

Report

European Polyurethane Industry Facts 2023
“Socio-Economic Contribution of the Polyurethane Industry to Growth and Jobs in Europe”

Elaborated for



Content

Background & Objectives

Management Summary

Market Overview

Appendix

Background & Objectives

CONVERSIO
| market & strategy

Background & main objectives

The study describes the value of the polyurethane industry to the European economy. It looks at the value provided by polyurethane and the industries which rely on it in terms of wealth and job creation, highlighting the importance of this sector for a large range of applications and stakeholders.

Aromatic and aliphatic diisocyanates and polyols are covered in the study.

The study itself is an update of the study from 2019 (data from 2018) and has a similar reporting structure.

Major aspects are identification and description of the ...

- ◆ number of companies along the value chain
- ◆ number of employees/jobs along the value chain of the polyurethane industry
- ◆ value creation along the value chain in €/t by region and sector

Frame and structure of the Socio-Economic Study

Regional frame

The study covers the EU 27 + Switzerland, Norway, UK and Türkiye
With an additional split for the following countries:

- Germany
- France
- Spain
- UK
- Italy
- Netherlands
- Poland

Industries in focus of the report are:

- Appliances
- Automotive
- Construction
- Furniture and bedding
- Footwear
- Industrial goods
- Others



About

Polyurethanes are part of modern everyday life. No matter the form, be that flexible or rigid foams, elastomers or various others, no matter the application. Polyurethane based products ease everyday life and perform, often not even noticed by the consumer, reliable and cost efficient.

This report highlights the key role, the polyurethane industry plays in the European economy, involving close to **1,850,000 companies** throughout Europe & Türkiye and contributing **€233 billion** annually to economy (EU27+3 & Türkiye)*. It also relates, directly and indirectly, to more than **7.2 million jobs** throughout Europe. Behind these figures stands a notable compound annual growth (CAGR) of the polyurethane industry of 4.2 % since 2023/2024.

The data contained in this report has been compiled by the independent consulting company Conversio Market & Strategy GmbH, picturing the situation for 2023, based on the most recent data available. It ties in with ISOPA's preceding report, published in 2018, while expanding the focus in relevant areas.

*All total figures in this Report relate to the regional coverage of the European Union (EU27) including Switzerland, Norway, UK plus Türkiye as an important country with close economic relations to the EU.

Methodology

The data presented within this report was compiled and analyzed on the basis of various sources. The latest market figures were used to create a model for the year 2023 on basis of a multi-stage calculation model. The calculation model for this study uses data from the following sources:

- Eurostat; Europur; ACEA; World footwear yearbook, Plastics Europe, National Statistic Bureaus for Non-EU member states, International plastics producers' associations
- Conversios internal databases and primary research
- Interviews with industry experts

The analysis includes a dedicated extrapolation broken down by turnover, employees and number of companies. Data for all relevant NACE codes were collected and analyzed in depth to ensure the most accurate extrapolation possible.

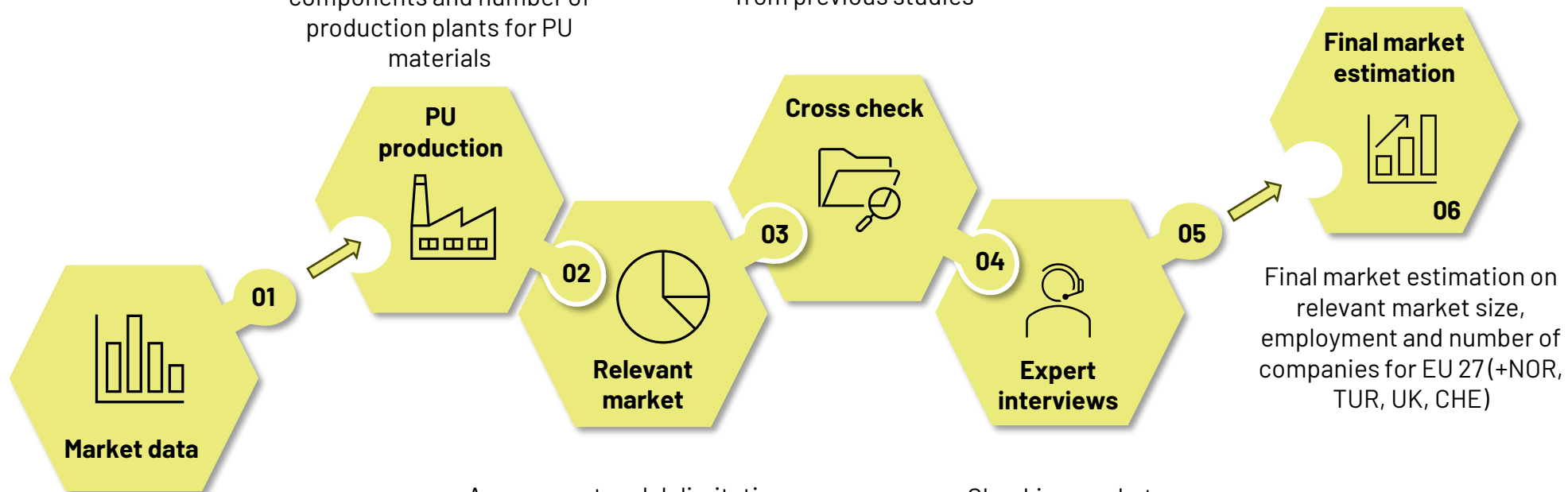
Employment and company growth rates were taken into account in order to adjust the indirect and direct contribution to employment. Employment in non-manufacturing activities was also taken into account in the modeling, whereby the proportion of employees affected in the overall company was delimited. All figures displayed are rounded.



Methodology

Gathering data on chemical production volumes for PU components and number of production plants for PU materials

Cross check with Conversio database and information's from previous studies



Gathering market data for employment, turnover, number of companies. Separated by relevant NACE codes and by multiple years. Allocation of Nace codes to respective industry sectors and stakeholders in the value chain

Assessment and delimitation on relevant share of companies, employees and turnover for PU relevant applications based on gathered information

Checking market estimations with information and data gather through expert interviews

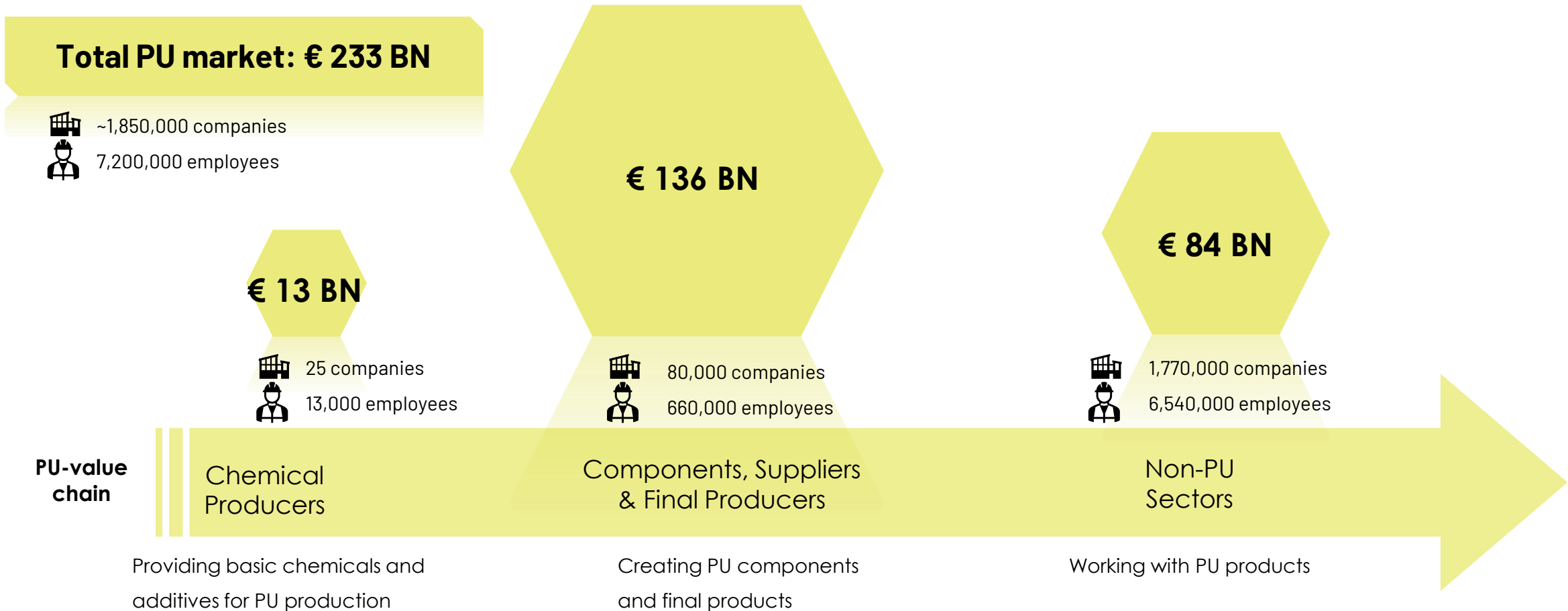
Final market estimation on relevant market size, employment and number of companies for EU 27(+NOR, TUR, UK, CHE)

Management Summary

CONVERSIO
| market & strategy

Total PU market overview

Polyurethane Industry created value along the Value chain



Total PU market overview

Polyurethane Industry created value along the Value chain

Polyurethane materials are lightweight, strong, durable and they can resist to abrasion, weathering and corrosion: all these properties make polyurethanes a key ally to enhance the quality of our lives through the products we use daily.

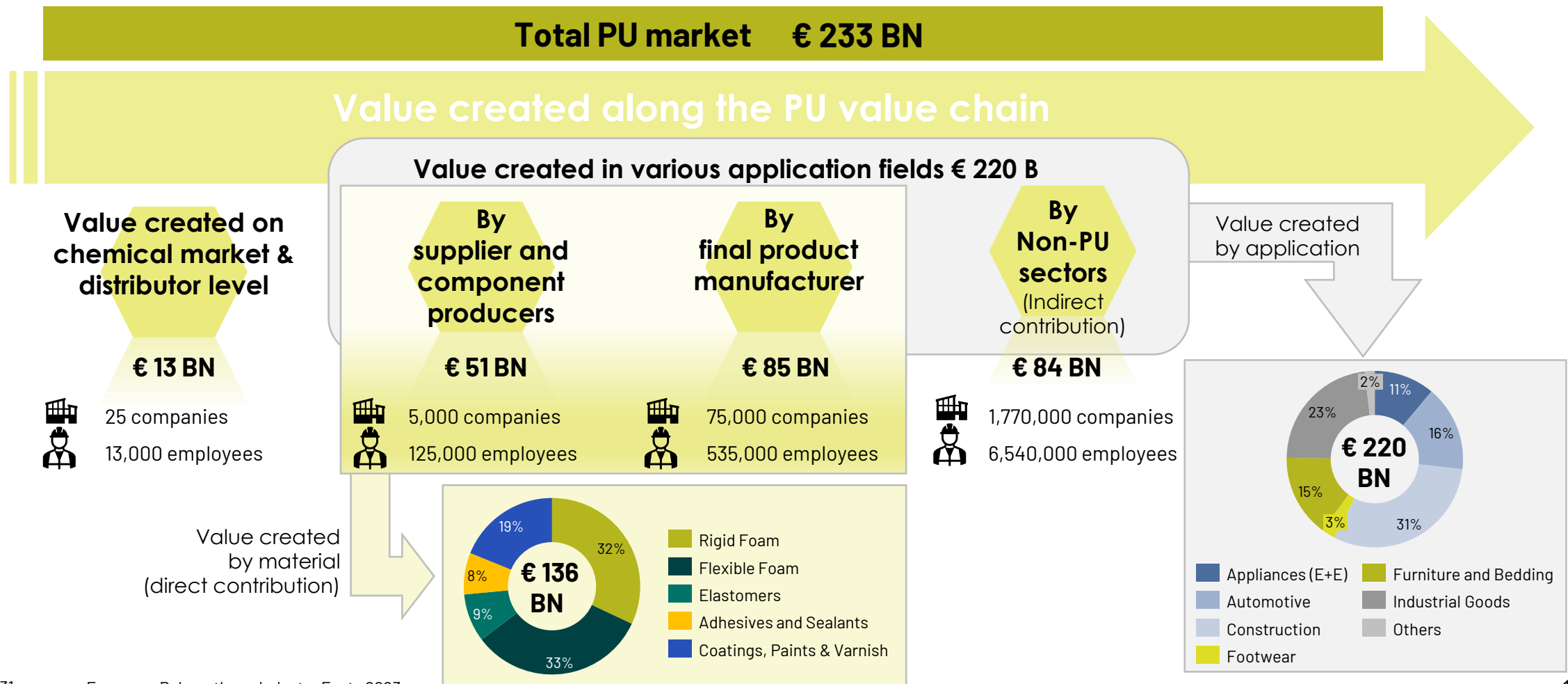
Given the manifold applications of polyurethanes and the huge variety of industries where PU materials are used, the polyurethane industry generates a substantial contribution to European wealth and job creation.

