



# PACKALL

PackAlliance:  
European alliance for innovation training  
& collaboration towards future packaging

## Linking **Academy** to **Industry**.

**Training program: New materials and biomaterials**

**Characteristics of new materials and biomaterials,  
and their types and uses (part 1)**



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## **Module: New materials and biomaterials**

# **Topic: Characteristics of new materials and biomaterials, and their types and uses (part 1)**

### **TABLE OF CONTENTS**

- 1. Introduction**
- 2. Types of plastics**
- 3. European and world plastic industry**
- 4. Plastics demand**

## 1. Introduction

Plastics are an immense family of unique and versatile materials.

The very first plastic material was invented in the middle of the 19th century and since then, based on their illimited innovative potential, plastics have shaped the world and continue to offer sustainable solutions to our fast-changing needs.

Still today, most plastic materials are fossil based and are produced from oil or gas. However, in the long term, plastics production should decouple from fossil feedstock.

# Types of plastics

## Thermoplastics

- Polyethylene (PE)
- Polypropylene (PP)
- Polyvinyl-chloride (PVC)
- Polyethylene Terephthalate (PET)
- Polystyrene (PS)
- Expanded polystyrene (EPS)
- ABS
- SAN
- Polyamides (PA)
- Polycarbonate (PC)
- Poly methyl methacrylate (PMMA) T
- thermoplastic elastomers (TPE)
- Polyarylsulfone (PSU)  
Fluoropolymers
- PEEK
- POM
- PBT
- EVOH
- Etc.

## Thermosets

- Polyurethane (PUR)
- Unsaturated polyesters
- Epoxy resins
- Melamine resins
- Vinyl esters
- Silicone Phenol - formaldehyde resins
- Urea - formaldehyde resins
- Phenolic resins
- Acrylic resins
- Etc.

