# A sustainable world in 2030? Are plastics the problem or part of the solution?

**Michel Loubry**

PlasticsEurope
Association of Plastics Manufacturers

# Sustainability Development
# – One Common Goal –

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**Sustainable development is the development that meets the needs of the present without compromising the ability of future generations**

The world commission on environment & development (the Brundtland commission – 1987)

**To guarantee a better quality of life now & for future generations**

# Slogans and Megatrends

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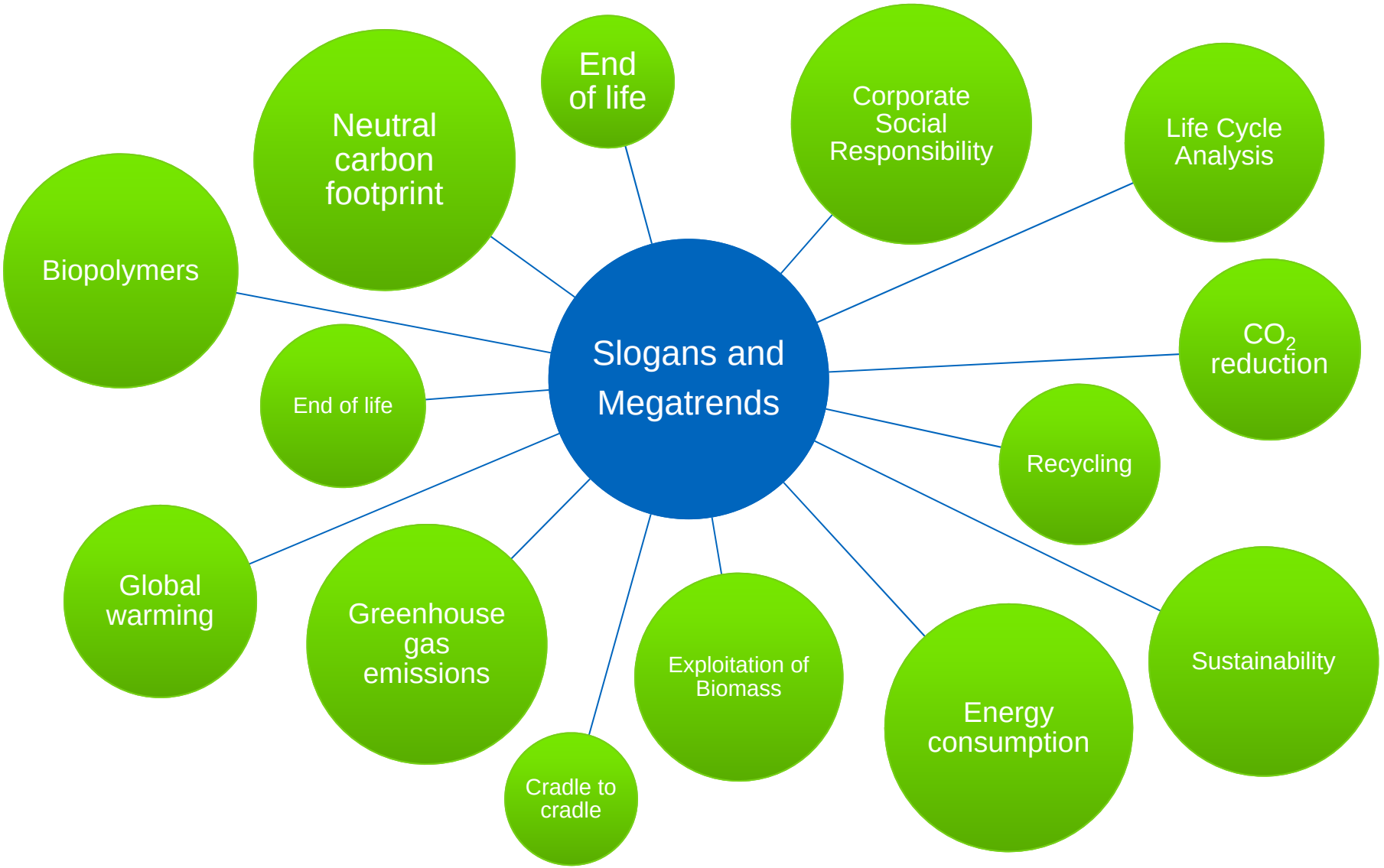

