nova-Institut GmbH
Leyboldstraße 16
50354 Hürth, Germany

Tel: +49 2233 460 14 00
Fax +49 2233 460 14 01
contact@nova-institut.de

nova-Institut GmbH (www.nova-institute.eu)

PRESS RELEASE

Global Bio-based Polymer Market to Grow by 11 % Annually Until 2030, Led by Europe and North America

New market data shows: Capacity expansions in Europe and North America drive growth – Asia remains major region

Hürth, 12 February 2026: The new high level report "Bio-based Building Blocks and Polymers – Global Capacities, Production and Trends 2025–2030", compiled by the international biopolymer expert group of the nova-Institute, provides an overview of capacities and production volumes for 17 commercially available bio-based building blocks and polymers in 2025, together with a forecast through 2030. The full report is available free of charge here:

https://renewable-carbon.eu/publications/product/bio-based-building-blocks-and-polymers-global-capacities-production-and-trends-2025-2030-pdf/

Comprehensive Market Data on Bio-based Building Blocks and Polymers

Drawing on decades of experience and expertise in the bio-based chemicals and materials sector nova-Institute with its renowned biopolymer expert group has become the leading provider of market and trend data on bio-based building blocks and polymers. In addition to publishing annual data on bio-based building blocks and polymers in its well-known report on "Bio-based Building Blocks and Polymers – Global Capacities, Production and Trends", nova-Institute has also been providing data to European Bioplastics (since 2016) and Plastics Europe (since 2023). The data published annually by European Bioplastics and Plastics Europe are taken from the nova-Institute market report, but cover a smaller or different selection of bio-based polymers, based on different scopes (Figure 3).

Market data on bio-based building blocks and polymers is in high demand. nova-Institute therefore provides the high-level report "Bio-based Building Blocks and Polymers – Global Capacities, Production and Trends 2025–2030" as a free download. For specific needs, nova-Institute offers tailored analyses, including region-focused assessments and price and trade data. These services cover capacity developments from 2018 to 2030, production data for 2024 and 2025, in-depth market analyses by building block, polymer and producer, and a statistical evaluation of "Mass Balance and Attribution (MBA)" products available worldwide.

The precise nature of the service provided is tailored to the client's individual interests and requirements. In terms of content, these services do not only focus on bio-based building blocks and polymers, but also cover other renewable carbon feedstocks, such as CO_2, as well as recycling. The services offered are technology- and market-related, and also include strategy development. Inquiries: Michael Carus (michael.carus@nova-institut.de).

Strong Growth for Bio-Based Polymers until 2030

2025 was a successful year for bio-based polymers, with an expected overall CAGR of 11% to 2030 and an average capacity utilisation rate of 86%. Overall, bio-based non-biodegradable polymers have larger installed capacities and higher utilisation rates than bio-based biodegradable polymers. While 58% of the total installed capacities are from bio-based non-biodegradable polymers, 42% are bio-based biodegradable polymers. The utilisation rate of bio-based non-biodegradable polymers is 90%, compared to an average rate of 81% for bio-based biodegradable polymers. The expected CAGR for both bio-based non-biodegradable and biodegradable products is similar, at 10% and 11%, respectively.

Epoxy resin and PUR production are growing moderately at 9 and 8 per cent respectively, while PE and PP are increasing by 17 and 94 per cent. Furthermore, it is anticipated that capacities for the biodegradable polymers PHA and PLA will increase by 49% and 16% respectively, up until 2030. Commercial newcomers such as casein polymers and PEF have increased production capacity and are expected to continue to grow significantly until 2030.

The increase in production capacity from 2024 to 2025 of approximately 550,000 tonnes is primarily attributable to the expansion of epoxy resin production and PLA capacities in Asia. Furthermore, it was reported in 2025 that there are plans for PA and PTT to expand into Asia. It is anticipated that PP, PEF and PHA will experience continuous growth of 65% on average until 2030. While PHA capacities will increase primarily in Asia, PEF capacities will increase in both Asia and Europe, and PP capacities will increase primarily in North America.

In 2025, the total production volume of bio-based polymers was 4.5 million tonnes, accounting for 1% of the total production volume of fossil-based polymers. The CAGR of bio-based polymers is significantly higher than the overall growth of polymers, at 11% compared to 2-3% respectively, and this trend is expected to continue until 2030 (see Figure 1). Given these growth rates, it is anticipated that the share of bio-based polymers will increase to 2%.

