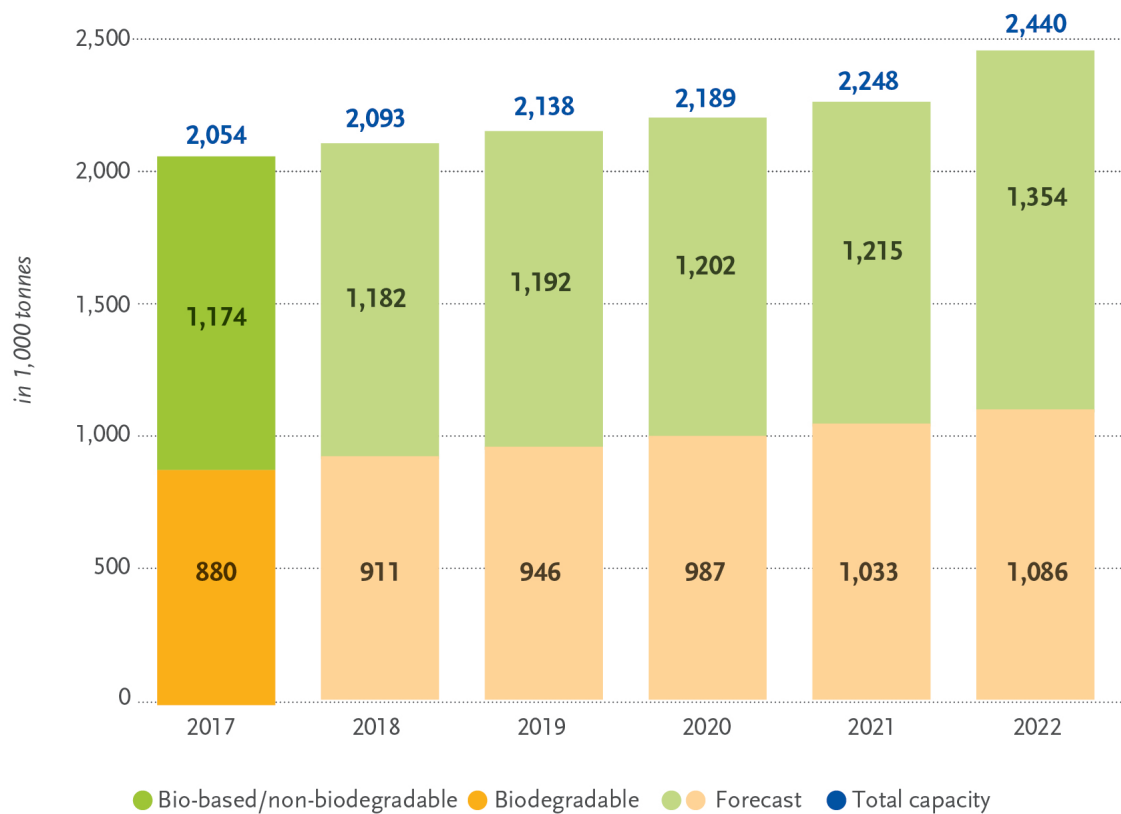


Bioplastics market data 2017

Global production capacities of bioplastics 2017-2022



Source: European Bioplastics, nova-Institute (2017).

More information: www.bio-based.eu/markets and www.european-bioplastics.org/market

Dynamic market growth

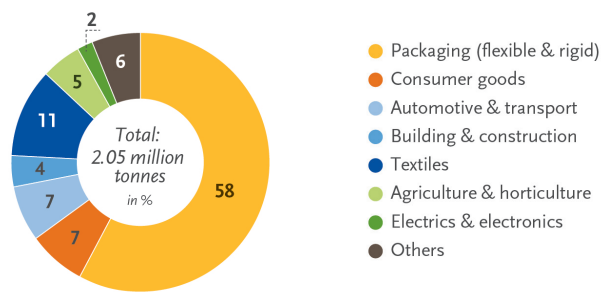
Currently, bioplastics represent about one percent of the about 320 million tonnes of plastic produced annually. But as demand is rising and with more sophisticated biopolymers, applications, and products emerging, the market is continuously growing.

According to the latest market data compiled by European Bioplastics in cooperation with the research institute nova-Institute, global bioplastics production capacity is set to increase from around 2.05 million tonnes in 2017 to approximately 2.44 million tonnes in 2022.