# Key figures of the European plastic industry

- Jobs 

Over 1,5 milion  
people

- Turnover 

More than 350  
billions euros

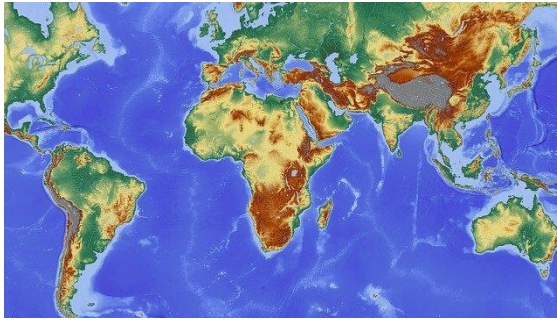
- Companies 

55000 comapnies

- Trade Balance 

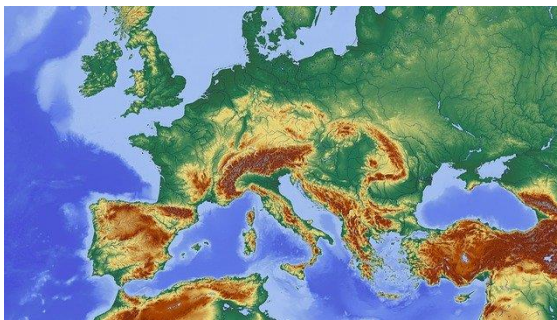
13 billions euros

# World and EU plastics production data



<https://pixabay.com/>

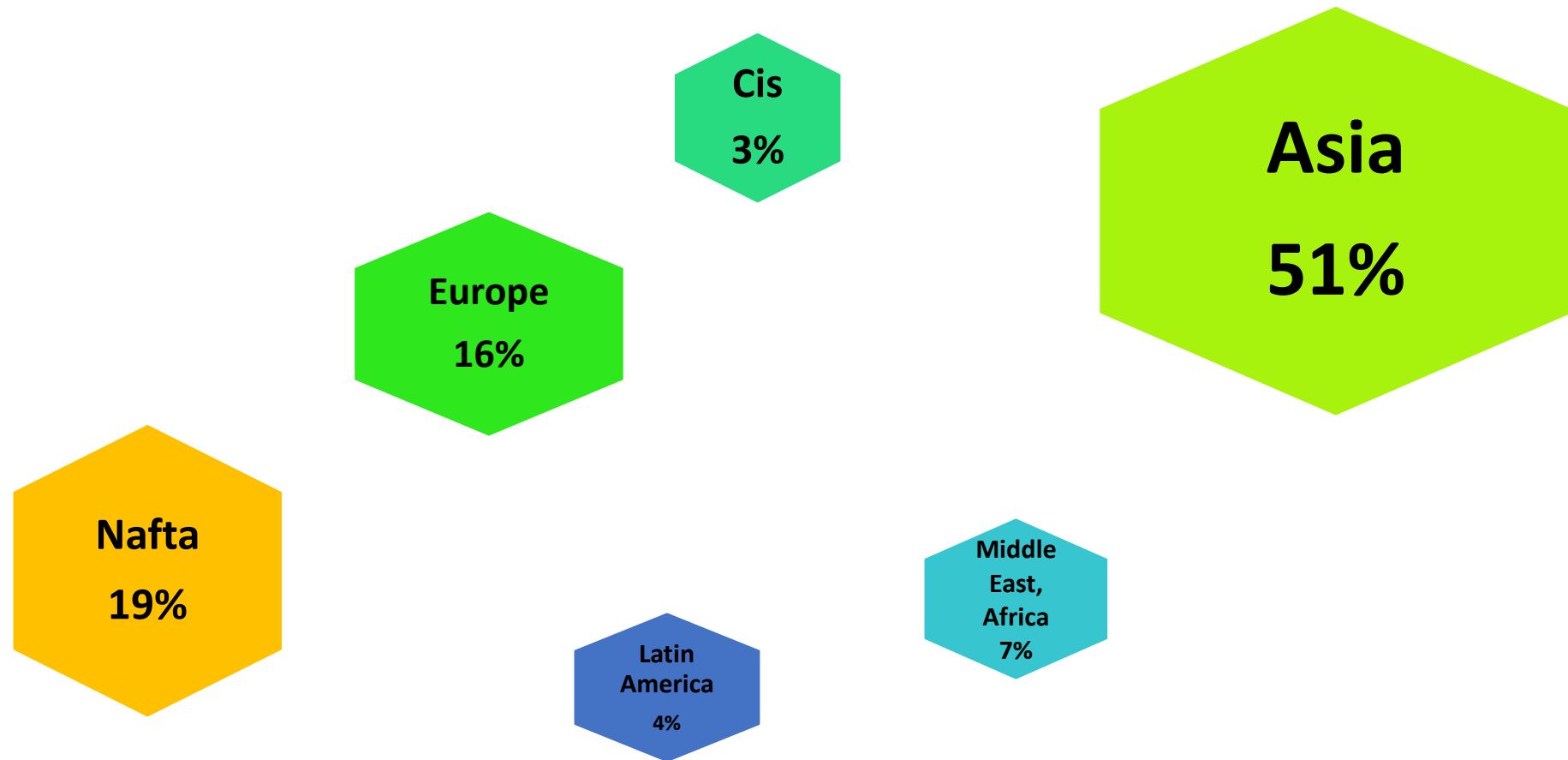
**World** 359 milion tonnes (2018)-> 368 (2019)