Of the total 4.5 million tonnes of bio-based polymers produced in 2025, cellulose acetate (CA), with a bio-based content of 50 % and epoxy resins with a bio-based content of 45 % accounted for more than half of the bio-based production, 25 % and 30 %, respectively. This is followed by 30 % bio-based polyurethanes (PUR) and 100 % bio-based polylactic acid (PLA) with 9 %. Polyamides (PA) (60 % bio-based content) with 8 %, polytrimethylene terephthalate (PTT) (31 % bio-based content) with 6 % and polyethylene (PE) with 5 % (Figure 2). The share of aliphatic polycarbonates (APC; circular and linear), poly(butylene adipate-co-terephthalate) (PBAT), polyethylene terephthalate (PET), polyhydroxyalkanoates (PHA), polypropylene (PP) and starch-containing polymer compounds (SCPC) was less than 5 %. Casein polymers (CP), ethylene propylene diene monomer rubber (EPDM), polybutylene succinate (PBS) and polyethylene furanoate (PEF) accounted for less than 1 % of the total bio-based polymer production volume and are not shown.

Demand for Bio-based Feedstock and Land Use

In view of the steadily increasing demand for bio-based polymers, it is vital to consider the need for biomass feedstocks as a key factor. This is particularly evident in the ongoing debate on the use of food crops for the production of bio-based polymers. The total demand for biomass was 13.7 billion tonnes, with utilisation primarily spanning feed, bioenergy, food, material use, biofuels, and bio-based polymers. While the majority of biomass (57%) is used for feed production, only 0.026% is required for the production of bio-based polymers (see Figure 4). This results in a biomass feedstock demand of 3.6 million tonnes for the production of 4.5 million tonnes of bio-based polymers, reflecting a land use share of only 0.016%. This is due to the fact that the main feedstocks used in the production of bio-based polymers are sugars (25 %) and starch (22 %), which are obtained from high-yield crops such as sugar cane and maize, resulting in a high area efficiency.

Furthermore, the protein content of these crops is utilised not only for polymer production but also for animal feed. Consequently, only the corresponding part is allocated to polymer production. Glycerol (28%), a by-product of biodiesel production, is a biomass with only an indirect, passive land use. This glycerol is primarily utilised in the manufacturing of epoxy resins via epichlorohydrin as an intermediate. The biomass used also included 13% from non-edible plant oil, such as castor oil, 8% from cellulose (mainly used for CA) and 4% from edible plant oil. Of the 4.5 million tonnes of bio-based polymers produced (fully and partially bio-based), 2.4 million tonnes were bio-based components of the polymers (53%), meaning that almost 1.5 times more feedstock was required than was incorporated into the final product. The 1.2 million tonnes of feedstock that did not end up in the product is due to the high number of conversion steps and the associated losses of feedstock and intermediates, as well as the formation of by-products.

Global Shift to Renewable Carbon Needed to Handle Regional Challenges for Bio-based Polymers

The key market drivers in 2025 are several global brands that have adapted their strategic agendas to transition the polymers, plastics and chemicals industry to become sustainable, climate-friendly and part of the circular economy, thus offering their customers green solutions and critical consumers alternatives to petrochemical products. Achieving this transition successfully will require the complete replacement of fossil carbon with renewable carbon from alternative sources, including biomass, CO_2 and recycling (www.renewable-carbon.eu). By expanding their feedstock portfolio to include renewable carbon in addition to fossil-based carbon, these brands are leading the way from a market perspective. In particular, there has been an increase in the use of biomass, and all indications point to this trend continuing. This will result in a higher supply of bio-based polymers.

For the first time, it is not anticipated that Asia will be the region with the largest growth until 2030. While North America and Europe will increase their global role in the supply of bio-based polymers, the market share of Asia in 2030 is expected to be 55%, reflecting the same market share as in 2025. Following new investments in a number of large-scale bio-based polymer production capacities, it is estimated that North America and Europe will increase their market share by 3% and 4%, respectively. Together, these regions are set to account for 38% of the global supply of bio-based polymers. The European policy landscape for bio-based polymers is subject to constant evolution. However, it currently lacks a consistent policy framework that sufficiently incentivises the benefits, properties and applications of bio-based polymers, in contrast to the situation in other regions of the world.

