STRATEGIC OVERVIEW OF THE POLYURETHANES INDUSTRY

Global Growth and Trends

Katie Tofts

Project Manager

www.ialconsultants.com

Agenda

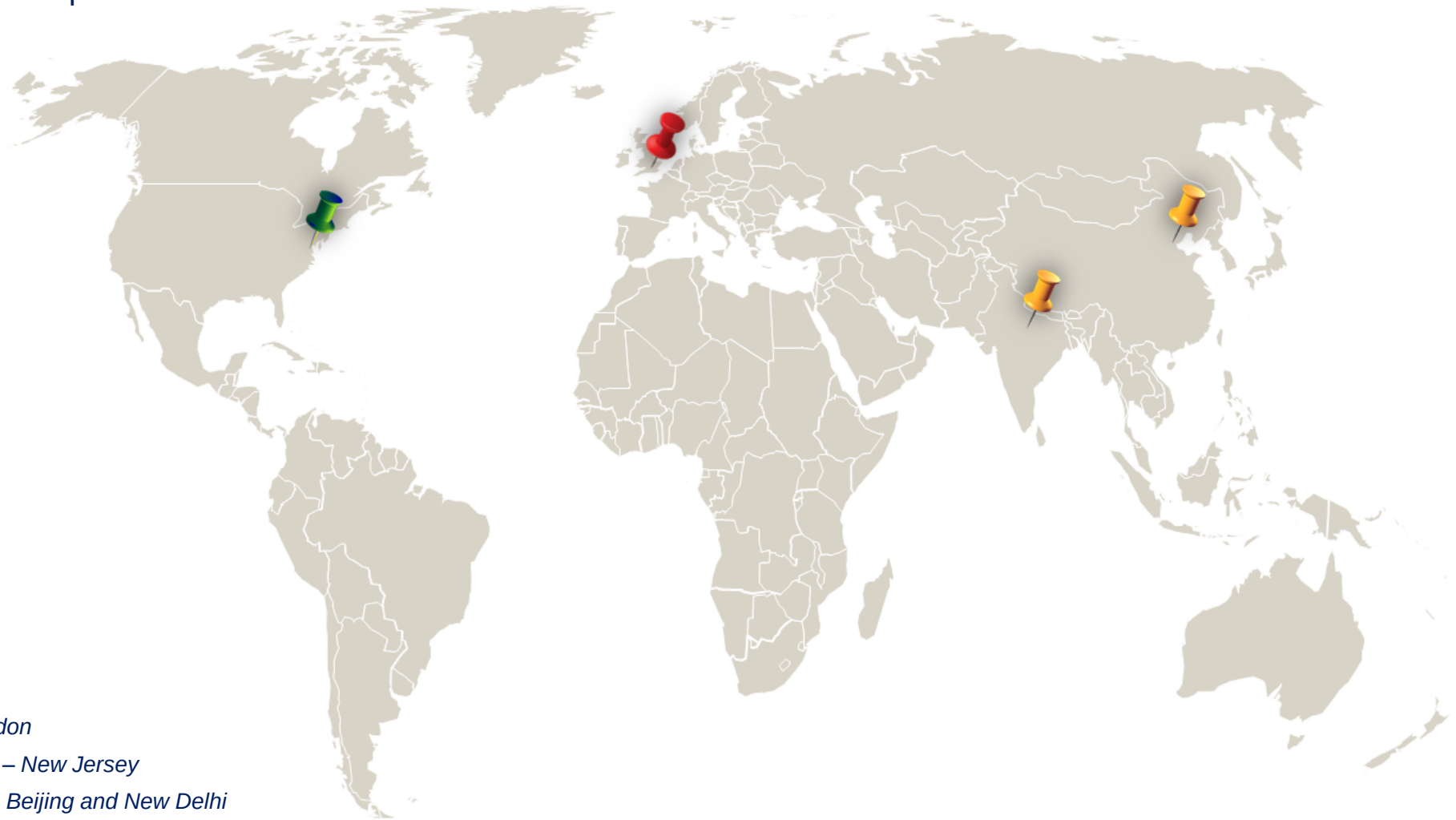
- Introduction to BRG and IAL
- Global PU Industry
- Regional Overview – EMEA
- Regional Overview – APAC
- Regional Overview – Americas
- Spotlight on Turkey
- Latest PU Trends, Sustainability

BRG & IAL Overview

- **Founded:** BRG founded in 1990, privately held and owner managed
- **Consultants:** 50+ globally
- **Offering:** Multi-disciplinary strategic research and product development consultancy providing evidence-based solutions that assist with client decision making and drive client specific initiatives
- **Global Reach**: Europe (London), North America (New Jersey) and Asia (Beijing and New Delhi)
- **Clients:** From blue-chip multinationals to mid-size and small specialists. All benefit equally from the professionalism and enthusiasm of our team and the pragmatic, actionable information that we provide
- **Key Sector Coverage:** Chemicals & Materials, Building Products & Technologies
- **IAL Consultants**: Founded in 1970s as global chemical industry consultancy.

Global Reach

- The BRG Group is a genuinely global company, with individuals from varied backgrounds, working collaboratively across 4 offices in 4 countries. Combining unparalleled industry experience with expert research and analysis, our teams deliver lasting results to hundreds of companies in the chemicals sector.



