



This project is co-funded by  
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## Technical Assistance for Assessment of Turkey's Potential on Transition to Circular Economy

EuropeAid/140562/IH/SER/TR

# Turkish Packaging Sector Efforts on Environmental Sustainability

Aslıhan Arıkan – Turkish Packaging Manufacturers Association (ASD)

Activity 1.2.1. Circular Economy Training  
13th May 2022 - Antalya, Türkiye

# Turkish Packaging Sector Works on Environmental Sustainability



Compiled & Presented by  
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Secretary General

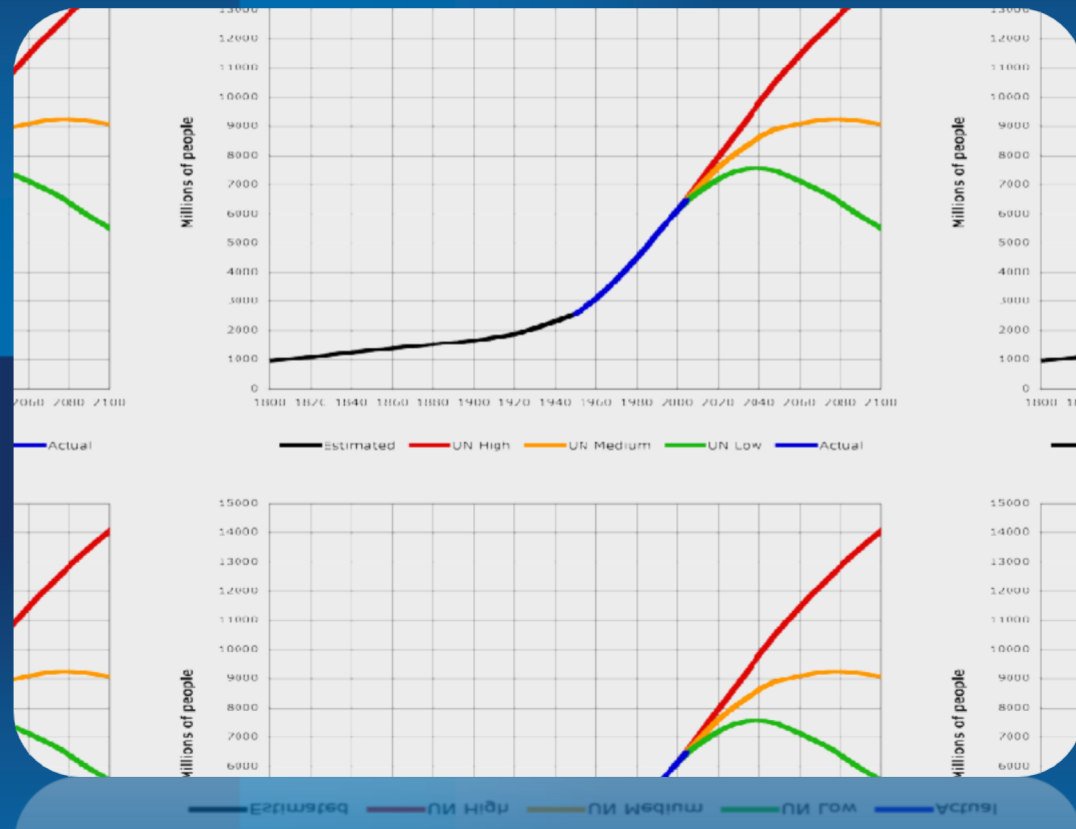
13 May 2022  
«DEEP Project – Circular Economy Training»  
Belek-Antalya



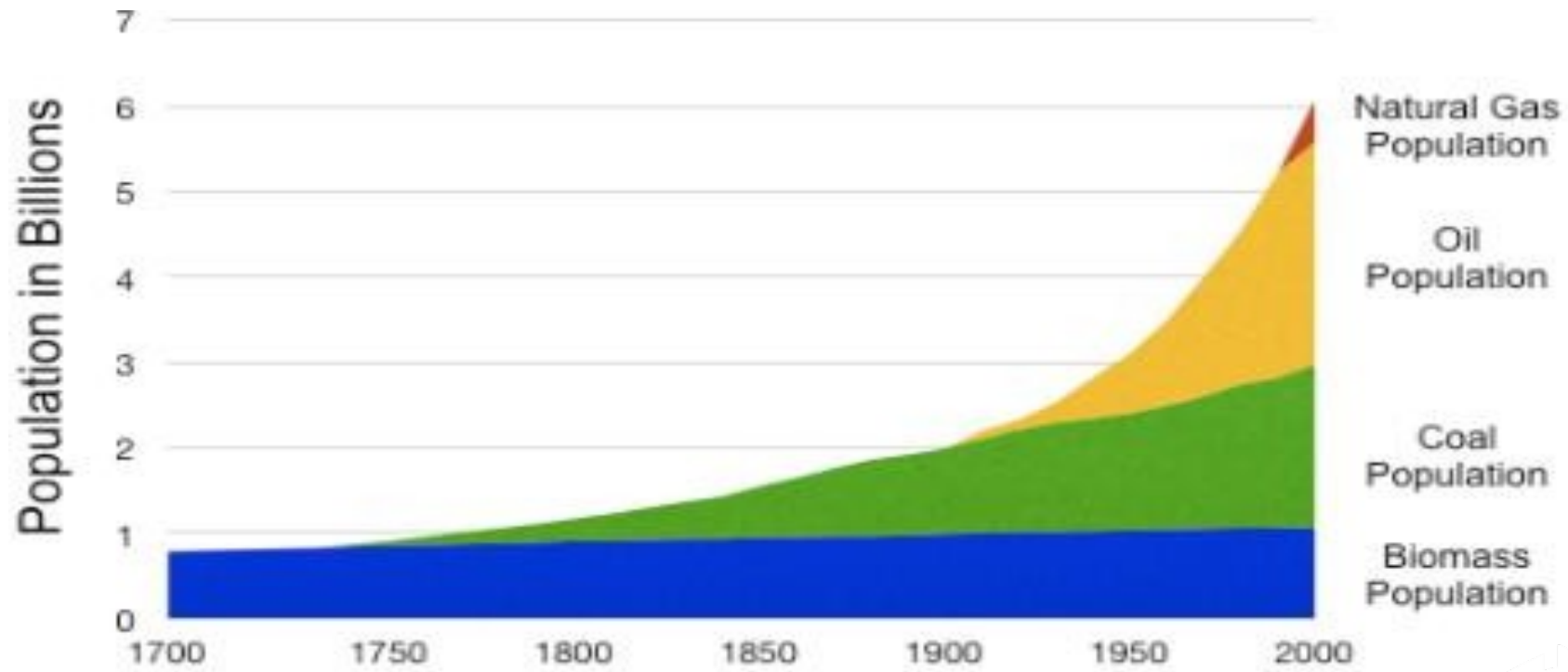
# Content

- Environmental Sustainability
- Linear & Circular Economy
- Waste Hierarchy
- Reduction & Renewables
- Recycling, Plastics & Environment
- Turkish & Global Packaging Industry Statistics
- Sustainable Development Goals
- Conclusion & Future Sustainability

# Global Human Population Shock



# Natural Resource Consumption against Time

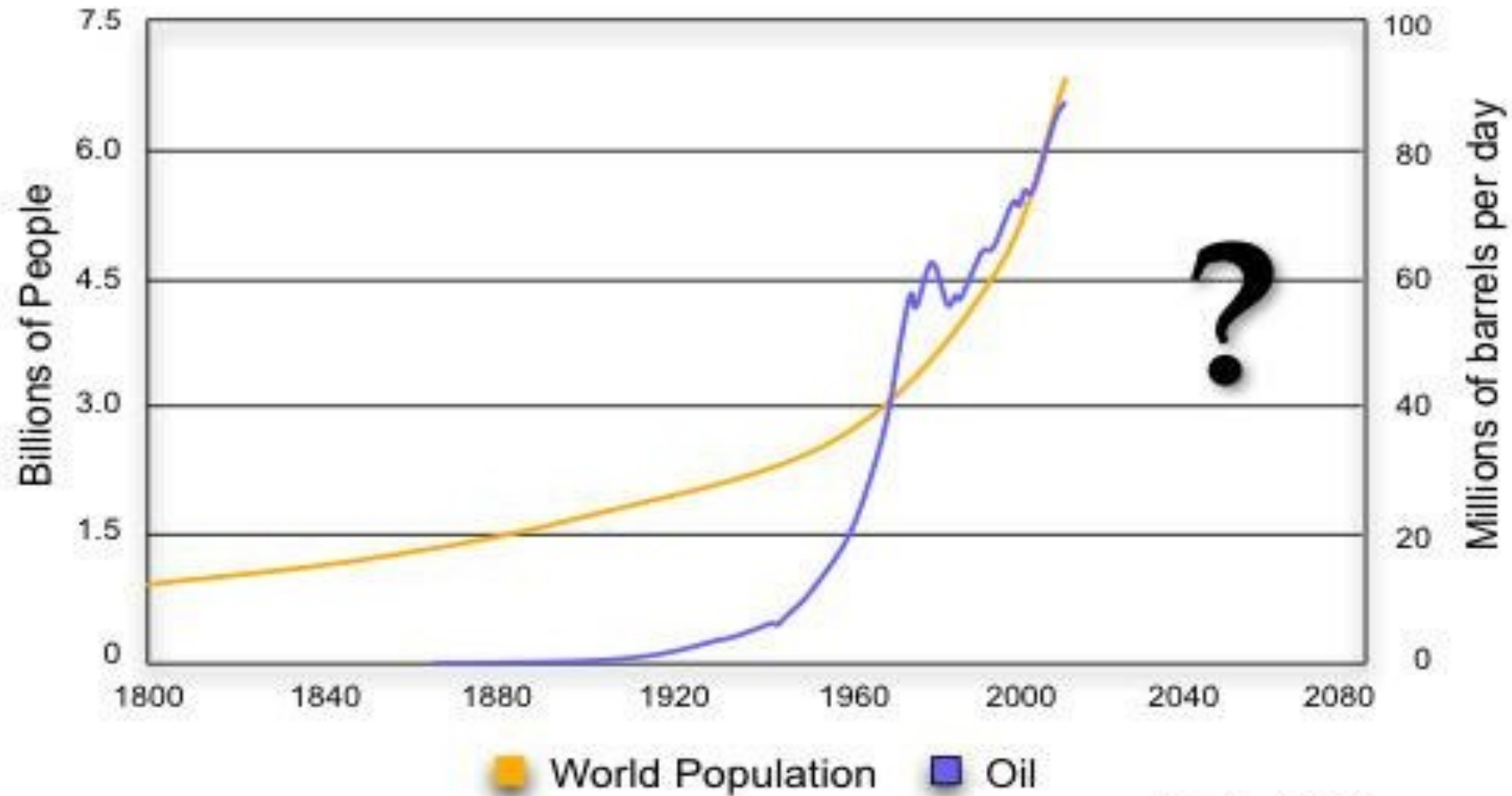


Data: Population and Energy, Graham 2004  
Graph: PostPeakLiving.com





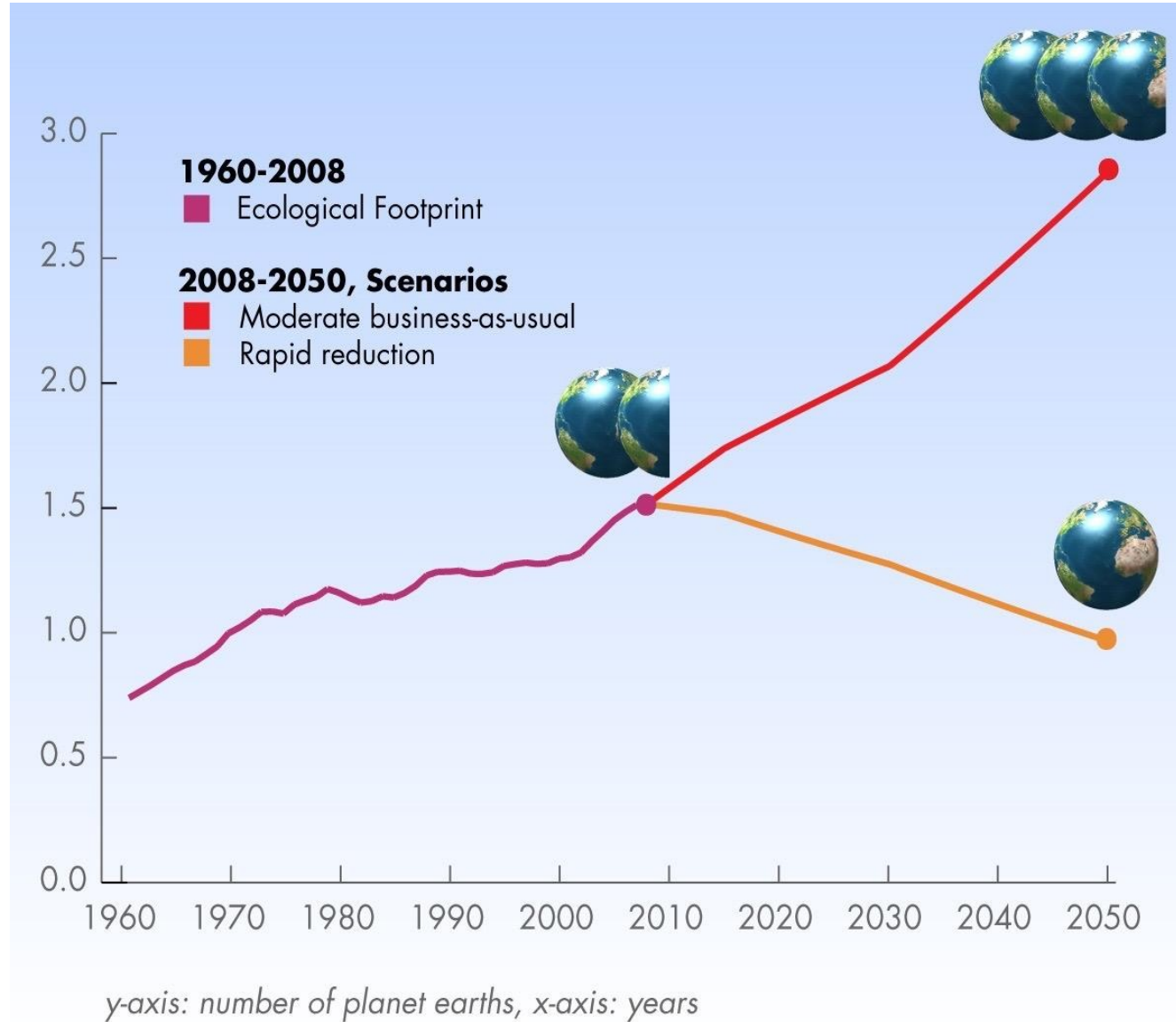
# Population and Oil Consumption

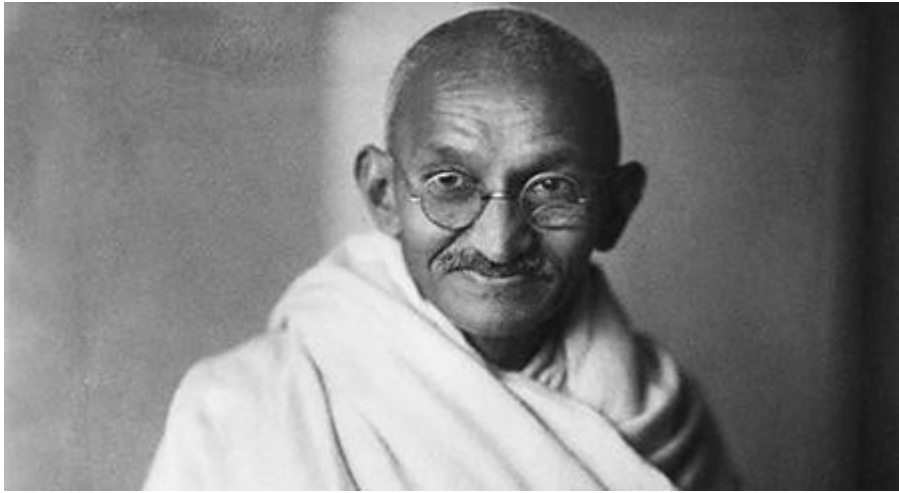


[www.PostPeakLiving.com](http://www.PostPeakLiving.com)  
Data from U.N., BP Statistical Review