Instead, bio-based polymers are directly and indirectly affected by a wide range of regulatory instruments. On the one hand, there is an indirect influence through policies targeting other biomass uses (mainly fuels and energy, but to a lesser extent also policies targeting more the food and feed sector). On the other hand, there is a direct influence through policies that are actually intended to regulate chemicals and materials, such as plastics. The main impacts originate from the Renewable Energy Directive (RED), the Packaging and Packaging Waste Regulation (PPWR) and the Fertilisers Regulation. The revised Bioeconomy Strategy, published in November 2025, has identified five lead markets for materials, including bio-based plastics for packaging and bio-based chemicals. The strategy refers to the implementation of the PPWR and to "possible" bio-based content quotas that could strengthen demand for bio-based materials in Europe. The Bioeconomy Strategy is already in place to improve the investment climate in bio-based industries in Europe.

End of the short version, long version of the press release continues on the next page.

Bio-based Polymers – The Highlights

As illustrated in Figure 5, the global polymer market encompasses functional and structural polymers, rubber products, and man-made fibres. The report focuses on the bio-based share of the structural polymers. Bio-based structural polymers are composed of the polymers that will later form the structural mass of the finished plastic part and the bio-based linoleum part. The total weight of the two items is 4.6 million tonnes.

Conversely, the total quantity of bio-based functional polymers comprises bio-based functional polymers and paper starch, amounting to 13.7 million tonnes. In addition to the two aforementioned groups, which account for 18 million tonnes of bio-based functional and structural polymers, rubber products and man-made fibres can also be bio-based. A total of 15 million tonnes of rubber products and 8.4 million tonnes of man-made fibres are manufactured using bio-based resources, representing 51% and 9% of the total, respectively.

Figure 6 shows all (semi-)commercial pathways from biomass via different intermediates and building blocks to bio-based polymers. The bio-based building blocks and polymers analysed in detail in the report are highlighted in bold.

Figure 7 illustrates the various pathways of bio-based "drop-in", "smart drop-in" and "dedicated" inputs within the chemical production chain. For each group, certain bio-based polymers are shown as examples. In addition, biodegradable bio-based polymers are highlighted with a green dot. It should be noted that the different groups of bio-based polymers are subject to different market dynamics. While drop-ins have direct fossil-based counterparts and can replace them, the dedicated ones have new properties and functionalities that are not available from petrochemicals. From a production and market perspective, each option has its own advantages and disadvantages. While bio-based drop-in chemicals are bio-based versions of existing petrochemicals that have well-established markets and are chemically identical to existing fossil-based chemicals, smart drop-in chemicals are a special sub-group of drop-in chemicals. While they are chemically identical to existing chemicals based on fossil hydrocarbons, their bio-based pathways offer significant process advantages over conventional pathways. Furthermore, these bio-based pathways can be based on entirely new approaches, such as epichlorohydrin, where the fossil feedstock propylene is not replaced by bio-based propylene, but by glycerol from biodiesel production. Dedicated bio-based chemicals are commercially produced via a dedicated pathway and do not have an identical fossil-based counterpart.

Figure 8 provides a summary of the development of capacities from 2018 to 2030, based on forecasts from current and some new producers. In 2025, the total installed capacity was 5.1 million tonnes, with an actual production of 4.5 million tonnes. It is anticipated that capacity will increase to 8.5 million tonnes by 2030, indicating an average compound annual growth rate (CAGR) of approximately 11%. The following polymers demonstrate an even higher increase, significantly exceeding the average growth rate: It is anticipated that PP, PEF and PHA will experience continuous growth, with an average projected increase of 65% until 2030.

Global Production Capacities of Bio-based Polymers by Region

As at 2025, Asia will be the leading region in terms of bio-based production capacity. It currently accounts for 55% of the world's largest capacities for PHA, PLA and PA. North America accounted for 17%, with significant installed capacities for PLA and PTT, while Europe accounted for 14%, primarily due to installed capacities for PBAT, PA and SCPC. South America accounted for 13% of the market share, with significant installations for PE. The figure for Australia and Oceania was less than 1%, as shown in Figure 9. Europe and North America are expected to experience the highest growth in bio-based polymer capacities compared to other regions of the world, with an expected CAGR of 20% between 2025 and 2030. This increase can be attributed to increased and new production capacities in Europe for PE, PLA and PP, and for PHA and PP in North America.