Development of innovative materials

Innovative biopolymers such as PLA (polylactic acid) and PHAs (polyhydroxyalkanoates) are the main drivers of this growth in the field of bio-based, biodegradable plastics. PHAs are an important polymer family that has been in development for a while and that now finally enters the market at commercial scale, with production capacities estimated to triple in the next five years. These polyesters are 100 percent bio-based, biodegradable, and feature a wide array of physical and mechanical properties depending on their chemical composition. Production capacities of PLA are also predicted to grow by 50 percent by 2022 compared to 2017. PLA is a very versatile material that features excellent barrier properties and is available in high-performance PLA grades that are an excellent replacement for PS (polystyrene), PP (polypropylene), and ABS (acrylonitrile butadiene styrene) in more demanding applications.

Global production capacities of bioplastics in 2017 (by market segment)



Source: European Bioplastics, nova-Institute (2017). More information: www.bio-based.eu/markets and www.european-bioplastics.org/market

lion tonnes) of the global bioplastics production capacities. The production of bio-based PE is predicted to continue to grow as new capacities are planned to come online in Europe in the coming years. Intentions to increase production capacities for bio-based PET, however, have not been realised at the rate predicted in previous years. Instead, the focus has shifted to the development of PEF (polyethylene furanoate), a new polymer that is expected to enter the market in 2020. PEF is comparable to PET but 100 percent bio-based and is said to feature superior barrier and thermal properties, making it an ideal material for the packaging of drinks, food and non-food products. In 2022, bio-based PP is expected to enter the market on a commercial scale with a strong growth potential due to the widespread application of PP in a wide range of sectors. Bio-based PUR (polyurethanes) are another important group of polymers that have huge production capacities with a well-established market and are expected to grow faster than the conventional PUR market due to their versatility.*

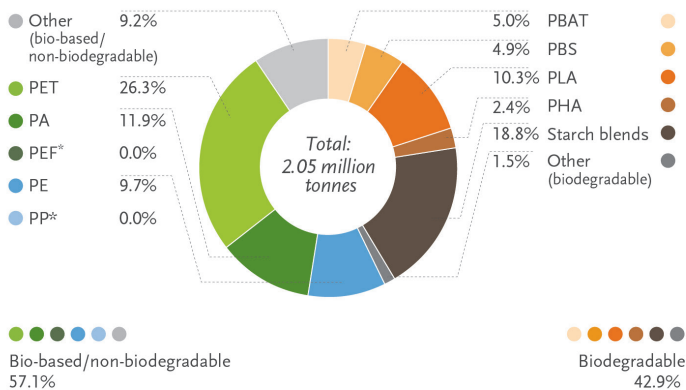
Applications and market sectors

Bioplastics are used in an increasing number of markets, from packaging, catering products, consumer electronics, automotive, agriculture/horticulture and toys to textiles and a number of other segments. Packaging remains the largest field of application for bioplastics with almost 60 percent (1.2 million tonnes) of the total bioplastics market in 2017.

Market drivers and development

The increase in the use of bioplastics in all market segments is driven by the increasing demand for sustainable products by consumers and brands alike due to a growing awareness of the impact on the environment and the need to reduce the dependency on fossil resources as well as the continuous advancements and innovations of the bioplastics industry in new materials with improved properties and new functionalities.

Global production capacities of bioplastics in 2017 (by material type)