European HQ - London

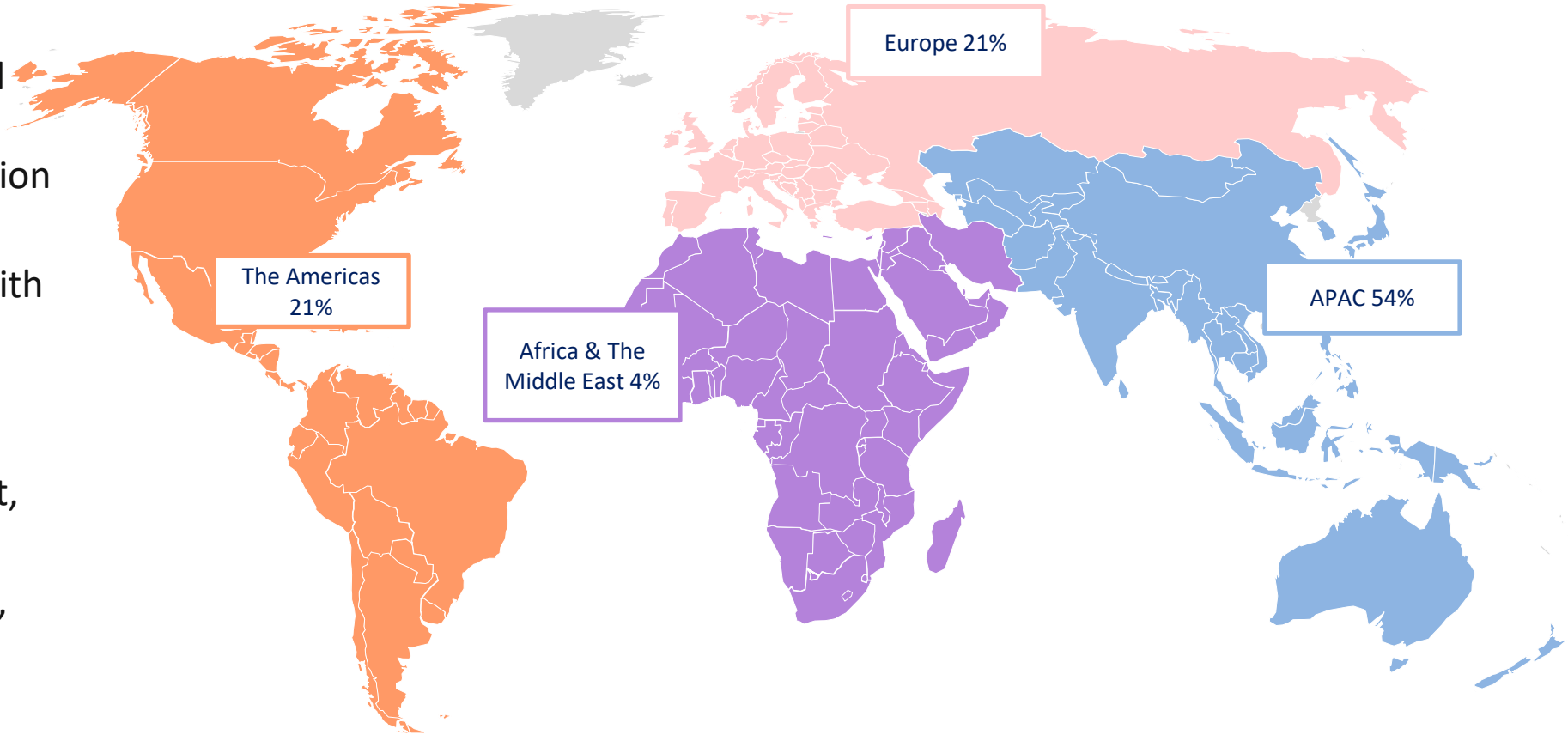
North American HQ – New Jersey

Research centres in Beijing and New Delhi

Global Overview

Global PU Industry

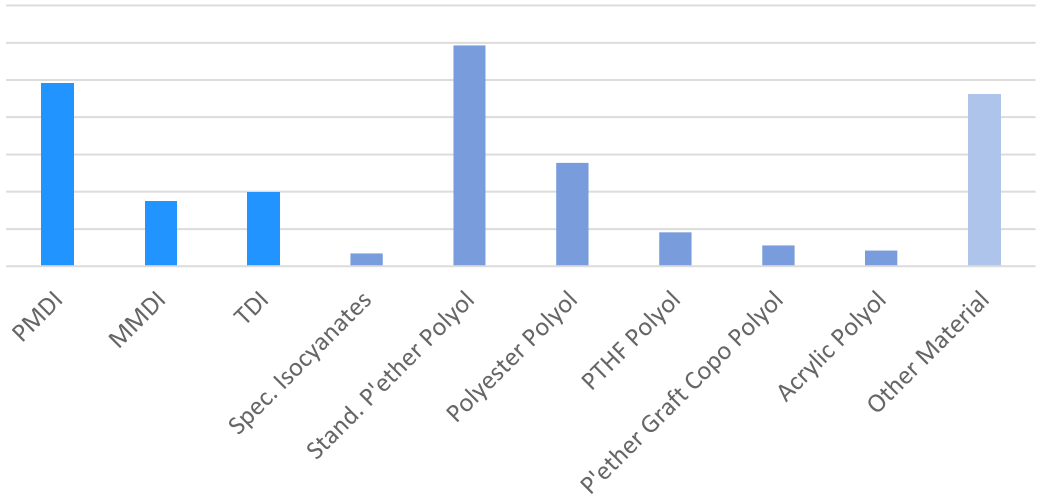
- PU production reached 24.0 million tonnes in 2023
- Rigid foam, flexible foam and elastomers are high volume markets. Elastomers production is concentrated in APAC
- APAC is the largest market with 54% global market share
- Economic and political challenges endure in many regions: Ukraine, Middle East, South America
- Global market declined 0.7%, better than the 3.6% drop in 2022
- IAL is forecasting growth of 1.3% for 2024



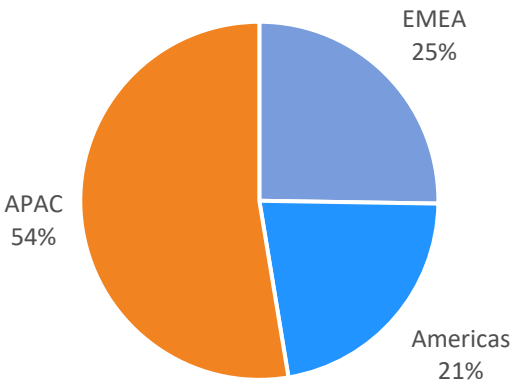
Global PU Production and Raw Material Usage

- Instability in 2022 was followed by stagnation in 2023
- Development in 2023 was very different across the regions and types of PU
- Some growth in elastomers, and adhesives & sealants
- Decline in binders, coatings, flex and rigid foams
- Region-wise, North America and Western Europe saw biggest production decreases; also Central Europe and surprisingly Africa experienced declines
- Political and economic uncertainty ongoing in 2024

