European Commission

CHEMICALS

INNOVATION FUND

Deployment of net-zero and innovative technologies

MoReTec-1: Fully electrified chemical recycling of plastic waste for deep decarbonisation of the polymer industry

The Innovation Fund is 100% funded by the EU Emissions Trading System

| Project Factsheet

With its proprietary MoReTec advanced recycling technology, LyondellBasell (LYB) aims to return post-consumer plastic waste to its molecular form. This will be used as a feedstock for new plastic materials that offer expanded applications, including medical and food packaging. LYB plans to build a MoReTec advanced recycling technology demonstration plant (MoReTec-1) in Wesseling, Germany. This represents the next step towards addressing the challenge of hard-to-recycle plastics at scale. This project is expected to provide LYB with the valuable operating experience and additional technological know-how that is needed to scale-up and fully commercialise the MoReTec technology. The plant will be designed to produce 40 kilotonnes/year (kt/yr) of pyrolysis oil and 7 kt/yr of pyrolysis gas, achieving a relative greenhouse gas (GHG) emission reduction of 100% compared to the reference scenario.

COORDINATOR
BASELL POLYOLEFINE GMBH

LOCATION
Germany

CATEGORY
Energy intensive industries (EII)

SECTOR
Chemicals

AMOUNT OF INNOVATION FUND GRANT
EUR 40,000,000

EXPECTED GHG EMISSIONS AVOIDANCE
823,484 tonnes CO2 equivalent

STARTING DATE
01 January, 2024

ENTRY INTO OPERATION DATE
30 April, 2026

FINANCIAL CLOSE DATE
30 June, 2025

Updated on 02 December 2024

Plastic waste is one of the most complex material mixtures from a recycling perspective. Recycling reduces incineration, landfill and the associated carbon emissions. Chemical or advanced recycling – the core of the MoReTec technology – will contribute towards a circular, climate neutral economy.

The project converts plastic waste into pyrolysis oil and gas. The pyrolysis oil can be used in LYB crackers, replacing naphtha from fossil crude oil as feedstock for new plastic materials such as polyethylene and polypropylene.

The project will demonstrate a first-of-its kind, breakthrough technology which includes a continuous process and advanced catalysts heat integration. This combination of technology will lead to high energy efficiencies, high yields, increased scalability potential and optimised capacities. The required heat inputs will also be supplied using 100% renewable electricity. The aim is to demonstrate the technical and economic feasibility of the technology for implementation at a large-scale plant capacity of up to 200 kt/yr as envisaged for future assets. MoReTec-1 is expected to achieve an absolute GHG emissions reduction of 823 484 CO2 equivalent over its first ten years of operation.

Most plastics are still produced from fossil-based feedstock. Especially for challenging segments like food packaging and healthcare products, no circular solutions at industrial scale exist worldwide. MoReTec technology is intended to provide circularity solutions.

It will contribute to interrelated EU policy objectives such as the Integrated Strategic Energy Technology Plan, the New Industrial Strategy for Europe and the recovery plan for Europe and the new Circular Economy Action Plan.

| Participants

BASELL POLYOLEFINE GMBH	Germany