Close to 1.8 million companies throughout Europe & Türkiye are creating a value of €233 billion every year. The production and use of polyurethane application ensures the employment of 7.2 million people throughout the European Union & Türkiye . As is evident from the variety of its uses, the polyurethane sector is not limited to the sole producers of the chemical compound: their direct customers, the final producers of polyurethane-based products and the producers of the end-products; which include the various forms of polyurethanes, have to be taken into account, too.

700,000 employees directly contribute in terms of polyurethane production, including direct and downstream customers and their suppliers and subcontractors. In addition to those, close to 6.5 million jobs, related to polyurethane products and their application are found in the non-polyurethane sector.

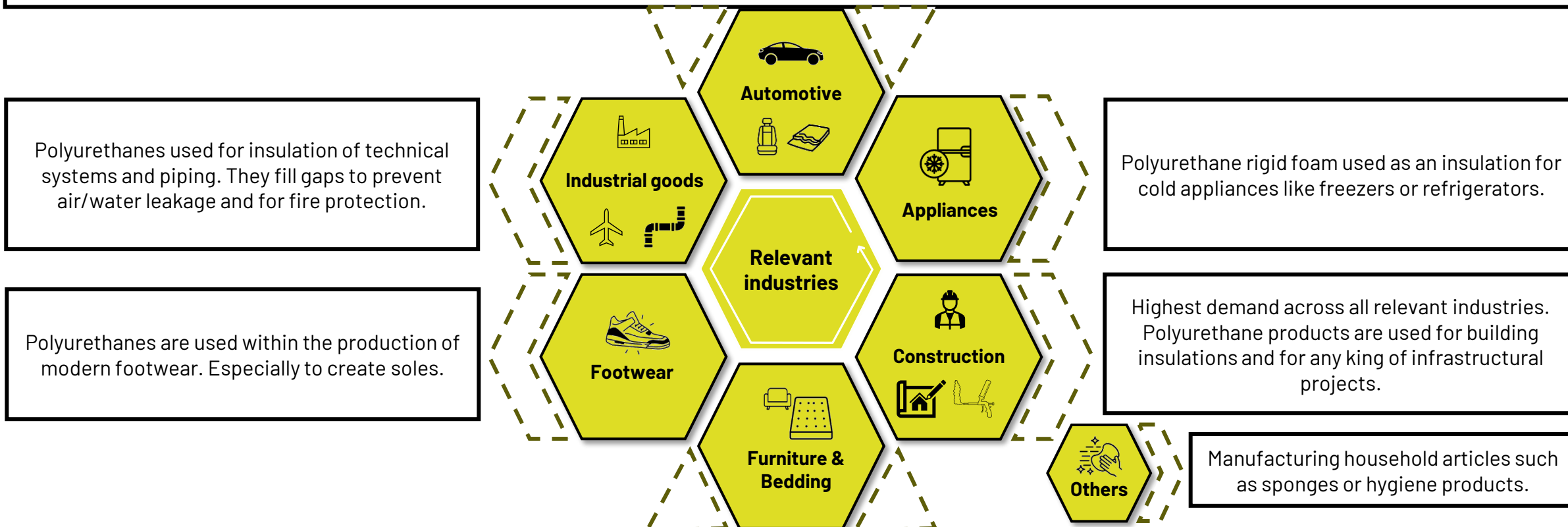
The PU industry 2023 – Overview

Socioeconomic Key data of the Polyurethane industry for EU27+(UK; Norway; Switzerland; Türkiye)



Typical applications of Polyurethanes by main industry

Polyurethanes used for the production of car components like seats, dashboards, headrests and others. Or used during the repair of cars.