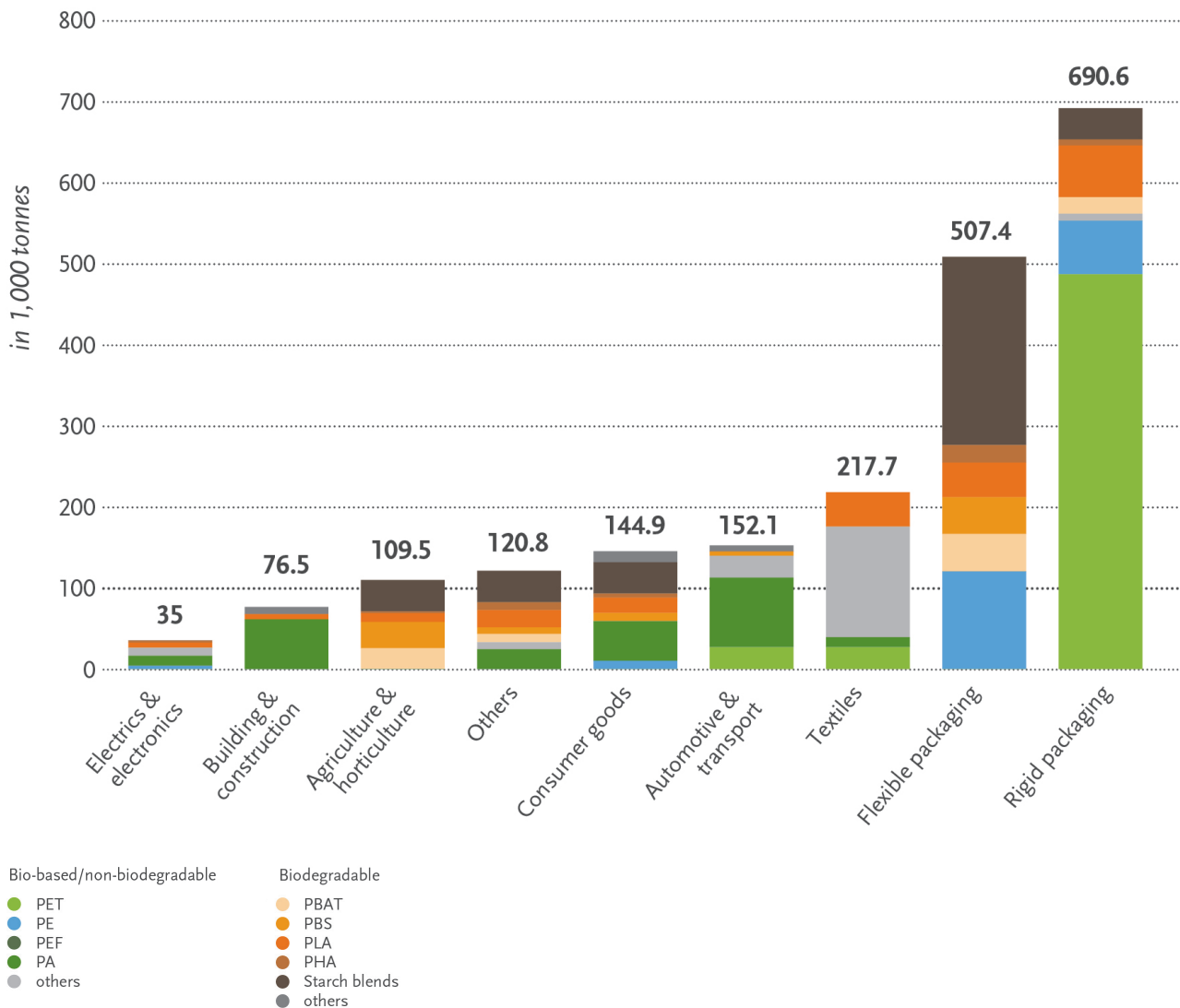
*Bio-based PP and PEF are currently in development and predicted to be available in commercial scale in 2020.

Source: European Bioplastics, nova-Institute (2017). More information: www.bio-based.eu/markets and www.european-bioplastics.org/market

Bio-based, non-biodegradable plastics, including the drop-in solutions bio-based PE (polyethylene) and bio-based PET (polyethylene terephthalate), as well as bio-based PA (polyamides), currently make up for around 56 percent (1.2 mil-

* Bio-based PUR is not included in the scope of the bioplastics from European Bioplastics this year, since there is no reliable data available at the moment about the actual volumes of PUR containing bio-based content. The available data only shows how much biomass is used to produce bio-based polyols, which, however, is not sufficient in order to deduct reliable data on the actual volumes of bio-based polyurethanes.

Global production capacities of bioplastics in 2017 (by market segment)



Source: European Bioplastics, nova-Institute (2016). More information: www.bio-based.eu/markets and www.european-bioplastics.org/market

Today, there is a bioplastic alternative for almost every conventional plastic material and corresponding application. Depending on the material, bioplastics have the same properties as conventional plastics and offer additional advantages, such as a reduced carbon footprint or additional waste management options such as industrial composting.

Economic and social development

With a growing number of materials, applications, and products, the number of manufacturers, converters and end-users also increases steadily. Significant financial investments have been made into production and marketing to guide and accompany this development. Legal framework conditions

provide incentives for the use of bioplastics in several countries worldwide, including some European Member States, providing stimulus to the market.