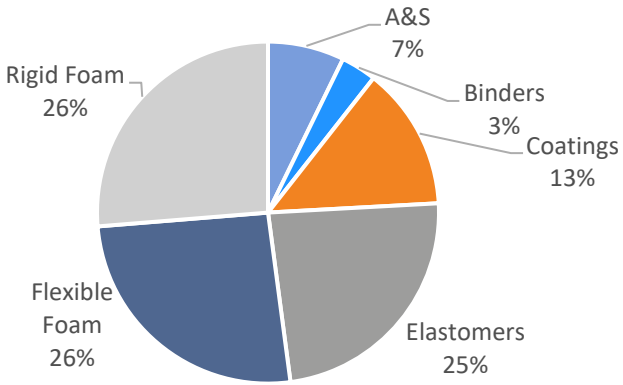
Global Raw Material Consumption, 2023



Global Production by Region, 2023



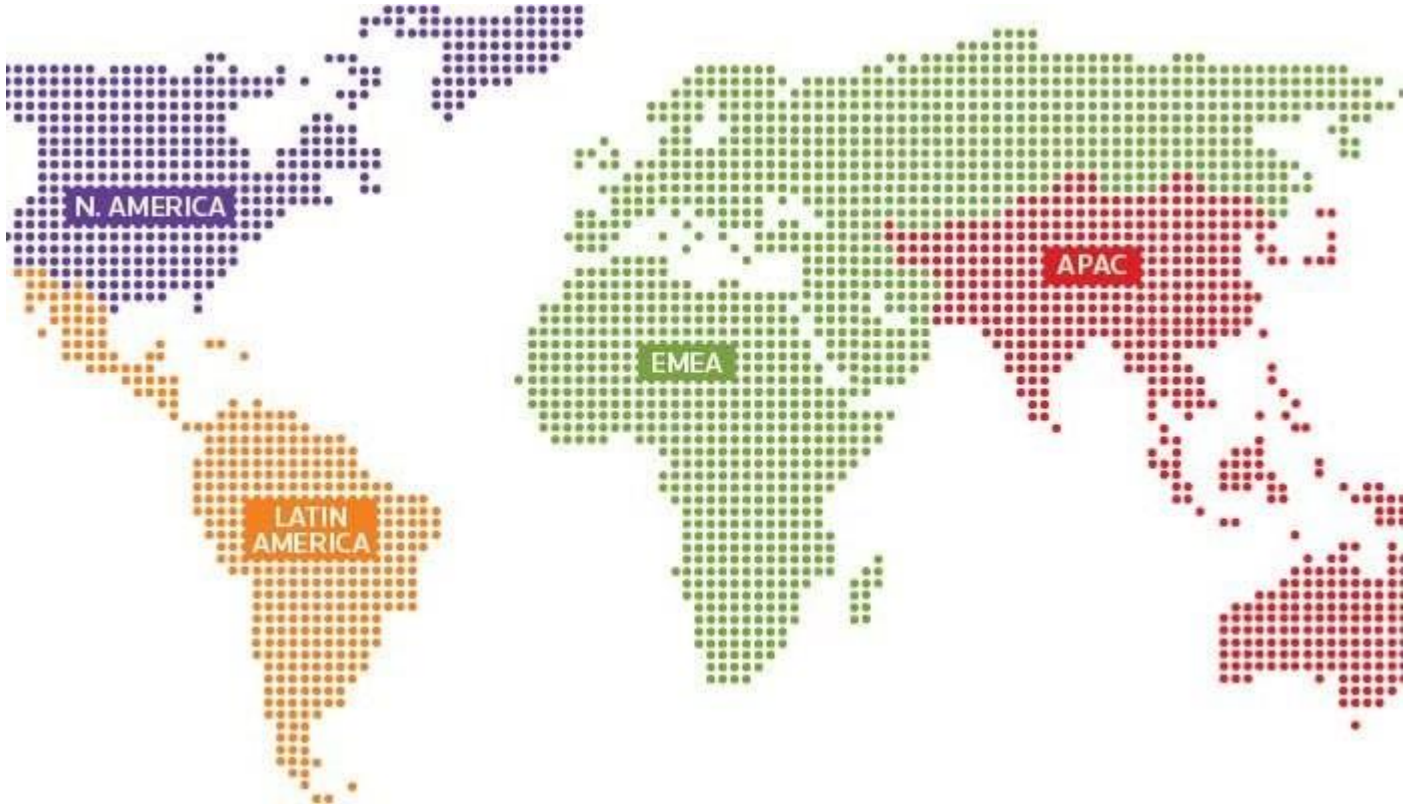
Global Production by Type, 2023



- Isocyanate consumption stood at approx. 8.9 million tonnes in 2023; isocyanate supply is highly consolidated
- pMDI is the most commonly used isocyanate material, followed by TDI and mMDI
- 10.5 million tonnes of polyol were consumed in 2023
- Standard polyether polyol remains by far the most popular at 5.9 million tonnes
- The share of environmentally friendly products is increasing globally.

Regional Overview

EMEA

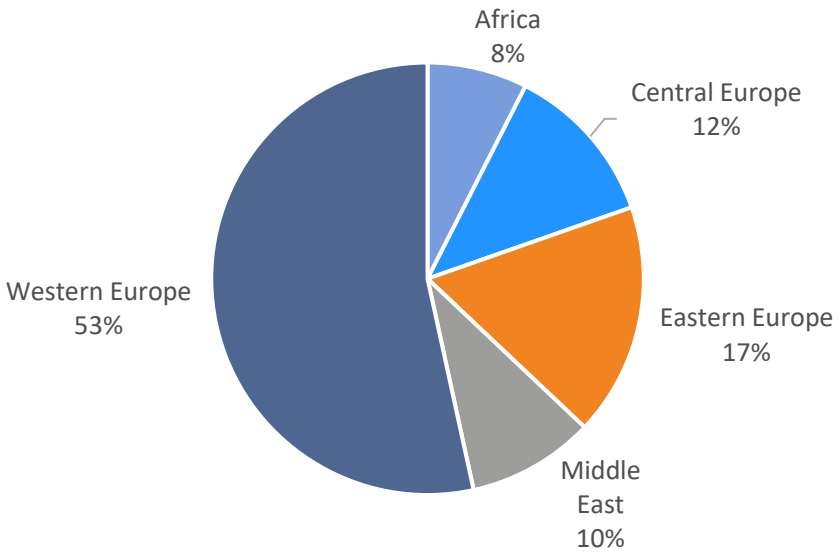


Market Trends – Europe, Middle East and Africa

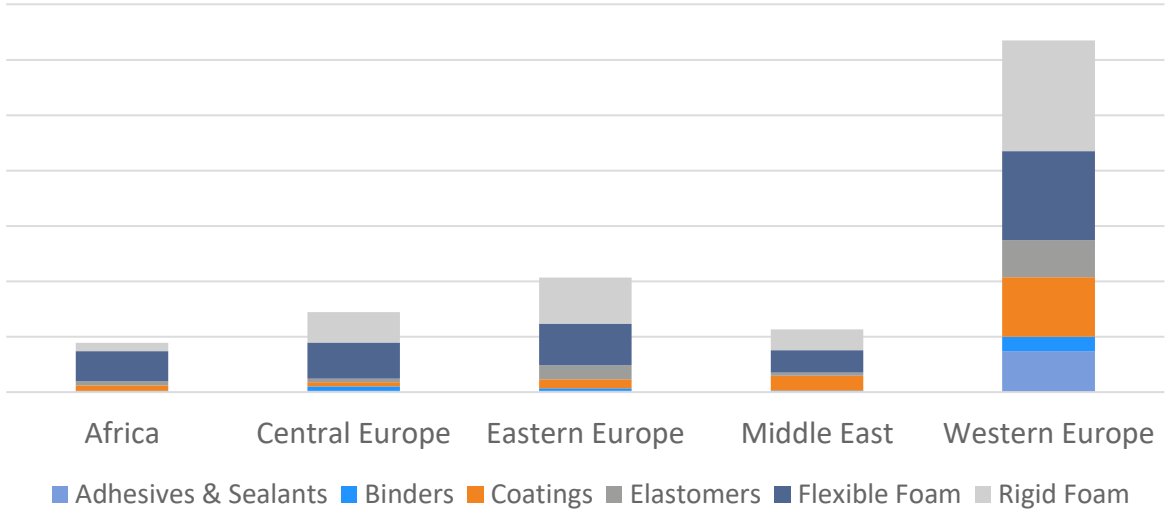
- Production output 2023: approx. 5.9 million tonnes
- Market declined by 5.1% in 2022 and 2.9% in 2023
- Big differences between regions. Middle East showed good growth and Western Europe showed biggest decline
- Stagnant year expected in 2024; uncertainty in Middle East
- Recovery could happen from H2 2024, but situation is still uncertain.