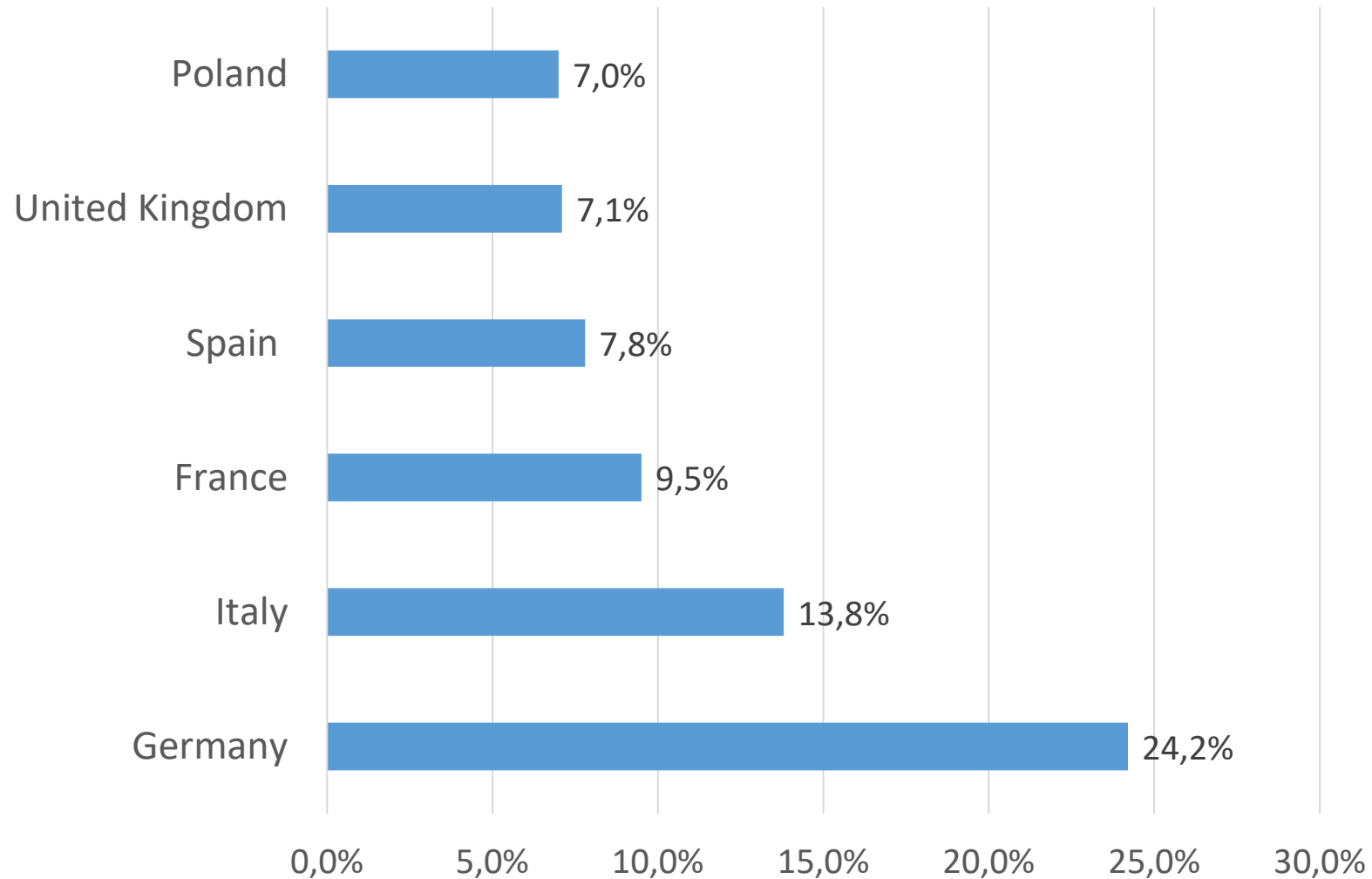
<https://pixabay.com/>

**Europe** 61.8 milion tonnes (2018)-> 57.9 (2019)

# Distribution