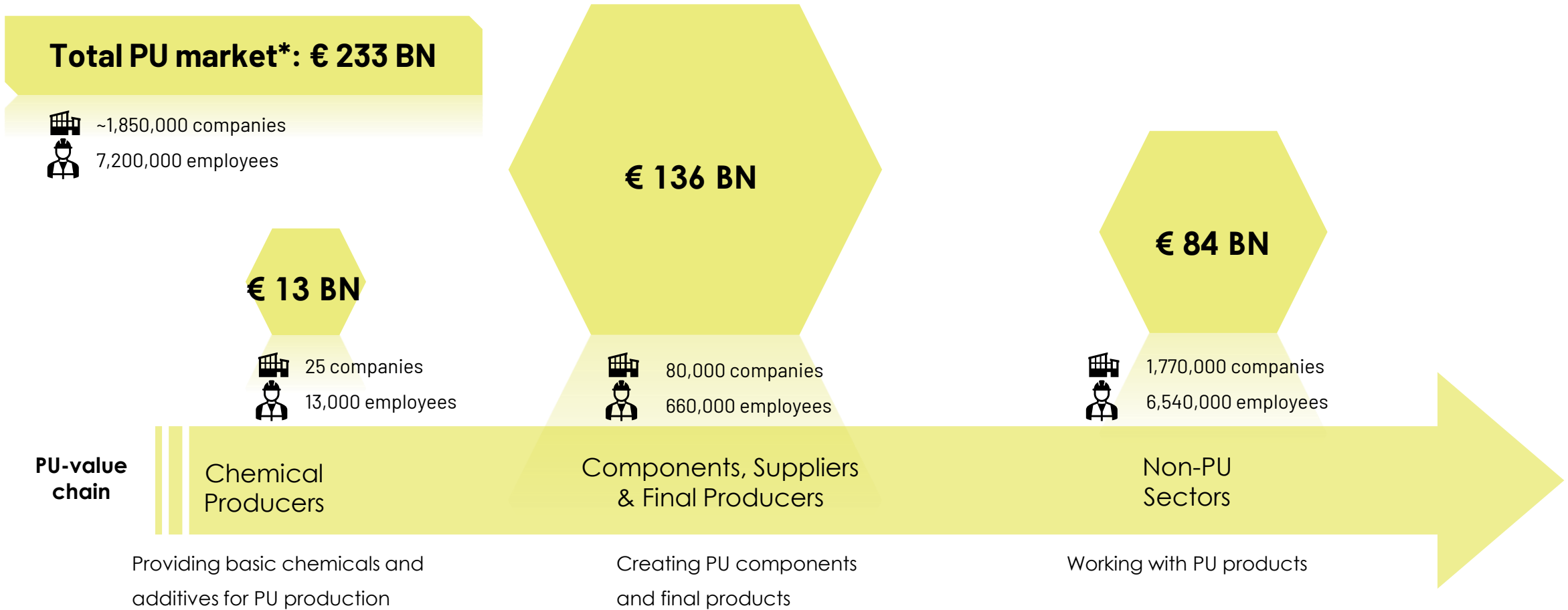


Market Overview

CONVERSIO
| market & strategy

Total PU market overview

Polyurethane Industry created value along the Value chain

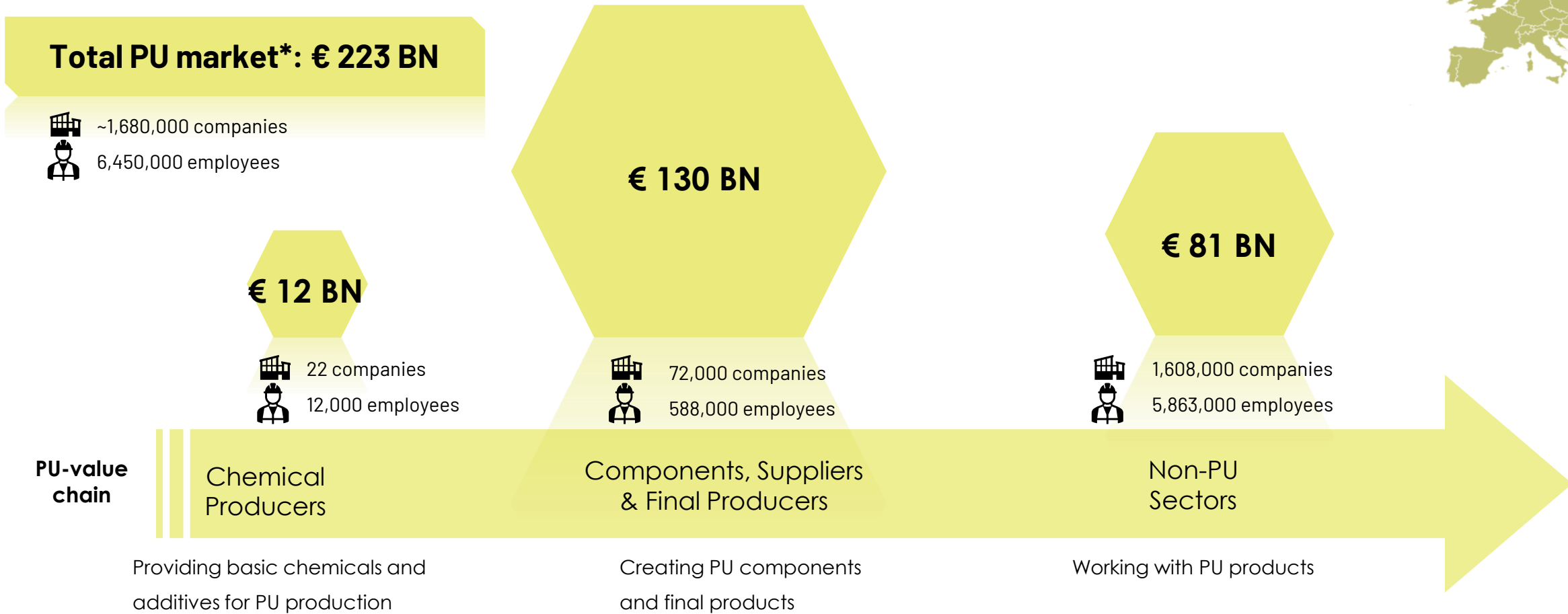


*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye



Total PU market overview for EU27 +3

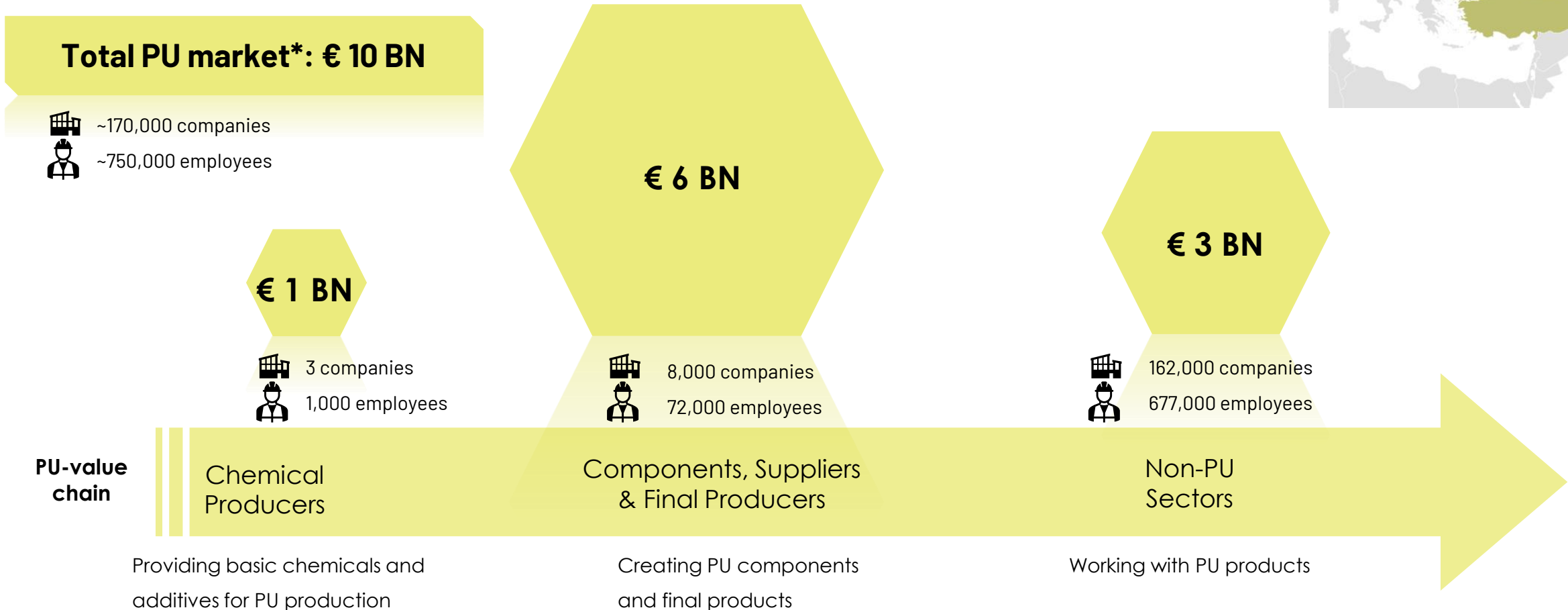
Polyurethane Industry created value along the Value chain



*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

Total PU market overview within Türkiye

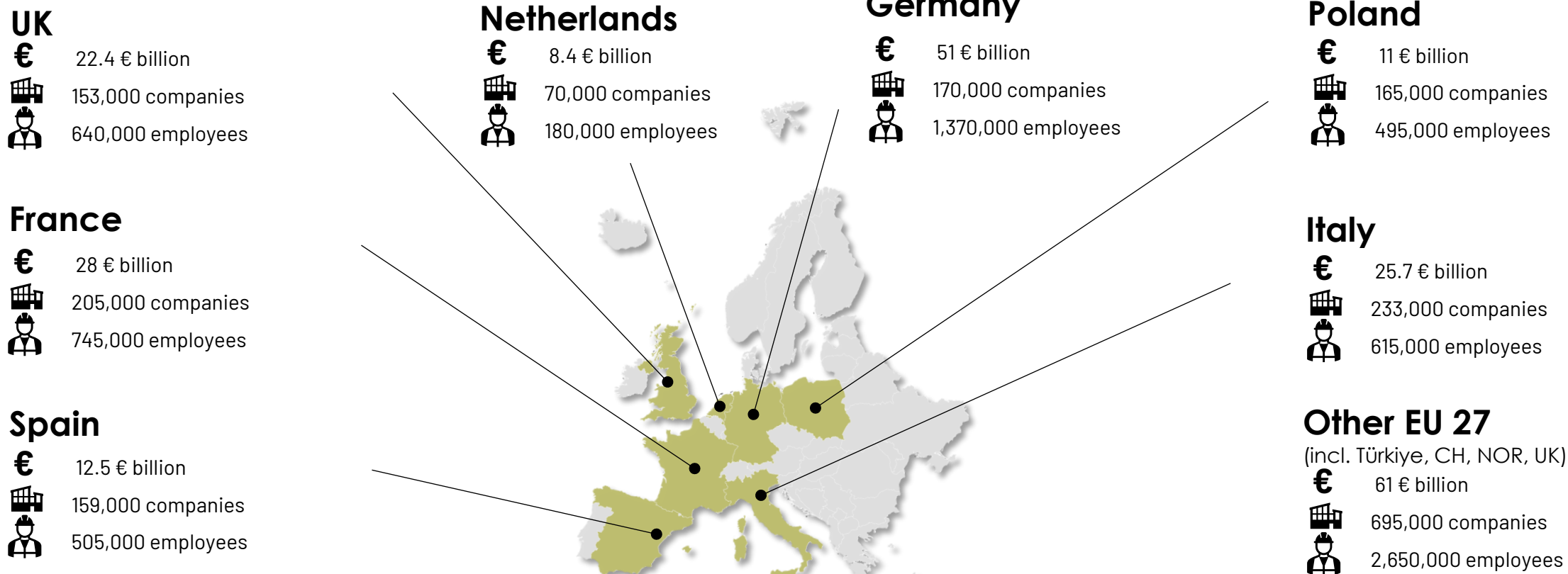
Polyurethane Industry created value along the Value chain



*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

Total value created in various application fields within EU market

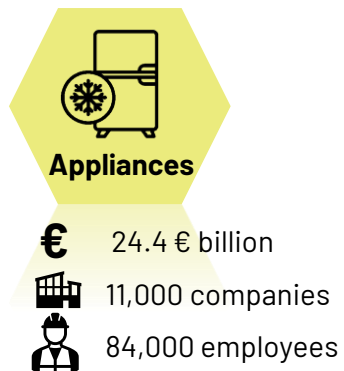
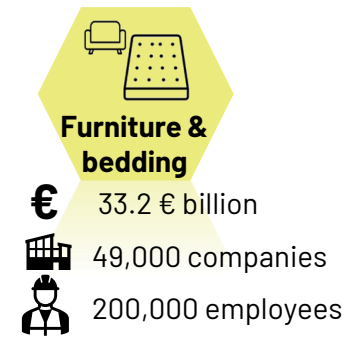
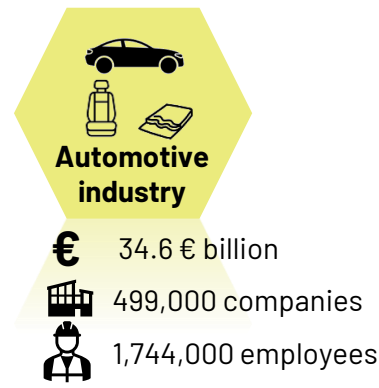
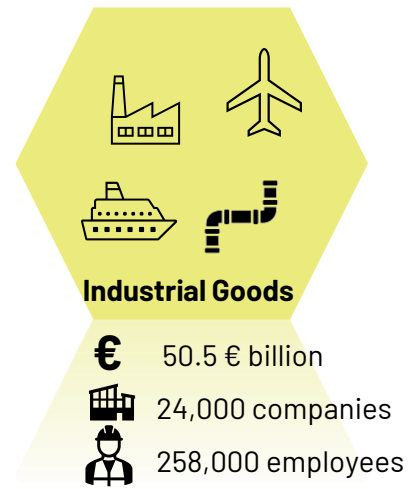
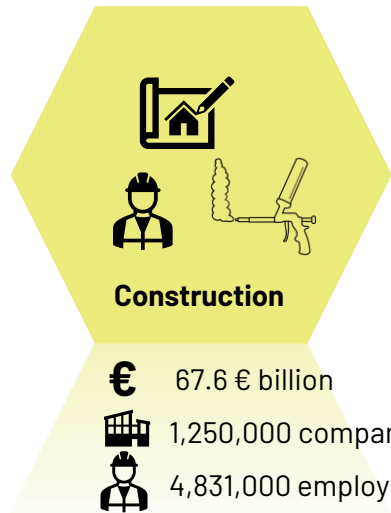
Polyurethane Industry created value split by countries



*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye. Excl the Value created on chemical market & distributor level.

Market overview by industry*

Socioeconomic value of Polyurethane by sector 2023



*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

Construction industry is the largest sector where PU-products are applied

Polyurethane in Construction sector



€ 67.6 billion created value
 1,250,000 companies
 4,831,500 employees

Trades along the value chain reflected in Construction sector

- Various construction professions and activities like roofing activities; floor and water covering; plumbing; heat and air-conditioning, etc.
- Construction of residential and non-residential buildings
- Manufacturers of plastic building supplies and chemical products

How Polyurethane is used in Construction

In the Construction industry, Polyurethanes are extensively used in insulation materials, significantly enhancing energy efficiency in buildings by reducing heat loss. Additionally, polyurethane coatings provide excellent protection for roofs, floors, and walls against environmental factors like moisture, UV radiation, and abrasion. In plumbing and air conditioning systems, polyurethanes ensure durability and performance, offering reliable seals and gaskets that withstand high pressure and varying temperatures.

What type of businesses are utilizing Polyurethanes in Construction

In the construction sector, various types of businesses utilize polyurethanes. These include different construction trades such as roofing, floor and water covering, and plumbing companies, which benefit from polyurethane's insulating and sealing properties. Companies involved in the construction of buildings also rely on polyurethane products for enhanced energy efficiency and durability. Additionally, manufacturers of plastic building supplies and chemical products integrate polyurethanes into their offerings to meet the industry's demands for high-performance durable materials.

The economic impact of the utilization of polyurethanes in the construction industry can hardly be overstated, as although the construction industry accounts for around 27% of the total economic value added through polyurethane across all industries, it is responsible for the employment of 67% of the total European workforce involved in polyurethane-related activities with over 4,7 million people employed.

Many craftsmen rely on and work with PU products across Europe and thus contribute to the European economy

PU-value chain in the construction sector

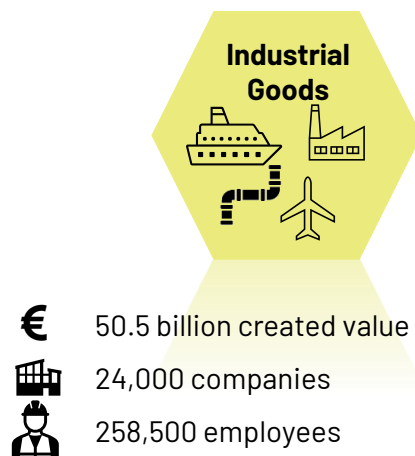


*Created value in terms of PU-related materials and products

Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye
2024-07-31 European Polyurethane Industry Facts 2023

Industrial Goods is the second largest sector for PU product applications

Industrial Goods



Trades along the value chain reflected in Industrial Goods sector

- Manufacturer (OEMs) of boilers; aircrafts, ships; rail vehicles and military combat vehicles
- Installation of industrial machinery and equipment
- Repair and maintenance of fabricated metal products and aircrafts, ships.