- Flexible foam was largest PU category; binders the smallest
- Growth was strongest in flexible foam, led by automotive
- Construction and furniture/bedding both quite negative
- Consumption of MDI and TDI was 1.80 million tonnes and 609,420 tonnes, respectively, in 2023
- MDI consumption was -3.5%, TDI -2.6%

PU Production in EMEA, 2023

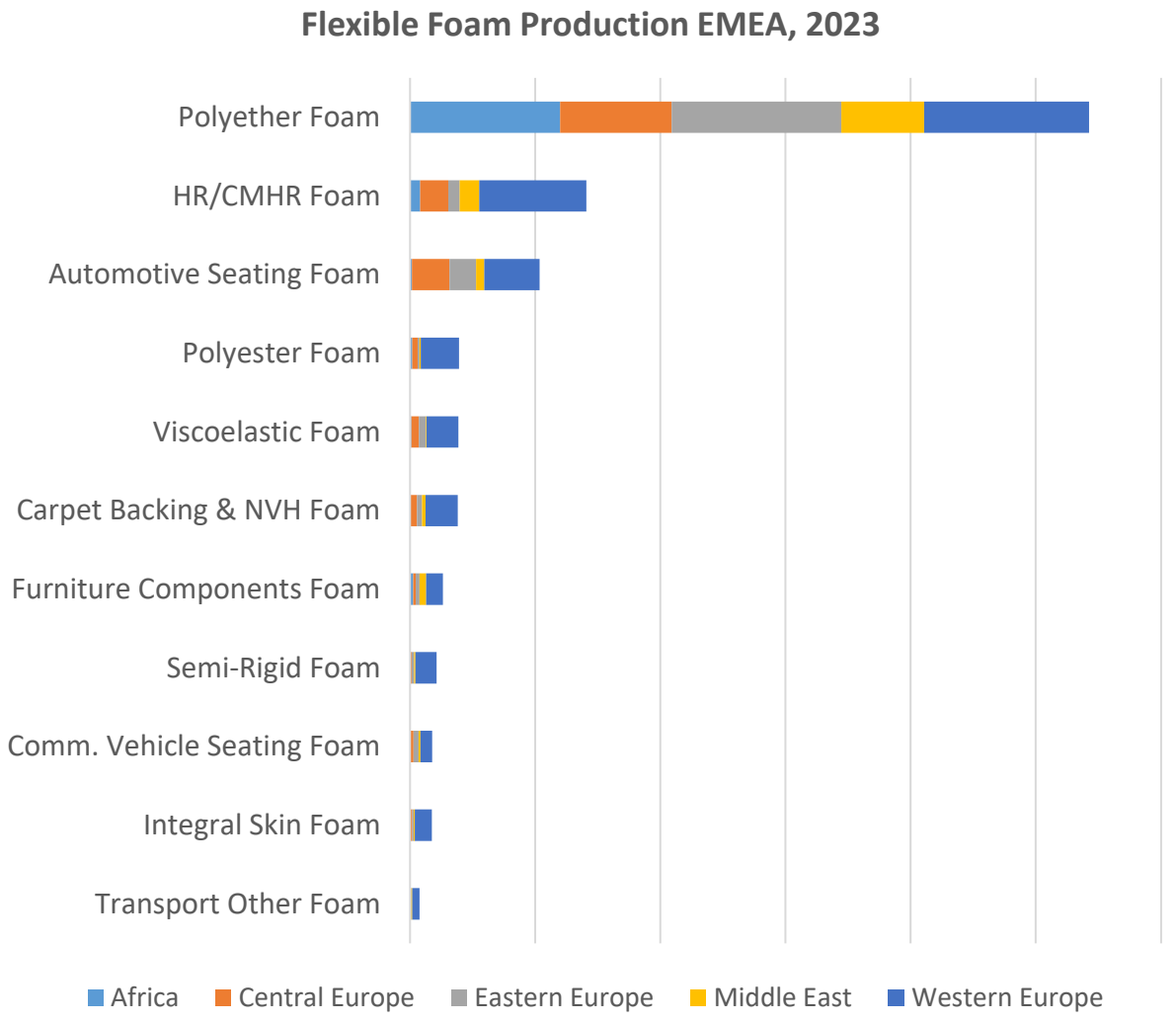


PU Production by Product Type, 2023



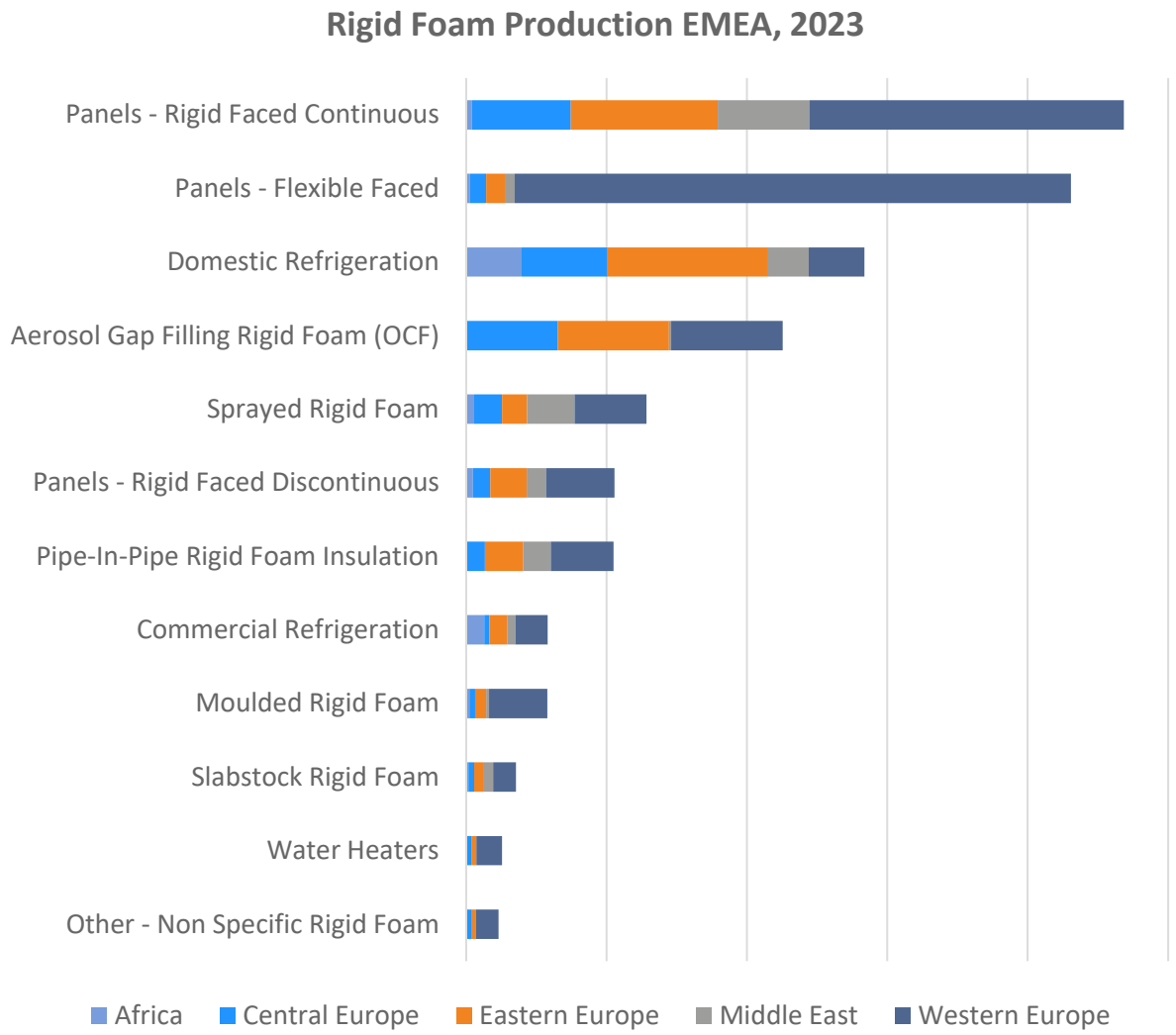
EMEA – Flexible Foam

- Production of flexible foam contracted by 1.7% in EMEA
- Production volumes very similar for flexible foam and rigid foam (approximately 33% each of the total PU market)
- Western Europe remains largest producing sub-region, followed by Eastern Europe and Central Europe
- Share of standard polyether foam remains highest (55%)