More planets necessary





“There is enough on the planet  
for everyone’s need, but not  
enough for everyone’s greed”

MK Gandhi



# The Limits to Growth

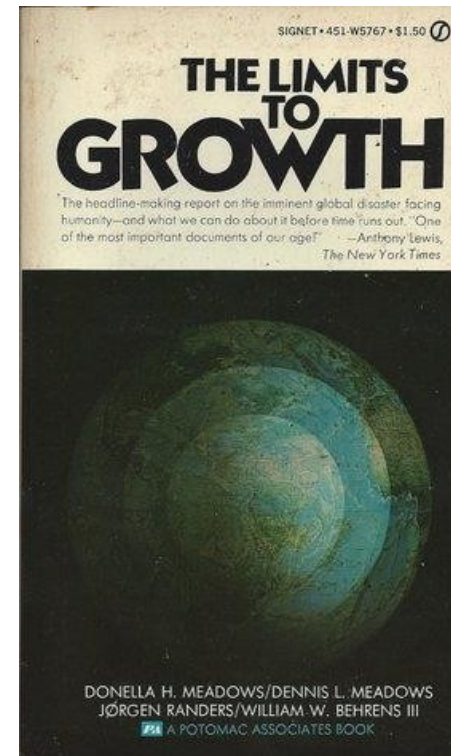
A group of manufacturers and intellectuals requested a research from M.I.T. Researchers. The book was written in 4 years and published in 1972 in USA.

5 variables;

- Population growth rate,
- Food production,
- Industrialization speed,
- Environmental pollution and
- Speed of consuming non-renewable natural resources

change as in those days, how will be the future of the World's economy?

According to this book;  
The economic growth in our planet will reach its limit in 60 years from today.



# How much raw materials we use?

- World has limited resources and disposal areas
- More than 90 billion tonnes of raw materials enter the economic system
- Around 60% of waste ends up in landfill.



Year	Used Raw Materials
1970	27 billion tonnes (27 Gigaton)
2017	89 billion tonnes (89 Gigaton)
2060	167 billion tonnes (167 Gigaton)

Source: OECD 2060 Raw Material Report, 2019

# From Linear Economy..



Current Economic Model **Take – Make - Dispose**

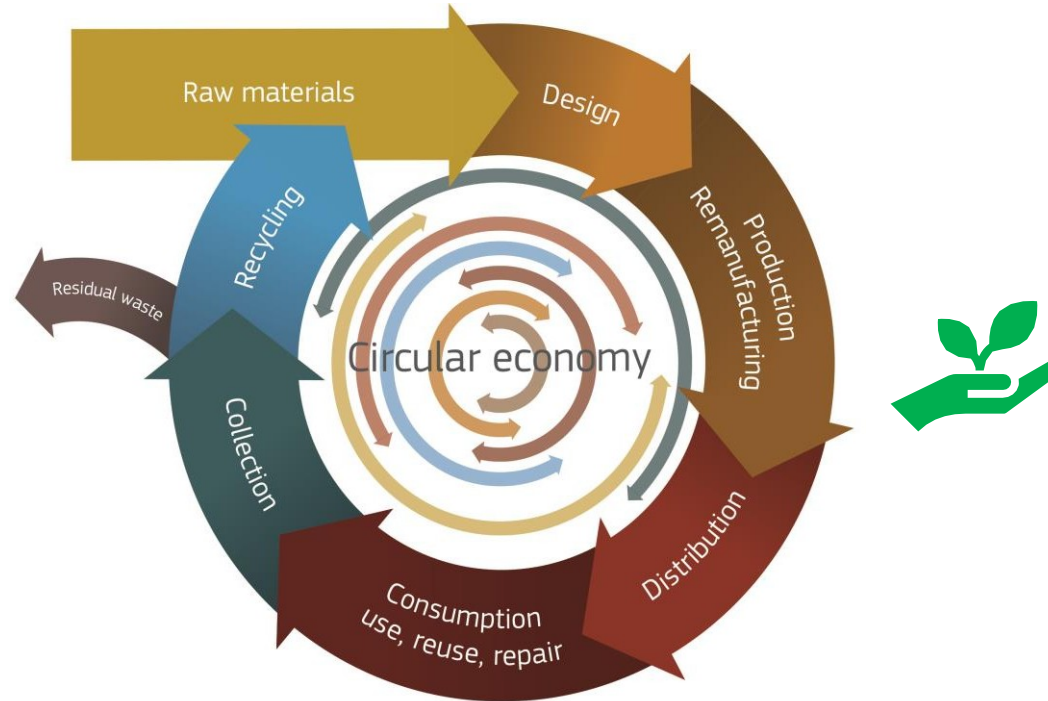




# To Circular Economy is inevitable.

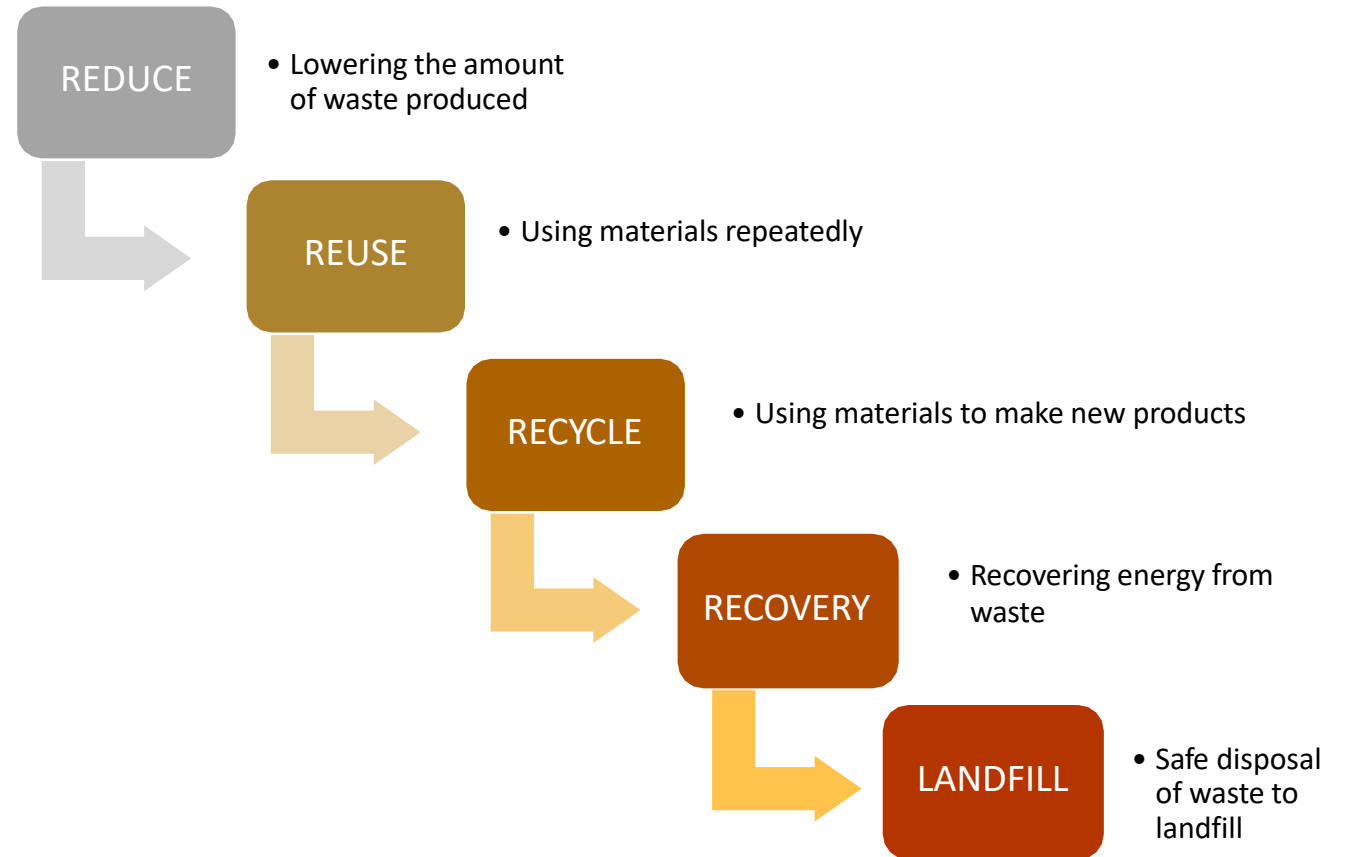


**Make – Use - Recycle**



# Waste Hierarchy

- Sets out most favourable to least favourable options for waste management;
- **Reduction, Reuse** and **Recycling** are most favoured options – fitting for the circular economy.



# Prevention

- Fewer *Raw Material* = Lower *Energy* consumption
  - Positive contribution to **Economy**
- Less *Fuel* consumption during transportation
  - Less **Greenhouse** gas emission
- Cheaper Products placing on the market
  - Positive contribution to the purchasing power of the **Consumers**





## Prevention of Packaging Waste

Remove  
Packaging

Reduce  
Packaging

# Remove Packaging

## Key initiatives

- No Packaging / bulk shopping



## Opportunities

- Value for money
- Little waste



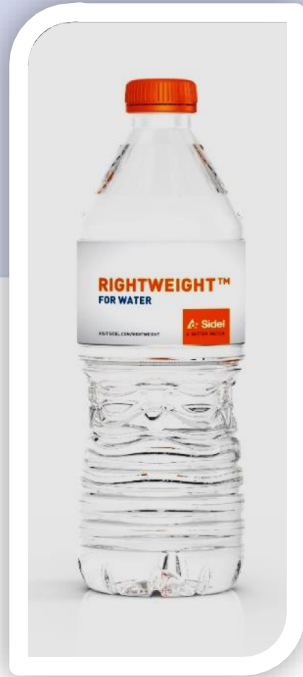
## Risks

- **Low product preservation**
- **Low consumer convenience**
- **Low product choice**
- **Increased risk of food waste**

# Reduce Packaging

## Key initiatives

- Smaller/lightweight Packaging
- Lighter pack type
- Renewable/bio-based material



## Opportunities

- **Smaller packs: more suitable for on-the-go consumption**
- **Less product waste through portion control**
- **Lighter packs: lower logistical costs, higher brand image**

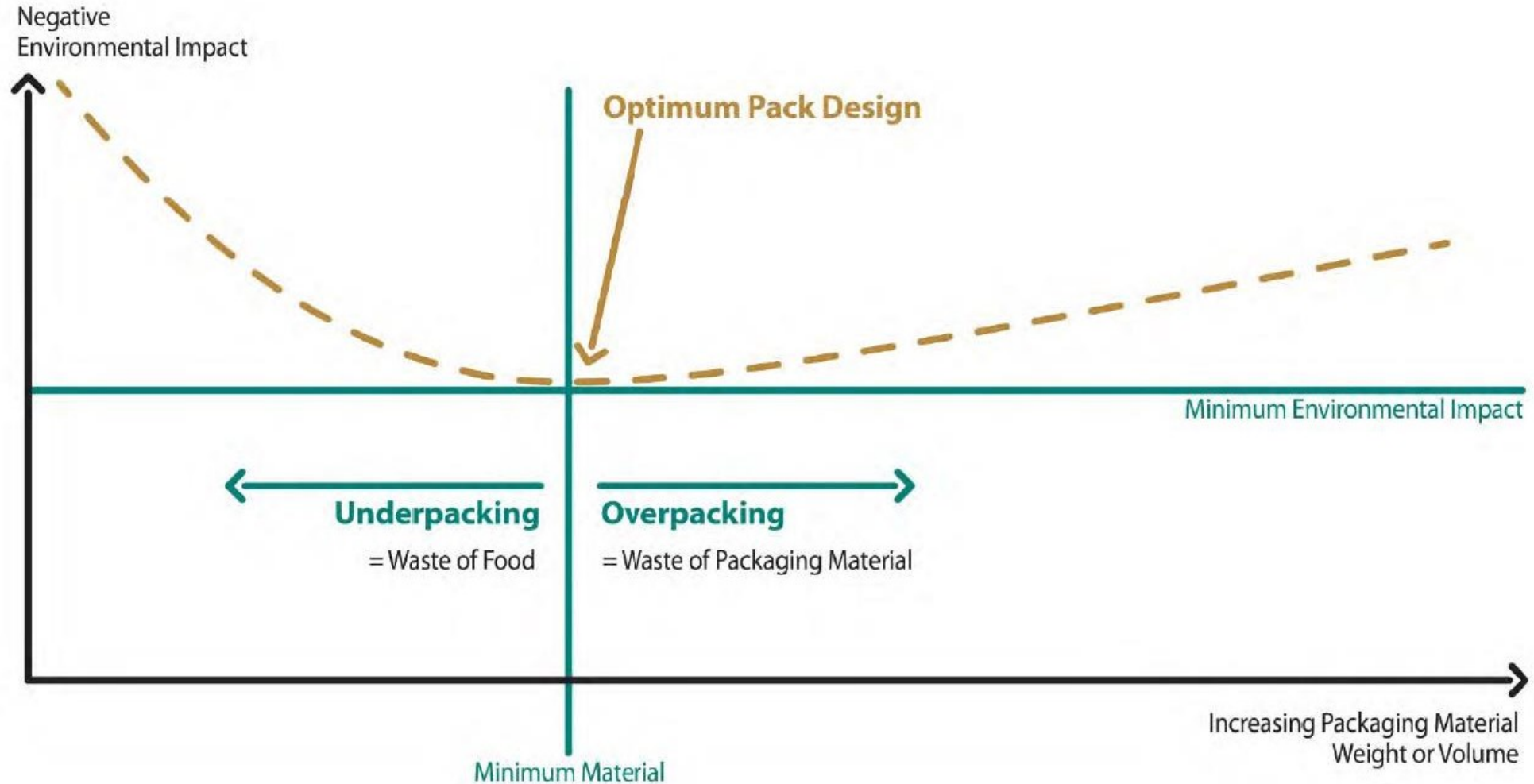


## Risks

- **Smaller packs: more frequent purchase**
- **Lighter packs: possibly lower physical properties of packaging**
- **Can be more difficult to identify and handle at recycling centers**

