value chain is fragmented and consists of relatively small organisations, specialised either in final application assembly or in components. Europe occupies a strong position, with almost 300 involved companies. The synthetic fuels value chain consists of four main parts:



For more information, read the full Product Watch report on Synthetic fuels here:
https://ati.ec.europa.eu/reports/product-watch/synthetic-fuels

Research and technology play a key role in the development of synthetic fuels

Key actors in the synthetic fuels value chain range from electrolysis technology providers to fuel cell and hydrogen research

- Fuel cell producers suppliers
- Electrolysis technology providers
- Storage providers and distributors
- Fuel cell and hydrogen research
- Green hydrogen producers

The Power-to-Liquid (PtL) includes Original Equipment Manufacturers and large oil companies, however, there seems to be less market interest on the European level. Biomass-to-Liquid (BtL) has limited economic activity. Both PtL and BtL producers and research play a role in development of multiple parts of the value chain.

- PtL producers and research
- BtL producers and research

EU's competitive positioning for synthetic fuels

Strengths

- Sustainability gains
- Research and Development capabilities
- Company experience and excellence
- Committed institutional framework

Opportunities

- The expansion of renewable energies
- Sector integration
- Political momentum

Challenges

- Techno-economic insecurity
- International competition
- Infrastructure investment needed

Risks

- Lacking clear regulatory framework
- Low economic competitiveness
- Technology optimisation and knowledge
- Weak access to infrastructures & resources

About the Advanced Technologies for Industry (ATI) project

The ATI project – funded by the European Commission – supports the **implementation** of Europe's new growth strategy with a systematic monitoring of **technological trends** and reliable, **up-to-date data** on advanced technologies.

The **Product Watch** analyses novel products that are based on advanced technologies for the development of goods and services - enhancing their overall commercial and social value. It supports cluster organisations and S3 partnerships, providing intelligence on innovation areas where European regions could team up and invest together.

For more information, read the full Product Watch report on Synthetic fuels here:
https://ati.ec.europa.eu/reports/product-watch/synthetic-fuels

Publications Office of the European Union

PDF: ISBN 978-92-9460-711-9 doi: 10.2826/925564 EA-05-21-189-EN-N