

Renewable energies | Bio-based chemistry

BIO-BASED CHEMISTRY
OVERVIEW AND CHALLENGES

The development of base material production processes for the chemicals sector using biomass addresses a triple objective:

- **use renewable raw materials** in order to reduce greenhouse gas (GHG) emissions and tackle climate change,
- **contribute to the development of a circular economy**,
- **reduce the chemical sector's reliance on oil**.

While still emerging, the bio-based product market is nonetheless enjoying strong growth, driven by:

- **consumers' increasing interest** in more sustainable consumer goods,
- the increased efforts of industry and brands to propose **100% bio-PET packaging and 100% bio-nylon textile fibers**,
- the threats of a **deficit in the global supply of olefins** (propylene and butadiene, in particular) and some highly **sought-after aromatics** (benzene), encouraging recourse to new raw materials and new production processes.

The production of major olefin-based and oxygenated intermediates (polyols, diacids) and polymers from lignocellulosic biomass is under way. For example, bioethylene and its derivatives (mono-ethylene glycol, in particular), lactic and polylactic acid, 1,4-butanediol, succinic acid and bioisobutanol, which provide access to numerous biobased derivatives, are **already produced on a commercial scale**.

The challenges for the large-scale deployment of bio-based chemistry concern:

- **production costs** relative to oil-based processes,
- **security of access to the resource** and the development of supply sectors,
- the **construction of bio-refineries** exploiting synergies between various biomass conversions, for example between biofuel production and bioproduct production,
- the design of chemically recyclable products.

The market also remains heavily dependent on key economic and political factors:

- **oil price changes**, likely to promote - or otherwise - the deployment of bio-based intermediate production capacities,
- the absence, or conversely the introduction, of **public and regulatory incentives**.

> *Today, bio-based chemistry is considered to represent a realistic option for producing the majority of the chemicals currently derived from fossil resources, particularly for the manufacture of plastics.*

Despite estimated average annual growth rate of 10% through to 2035, bio-based plastics are still only likely to represent 1.7% of plastics produced globally by that time.

Developing chemical intermediate production processes based on renewable raw materials.

Our solutions Our strengths

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