Market Segments for Bio-based Polymers

Today, bio-based polymers can be used in almost all market segments and applications, but the different applications per polymer can be very different. Figure 10 shows a summary of the applications for the bio-based polymers. In 2025 fibres including woven, non-woven (mainly CA and PTT) had the highest share with 28 %. Packaging, flexible and rigid, had a total share of 21 % (mainly PE, PET and PLA), followed by functional applications with 17 % (mainly epoxy resins and PUR), automotive and transport with 11 % (mainly PA and PUR) and consumer goods with 10 % (mainly epoxy resins PA). Building and construction accounted for 6 % (mainly epoxy resins and PUR) and electrics and electronics for 5 % (mainly epoxy resins and PA). The market segments agri- and horticulture and others had a market share of 2 %, respectively.

Bio-based and Non-biodegradable Polymers and Biodegradable Polymers

Bio-based non-biodegradable polymers show a CAGR of 10 % to 2030 (Figure 11). The highest growth is expected for PP and PEF, followed by PE. Similar to the non-biodegradable polymers, bio-based biodegradable polymers show a growth of 11 % to 2030 (Figure 12). This is mainly due to high growth rates for PHA, PLA and casein polymers. The biodegradability of polymers is completely independent of the resource from which the polymer is made, so being bio-based does not necessarily mean that certain polymers are biodegradable. PBS and copolymers such as poly(butylene succinate-co-butylene adipate) (PBSA) are both industrial compostable, but only PBSA biodegrades also under home composting conditions and in soil, according to the conditions defined in the established standards and certification schemes. The same applies to PBAT, which is industrial compostable and, for certain grades, also home compostable and biodegradable in soil. This biodegradability applies to both bio-based and fossil-based PBS and PBAT. As this overview focuses on bio-based polymers, the development of fossil-based PBS and PBAT, although biodegradable, is not shown in detail here. However, fossil-based PBS and PBAT production capacities, mainly in Asia, were at 3 million tonnes in 2025, with an assumed actual production of around 600,000 tonnes. Until 2030 fossil-based PBS and PBAT production capacities are not expected to increase significantly, with a CAGR of 1 %.

Bio-based Building Blocks – The Highlights

Figure 13 shows the development of capacities for the main bio-based building blocks used for the production of polymers from 2011 to 2030. The building blocks are used for the synthesis of structural and functional polymers as well as ingredients for various other applications such as food, feed, cosmetics or pharmaceuticals. The total production capacity of bio-based building blocks in 2025 was 5.8 million tonnes, an increase of about 15 % (746,000 t/a) from 2024 to 2025. This increase is mainly based on epichlorohydrin (ECH), 1,4-butanediol (1,4-BDO), L-lactic acid (L-LA), 1,5-Pentamethylenediamine (DN5), naphtha and succinic acid (SA). The overall forecast for bio-based building blocks worldwide is for growth of 10 % (CAGR) to 2030, with ethylene, ECH, L-LA, naphtha, propylene and 1,4-butanediol (1,4-BDO) being the main drivers.

Responsible for the content under German press law (V. i. S. d. P.):

Dr. Lars Börger (CEO)
nova-Institut für politische und ökologische Innovation GmbH

Leyboldstraße 16 Tel: +49 2233 460 14 00
50354 Hürth Fax +49 2233 460 14 01
Germany contact@nova-institut.de

Since the mid-1990s, the nova-Institute has been dedicated to sustainability and today focuses primarily on renewable carbon cycles. As an independent research institute, it supports companies –

particularly from the chemical, plastics, and materials industries – in the use of renewable carbon derived from biomass, direct CO_2 utilisation (CCU), and recycling.

With a multidisciplinary team of scientists, the nova-Institute participates in international innovation projects and provides science-based management consulting. The institute follows a holistic approach: its experts analyse which technologies and raw materials are suitable for specific products, in which markets their application is feasible, which regulatory frameworks apply, how sustainable the solutions are, and how they can be successfully positioned in the market.

Based on these analyses, the team develops tailored strategies to support the transformation from fossil to renewable carbon. Around 50 experts from various disciplines work together to drive the defossilisation of industry – for a climate-neutral future.

More information: **www.nova-institute.eu – www.renewable-carbon.eu**

Subscribe to our newsletter: **https://renewable-carbon.eu/newsletters**
Comprehensive reports and free graphics available at: **https://renewable-carbon.eu/publications**