# The 3 Dimensions of Sustainability

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- The environment
  1. Raw materials (natural resources)
  2. Emissions
  3. Toxic substances
  4. Recyclability
  5. Span of life, durability
  6. Waste

- Economic: sustainable growth

- Social aspects: a license to operate, human rights, employment, health, social welfare.

# The Environment - Some Context - Ample Contradictions -

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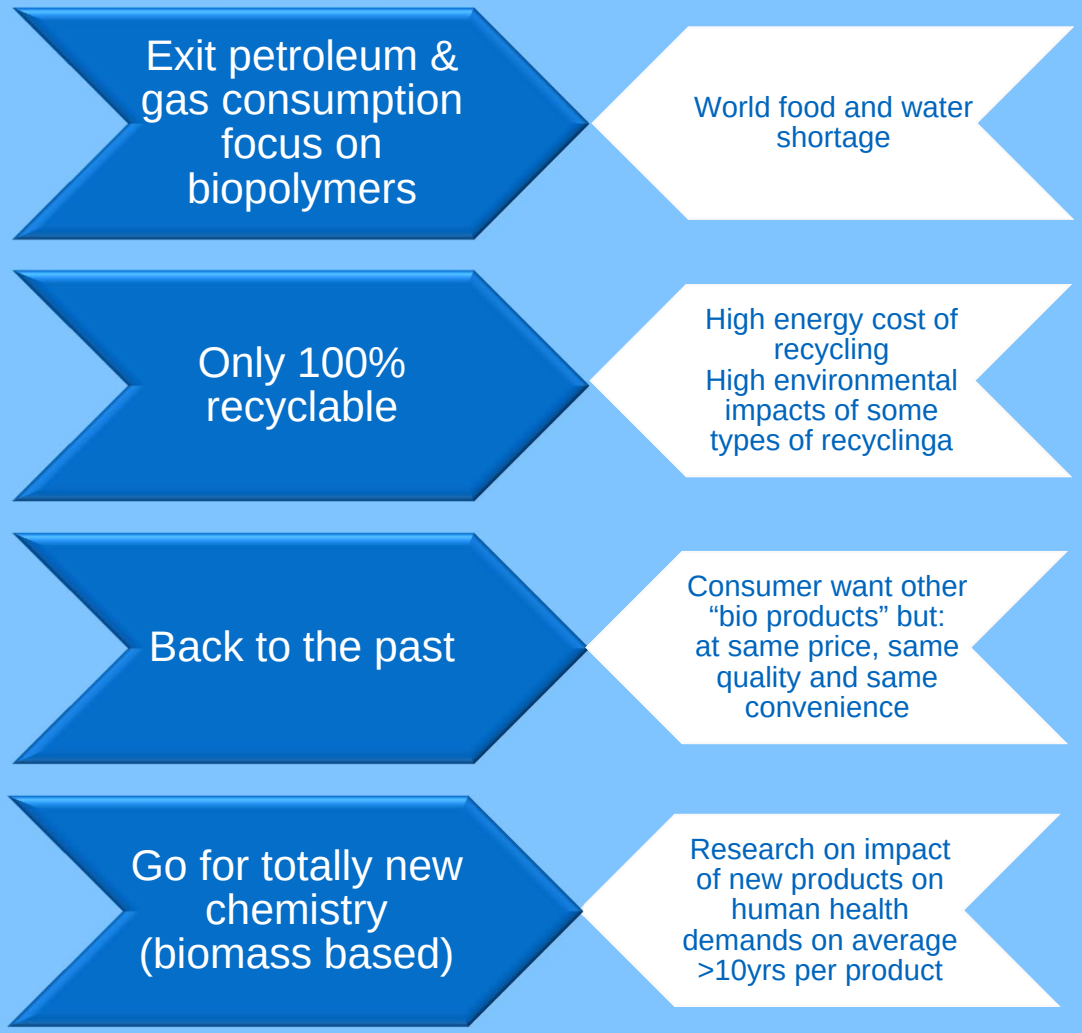