- Majority of slabstock is produced for upholstered furniture, followed by bedding and transportation
- Turkey is now the largest producing country
- Comfort market struggled in 2023; automotive segment is recovering
- Market expected to show small recovery in 2024



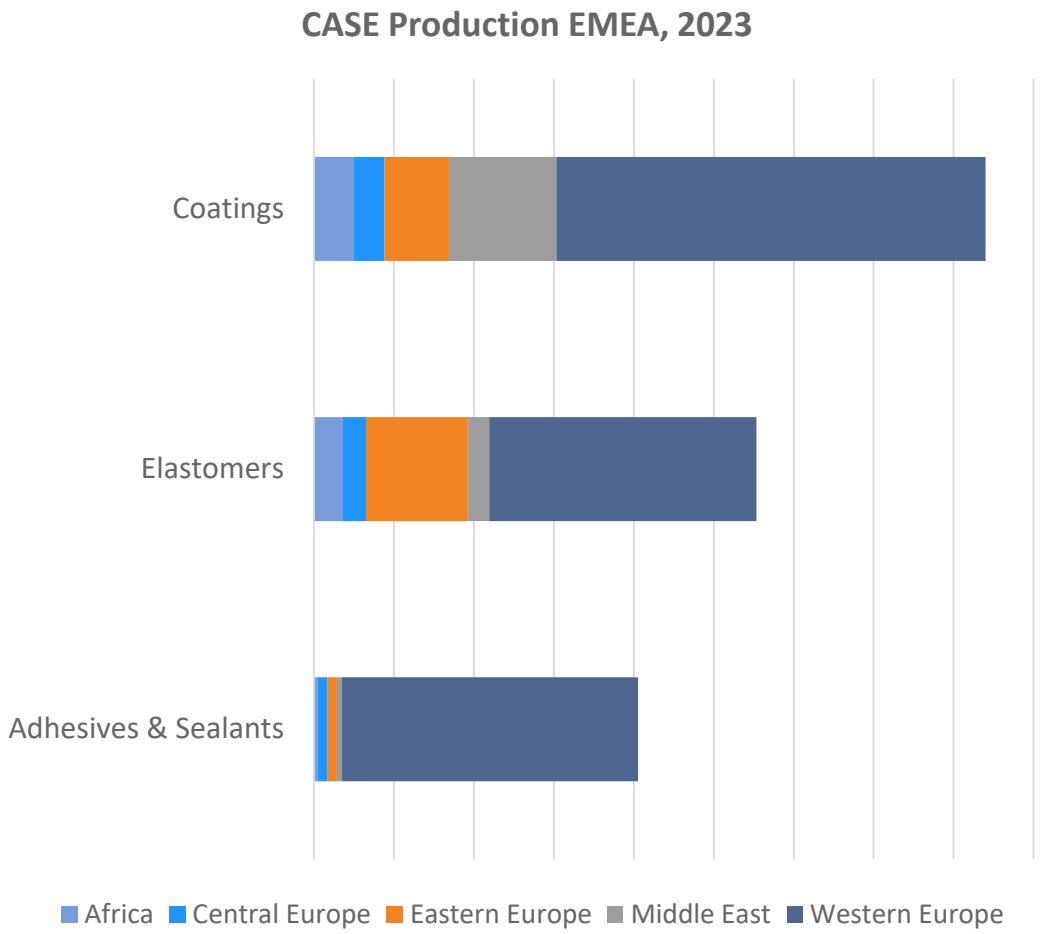
EMEA – Rigid Foam

- Total production in the EMEA in 2023: 1.95 million tonnes
- Strong differences in growth rates between countries and regions
- Strong growth in the Middle East, challenging situation in Western and Central Europe
- Market in Middle East and Africa still underdeveloped
- Rigid-faced continuous panels remain the largest segment, followed by flexible-faced panels (boardstock)
- Production expected to remain flat/slight decline in 2024, and slow growth is expected from 2025
- Decline for flexible-faced panels particularly high in Western Europe.