of global plastics production



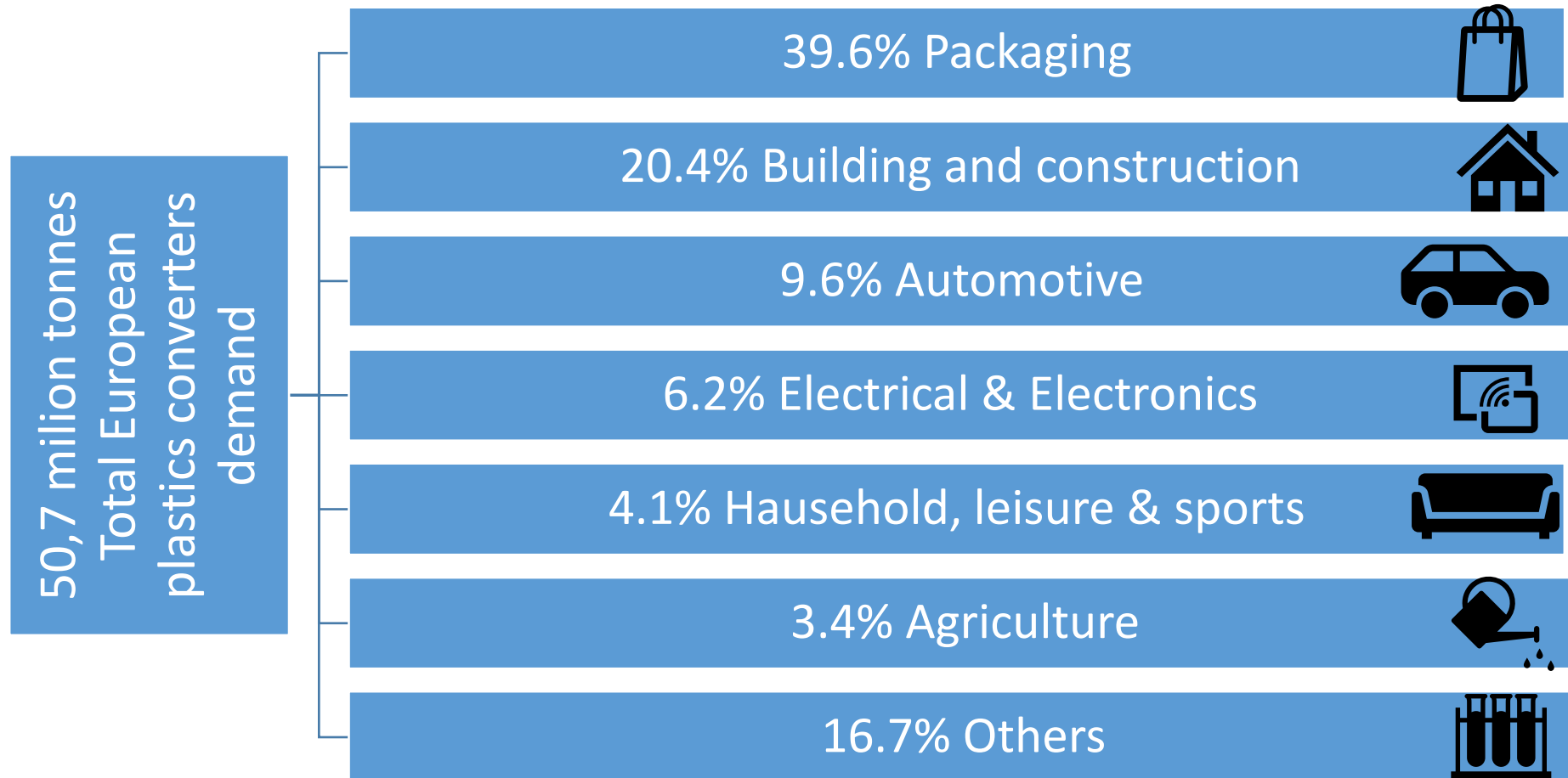
# Plastics demand in selected countries 2019