# Plastics Contribution to Economic Development – EU 27

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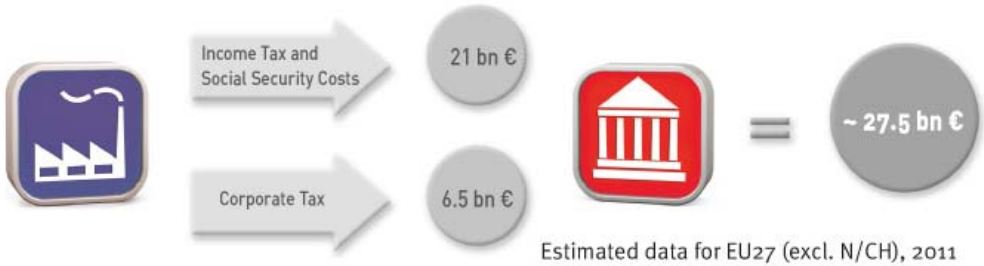
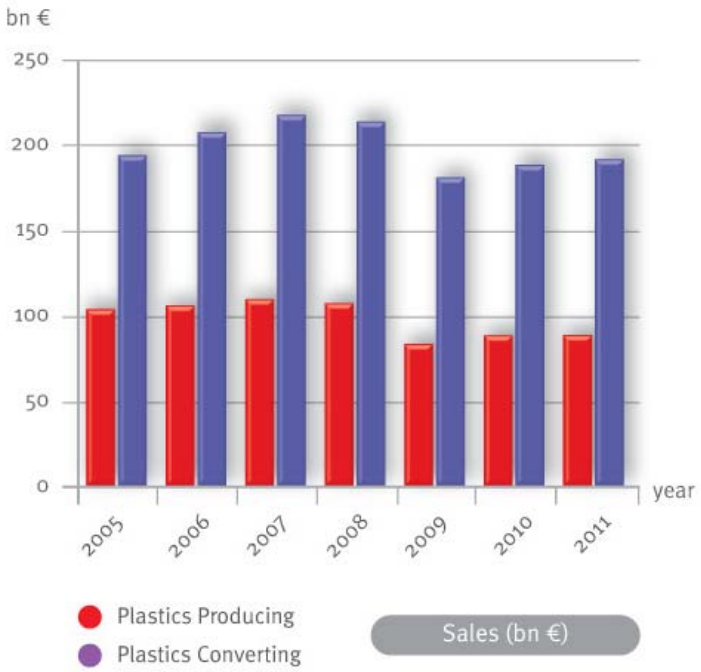
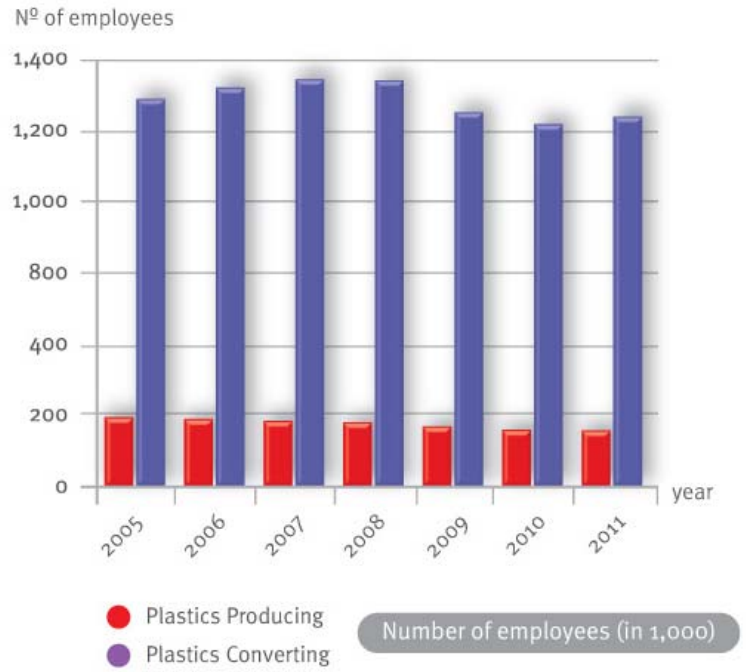