The budding bioplastics industry has the potential to unfold an immense economic impact over the coming decades. According to a recent job market analysis conducted by EuropaBio (2016), the European bioplastics industry could realise a steep employment growth. In 2013, the bioplastics industry accounted for around 23,000 jobs in Europe. With the right framework conditions in place, this number could increase more than tenfold by 2030, with up to 300,000 high-skilled jobs being created in the European bioplastics sector.

Regional development

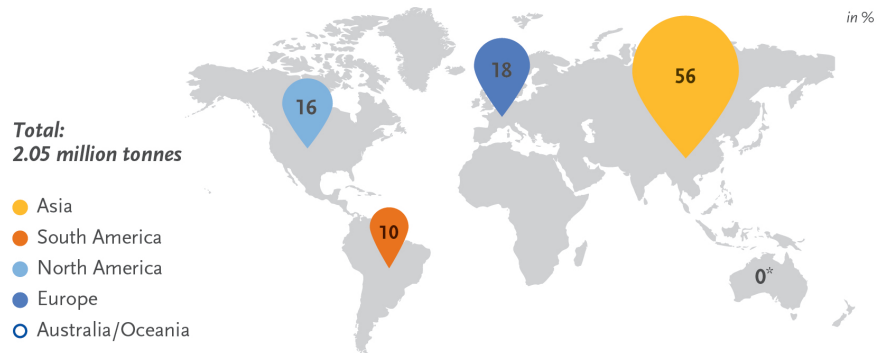
Europe is a major hub for the entire bioplastics industry; it ranks highest in the field of research and development and is the industry's largest market worldwide.

With a view to the actual production of bioplastics and regional capacity development, Asia is a major production hub. In 2017, over 50 percent of bioplastics were produced in Asia. Around one fifth of the global bioplastics production capacity is located in Europe.

Land use

The land used to grow the renewable feedstock for the production of bioplastics amounted to approximately 0.82 million hectares in 2017, which accounted less than 0.02 percent of the global agricultural area of 5 billion hectares, 97 percent of which were used for pasture, feed and food. Despite the market growth predicted in the next five years, the land use share for bioplastics will remain around 0.02 percent. This clearly shows that there is no competition between the renewable feedstock for food, feed, and the production of bioplastics.

Global production capacities of bioplastics in 2017 (by region)

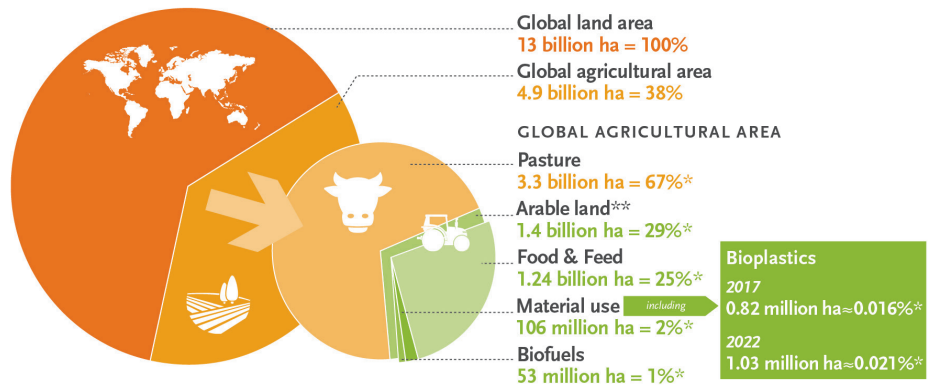


* Production in Australia/Oceania is a small proportion relative to the global production capacity.

Source: European Bioplastics, nova-Institute (2017).

More information: www.bio-based.eu/markets and www.european-bioplastics.org/market

Land use for bioplastics 2017 and 2022



Source: European Bioplastics (2017), FAO Stats (2014), nova-Institute (2017), and Institute for Bioplastics and Biocomposites (2016). More information: www.european-bioplastics.org

* In relation to global agricultural area
** Including approx. 1% fallow land

About the market data report

The market data update 2017 has been compiled in cooperation with the market experts of the nova-Institute (Hürth, Germany). The data for the global production capacities of bioplastics is based on the market study "Bio-based Building Blocks and Polymers" by nova-Institute (2018), which looks at the entire scope of bio-based polymers. For more information on the study and full market data report, please go to www.bio-based.eu/markets.

More information can be found on <http://www.european-bioplastics.org/market/>

The market data graphs are available for download on <http://www.european-bioplastics.org/news/publications/>

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