How Polyurethane is used in Industrial Goods

In the industrial goods sector, polyurethanes are valued for their robustness and versatility. They are widely used in the production of machinery components, such as rollers and belts, due to their durability and resistance to abrasion. As Polyurethanes are widely used in building and refrigeration due to their excellent insulation performance, they are also indispensable as insulation material in many heat and energy intensive industry production plants to prevent unwanted temperature loss.

Additionally, Polyurethane coatings protect industrial equipment from corrosion, extending their service life. Polyurethane elastomers are essential in the manufacturing of seals and gaskets, ensuring leak-proof and efficient operation of machinery. These properties make polyurethanes crucial in maintaining the reliability and efficiency of a multitude of industrial operations.

What type of businesses are utilizing Polyurethanes in Industrial Goods

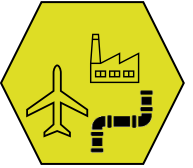
Manufacturers of industrial goods, including those producing boilers, aircraft, ships, rail vehicles, and military combat vehicles, extensively utilize polyurethanes in their production processes. These businesses benefit from both the material's strength and flexibility, which are essential for high-performance applications. Companies involved in the installation and maintenance of industrial machinery and equipment also rely on polyurethane products for their long-lasting and resilient nature. The repair and maintenance sector for fabricated metal products and various types of vehicles further underscores the material's critical role in ensuring operational efficiency and safety in the industrial goods industry.

Since 2018, the industrial goods sector has seen significant growth, growing by 14% in economic value added and almost 12% by the number of companies involved through polyurethane-related activities.

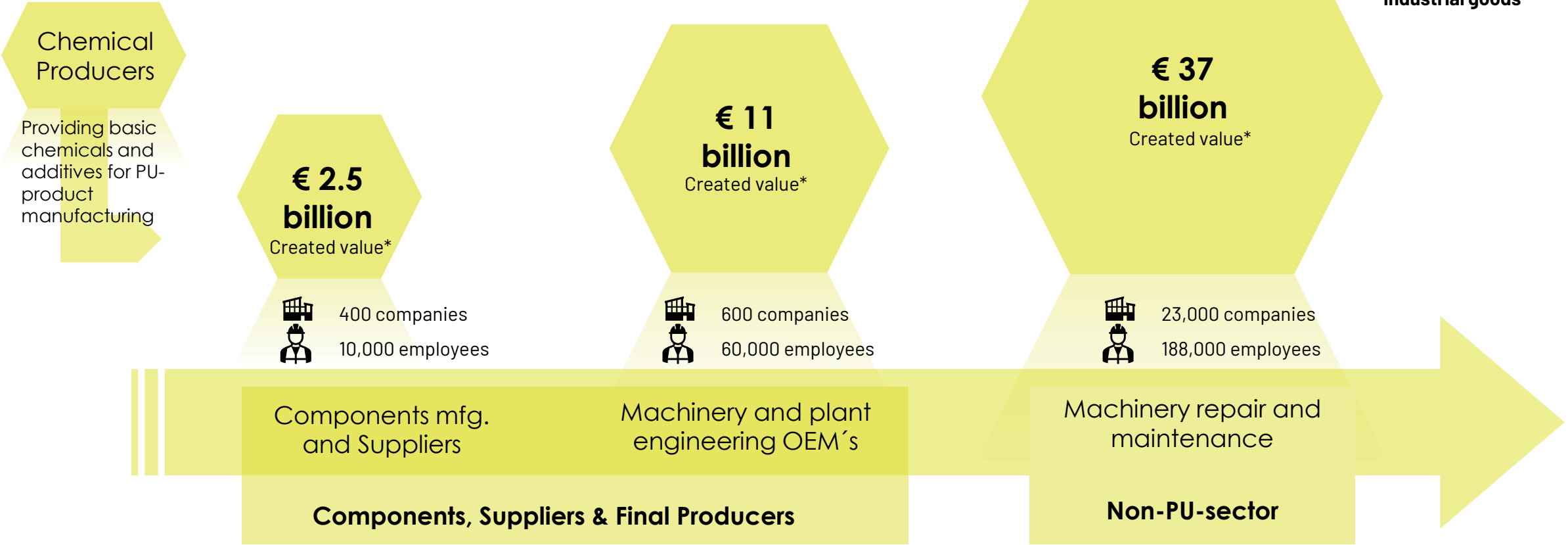
• **Nace Codes included:** C20.52; C22.21; C22.23; C25.3; C30.2; C30.3; C30.4; C33.1.1; C33.1.2; C33.1.5; C33.1.6; C33.2; F43.29

Most relevant employees within Non-PU-sector

PU-value chain for industrial goods



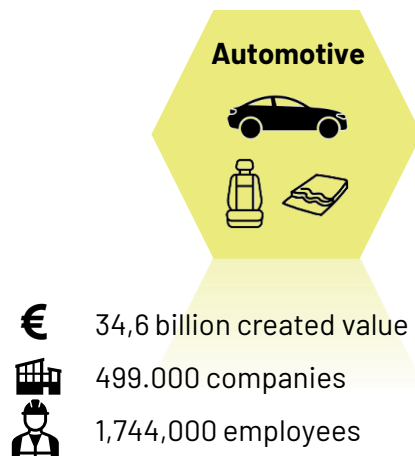
Industrial goods



*Created value in terms of PU-related materials and products

The Automotive industry is extensively relying on PU products due to their flexibility and resilience characteristics

Automotive industry



Trades along the value chain reflected in Automotive sector

- Manufacture (OEMs) of all types of motor vehicles (incl. passenger cars, agriculture vehicles, military, busses, camper vans, construction and utility and heavy-duty vehicles)
- Component Supplier industry (Tier 1)
- Maintenance and car repair

How Polyurethane is used in Automotive

Used in flexible foams in car seats, headrests and other components in the passenger cabin, polyurethanes not only make traveling more convenient but also greatly reduce the risk of injury in case of collision. Used for sound insulation, polyurethanes dampen vehicle noises by more than 50 % compared to traditional materials. Polyurethanes also cut down vibration, providing for a more pleasant and less tiring drive. Lastly, they are used as Coating varnish, due to their ability to withstand environmental impacts such as UV-irradiation.

What type of businesses are utilizing Polyurethanes in Automotive

Original Equipment Manufacturers (OEMs) employ polyurethanes in the production of lightweight, durable components such as seating, insulation, and interior trim. Automotive parts suppliers use polyurethanes for manufacturing gaskets, seals, and bushings due to their flexibility and resilience. Additionally, maintenance and car repair companies rely on polyurethane products for aftermarket parts and repairs, benefiting from their longevity and resistance to wear and tear.

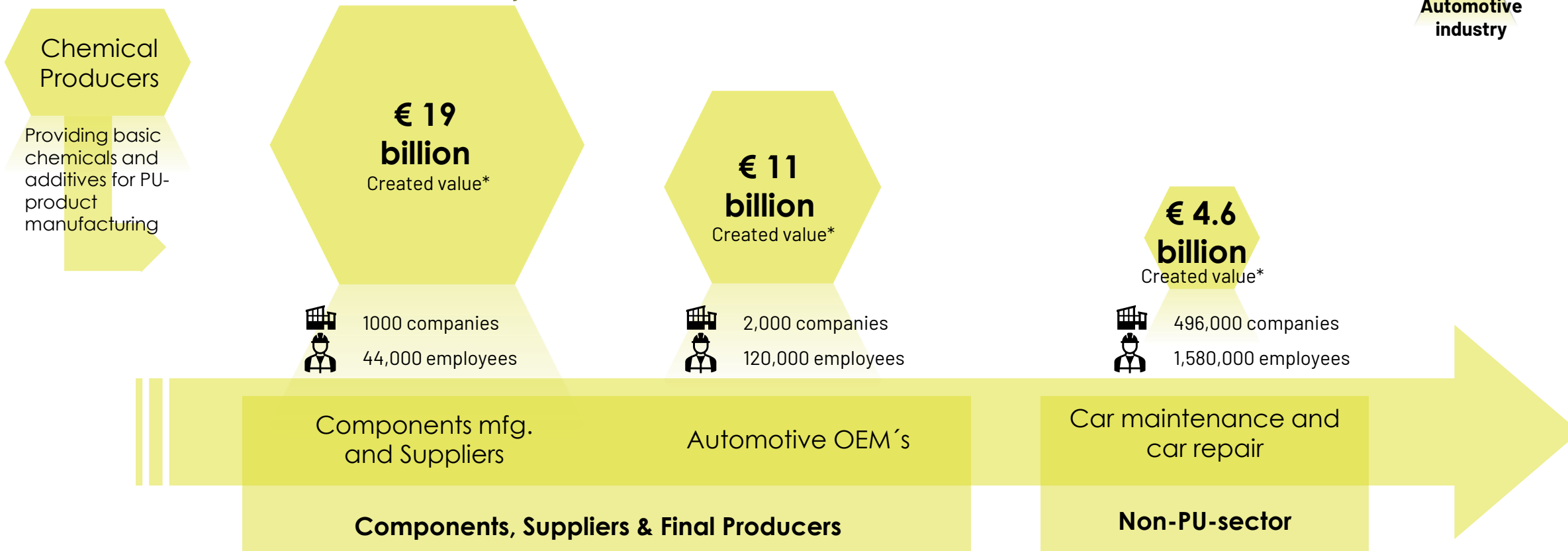
Polyurethane can be considered an ally of the European automotive industry, generating roughly 1,7 million additional jobs in the automotive sector almost 500,000 companies. €28 billion of the value added from these components is found within their direct producers and users, for a total economic contribution of €34,5 billion in the European economy.

Besides various product applications, more than 1.5 million employees in car repair and maintenance work with PU products



Automotive industry

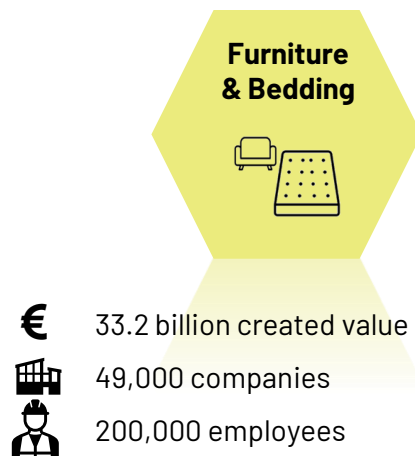
PU-value chain in the automotive industry



*Created value in terms of PU-related materials and products

Due to excellent flexibility, durability and resilience PU foam play a critical role for the Furniture and Bedding industry

Furniture & Bedding



Trades along the value chain reflected in Furniture & Bedding sector

- Manufacturer (OEMs) of mattresses
- Manufacturer (OEMs) of office; shop, kitchen and other furniture

How Polyurethane is used in Furniture & Bedding

Polyurethanes play a critical role in the furniture and bedding industry, primarily used in the production of flexible foams for mattresses and upholstered furniture. These foams provide comfort and support while simultaneously ensuring durability and resilience over time. Polyurethane coatings are also applied to furniture surfaces to enhance their resistance to scratches and wear. Furthermore, the material's lightweight nature and ease of molding allow for innovative design and customization in modern furniture pieces, catering to diverse consumer preferences and requirements.