**Our purpose should be to develop high performance products with less material.**

# Underpacking as Danger



# Packaging as Solution

- Perform Life Cycle Analysis
- Don't forget Hygiene
- Trade-offs between food waste & packaging



- "As little as possible, as much as necessary"

# Reduction

## Green Technology



Elif - ElifHybr Hybrid Printing System

**No Solvent!**

## Lightweighting packaging



Şişecam – 20 cl Mineral Water Bottle,  
Glass,

**140 gr to 110 gr.**

## Lightweighting packaging



Özler – The Lowest Weight  
and High Strength 20 Liter  
Canister

**17% lightweighting**

## Refills / Reuse



Pınar - Yoghurt with  
Flowerpot Design

**Reuse**



# Renewable materials

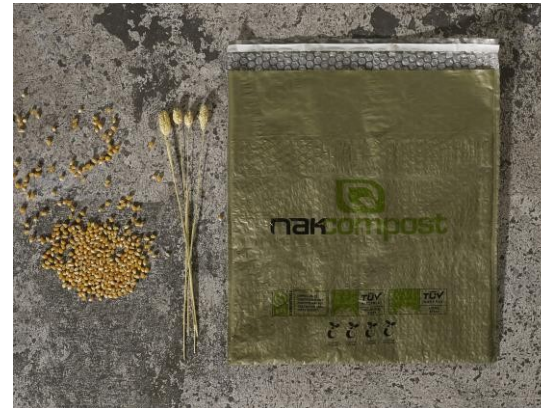
Biobased



ElifGreen – Renewable Resourced PE Packaging

**Sugar Cane**

Biobased



Naksan – Bubble Wrap Compostable Cargo Bag

**100% Bioplastic**

Alternative to Plastic



Rampak – Alternative to the Plastic Bubble Wrap, Online Shopping



Alternative to Plastic



Onurcan – Tip up Bag, 15 Lt Capacity

# Fact: Plastics have shaped the modern Civilisation!



## **JOBS**

**Over 1.6 million people**

The plastics industry gives direct employment to more than 1.6 million people in Europe



Packaged Goods have beneficially transformed the lives of People in the areas of Health, Professional Jobs, Urban Living, Technology and Convenience.



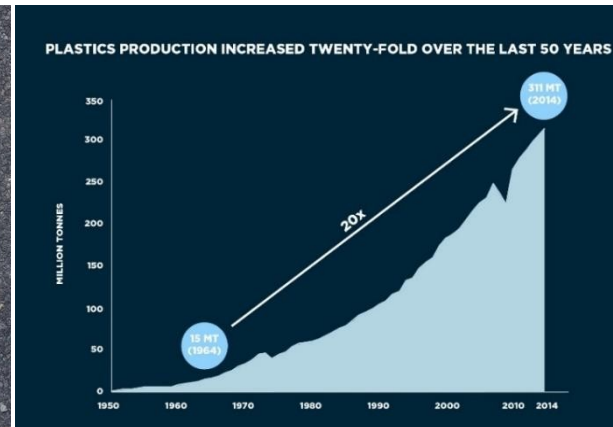
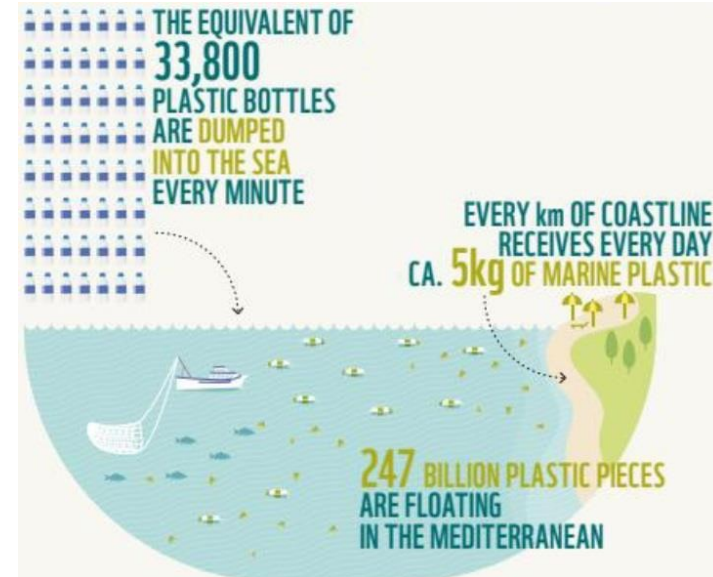
# Plastic demand by Sector

## Packaging is the biggest end-use market

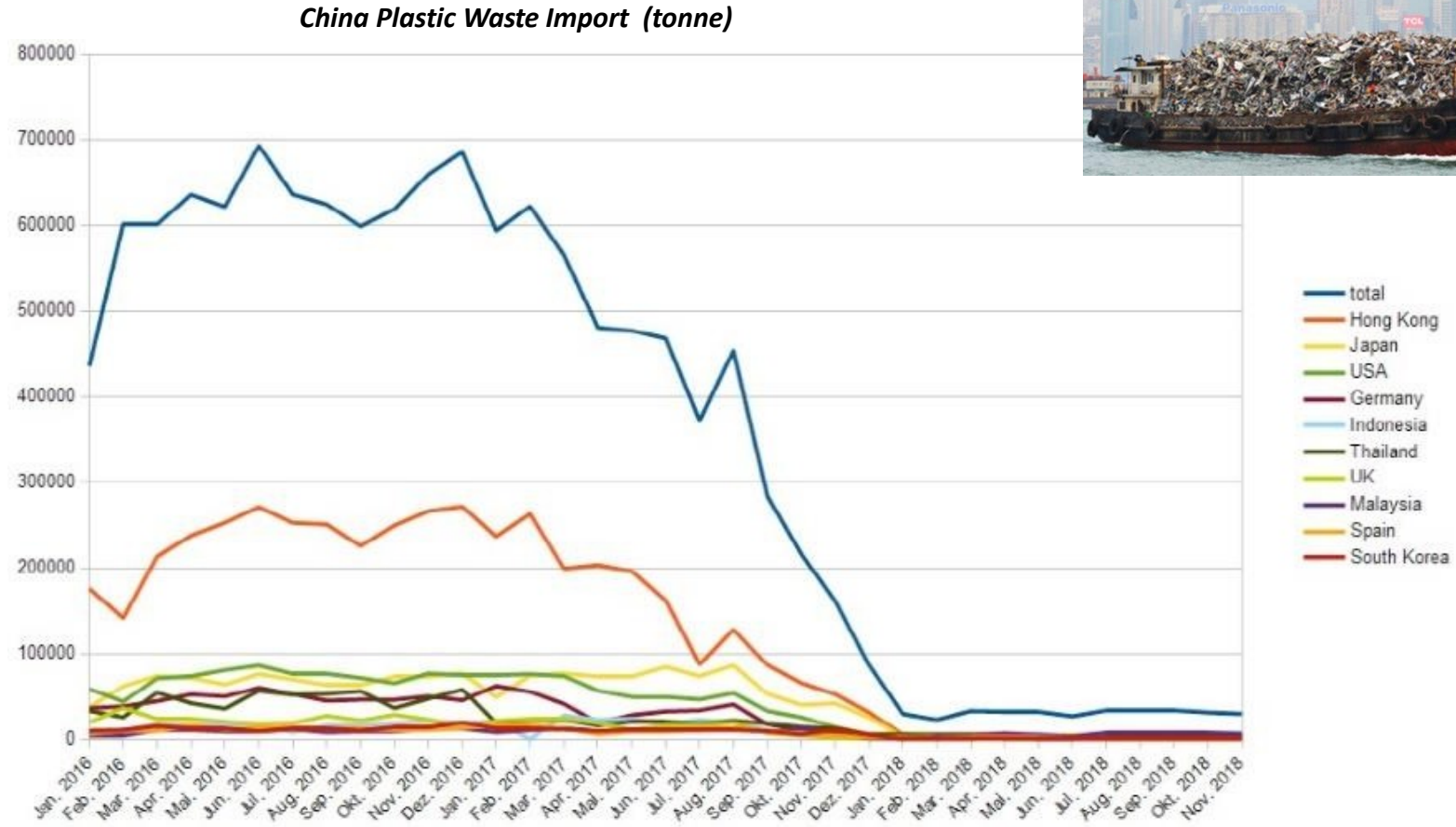




# Environmental Plastic Packaging Pollution is the Problem!



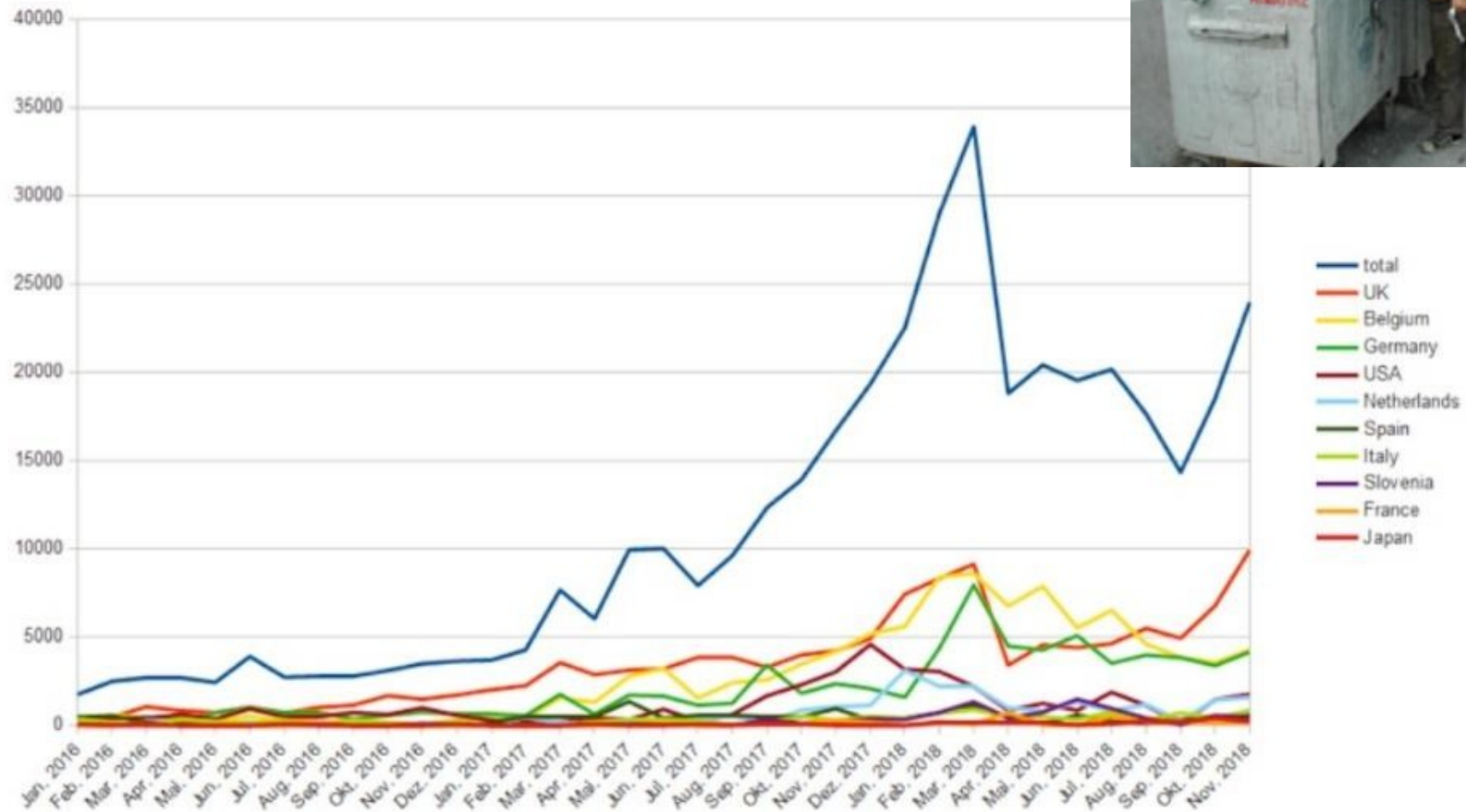
The world as come to the conclusion that  
Transporting Plastic Packaging Waste is not  
the solution