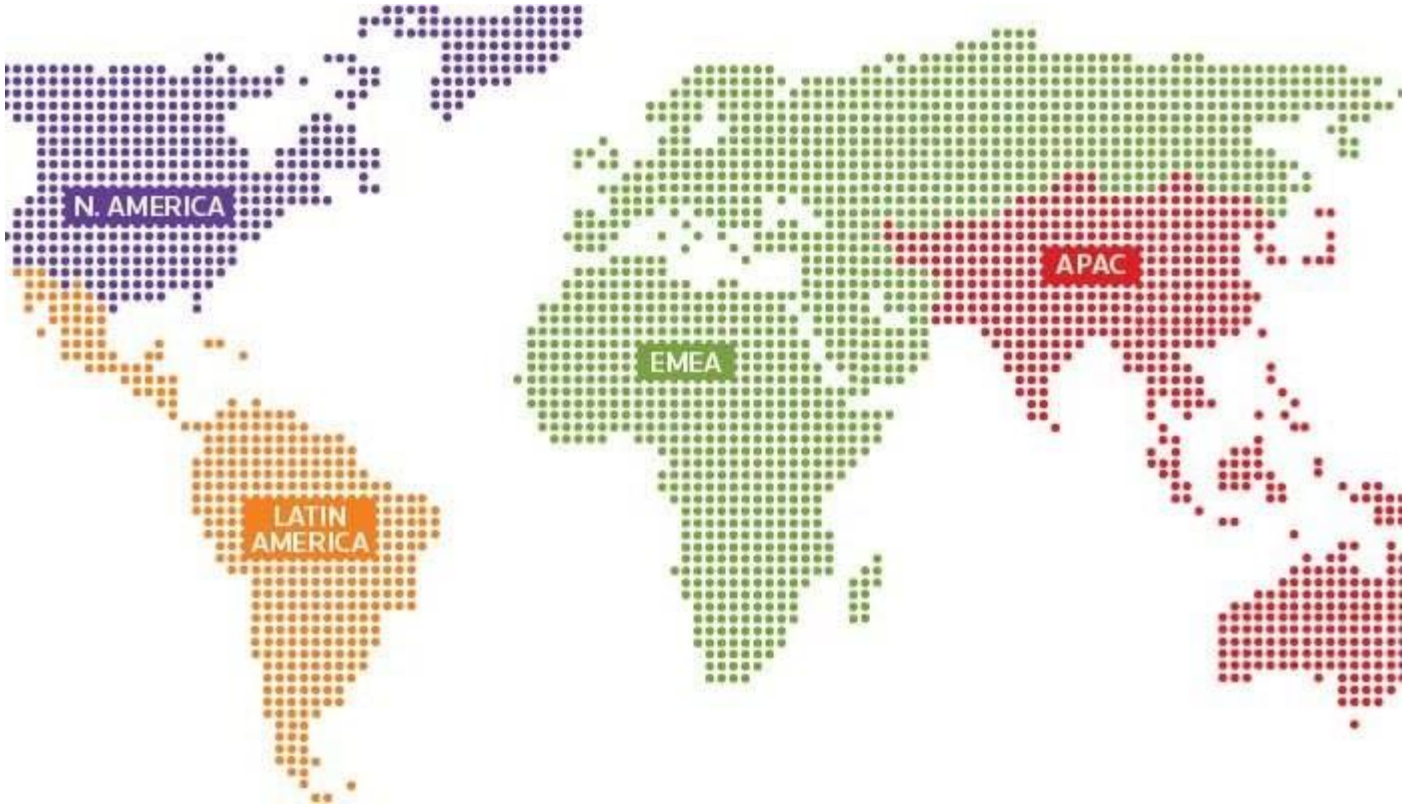
EMEA – CASE

- CASE market reached a production volume of 1.8 million tonnes in 2023
- Production output declined by 2.9% in 2023, moderate growth (<1%) expected for 2024
- Coatings largest product segment, followed by elastomers
- Western Europe remains by far the largest producing sub-region within EMEA (69%)
- Good potential for Middle East and Africa
- Share of hybrid products increases, especially in the coatings segment
- Final segment = Binders; down 5.4% in 2023



Regional Overview

APAC

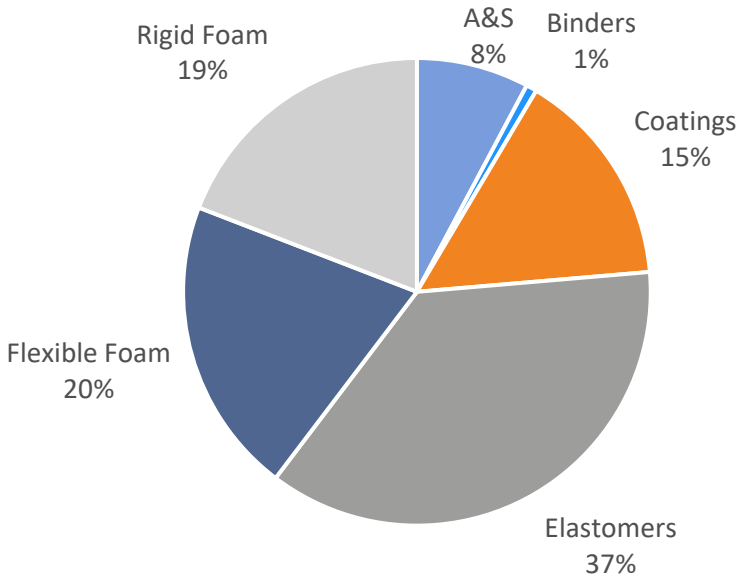


Market Trends – Asia Pacific

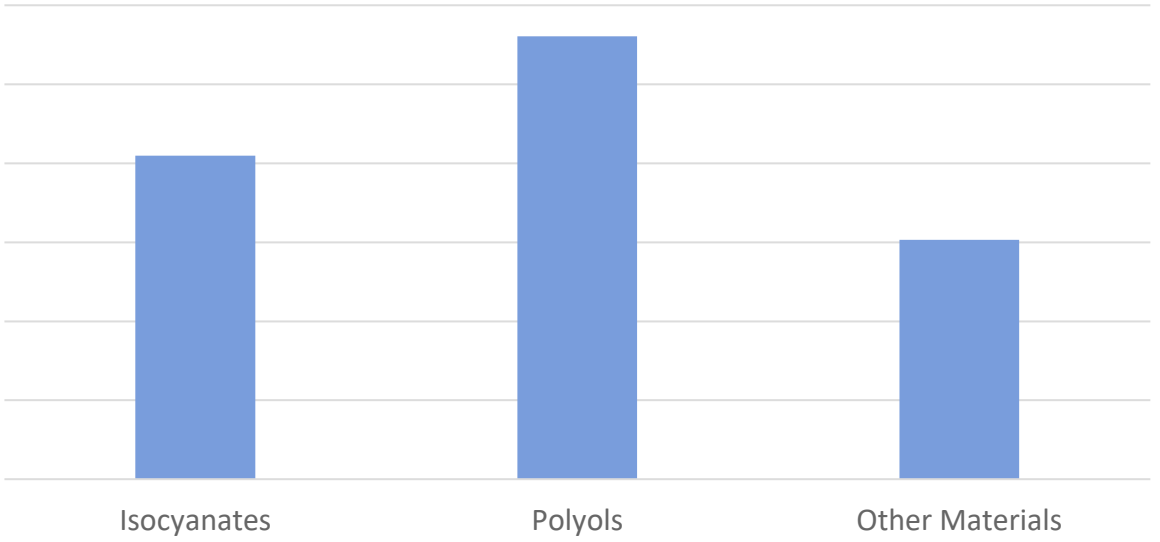
- The production output in APAC increased by 1.5% in 2023 to 12.9 million tonnes
- Low growth expected in 2024; better recovery in 2025
- Elastomers are largest product group (38%)
- Flexible and rigid foam each have around 20% market share
- China accounts for 75% of production in APAC, followed by India, South Korea and Japan

- The APAC consumption of MDI and TDI was 2.02 million tonnes and 900,000 tonnes, respectively, in 2023
- +1.6% for pMDI, +3.7% for mMDI and -3.5% for TDI in 2023
- Elastomers and rigid foam showed best growth in 2023