What type of businesses are utilizing Polyurethanes in Furniture and Bedding

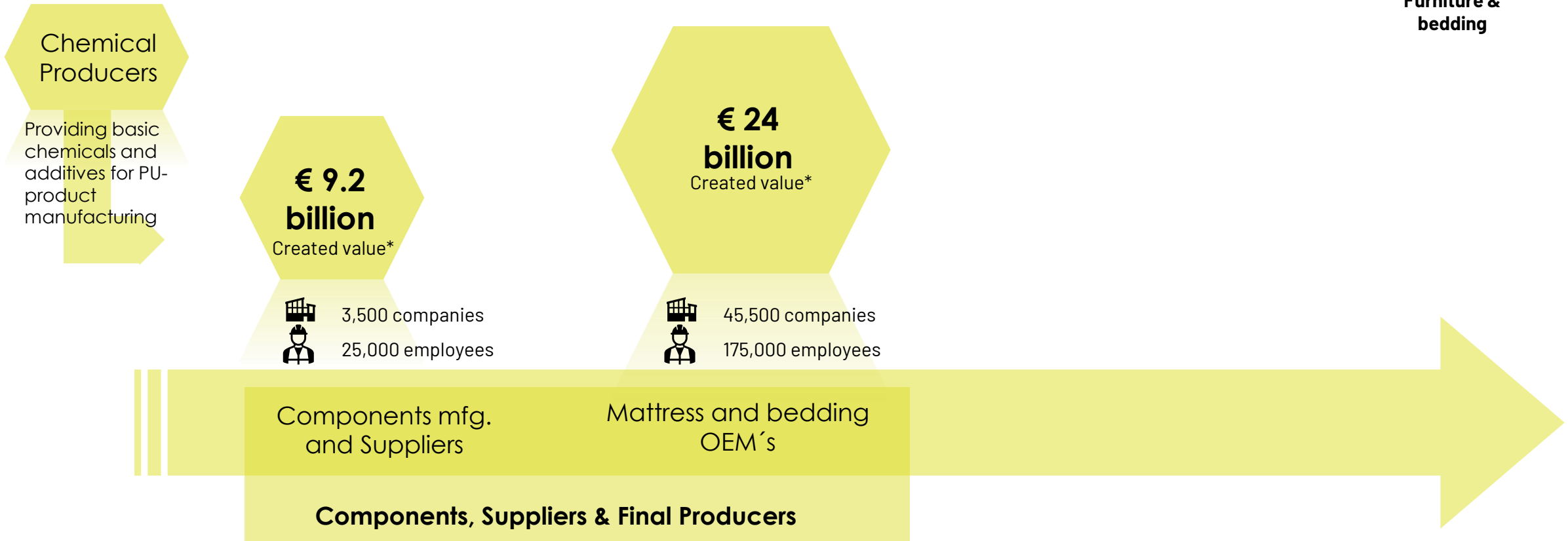
In the furniture and bedding sector, the primary users of polyurethanes are manufacturers of office, shop, kitchen, and other types of furniture. These companies generally aim to leverage the benefits of polyurethane foams to create comfortable and durable seating and bedding products. Mattress manufacturers depend heavily on polyurethane foams to deliver products that offer superior comfort and support. This widespread use by original equipment manufacturers (OEMs) underscores the material's essential role in enhancing the quality and functionality of furniture and bedding products.

The furniture and bedding sector has seen impressive growth in economic value added, increasing by almost 29% compared to 2018, while being responsible for 27% of the total economic value added through polyurethane-related activities across all industries.

• **Nace Codes included:** C31.0.1; C31.0.2; C31.0.3; C31.0.9

The furniture and bedding industry has the largest direct contribution to the PU industry

PU-value chain for furniture and bedding

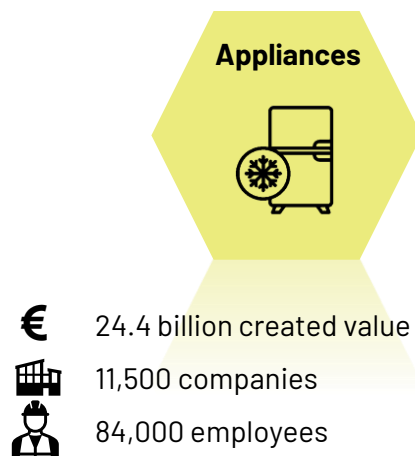


*Created value in terms of PU-related materials and products

Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

The insulating properties of Polyurethanes are indispensable for domestic and industrial cooling equipment

Appliances



Trades along the value chain reflected in Appliances sector

- Manufacturer (OEMs) of cooling and ventilation equipment for domestic and industrial appliances and other general-purpose machinery
- Manufacturer (OEMs) of communication equipment and other electronics.

How Polyurethane is used in Appliances

Polyurethanes are essential in the appliance industry, where they are used for insulation in refrigeration units, ensuring energy efficiency and optimal temperature control. The material's excellent thermal insulating properties make it ideal for use in both domestic and industrial cooling and ventilation equipment. Polyurethane adhesives and sealants are also crucial in assembling and maintaining various household and industrial appliances, providing long-lasting performance. Additionally, polyurethane coatings protect appliance surfaces from scratches and impacts, prolonging their lifespan and maintaining their aesthetic appeal.

What type of businesses are utilizing Polyurethanes in Appliances

The appliance sector sees extensive use of polyurethanes by manufacturers of cooling and ventilation equipment for both domestic and industrial purposes. These manufacturers rely on polyurethane's insulating properties to enhance energy efficiency and performance in appliances. Companies producing communication equipment and other electronics also utilize polyurethane components for their durability and reliability. The broad application of polyurethanes in manufacturing various general-purpose appliances highlights the material's versatility and critical importance in the industry.

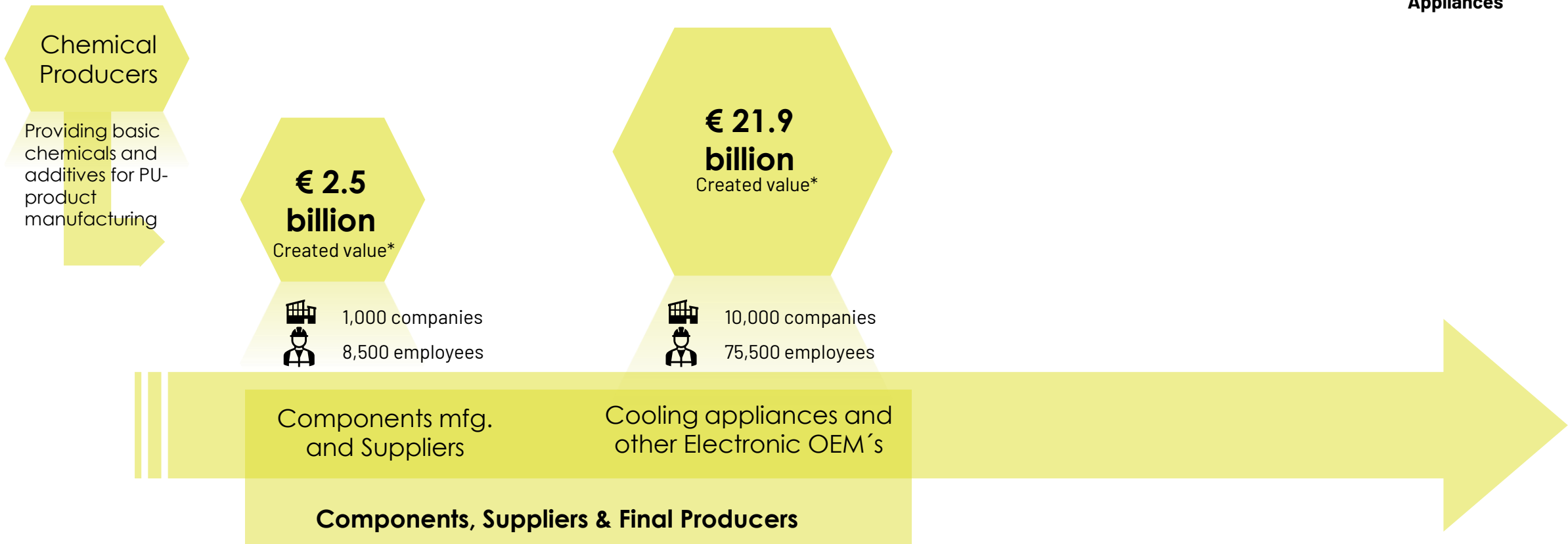
Regarding the economic importance of polyurethanes, it must be stated that even though the appliance industry accounts for roughly 10% of the total value added through polyurethane-related activities, it is only responsible for about 1 % of the total number of companies and employees involved. This indicates that in the appliance industry, larger manufacturers are responsible for the bulk of added value, and smaller maintenance and repair operations are less common.

The appliance sector creates the highest value per employee with their products compared to other sectors



Appliances

PU-value chain for appliances



*Created value in terms of PU-related materials and products

Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

PU foams as used in versatile components in shoes are indispensable for modern footwear

Footwear



- € 5.7 billion created value
- 16,500 companies
- 53,000 employees

Trades along the value chain reflected in Footwear sector

- Manufacturer (OEMs) of footwear

How Polyurethane is used in Footwear

Polyurethanes are integral to the footwear industry, primarily used in the production of soles and midsoles for shoes. The material's lightweight nature, combined with its durability and comfort, makes it ideal for high-performance athletic shoes, casual footwear, and work boots. Polyurethane foams provide excellent cushioning and support, enhancing the wearer's comfort and reducing fatigue. Additionally, polyurethane coatings on leather and synthetic materials improve the durability and water resistance of footwear, ensuring long-lasting protection and aesthetic appeal.

What type of businesses are utilizing Polyurethanes in Footwear

In the footwear sector, manufacturers of various types of shoes, including athletic, casual, outdoor and work footwear, extensively utilize polyurethanes in their products. These original equipment manufacturers (OEMs) leverage the material's properties to produce shoes that meet high consumer standards of comfort, durability, and performance. The use of polyurethane in footwear manufacturing underscores its importance in delivering products that cater to diverse consumer needs and preferences, making it a cornerstone material in the industry.