Generating about 27.5 billion euros for public finance and welfare, the European plastics industry is a pillar of economics and society.

Estimated data for EU27 (excl. N/CH), 2011
Source: Consultic




Development of Sales and Employment in EU-27 2005 – 2011
Source: EU Eurostat

## Slide 6

**P4** UPDATE SLIDE (ALSO MACHINE MANUFACTURERES>>>>OR USE MORE APPEALING SLIDE)

PVA; 13/09/2012

# Futurologist: Ray Hammond


PlasticsEurope commissioned the futurologist **Ray Hammond** to write a report that would anticipate what society might look like in 20 years time – and the role of plastics in the world of 2030

# Six key drivers of the future

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1. World population explosion and changing societal demographics

2. Climate change and the environment

3. Looming energy crisis

4. Expanding globalization

5. Disease prevention and longevity

6. Accelerating, exponential technology development

# Est. world population 2030: 8 billion

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- **Plastics will contribute to combating shortages of food:**
  - Keeping food safe
  - Maximising crop yields
  - Extending shelf life

- **Plastics will help to combat shortages of drinking water:**
  - Keeping drinking water safe
  - Creating drinking water
  - Preventing losses

# Combating shortages of food

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- Enabling food to be grown under cover
- Enabling multiple harvests
- Optimising crop development
- Hydroponic systems
- Micro-sprinklers and drop irrigation systems

# Combating lack of drinking water

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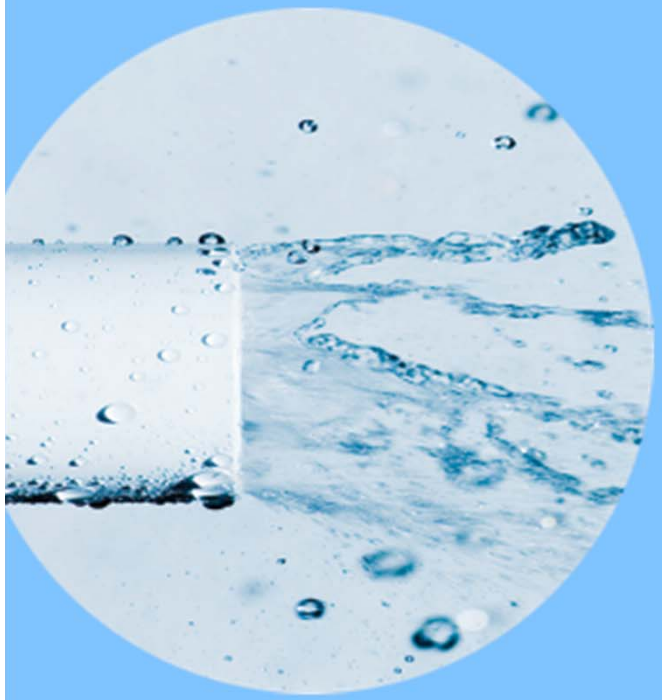

- Replacing old pipe systems to prevent leakage
- Building water ‘super-grids’
- Reverse osmosis desalination
- Plastics pipe systems resist harsh conditions.