APAC Production by Type, 2023

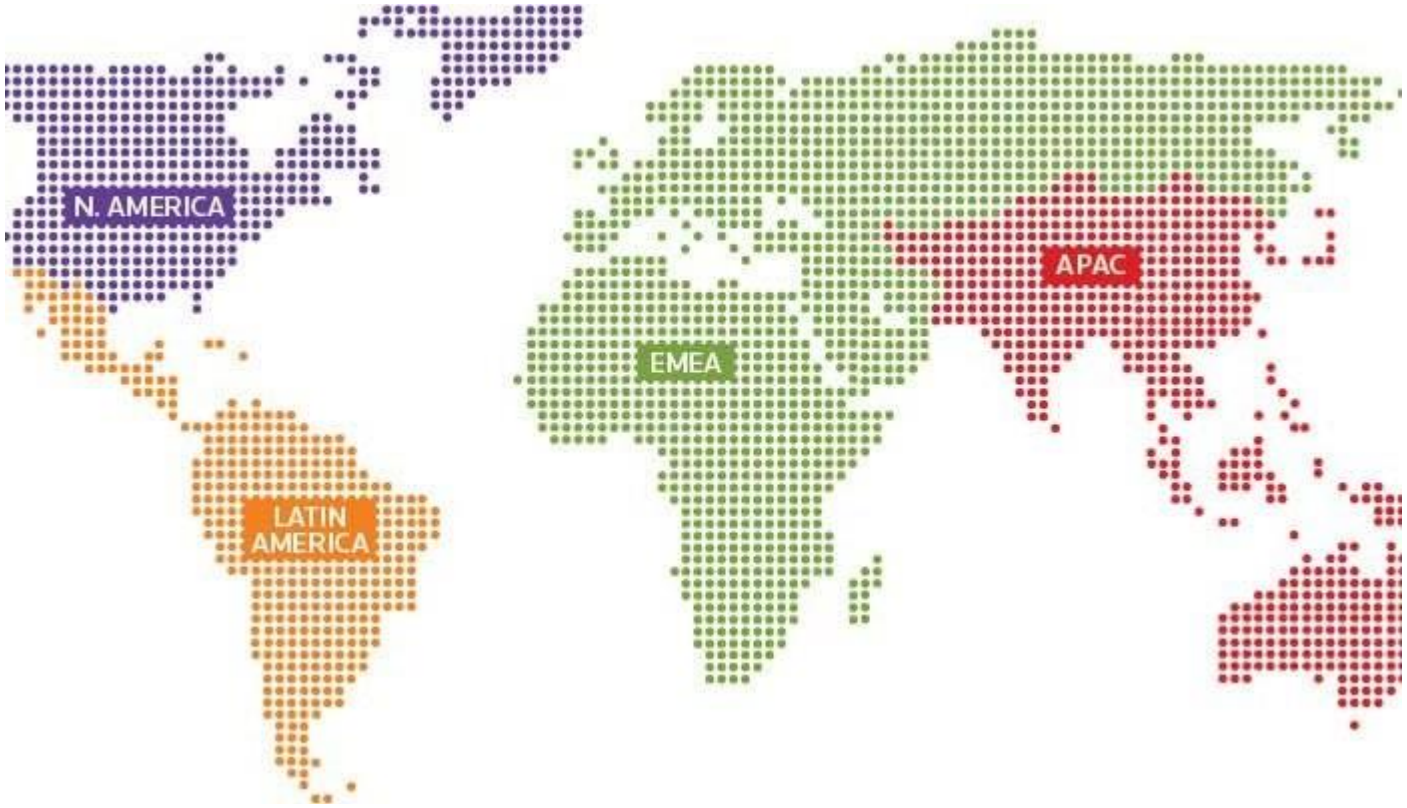


APAC Raw Material Consumption, 2023



Regional Overview

AMERICAS

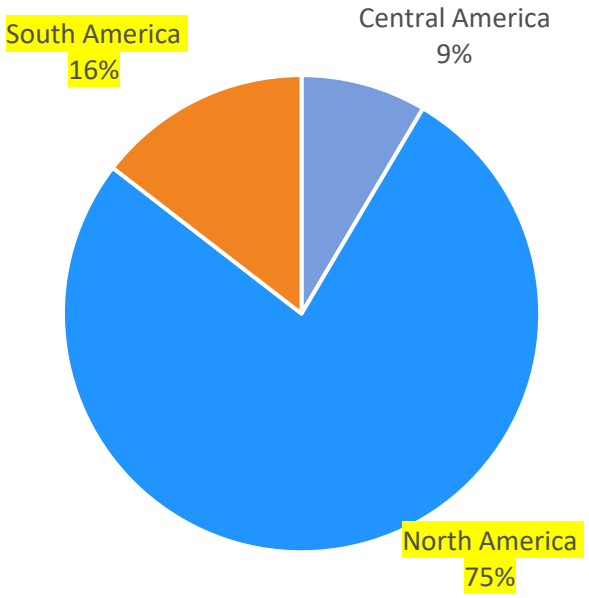


Market Trends – The Americas

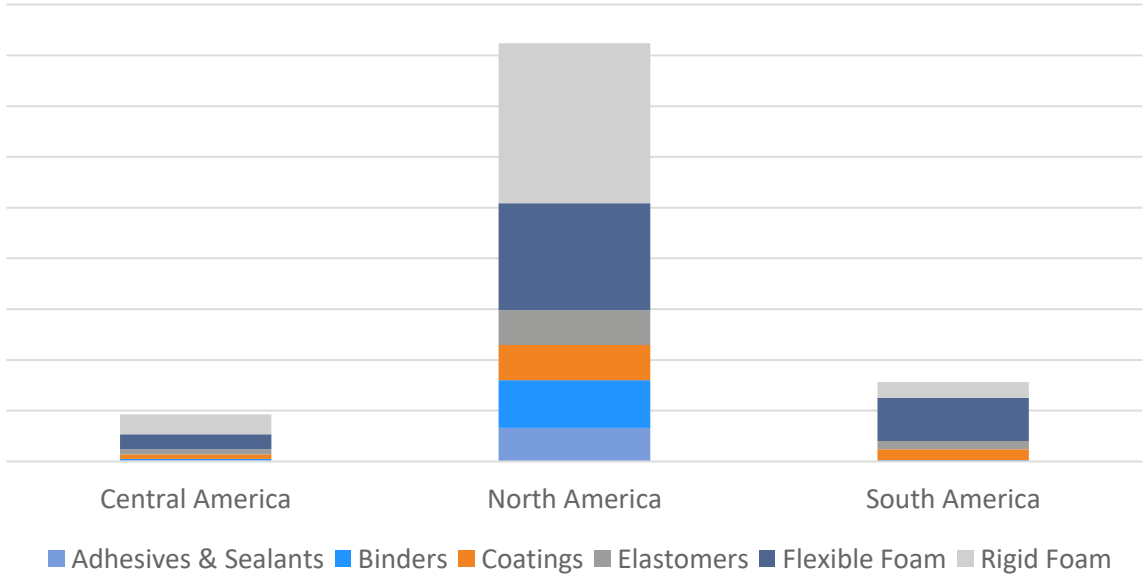
- Overall production in the Americas declined 3.7% in 2023 to 5.1 million tonnes
- US largest producer in the region at ~70% share
- Brazil and Mexico are also large producing countries (~10% each)
- Declines in Argentina, Canada and US in 2023
- 2024 expected to be better; IAL forecasting +2.7%