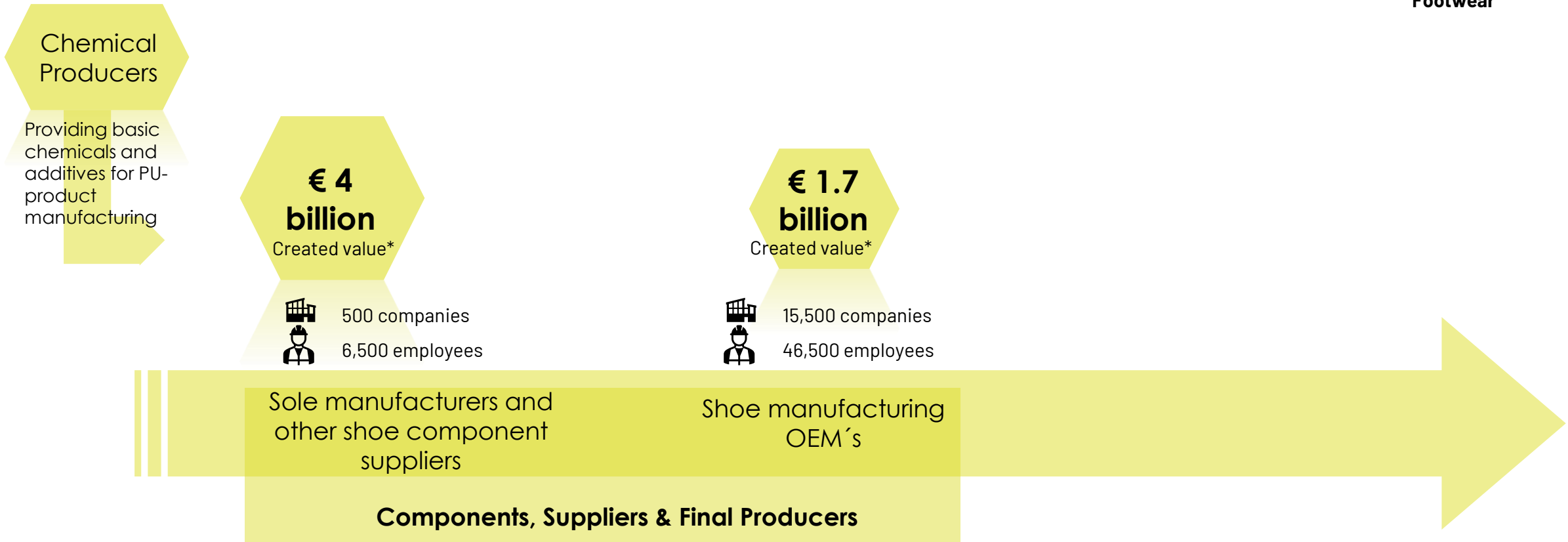
Although in the context of overall value added, the footwear industry only accounts for 2% of the total value added across all major industries. As more and more production lines are located overseas the economic value added in Europe has shrunk by almost 2% since 2018. Nevertheless, modern footwear is directly connected to the material characteristics of Polyurethane. PU foams as used in versatile components in shoes are indispensable for the industry.

Main value created is by component manufacturers and suppliers industry



Footwear

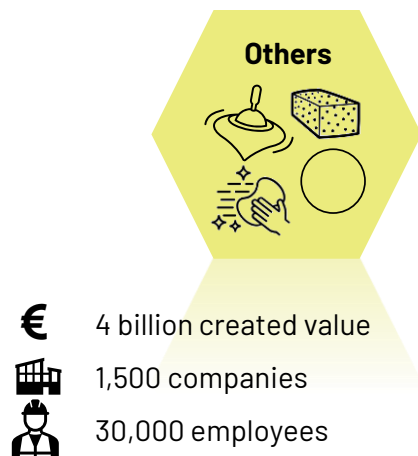
PU-value chain in the footwear industry



*Created value in terms of PU-related materials and products

Polyurethanes find diverse applications in various other industries

Other industries



Trades along the value chain reflected in other sectors

- Manufacturer (OEMs) of household articles (e.g. sponges), hygiene and toilet articles, toys, underwear, carpets and technical textiles
- Manufacturer of PU packaging materials

How Polyurethane is used in Others

Polyurethanes find diverse applications in various other industries, contributing to the production of a wide range of consumer and industrial goods. They are used in manufacturing household articles such as sponges, hygiene products, and toilet articles due to their flexibility and resilience. They are also essential in producing toys. In the textiles sector, polyurethane coatings enhance the functionality of technical textiles, making them water-resistant and more durable. Additionally, polyurethane is used in packaging materials for its lightweight and protective properties, ensuring safe transport and storage of goods.

What type of businesses are utilizing Polyurethanes in Others

In these diverse sectors, a variety of businesses utilize polyurethanes. Manufacturers of household articles, hygiene and toilet products, and toys incorporate polyurethane to improve product performance and safety. Companies producing underwear, carpets, and technical textiles rely on polyurethane coatings to enhance the durability and functionality of their products. The packaging industry also benefits from polyurethane's protective qualities, using it to create efficient and reliable packaging solutions. The widespread application across these different industries highlights polyurethane's versatility and critical role in modern manufacturing processes.

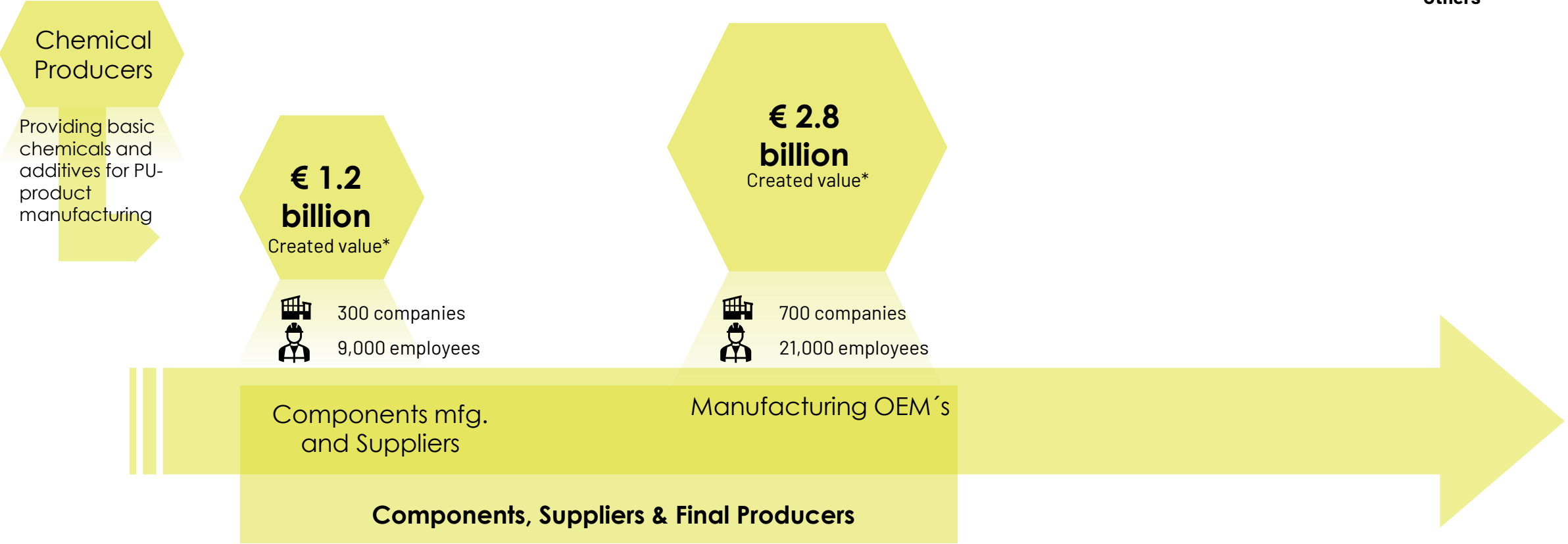
The overall economic impact of these other industries, while estimated at roughly four billion Euros in Economic value added, can be considered negligible when compared to some of the main industries. However, the diversity of products that contain Polyurethanes, especially in this sector, is notable.

There is a notable number of versatile product manufacturers relying on the characteristics of Polyurethane



Others

PU-value chain for other industries

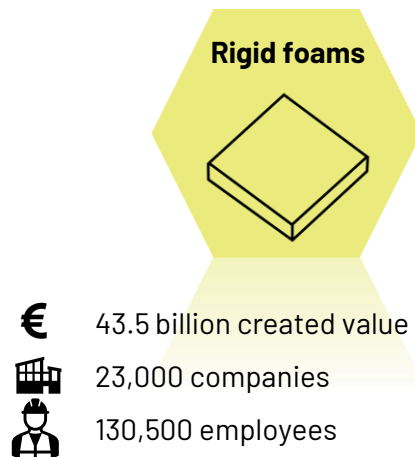


*Created value in terms of PU-related materials and products

Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

Rigid Foams

Socioeconomic value of Polyurethane rigid foams in Europe*



How Polyurethane is used in Rigid Foams

Polyurethane rigid foams are a versatile material available in various densities, making them suitable for a wide range of applications. In the construction industry, rigid foams are extensively used for insulation, providing superior thermal resistance and energy efficiency for buildings. They are also found in floating devices due to their buoyancy and durability. Additionally, rigid foams in aerosol cans are convenient for direct application in construction, ensuring seamless insulation and filling of gaps and crevices. This adaptability makes rigid foams essential across various sectors requiring reliable and efficient insulation solutions.

What type of businesses are utilizing Polyurethanes in Rigid Foams

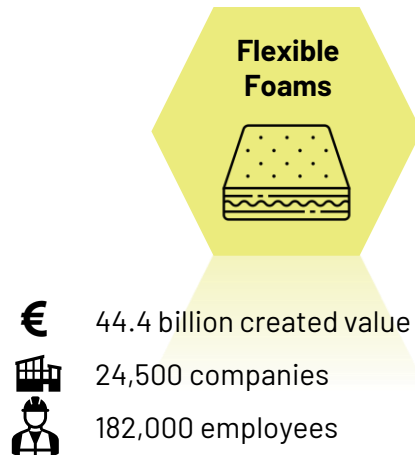
Businesses utilizing polyurethane rigid foams span multiple industries. In construction, contractors and builders use these foams for insulating roofs, walls, and floors, enhancing energy efficiency and structural integrity. Manufacturers of plastic building supplies and chemical products also incorporate rigid foams into their products to meet the demand for high-performance insulation materials.

The relevance of rigid PU-foams from an economical point of view can hardly be overstated; in terms of economic value added by material type, rigid foams contribute to 32% of the total volume of economic value added across all major PU-materials, while being responsible for the employment of about 125,000 people in over 22,000 companies.

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

Flexible Foams

Socioeconomic value of Polyurethane flexible foams in Europe*



How Polyurethane is used in Flexible Foams

Flexible polyurethane foam is an integral material that impacts various aspects of daily life, with new applications continually emerging. Widely used for cushioning in furniture and bedding, it provides comfort and support in mattresses, sofas, and chairs. In the automotive sector, flexible foams find their use in car seats and headrests. Additionally, these foams are employed for acoustic and thermal insulation in buildings and transportation, significantly reducing noise and improving energy efficiency. Their application extends to packaging, ensuring the safe transport of goods, and to textiles for added comfort and resilience.

What type of businesses are utilizing Polyurethanes in Flexible Foams

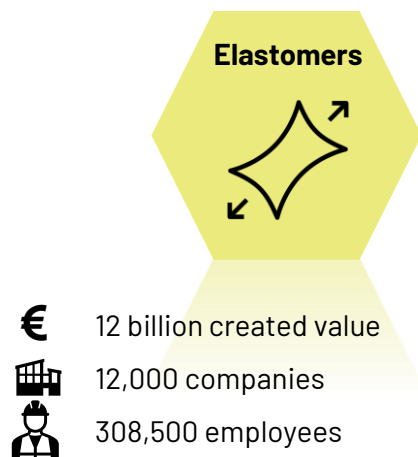
The flexible foam industry sees significant utilization of their products by various businesses. Furniture and bedding manufacturers incorporate these foams to produce high-quality, comfortable, and durable products. Automotive OEMs and parts suppliers use flexible foams for vehicle interiors, enhancing passenger comfort and safety. Construction companies rely on these foams for effective acoustic and thermal insulation solutions. Packaging companies also utilize flexible foams to protect goods during transit. This extensive use across multiple sectors highlights the material's versatility and critical role in improving product performance and consumer comfort.

With € 55,6 Billion in created value, flexible foams represent the largest economic significance out of all PU-applications, accounting for a third of the total value created by the PU-industry as a whole.