Source: Data from the global plastic waste trade 2016 - 2018

Turkey is yet to acknowledge this fact

**Turkey Plastic Waste Import (tonne)**

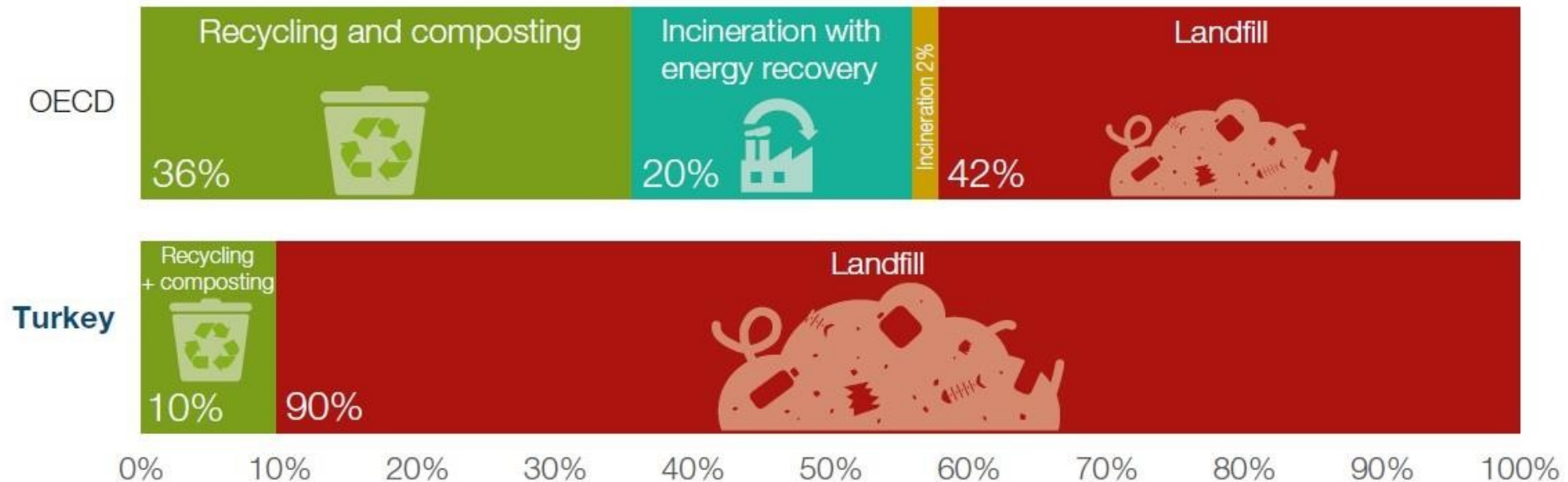


Source: Data from the global plastic waste trade 2016 - 2018



## Turkey Vs. OECD Waste Management

*Focus in Turkey is to efficiently put waste into contained Landfill*

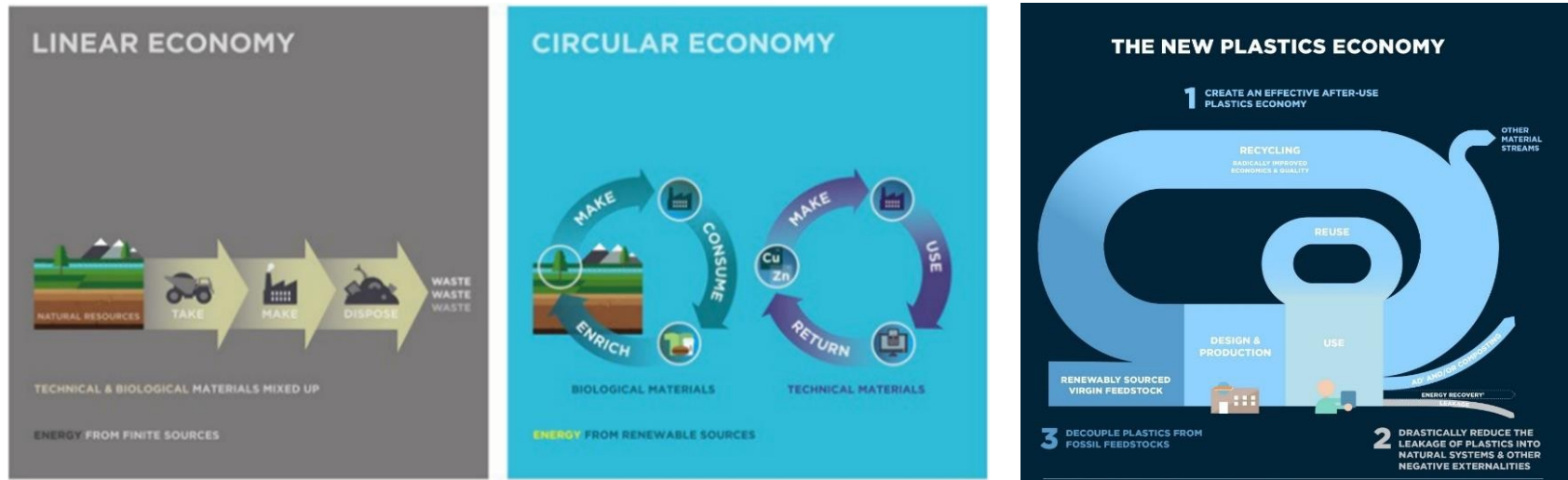


Source: OECD (2018) Environment Statistics (database)

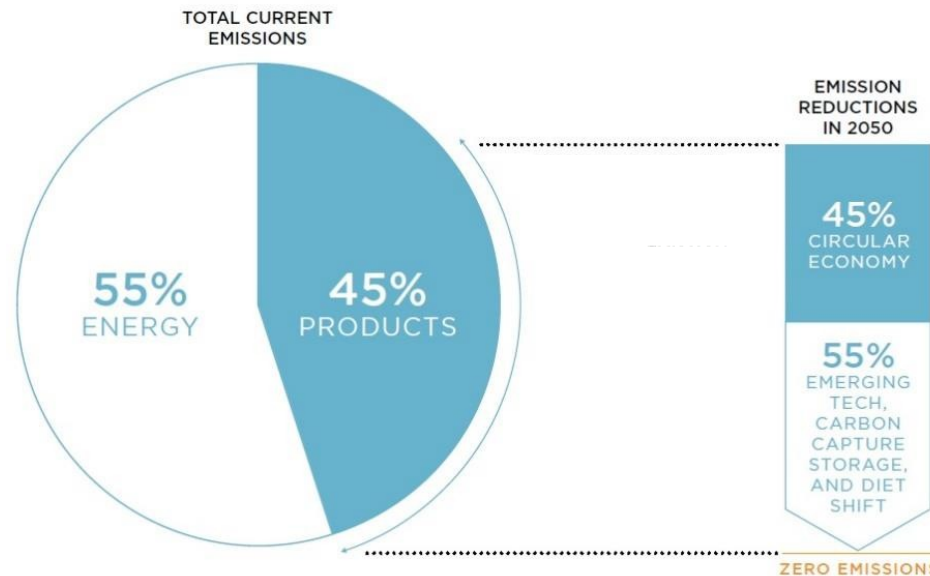
*Every Year appx. 1.500.000 tons Plastic and 426.000 tons of Metal Consumer waste is buried in Landfill with about 30% of sites not fully contained so leaking into the environment.*

**This is short sighted and not sustainable!**

## Taking Positive action – Moving to a more Circular Economy



Source: Ellen MacArthur Foundation

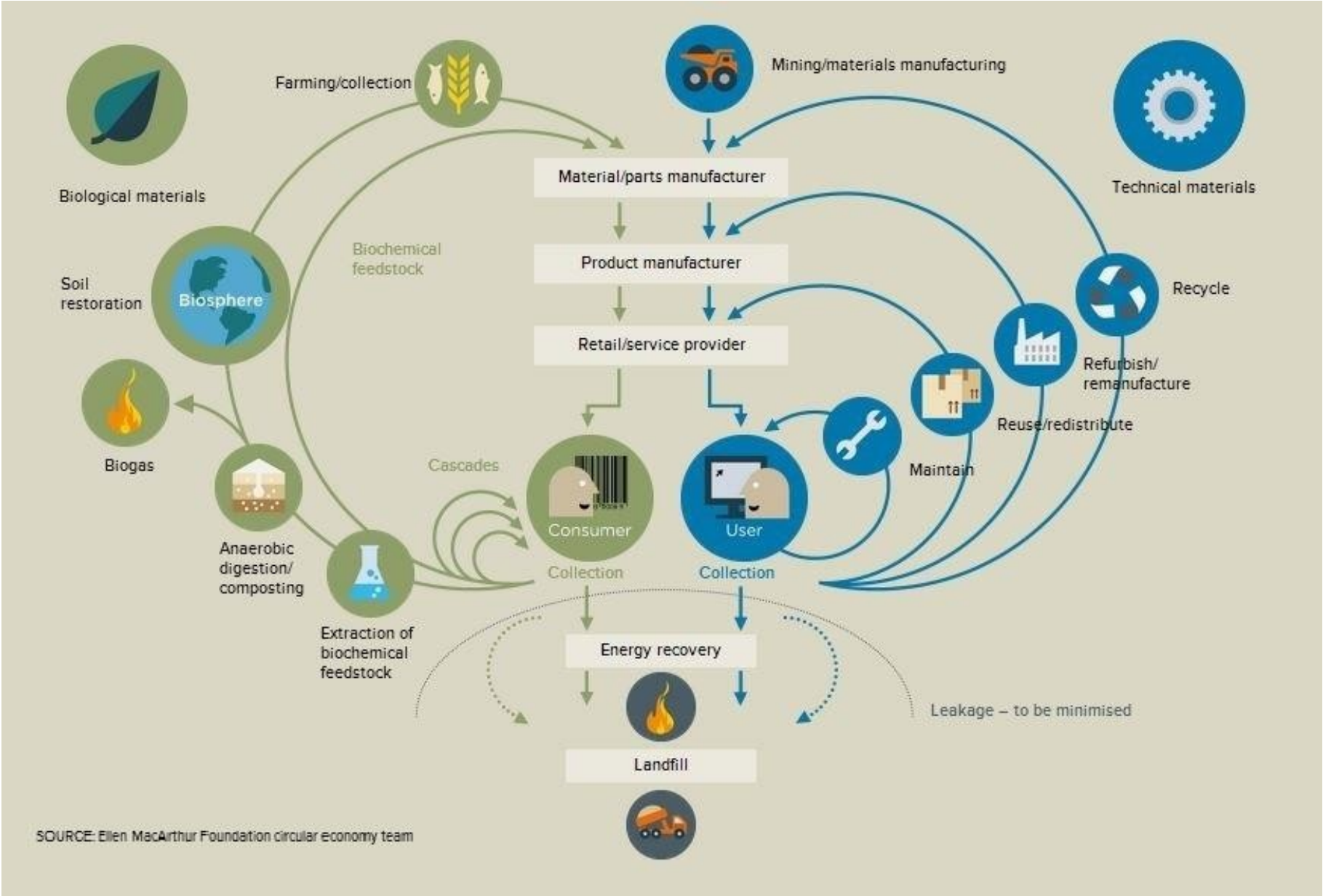


Source: Completing the Picture- How the Circular Economy Tackles Climate Change

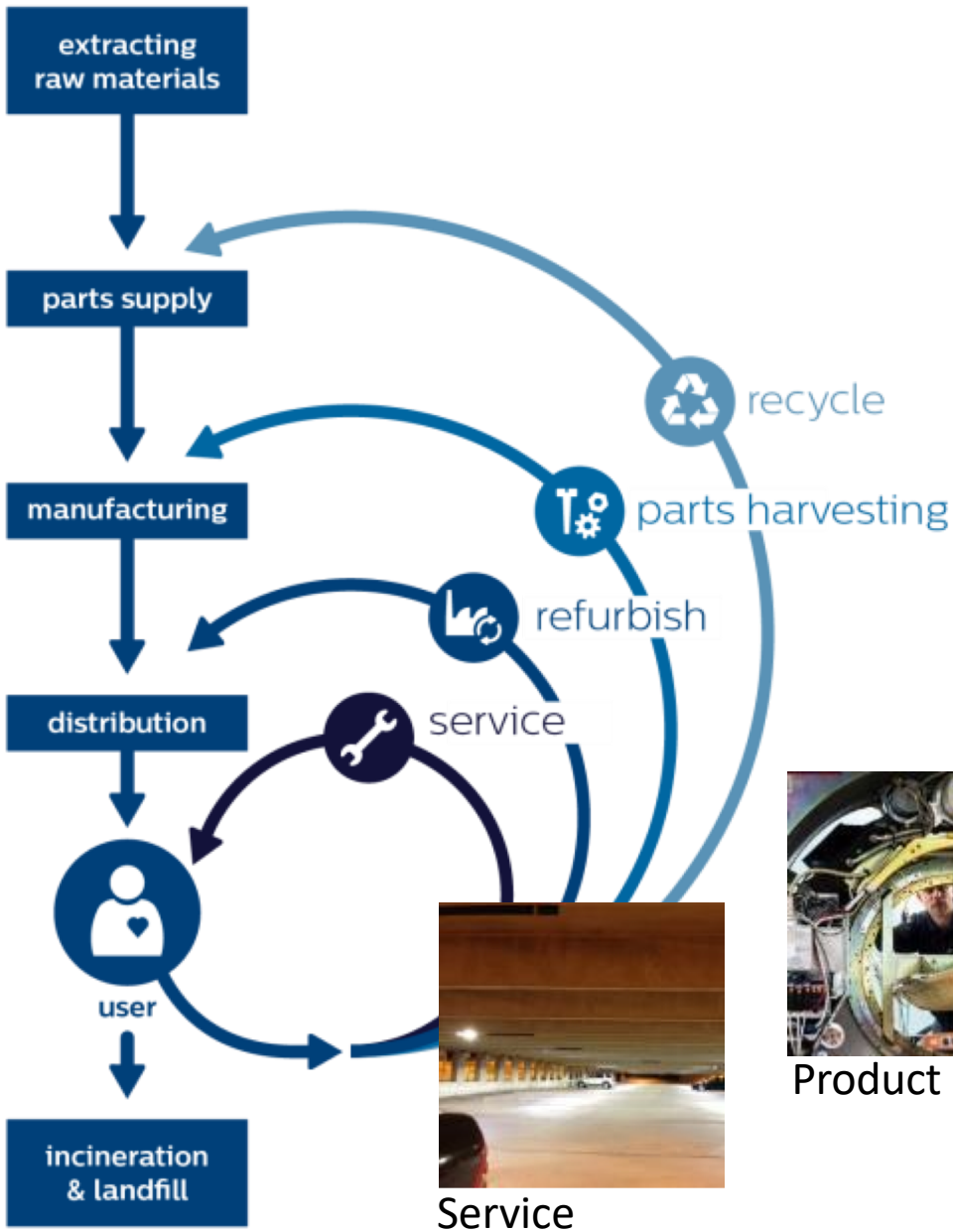
# Ellen MacArthur

- Dame Ellen Patricia MacArthur
- English sailor
- Solo long-distance yachtswoman
- Became the fastest solo sailor to circumnavigate the globe in 2005
- The Ellen MacArthur Foundation promotes the circular economy.