- Large decline in rigid foam in 2023 at -8% due to destocking and construction downturn
- Automotive recovery helped flexible foam – the drop was just 1.5%
- Best performance in coatings and elastomers
- Demand for renewable materials continues to grow

PU Production Americas, 2023



PU Production by Product in the Americas, 2023



Country Spotlight

TURKEY

Spotlight on Turkey

Market Data

Turkey Production of Polyurethane

Product Type	Production 2023 (Tonnes)
Adhesives & Sealants	8,600
Binders	1,400
Coatings	59,900
Elastomers	106,500
Flexible Foam	220,300
Rigid Foam	243,600
Total	**640,300**

- Turkey is part of IAL's 'Eastern Europe' region
- Production growth was 1.5% in 2023
- IAL is forecasting growth of 2.7% for 2024

Trends

- Turkey is integral to the polyurethane industry of the EMEA region; sits at the crossroads of Europe and Asia
- Turkey has leapfrogged Poland to become EMEA's largest producer of flexible foam – presence of strong domestic producers
- It is also the largest manufacturer of rigid foam – key strengths in refrigeration foam and panels
- Overall, only Germany produces more polyurethane than Turkey
- There was strong growth in 2023 in flexible foam for automotive seating, commercial vehicle seating, furniture components and bedding
- Growth was also above 5% for auto coatings, flexible-faced panels and spray foam
- There were some difficulties in the sectors of textiles, synthetic leather and footwear
- Raw materials: No local production of aromatic or aliphatic isocyanates; some polyol production, limited to polyester types
- Very good availability of locally made systems

PU – Versatility & Sustainability

TRENDS

Polyurethane – Versatility and New Applications

Incredibly versatile

- The versatility of PU allows it to be formulated as both a flexible and rigid foam, and in various CASE products
- Uses range from cars to refrigerators, from footwear to mattresses, from construction to clothing, and much more besides
- Polyurethane offers strength, elasticity and durability
- It can be adapted to solve a variety of problems, be moulded into unusual shapes, and add comfort and convenience to our lives

Growth opportunities

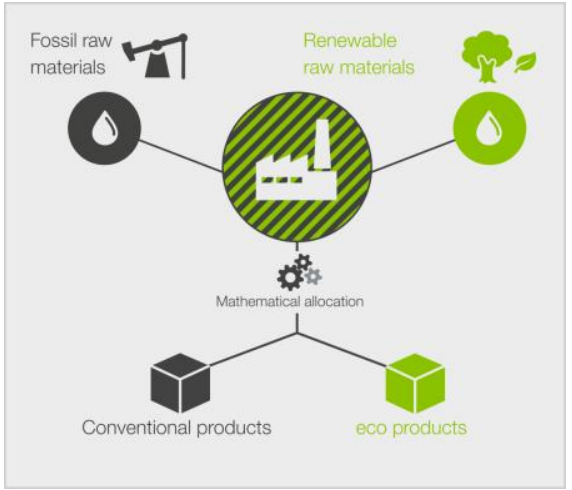
- Rigid polyurethane foam is growing in geotechnical applications for soil stabilisation and concrete lifting
- Concrete coating and deck waterproofing is another growth area
- The soaring production of electric vehicles is bringing many opportunities for PU (including TPU) in new areas such as battery packs, lightweighting, films and charging infrastructure
- Medical uses
- TPU as cured-in-place piping for potable water and sewer repair

Polyurethane - Sustainability

True circularity could be 20-25 years away, but much progress has been made and the journey continues. The current focus is on reducing the carbon footprint of PU. However, a delicate economic balance still exists between the desire for circularity and the willingness to make the necessary investment.

Raw Materials

- Polyols based on recycled PET
  - Proven legacy – up to 60% recycled waste
  - Aromatic polyester polyols for rigid foams – fire retardation, compressive strength, low cost
- Bio-based polyols
  - Soybean oil, palm oil, castor oil, cashew nutshell liquid, rapeseed oil – can be difficult to engineer
  - Starch, lignin, acids
- CO2 polyols
  - Early stage; some processing issues
- Bio-based feedstocks, e.g. bio-adipic acid, bio-based diols
  - Drop-in replacements
- Mass balance isocyanates and polyols
  - Chain of custody approach
  - Immediate use in existing formulations with no changeover

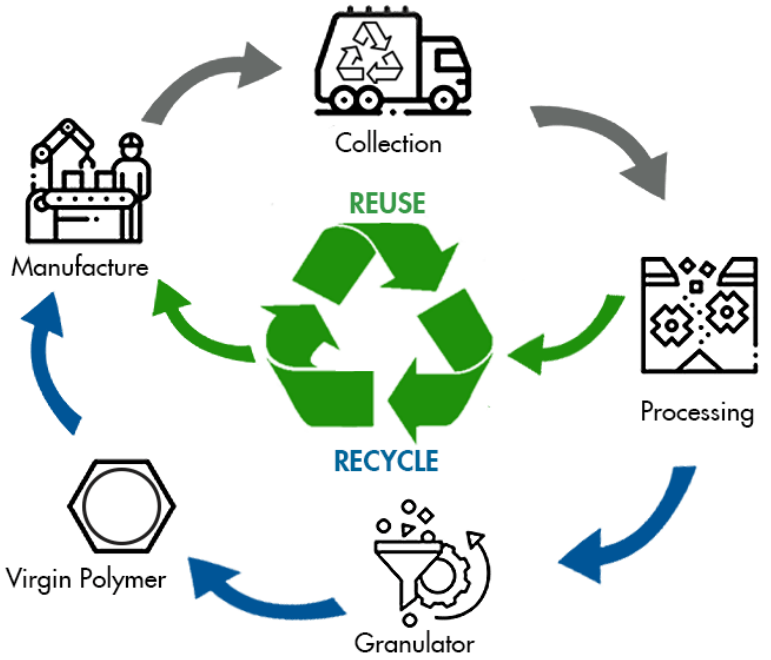


Polyurethane – Sustainability - Continued

PU enhances the durability of many products, keeping them out of landfill for longer. It also contributes to the energy efficiency of buildings, vehicles and appliances, among others. However, the desire to recycle has never been stronger.

Recycling

- Polyurethane recycling – **mechanical** (post-consumer and post-industrial waste)
  - Rebond foam
    - Carpet backing/underlay
    - Acoustic insulation
    - Athletic mats
  - TPU
- Polyurethane recycling – **chemical** (hydrolysis, glycolysis and other)
  - One known plant in the US, several in Europe
  - Recycled polyols – some commercially available already, led by Europe
    - Can replace up to 50% of virgin polyol
- Energy recovery
- Extended producer responsibility
  - Product stewardship in areas such as cars, mattresses and appliances
  - Mattress recycling program in the US: 4 states already signed up
  - EPR for mattresses – Belgium, France, Netherlands already operate schemes



Thank you

www.ialconsultants.com

Katie Tofts ktofts@brggroup.com +44 20 3882 1780