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

Elastomers

Socioeconomic value of Polyurethane elastomers in Europe*



How Polyurethane is used in Elastomers

Polyurethane elastomers are valued for their viscoelastic properties, making them suitable for numerous engineering applications. Their durability, abrasion resistance, and chemical and oil resistance make them ideal for producing industrial components like seals, gaskets, and wheels for heavy machinery. In the footwear industry, elastomers are used to create resilient, yet flexible and comfortable shoe soles, enhancing performance and longevity. Additionally, they are utilized in leisure products such as rollerblade wheels, where their strength and flexibility provide a smooth ride and long-term durability.

What type of businesses are utilizing Polyurethanes in Elastomers

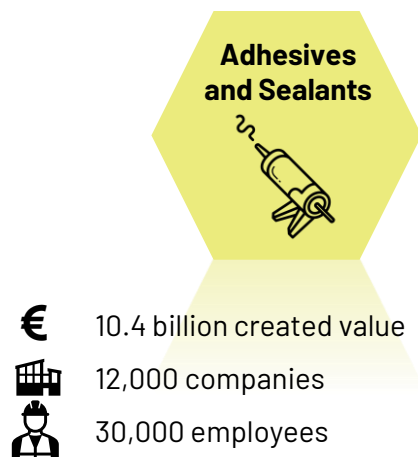
Manufacturers of industrial machinery and equipment utilize elastomers for producing high-performance components that withstand harsh operational conditions. Footwear manufacturers rely on the durability and comfort provided by polyurethane elastomers to produce high-quality shoes for various applications, including sports and work environments. Companies producing leisure products incorporate these elastomers to ensure product longevity and user satisfaction. The broad application of elastomers across different industries showcases their essential role in enhancing product durability and performance.

Despite only accounting for roughly 8% of the total value created across all PU-applications, the elastomer industry is responsible for the employment of 45% of the total workforce of all PU-applications combined, which hints at a higher ratio of human capital costs in this sector, when compared to others.

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

Adhesives and Sealants

Socioeconomic value of Polyurethane adhesives and sealants in Europe*



How Polyurethane is used in Adhesives and Sealants

Polyurethane adhesives and sealants are renowned for their strength and resilience, making them ideal for a variety of applications. In the construction industry, these adhesives are used to bond materials like wood, metal, and plastic, providing strong and durable connections. Sealants are crucial in preventing the intrusion of liquids and gases, ensuring the integrity of structures and components in harsh climates. Additionally, polyurethane adhesives play a significant role in the packaging industry, securing materials and improving the longevity of products. Their versatility and effectiveness make them indispensable in multiple sectors.

What type of businesses are utilizing Polyurethanes in Adhesives and Sealants

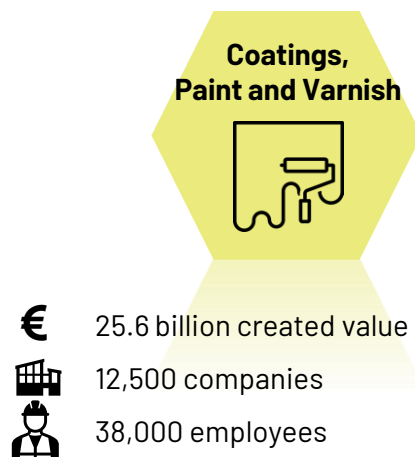
Businesses across various industries utilize polyurethane adhesives and sealants. Construction companies employ these products for bonding and sealing materials in building projects, enhancing structural integrity and durability. The packaging industry benefits from polyurethane adhesives to create secure and durable packaging solutions, ensuring safe transport and preservation of goods. Manufacturers of exterior furniture also use these adhesives to produce weather-resistant products. The extensive use of polyurethane adhesives and sealants across different industries highlights their importance in providing strong, reliable, and durable solutions for bonding and sealing applications.

At around 28,500 employees, the adhesives and sealants sector represents the smallest sector of all major PU-applications in terms of employment at 4% relative share. However, it accounts for 8% of the overall economic value added.

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

Coatings, Paint and Varnish

Socioeconomic value of Polyurethane coatings, paint and varnish in Europe*



How Polyurethane is used in Coatings, Paint and Varnish

Polyurethane coatings, paints, and varnishes are essential for protecting and enhancing the appearance of various products. These coatings provide a durable and resilient finish that extends the lifespan of surfaces by protecting them from wear, abrasion, and environmental factors such as UV radiation and moisture. In the automotive industry, polyurethane coatings are used to protect vehicle exteriors and interiors. In the construction sector, these coatings protect buildings and structures from environmental damage, while in the industrial sector, they provide corrosion resistance to machinery and equipment.

What type of businesses are utilizing Polyurethanes in Coatings, Paint and Varnish

A wide range of businesses benefits from the use of polyurethane coatings, paints, and varnishes. Automotive manufacturers and parts suppliers utilize these coatings to enhance the durability and appearance of vehicles. Construction companies apply polyurethane coatings to protect buildings and infrastructure from environmental wear and tear. Manufacturers of industrial machinery and equipment use these coatings to prevent corrosion and extend the service life of their products.

With an economic value created of over €32 billion, the coatings, paint and varnish industry represents the third largest PU-application with a share of 19%, while only being responsible for 6% of the total share of employment created through PU-applications.

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

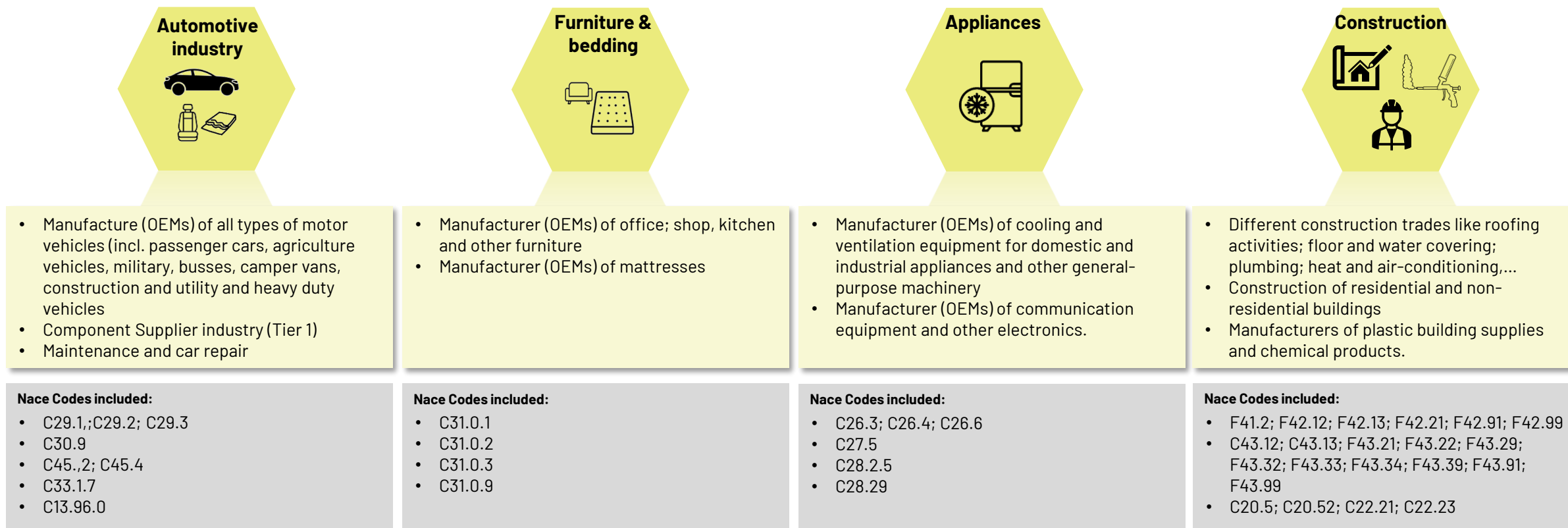
Appendix

CONVERSIO
| market & strategy

Category definitions and clusters allocated and defined by NACE-Codes

Appendix

To allocate and build the analytical basis following trades were selected and allocated to PU-user groups according to Nace codes classification system. Each NACE code was then assessed to how much % of the companies and employees apply PU products and how much % of the sector created value is related to PU-products



Category definitions and clusters allocated and defined by NACE-Codes

Appendix

To allocate and build the analytical basis following trades where selected and allocated to PU-user groups according to Nace codes classification system. Each NACE code was then assessed to how much % of the companies and employees apply PU products and how much % of the sector created value is related to PU-products



Industrial goods

- Manufacturer (OEMs) of boilers; aircrafts, ships; rail vehicles and military combat vehicles
- Installation of industrial machinery and equipment
- Repair and maintenance of fabricated metal products and aircrafts, ships.

Nace Codes included:

- C20.52; C22.21; C22.23
- C25.3
- C30.2; C30.3; C30.4
- C33.1.1; C33.1.2; C33.1.5; C33.1.6; C33.2
- F43.29

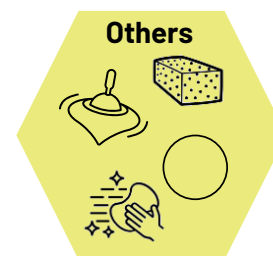


Footwear

- Manufacturer (OEMs) of footwear
- Manufacturer of footwear components like shoe soles

Nace Codes included:

- C15.2
- C22.29



Others

- Manufacturer (OEMs) of household articles (e.g. sponges), hygiene and toilet articles, toys, underwear, carpets and technical textiles
- Manufacturer of PU packaging materials

Nace Codes included:

- C13.93.0; C13.96.0
- C14.14
- C17.22.0
- C32.40.0
- C22.22

Overview automotive industry

Automotive*	Total			Directly involved with polyurethane			
	Country	Employment (units)	Number of companies (units)	Economic contribution (billion euros)	Employment (units)	Number of companies (units)	Economic contribution (billion euros)
	Germany	1,100,000	49,000	550	435,000	40,000	12.5
	Spain	250,000	44,000	87	95,000	35,000	2
	Italy	327,000	67,000	102	132,000	54,000	2.3
	France	380,000	47,000	208	150,000	40,000	4.6
	UK	345,000	45,500	136	135,000	38,000	3.1
	Netherlands	48,500	9,500	26	19,000	7,000	0.6
	Poland	295,000	57,000	44	119,000	48,000	1
	Türkiye	295,000	83,500	37	119,000	65,000	0.9
	Norway	25,000	4,000	8	10,000	2,000	0.2
	Others (EU)	1,430,000	241,000	355	530,000	170,000	7.4
	Total*	4,495,500	647,500	1.553	1,744,000	471,500	34.6

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

*incl. the following NACE Codes: C29.1; C29.2; C29.3; C30.2; C30.3; C30.4; C30.9; C33.1.7; G45.2; G45.4

Overview appliances

Appliances	Total			Directly involved with polyurethane			
	Country	Employment (units)	Number of companies (units)	Economic contribution (billion euros)	Employment (units)	Number of companies (units)	Economic contribution (billion euros)
	Germany	277,000	4,000	72	21,000	1,300	6.2
	Spain	34,000	1,300	7	2,500	300	0.6
	Italy	147,500	5,500	39	10,000	1,900	3.4
	France	89,000	1,400	28	7,000	400	2.4
	UK	61,000	3,000	27	4,500	1,100	2.3
	Netherlands	22,000	1,100	8.4	1,500	300	0.7
	Poland	63,000	1,800	12	5,000	400	1
	Türkiye	114,500	3,700	14	8,000	1,200	1.2
	Norway	3,500	250	1	500	100	0.1
	Others (EU)	367,000	13,000	81	24,000	4,000	6.5
	Total*	1,178,500	35,050	289.4	84,000	11,000	24.4