# the circular economy



Modular designs deliver parts





# Recycling

## THE SEVEN TYPES OF PLASTICS

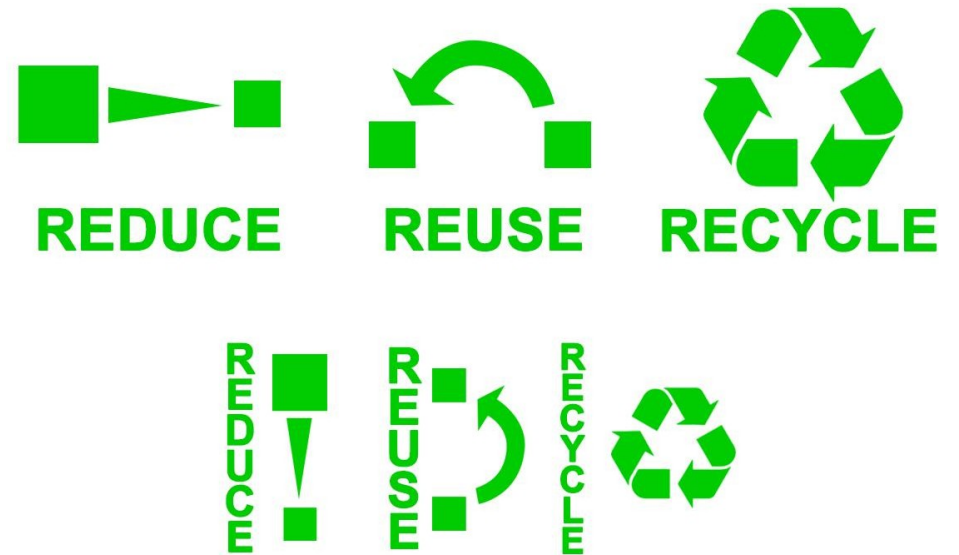
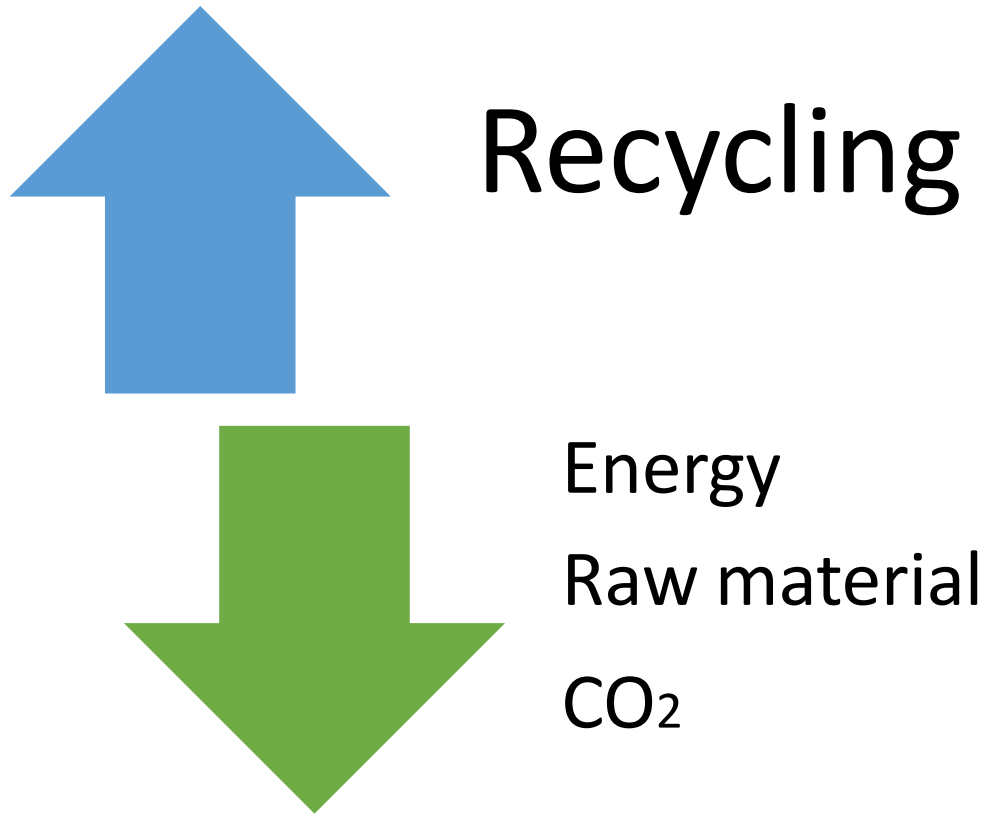
1	2	3	4	5	6	7
 PETE (Polyethylene Terephthalate)	 HDPE (High-Density Polyethylene)	 PVC (Polyvinyl Chloride)	 LDPE (Low-Density Polyethylene)	 PP (Polypropylene)	 PS (Polystyrene/ Styrofoam)	 Misc.
 (Soda bottles, jelly jars, pill bottles, combs)	 (Milk jugs, detergent bottles, shampoo, toys)	 (Plumbing pipes, shoes, binders)	 (Condiment bottles, plastic bags, plastic wrap)	 (Yogurt containers, plastic cups, kitchenware, diapers, prescription bottles)	 (Disposable coffee cups, packing foam/peanuts, plastic cutlery)	 (CDs, DVDs, eyeglasses, baby bottles)
<b>EASILY RECYCLED</b>	<b>ASK YOUR RECYCLER</b>		<b>NON-RECYCLABLE</b>			

What every Plastic Recycling Symbol actually means?  
Does it always mean that an item or material is recyclable?



# Recycling

- Recycling should be considered the last line of defence.



# Recyclable & Recycled materials

## Recyclable flexible packaging



Mondi Kale Nobel - **Metal Free**  
Structure for Chips Packaging

## Recycled label



Etapak - Wrap Around  
Label with **Recycled PET**

## Recycled bottle



Danone/Hayat Su - “Eco-  
Fiendly Bottle”

**50% Recycled content**

**The label has a QR code to  
explain the recycling process**

## Recyclable flexible packaging



Bak – reBorn® mono PE  
structure

**Easily recyclable**

# Recyclable & Recycled materials

## Recycled plastic



Jokey Turkey- Paint Bucket with Ocean Plastic

**50% recycled materials – PCR**

## Recyclable flexible packaging



Korozo - KORORCY Stand-up Pouch – mono PE

**Easily recyclable**

## Recyclable bottle



Sarten – PET bottle

**Replacing PVC**

## Recyclable flexible packaging



Elif - Elif2Pouch **100% Recyclable** PE Pouch

# Examples for Less CO<sub>2</sub> Emissions

## Industrial Packaging



Mondi Turkey – Cable Reed

**97% less CO<sub>2</sub>**

## Consumer Packaging



Korozo – 51% Green PE  
Personal Care Bags

**200 ktons green PE  
captures 800 ktons CO<sub>2</sub>**

## Fast Food Packaging



Sem - Milk Shake CUP

**20% less CO<sub>2</sub>**

## Transit Packaging



Mondi Turkey - Flap separator  
**63% less CO<sub>2</sub>**

# When you recycle packaging, you will have less CO<sub>2</sub> Emissions

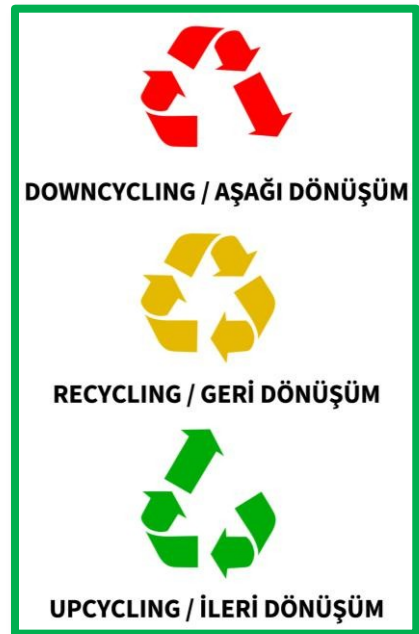


Material Recycling (1,000 kg or 1 ton)	Saving Greenhouse Gas / CO <sub>2</sub> Emissions (kg)	References
Steel	1,512	UNEP
PET	1,500	Meltem Kimya
Glass	670	Şişecam
Cartonboard	326	ProCarton
Aluminum	95	UNEP

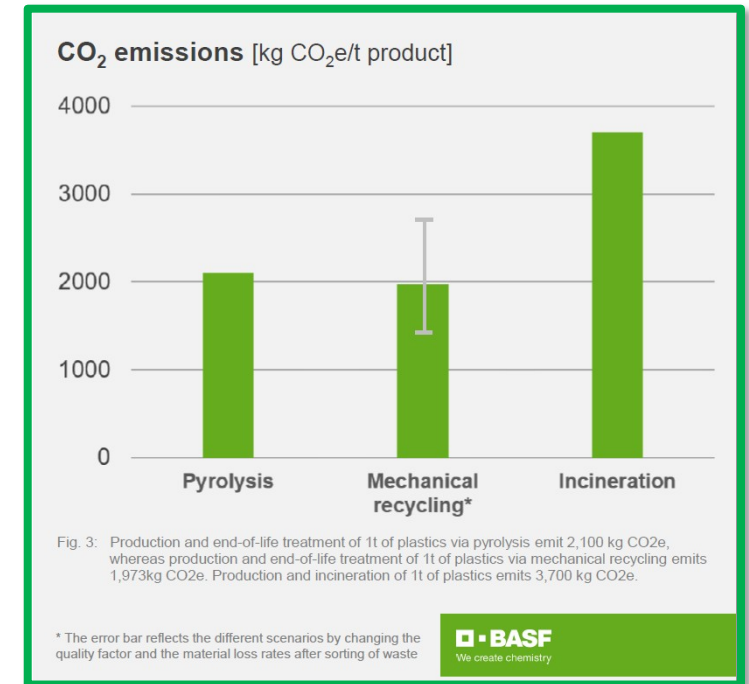




# Which type of Recycling



- Current Mechanical Recycling technologies are «**down-cycling**» processes. We need new technologies for «**up-cycling**» products as stated in Circular Economy.
- **Pyrolysis** is an effective method for polyolefins PVC, LDPE and PP.
- **Chemical recycling** is an alternative method. We need for developed technologies to reduce CO<sub>2</sub> emissions during chemical recycling.
- **Need for incentive funds for this transition.**



# rPET Technology from Turkey: PET Depolymerisation

- **Chemical recycling** of used plastic bottle flakes by **depolymerization** method in **glycolysis** system.
- **rPET content up to 50%**
- Can be used for Carbonated Soft Drink, water, hot-fill, BOPET film and textile applications.
- Produced from hot-washed high quality PET flakes used as food packaging.
- **Allowed by the Turkish food contact materials regulation**
- Generates **less carbon footprint** compared to original PET.
- Chemical recycling of PET (depolymerisation) has reduced greenhouse gas emission of 1,5 ton CO<sub>2</sub>-eq per ton input.







# Sustainable Development Goals

# SDG Sustainable Development Goals

- United Nations set its 17 Sustainable Goals in 2015
- The SDGs are intended to be achieved by the year 2030.
- There are 169 targets linked to these topics.



# SDG Sustainable Development Goals





# Top Business Impacts by Industry

Chemicals	Communication	Energy, Utilities and Mining	Engineering and Construction	Financial Services	Healthcare	Manufacturing	Professional Services	Retail and Consumer	Technology
13 CLIMATE ACTION 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	7 AFFORDABLE AND CLEAN ENERGY 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	8 DECENT WORK AND ECONOMIC GROWTH 	3 GOOD HEALTH AND WELL-BEING 	8 DECENT WORK AND ECONOMIC GROWTH 	8 DECENT WORK AND ECONOMIC GROWTH 	8 DECENT WORK AND ECONOMIC GROWTH 	8 DECENT WORK AND ECONOMIC GROWTH 
12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	8 DECENT WORK AND ECONOMIC GROWTH 	8 DECENT WORK AND ECONOMIC GROWTH 	8 DECENT WORK AND ECONOMIC GROWTH 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	8 DECENT WORK AND ECONOMIC GROWTH 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	4 QUALITY EDUCATION 	3 GOOD HEALTH AND WELL-BEING 	4 QUALITY EDUCATION 
2 ZERO HUNGER 	4 QUALITY EDUCATION 	13 CLIMATE ACTION 	13 CLIMATE ACTION 	5 GENDER EQUALITY 	5 GENDER EQUALITY 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	5 GENDER EQUALITY 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	13 CLIMATE ACTION 
3 GOOD HEALTH AND WELL-BEING 	3 GOOD HEALTH AND WELL-BEING 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	11 SUSTAINABLE CITIES AND COMMUNITIES 	13 CLIMATE ACTION 	4 QUALITY EDUCATION 	13 CLIMATE ACTION 	3 GOOD HEALTH AND WELL-BEING 	2 ZERO HUNGER 	3 GOOD HEALTH AND WELL-BEING 
6 CLEAN WATER AND SANITATION 	13 CLIMATE ACTION 	6 CLEAN WATER AND SANITATION 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	4 QUALITY EDUCATION 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	7 AFFORDABLE AND CLEAN ENERGY 	13 CLIMATE ACTION 	13 CLIMATE ACTION 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION 

Source: PwC SDG Engagement Survey, 2015

# Examples

- 100 % Renewable energy by 2035
- Electrifying and zeroing out emissions from all vehicles including trucks by 2040
- Protecting min. 50 million decare land
- Restoring 1 million mile square ocean



**0 EMISSIONS ACROSS GLOBAL OPERATIONS BY 2040**

Walmart aims to achieve this without carbon offsets by:

- Harvesting enough wind, solar and other energy sources to power its facilities with **100% renewable energy by 2035.**
- Electrifying and zeroing out emissions** from all of its vehicles, including long-haul trucks, by 2040.
- Transitioning to **low-impact refrigerants for cooling and electrified equipment for heating** in its stores, clubs, data centers and distribution centers by 2040.