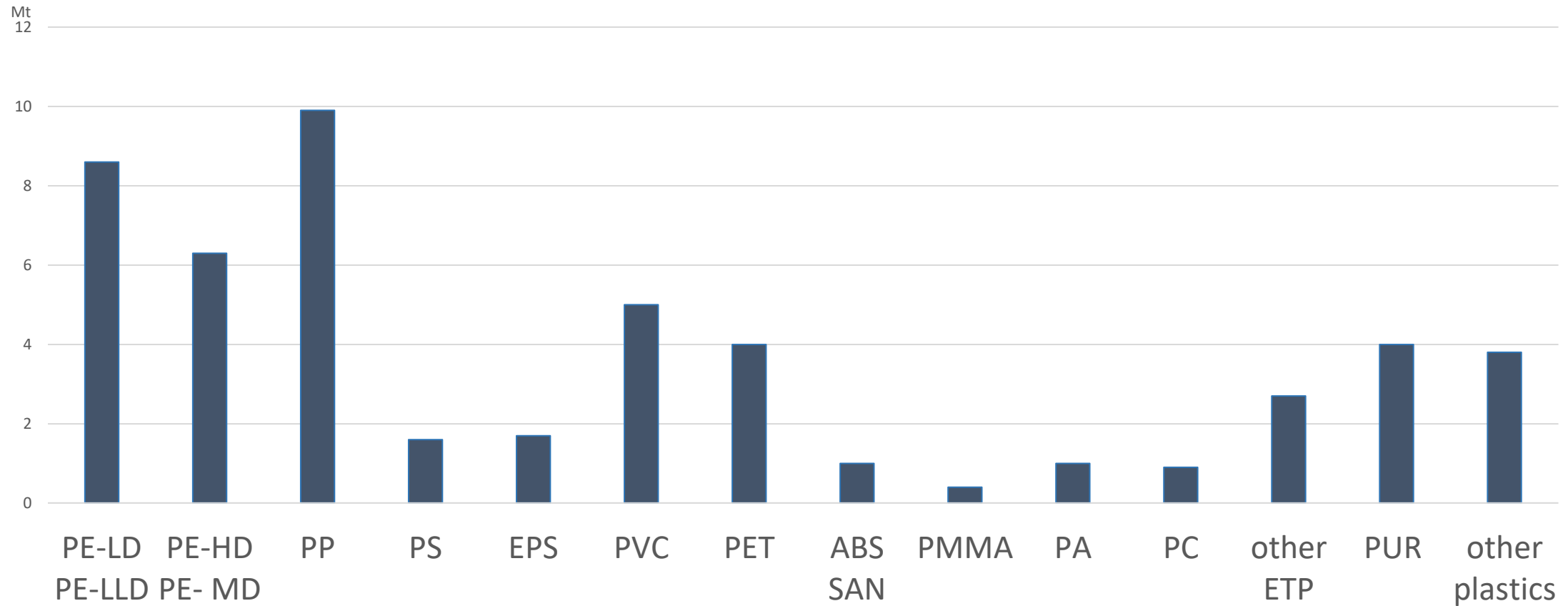
Plastic demand  
in Europe -  
50,7 milion  
tonnes



# Plastics demand by segments 2019

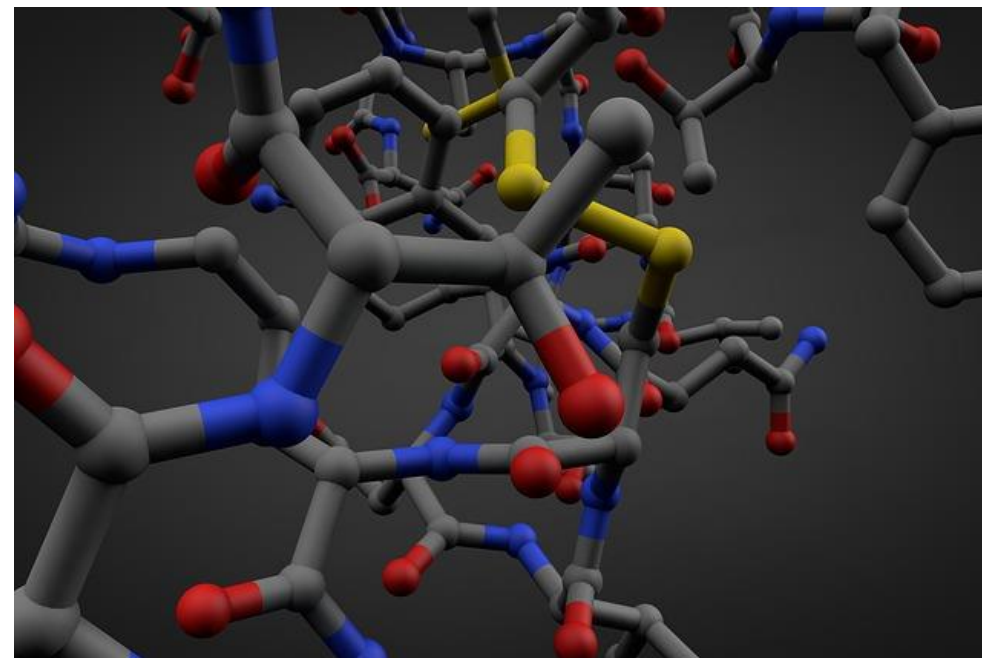


# Plastic demand by resin type 2019



## Summary

The family of plastics is huge and extremely diverse, which translates into their properties, which differ significantly depending on the type of plastic. Hence, knowledge of physical, mechanical and chemical properties is essential for the proper selection of materials for a specific application.



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