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

*incl. the following NACE Codes: C27.5

Overview construction market

Construction	Total			Directly involved with polyurethane		
	Country	Employment (units)	Number of companies (units)	Economic contribution (billion euros)	Employment (units)	Number of companies (units)
Germany	2,000,000	328,000	272	780,000	112,000	11
Spain	950,000	307,000	117	360,000	105,000	4.5
Italy	1,000,000	436,000	140	397,000	152,000	5.5
France	1,400,000	430,000	265	442,000	147,000	10
UK	1,200,000	290,000	218	440,000	103,000	8.5
Netherlands	365,000	157,000	86	132,000	54,000	3.2
Poland	780,000	285,000	68	295,000	96,000	2.5
Türkiye	1,300,000	190,000	82	500,000	62,000	3.2
Norway	140,000	34,000	36	45,000	11,000	1.2
Others (EU)	4,600,000	1,200,000	536	1,440,000	408,000	18
Total*	13,735,000	3,657,000	1,820	4,831,000	1,250,000	67.6

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

*incl. the following NACE Codes: F41.1; F41.2; F42.12; F42.13; F42.21; F42.22; F42.91; F42.99; F43.11; F43.12; F43.13; F43.21; F43.22; F43.29; F43.31; F43.32; F43.33; F43.34; F43.39; F43.91; F43.99

Overview furniture & bedding industry

Furniture & Bedding	Total			Directly involved with polyurethane		
	Country	Employment (units)	Number of companies (units)	Economic contribution (billion euros)	Employment (units)	Number of companies (units)
Germany	103,000	7,900	17.1	20,000	3,300	6
Spain	44,000	8,900	4.6	8,000	3,600	1.5
Italy	95,000	13,500	17.2	19,000	5,100	6
France	32,000	8,900	5.9	6,000	3,500	2
UK	66,000	4,900	7.7	13,000	2,000	2.6
Netherlands	18,500	7,000	3.2	3,000	2,900	1.1
Poland	147,000	16,500	9.4	28,000	1,500	3.2
Türkiye	148,500	30,000	5	28,000	2,600	1.6
Norway	3,800	700	0.7	1000	500	0.3
Others (EU)	400,500	62,500	26.2	74,000	24,000	8.9
Total*	1,058,300	160,800	96.4	200,000	49,000	33.2

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

*incl. the following NACE Codes: C31.0.1; C31.0.2; C31.0.3; C31.0.9

Overview footwear industry

Footwear	Total			Directly involved with polyurethane		
	Country	Employment (units)	Number of companies (units)	Economic contribution (billion euros)	Employment (units)	Number of companies (units)
Germany	115,000	2,500	27	7,800	900	1.4
Spain	44,000	3,500	7	3,000	1,300	0.4
Italy	107,000	8,700	22	7,400	2,900	1.2
France	32,000	1,400	5.7	2,200	450	0.3
UK	42,500	2,000	6	3,000	700	0.3
Netherlands	30,500	550	5.3	2,000	200	0.3
Poland	69,000	3,400	5.8	4,600	1,200	0.3
Türkiye	76,500	6,400	5.6	4,950	2,400	0.3
Norway	850	100	0.2	50	50	0.01
Others (EU)	314,000	17,500	23	18,000	5,900	1.2
Total*	831,350	46,050	107.6	53,000	16,000	5.7

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

*incl. the following NACE Codes: C15.2

Overview industrial goods

Industrial Goods	Total			Directly involved with polyurethane			
	Country	Employment (units)	Number of companies (units)	Economic contribution (billion euros)	Employment (units)	Number of companies (units)	Economic contribution (billion euros)
	Germany	575,000	36,000	132.5	53,000	2,400	12.2
	Spain	161,000	23,000	32.1	15,000	1,600	3
	Italy	314,000	49,500	66.8	28,000	3,300	6
	France	250,500	18,500	80.1	23,000	1,300	7.5
	UK	224,000	21,500	50.1	20,000	1,500	4.5
	Netherlands	66,500	10,000	21.6	6,000	700	2
	Poland	224,500	36,500	25.8	20,000	2,500	2.4
	Türkiye	232,500	36,000	17.4	21,000	2,400	1.5
	Norway	13,000	1,900	4.9	1,000	100	0.5
	Others (EU)	868,000	145,500	125.7	71,000	8,200	10.9
	Total*	2,929,000	378,400	556.8	258,000	24,000	52.4

*Total market relates European Union (EU27) including Switzerland, Norway, UK and Türkiye

*incl. the following NACE Codes: C33.1.1; C33.1.2; C33.1.5; C33.1.6; C33.2

Data comparison and explanation for adaptations compared to study 2018

Methodology to align data basis from 2018 to Eurostat data sources as basis for extrapolations for 2023 data

Aggregated Data for EU27+ UK, Switzerland, Norway, Türkiye




Total market

	Data study 2018 (incl Russia)	No of all total sample based on Eurostat Nace codes 2018	Delimitation	New relevant sample 2018 (incl. Türkiye)	Explanation
Automotive	€ 27.4 billion EUR 20,100 companies 222,000 employees	€ 1,544 billion EUR 685,000 companies 5.1 M employees	€ ↗ 20,100 ↗ 222,000 ↗	€ 31.4 billion EUR 452,500 companies 1.7 employees	Data 2023 now includes car maintenance and car repair companies as further application markets for PU foams and coatings
Appliances	€ 15.1 billion EUR 11,750 companies 83,000 employees	€ 319 billion EUR 44,000 companies 1.3 M employees	€ ↗ 11,750 ↘ 83,000 ↘	€ 19.7 billion EUR 8,800 companies 69,500 employees	Application definition alike 2018 New statistical data available resulted in a reevaluation of the sector
Construction	€ 59.3 billion EUR 70,250 companies 3.8 M employees	€ 1,819 billion EUR 3.6 M companies 14.9 M employees	€ ↘ 70,250 ↗ 3.8 M ↗	€ 51.4 billion EUR 1.1 M companies 4.5M employees	Data 2023 now includes all type of craftsmen and users of PU foam insulation in construction area, that have not been fully captured in 2018
Furniture and Bedding	€ 31.5 billion EUR 29,200 companies 335,000 employees	€ 119 billion EUR 170,000 companies 1.3 M employees	€ ↘ 29,200 ↗ 335,000 ↘	€ 26.1 billion EUR 42,000 companies 182,000 employees	Application definition alike 2018
Footwear	€ 0.7 billion EUR 13,000 companies 98,000 employees	€ 126 billion EUR 56,000 companies 997,500 employees	€ ↗ 13,000 ↗ 98,000 ↘	€ 5.7 billion EUR 16,500 companies 56,000 employees	Application definition alike 2018 New statistical data available resulted in a reevaluation of the sector
Industrial goods	€ 34.9 billion EUR 17,500 companies 200,000 employees	€ 599 billion EUR 334,500 companies 3.1 M employees	€ ↗ 17,500 ↗ 200,000 ↗	€ 44.1 billion EUR 21,500 companies 247,000 employees	Now includes non-automotive transportation sectors (e.g. Aerospace, Train) and PU components used for the construction and maintenance of plants and industrial facilities
Others	€ N/A	€ 161 billion EUR 40,000 companies 948,500 employees	€ N/A	€ 4.4 billion EUR 1,500 companies 32,000 employees	This category was not included in previous report and was now newly included

Market development based on new calculated market data for 2018

Mostly moderate growth rated within the last five years (2018-2023)

 Market development	Market data 2018 (incl. Türkiye)	CAGR (2018-2023)	Market data 2023 (incl. Türkiye)
Automotive	€ 31.4 billion EUR 452,500 companies 1.7 employees	€ ↗ ~+2.0% ↗ ~+2.0 % ↗ ~+0.5%	€ 34.6 billion EUR 499,000 companies 1.74 employees
Appliances	€ 19.7 billion EUR 8,800 companies 69,500 employees	€ ↗ ~+4.4% ↗ ~+4.6 % ↗ ~+3.9%	€ 24.4 billion EUR 11,000 companies 84,000 employees
Construction	€ 51.4 billion EUR 1.1 M companies 4.5M employees	€ ↗ ~+5.6% ↗ ~+2.6 % ↗ ~+1.4%	€ 67.6 billion EUR 1.25 M companies 4.83M employees
Furniture and Bedding	€ 26.1 billion EUR 42,000 companies 182,000 employees	€ ↗ ~+4.9% ↗ ~+3.1 % ↗ ~+1.9%	€ 33.2 billion EUR 49,000 companies 200,000 employees
Footwear	€ 5.7 billion EUR 16,500 companies 56,000 employees	€ → ~0% ↘ ~-0.6 % ↘ ~-1.1%	€ 5.7 billion EUR 16,000 companies 53,000 employees
Industrial goods	€ 44.1 billion EUR 21,500 companies 247,000 employees	€ ↗ ~+2.8% ↗ ~+2.2 % ↗ ~+0.9%	€ 50.5 billion EUR 24,000 companies 258,000 employees
Others	€ 4.3 billion EUR 1,000 companies 31,000 employees	€ ↘ ~-1.4% → ~0% ↘ ~-0.6%	€ 4 billion EUR 1,000 companies 30,000 employees

Calculation approach for total number of relevant employees

- The definition of the number of employees utilized in this socioeconomic study encompasses, all individuals employed in the PU industry who contribute to the value added. This implies that the 7.2 million employees contribute, either directly or indirectly, to the creation of a value of €233 billion.
- In the analysis, the number of employees were assessed and taken into account that contribute to the value creation of polyurethane (PUR) depending on the specific activities of the respective company.
- The number of employees working in companies in the polyurethane (PU) chemical industry and in PU production companies is included in its entirety.
- Employees in companies that manufacture products in which polyurethane is processed or used were included in proportion to their contribution to the overall company value added, specifically in relation to their PU value added.
 - To illustrate, a furniture manufacturer that uses PU foam products is counted with its entire revenue to the PU value add, but rather only the proportion of revenue generated through the PU value added contribution. A similar approach was applied to the number of employees.
 - The number of total employees was calculated on a proportional basis relative to the company's PU value added.
- In the case of the non-PU sectors, with a considerable number of employees in construction and craft, it would have been an overestimation of the number of employees (12 million employees) to have them all included in the calculations, given that only a minor proportion of the revenue generated by these companies is derived from PU foam or PU products. It is necessary to consider the fact that the value added in the non-PU sector is primarily generated by a limited number of employees who are primarily engaged in working with PU products. From a statistical standpoint, the number of employees in the non-PU sector has also been counted proportionately to the PU value added to total revenue.
- In conclusion, the figures presented in this report do not solely reflect employees who may potentially be exposed to PUR and diisocyanates. Instead, they encompass all employees (including those in sales or R&D) who contribute proportionately to the PU added value generated within a company.

Your Conversio Team



Christoph Lindner
Geschäftsführender
Gesellschafter/
Managing Partner

c.lindner@conversio-gmbh.com
+49 (0) 6021 15067-01



Matthias Arnold
Bereichsleiter/
Director

m.arnold@conversio-gmbh.com
+49 (0) 6021 15067-05



Pascal Opaterny
Projektleiter/Project Manager

p.opaterny@conversio-gmbh.com
+49 (0) 6021 15067-11

**Conversio
Market & Strategy GmbH**
Am Glockenturm 6
63814 Mainaschaff/Germany
+49 (0) 6021 15067-00



EXPERTS ALONG YOUR VALUE CHAIN

FOR SUSTAINABLE
BUSINESS SOLUTIONS.

CONVERSIO
| market & strategy