**COMBATING CLIMATE CHANGE & REVERSING NATURE LOSS**

**WALMART'S NEW COMMITMENTS**



# Examples

- Declare Climate Action Plans



# Examples

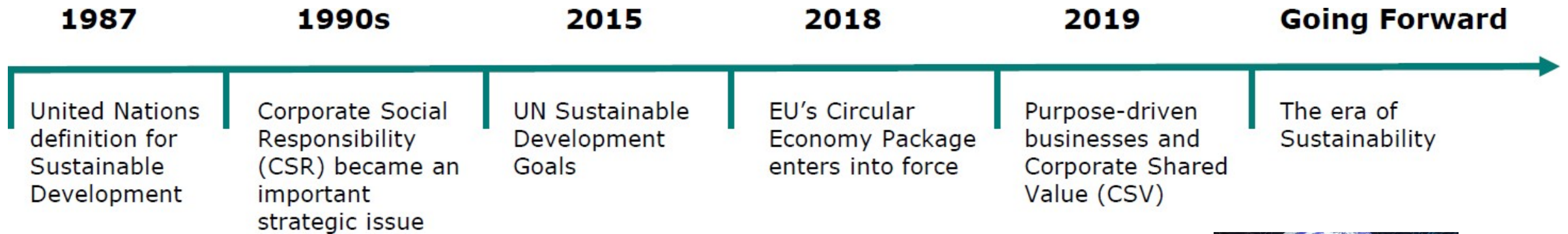
Key examples of Global Sustainable Packaging Targets are with multinational businesses linking their businesses to sustainable packaging

- **Unilever** confirmed it will halve its use of virgin plastic by reducing its use of plastic packaging by more than 100,000 tonnes and accelerating its use of recycled plastic by 2025.
- **Coca-Cola** announced an industry-first goal to collect and recycle the equivalent of every bottle or can it sell globally by 2030.
- **Kellogg** announced the expansion of its Global Sustainability Commitments to include a goal of working toward 100 % reusable, recyclable or compostable packaging by the end of 2025.



# The Era of Sustainability

- **Corporate Social Responsibility** emerged in response to rising awareness of the negative impacts of business on the environment and local communities .







# Turkish & Global Packaging Industry Statistics

## Türkiye

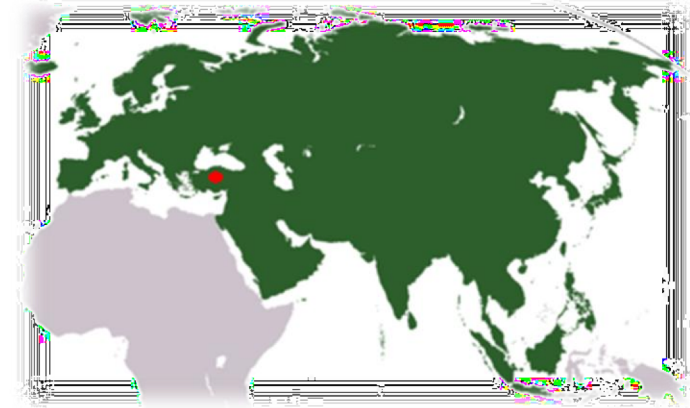


- **84 million 680 thousand population increasing 0,6-1,1 %** every year.
  - Number of cities populated over 1 million = **24**
  - The population is **young** and highly dynamic that people can adapt themselves rapidly to novelties and new developments.
  - Number of working **women** is increasing
  - Family sizes shrink
  - Self service offers in distribution channels increase significantly
  - You can travel 116 Capital cities of the World from Istanbul
  - The highest GDP growth in the World in 2017, 7%
- 19th biggest economy**, total GDP 720 billion \$ in 2020
- Total exports in 2021 : 225 billion 368 million \$
  - Total imports in 2021 : 496 billion 723 million \$



## World Packaging Sector (USD)

- **Global Packaging Industry:**  
**975 billion USD (estimated) in 2018**
- The biggest consumer is China
- Europe + Asia + the Middle East  
**675 billion USD**
  - Emerging markets: India, Indonesia and Türkiye
- **Turkish Packaging Industry**
  - **6th in Europe**
  - **16th in World**
  - **6th in Asia**



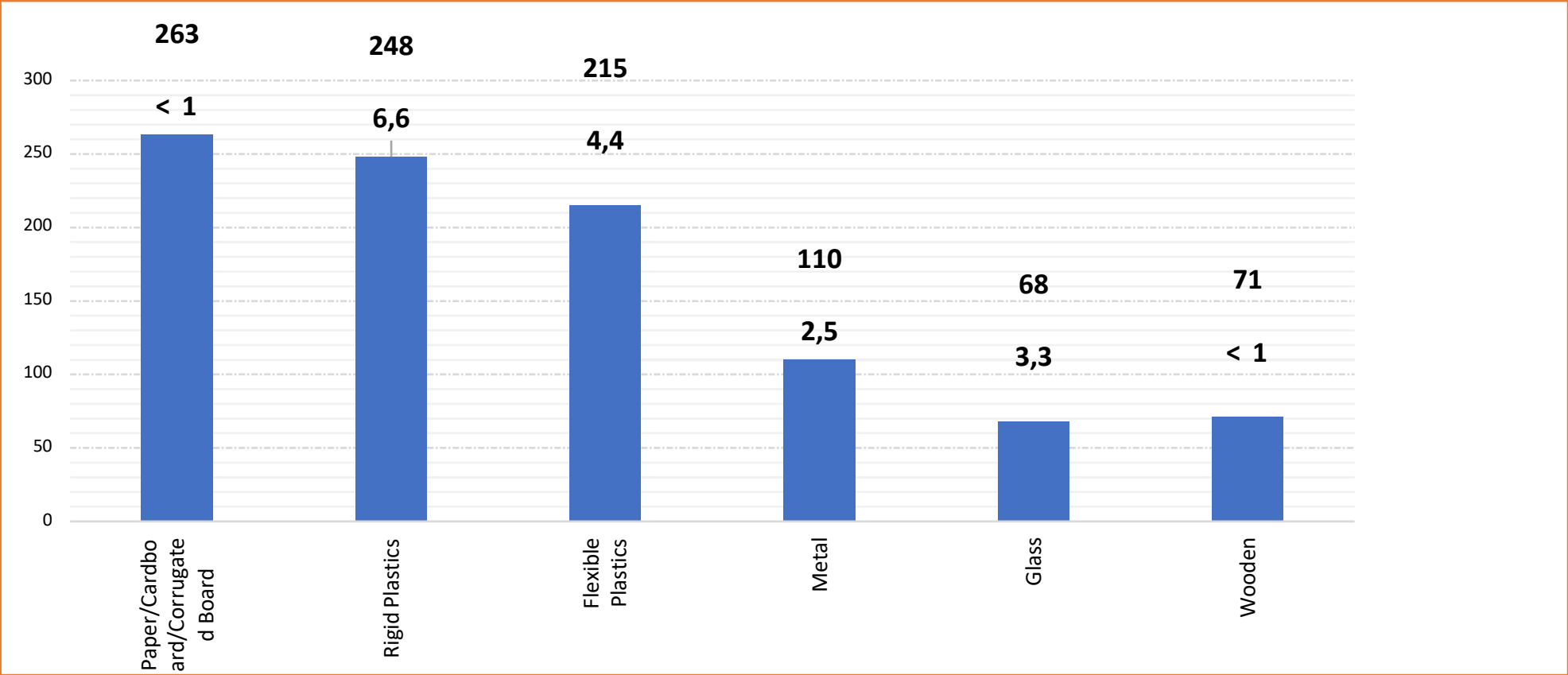
## World Packaging Sector (USD)

- The biggest consumer is **China - 220 billion USD**, growth rate % 9
- Second **USA - 165 billion USD**, growth rate %2
- Sector shrinks in USA, Canada, Western Europe
- Developing in **China, India, Indonesia, Mexico, Türkiye**
- Countries having sectoral revenue similar to our country are **India, Brazil and Russian Federation** that they have population advantage.





### Global Packaging Industry According to Material Consumption (billion USD and growth rate, 2018)



Source: Pira International

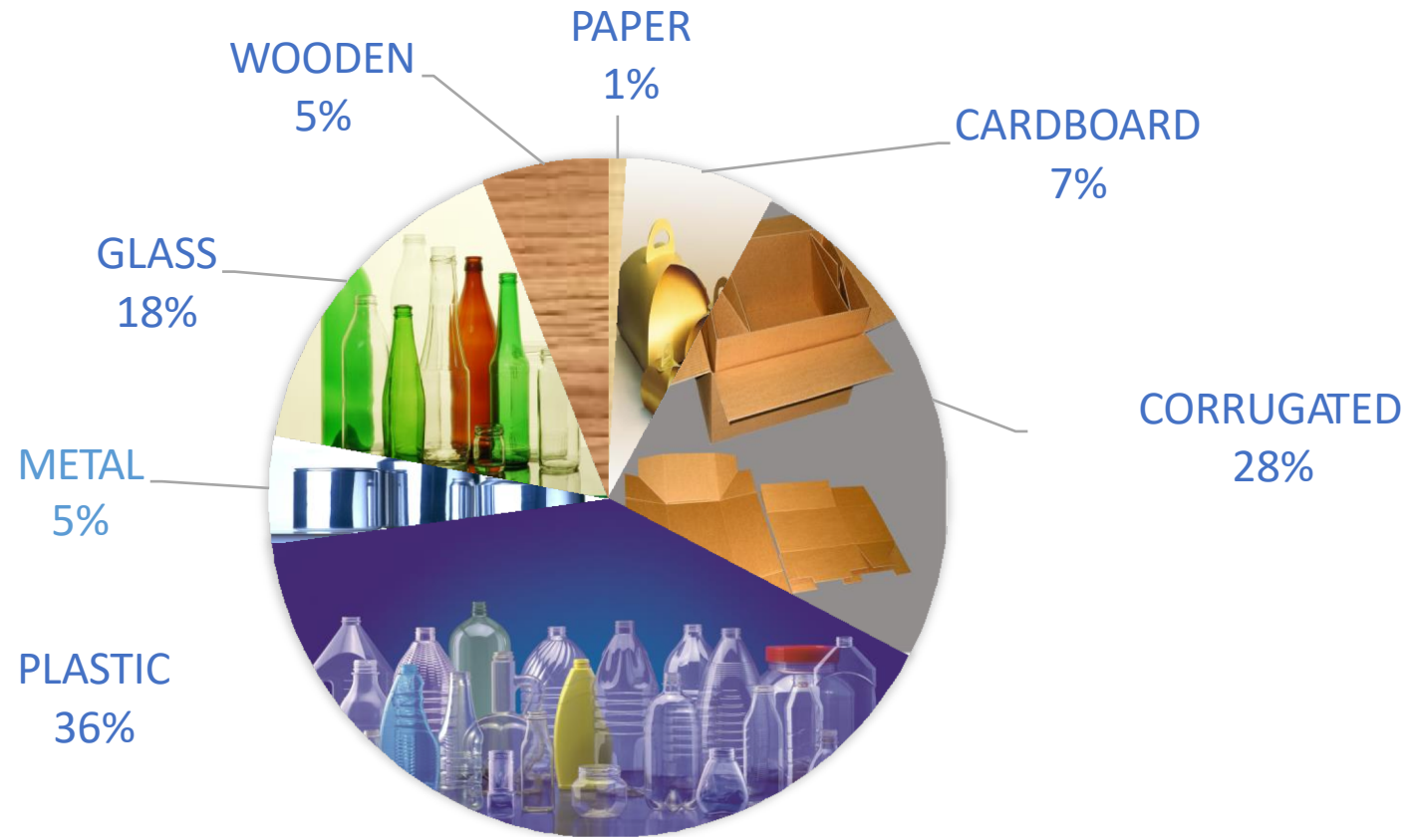
## Turkish Packaging Sector in GDP

### Turkish Packaging Industry Production (tons)

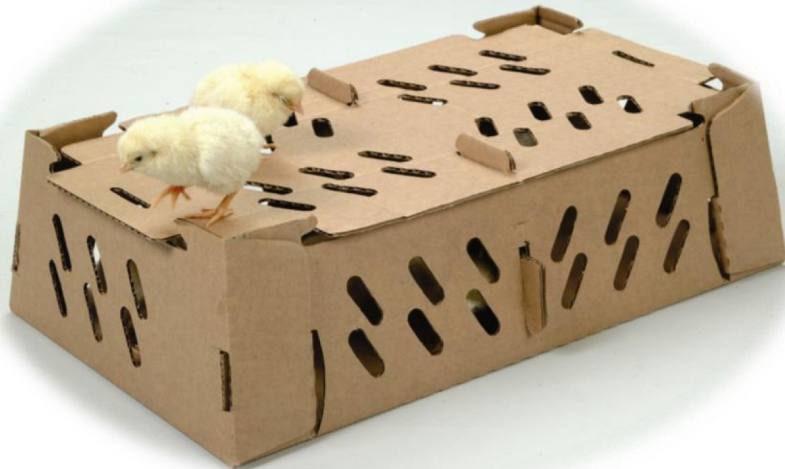
PACKAGING TYPE	2016	2017	2018	2019	2020
PAPER	80.000	82.750	103.000	99.500	85.400
CARDBOARD	615.000	643.000	660.000	714.000	722.000
CORRUGATED	2.022.000	2.241.000	2.300.000	2.282.000	2.880.000
PLASTIC	3.293.000	3.648.000	3.500.000	3.600.000	3.720.000
METAL	433.000	464.000	430.000	452.000	547.000
GLASS	1.232.000	1.455.700	1.560.000	1.640.000	1.800.000
WOODEN	526.000	542.000	540.000	550.000	550.000
TOTAL (tons)	8.201.000	9.076.450	9.093.000	9.337.500	10.304.400

**Approx.: 25 billion USD total revenue, 2020**  
**2023 target is 30 billion USD**  
**2030 target is 50 billion USD**

## TURKISH PACKAGING MATERIAL PRODUCTION SHARE IN 2020 (TON, %)



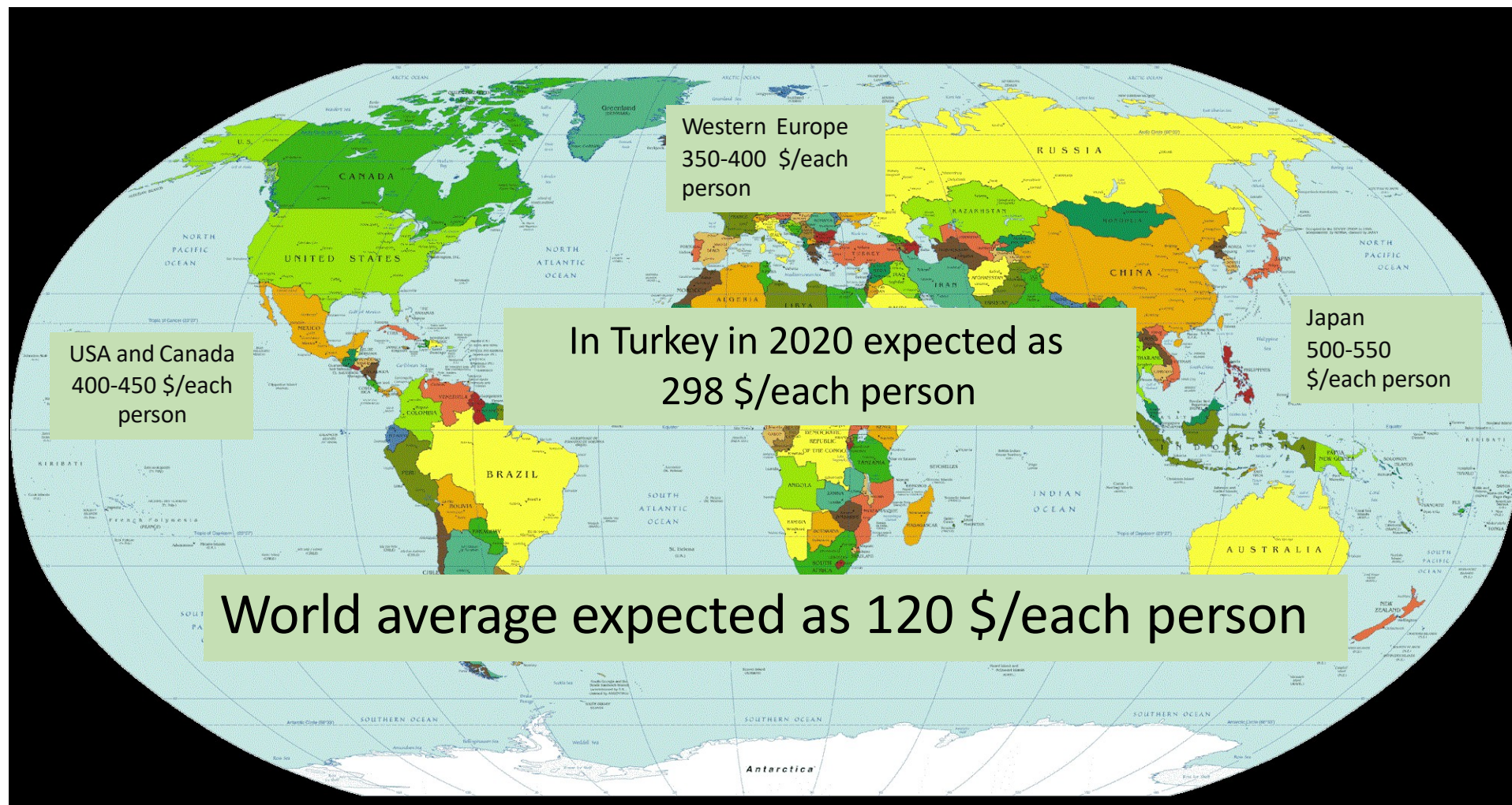
**USD 25Billion  
Packaging Production  
enables**



**Economy of min. USD  
400 billion in the country**



## Per Capita Consumption (USD / person)





# Packaging Sector



Packaging consumption increased **two-fold** in the last **20 years**.



Per capita consumption;  
**298 \$**

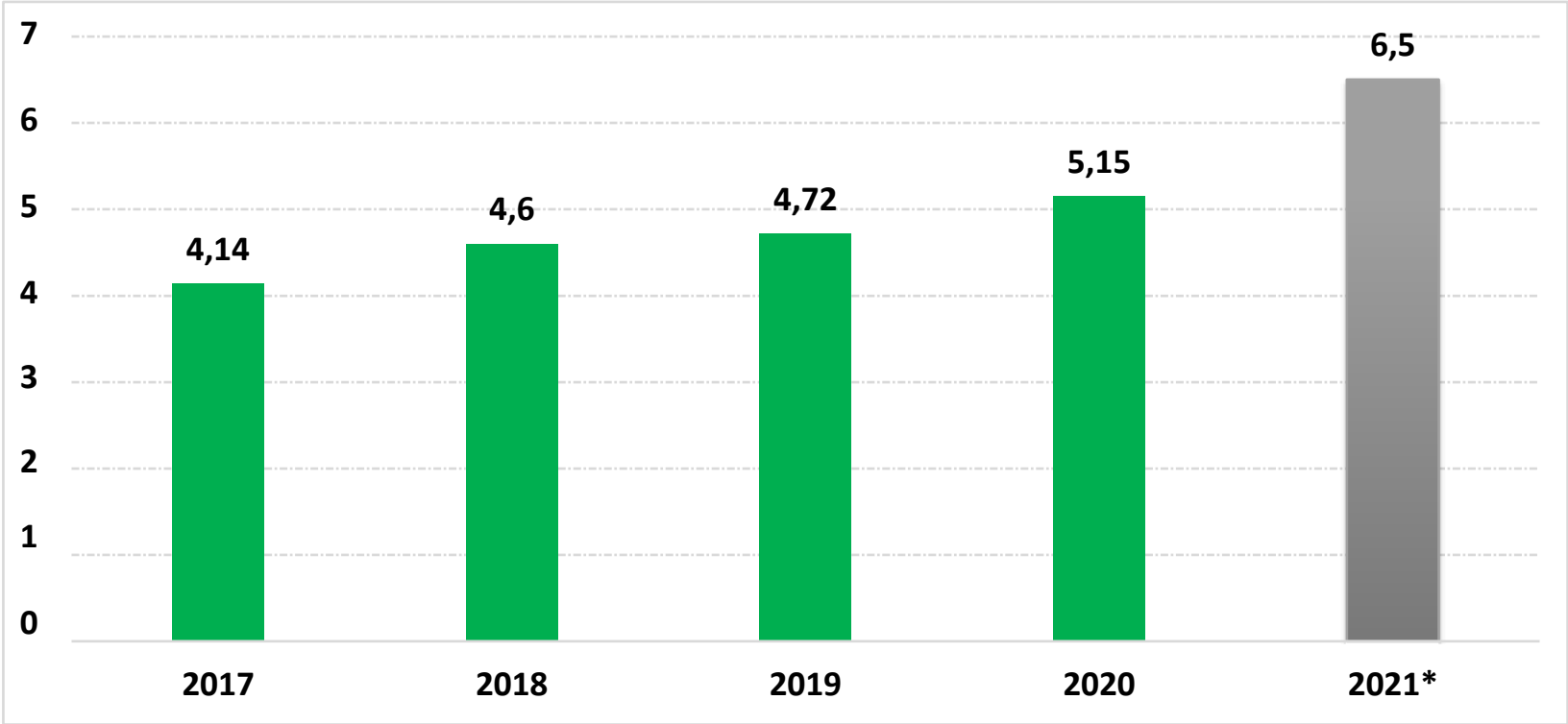


# Packaging Sector



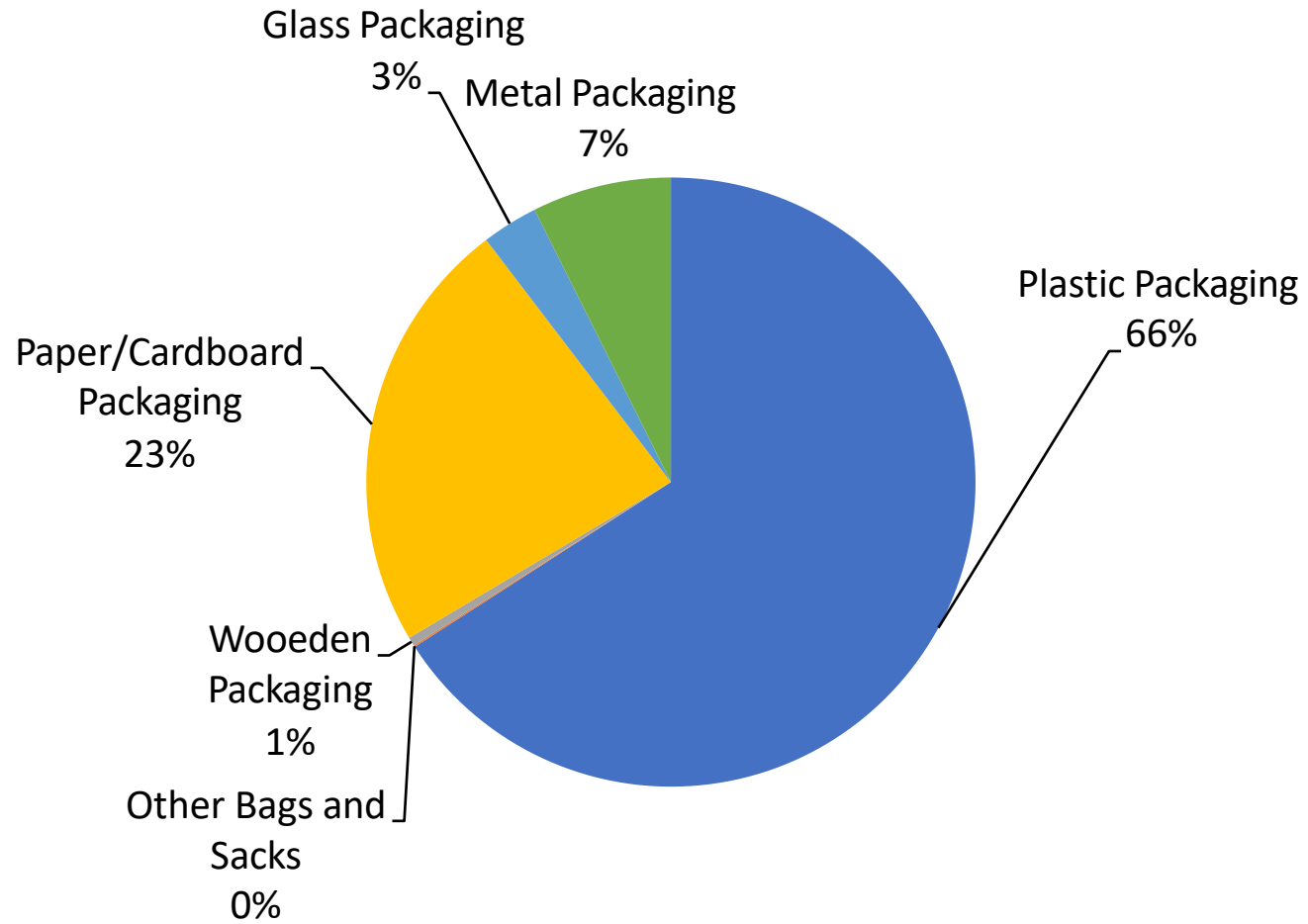
**Our 2023 target is to increase per capita consumption to 380 \$ level**

## Packaging Sector Exports (billion USD)

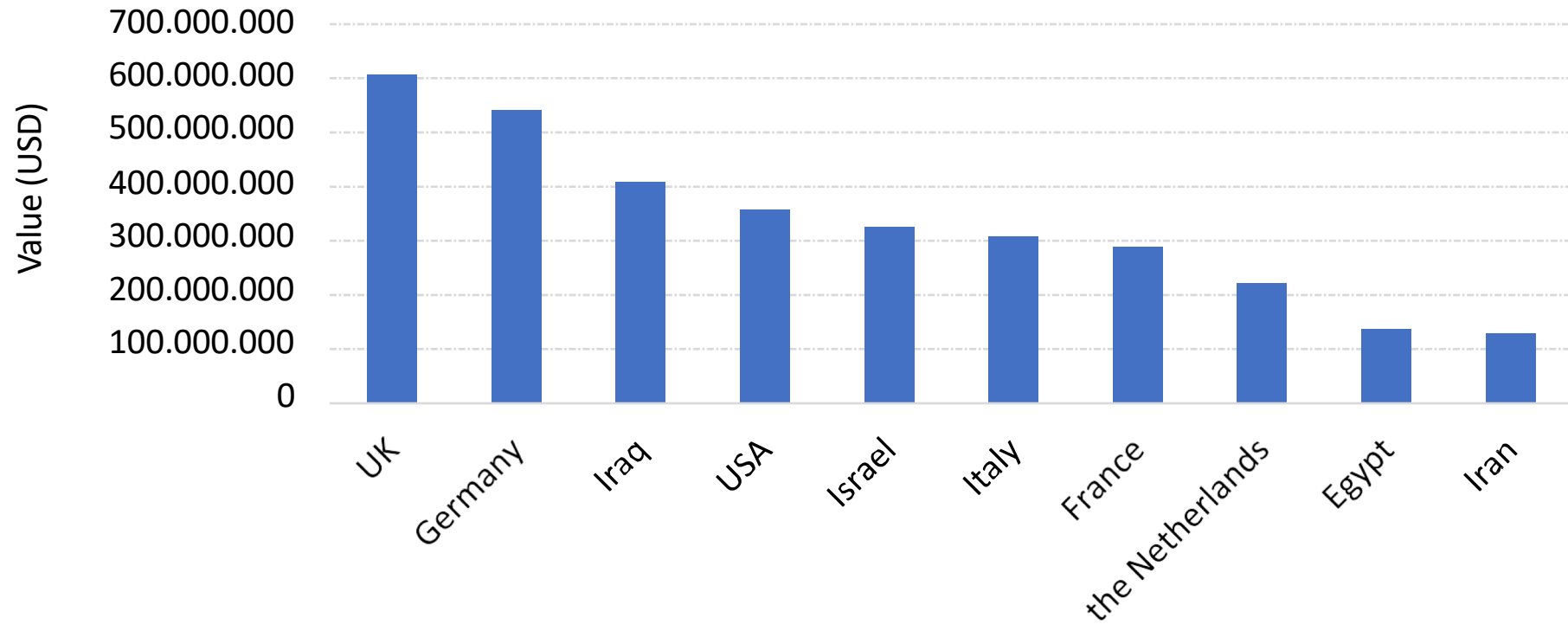


**Our 2023 target is 8-10 billion \$ exports**

### Exports Share by Packaging Type in 2021 (USD)



### Top 10 Countries in Exports in 2021





## Packaging Sector Imports (million, USD)

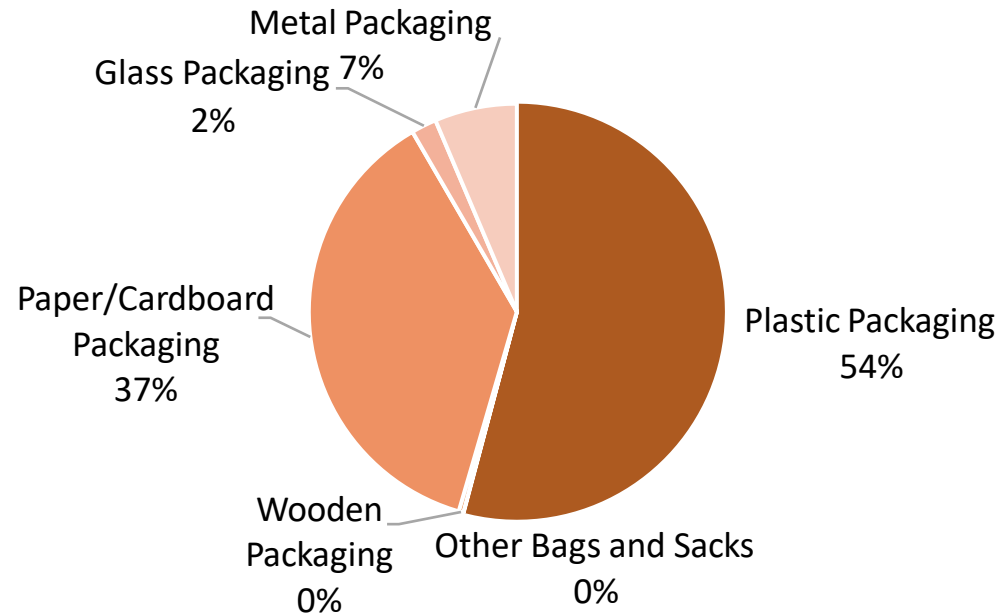


The majority of Packaging Imports are semi-finished products and raw materials.

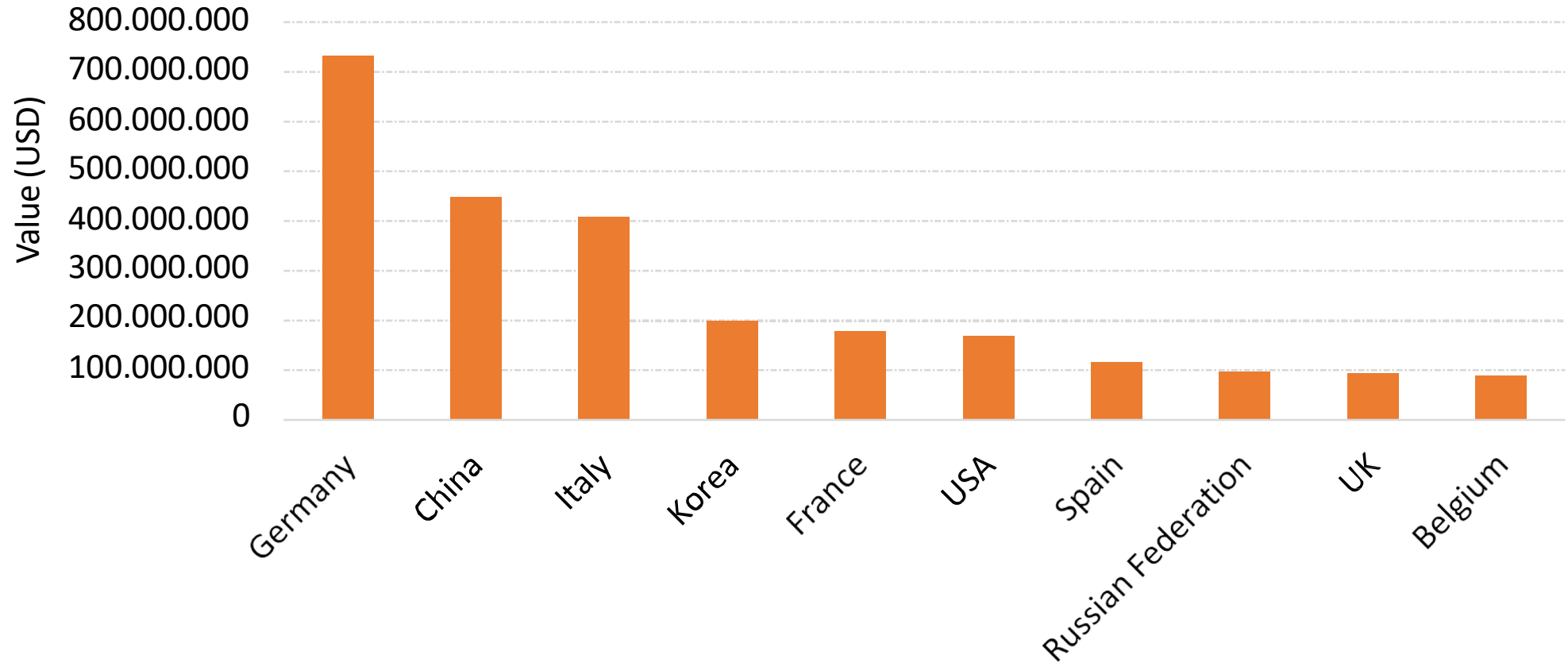
**In 2021 3,8 billion \$ imports**

**Foreign trade surplus was + 2,7 billion \$**

Imports Share by Packaging Type in 2021 (USD)



### Top 10 Countries in Imports in 2021



# Packaging Sector

- ✓ 2019, **22 billion \$ market size**, 9.4 million tons production; 4 billion 700 million \$ export revenue, 1 billion 138 million \$ foreign trade surplus,
- ✓ 2020, **25 billion \$ market size**, 10.3 million tons production; 5 billion 147 million \$ export revenue, 2 billion 28 million \$ foreign trade surplus,
- ✓ 2021, estimated **28 billion \$ market size**; 6.5 billion \$ million..



**We aim 440 billion \$ of total GDP by packaging industry support.**



## STRENGTHS AND WEAKNESSES OF THE INDUSTRY

### Strengths:

- Packaging has become fundamental material.
- The increase in large supermarkets, discount stores and other retail chains demands packaged products so packaging sector develops.
- Packaging has a very important place in the marketing of developing industries and agricultural products and export goods in our rapidly growing country.



The Turkish manufacturing industry is expanding and the Turkish packaging industry can respond to the expansion in the manufacturing industry in Turkey and in the world.





## STRENGTHS AND WEAKNESSES OF THE INDUSTRY

### Weaknesses:

- Insufficient raw material producers.
- Waste management etc. some legislation that does not prevent the development of the industry, is suitable for the conditions of our country and is not structured with the unique practices of our country.
- Offering unpackaged food and beverage products.
- Shortage of trained intermediate staff in the packaging industry.





## Conclusion & Future Sustainability

# Packaging Requirements

- Protection against external environment
- Mechanical protection
- Function
- Security
- Inertness
- Cost
- Information
- Appearance/Presentation





# The Purpose of Packaging

- Primarily to **protect** food products from outside influences and damage, or **preserve** its contents  
and,
- Secondly to improve the products **presentation**.





# Products without packaging are exposed to risks







*Better life through better packaging for more people*



# Packaging Perception

The image of the packaging after use is preventing the perception of its most important function.

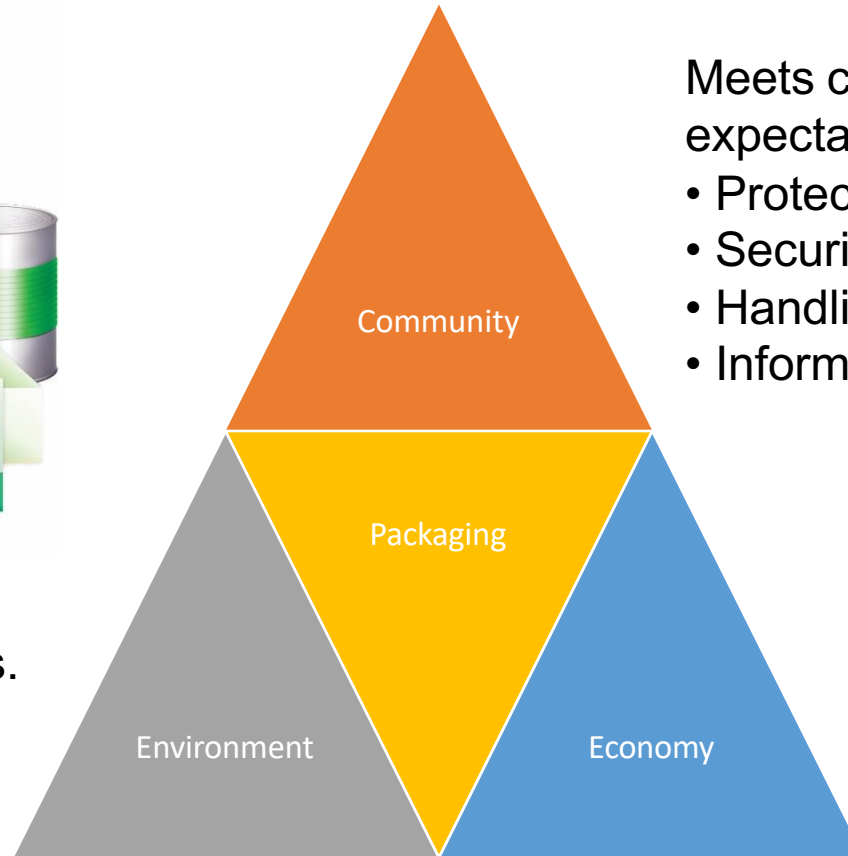
This function is to protect the product.

If the products are protected by suitable Packaging to prevent decomposition, actually, product waste will be less and so less Packaging will be used.





Saves resources more than it uses.



Meets consumers expectations:

- Protection
- Security
- Handling
- Information



Puts products on the market.

Recovery brings money.





Surrounds , Saves , Sells

3 + 1 S

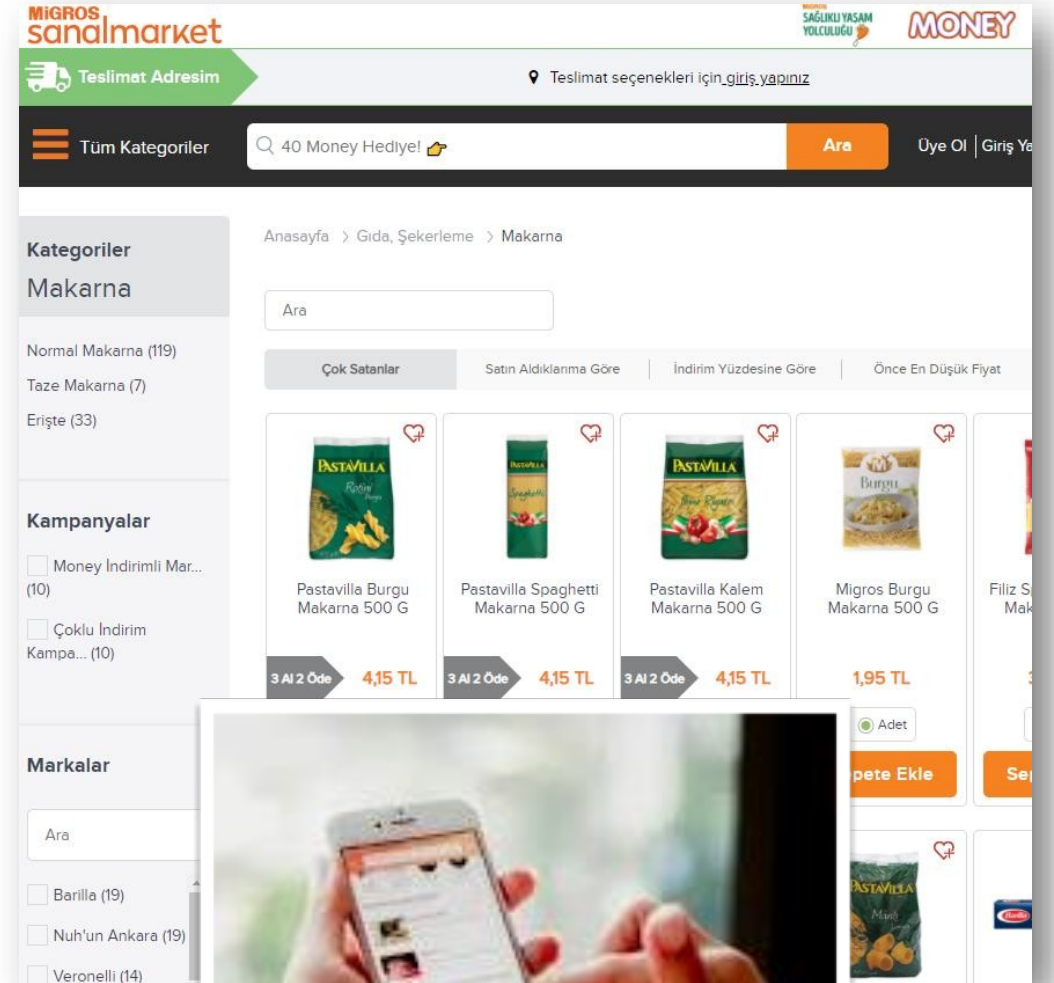
Packaging should be obliged to achieve this mission **sustainably** to protect Environment and Natural Resources.





# Future Market Growth

- Era of online shopping
- Shopping through small screens
  - **Packaging & Logistics**





## The e-commerce trend grows worldwide



## The challenge - the e-commerce trend grows



Source: World Design Challenge - Sustainable Packaging





## Consumers demand an Increase in Life Expectancy



There is no way back from Packaging  
Let us redesign and use it Properly!  
**Thank you**

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