# Reduce plastics consumption to reduce crude oil usage?

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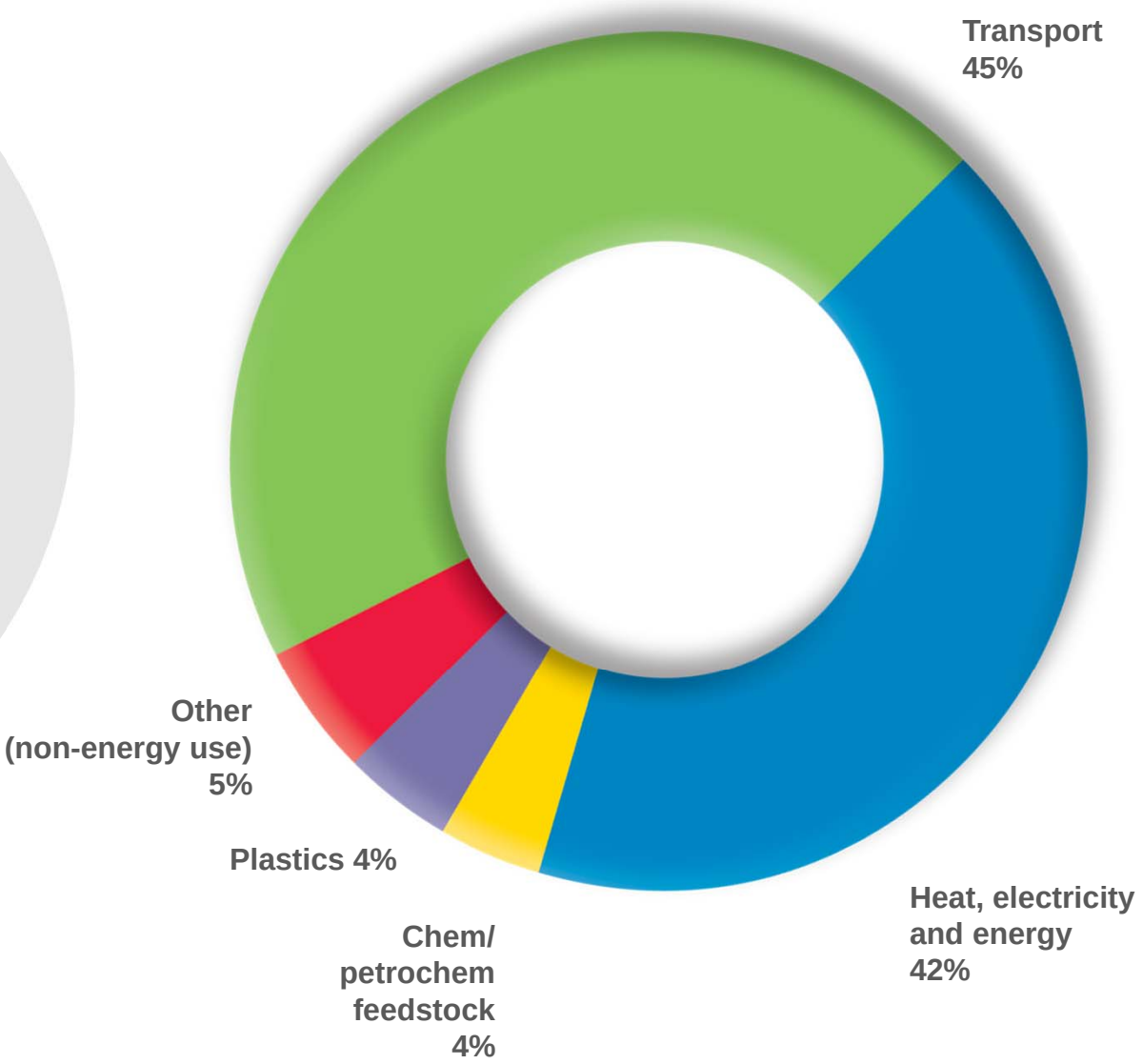
Only 4% of oil and gas in Europe are used for manufacturing plastics

**and…**

plastics contribute significantly to energy savings and emission reductions



# Energy impact and $CO_2$ emissions

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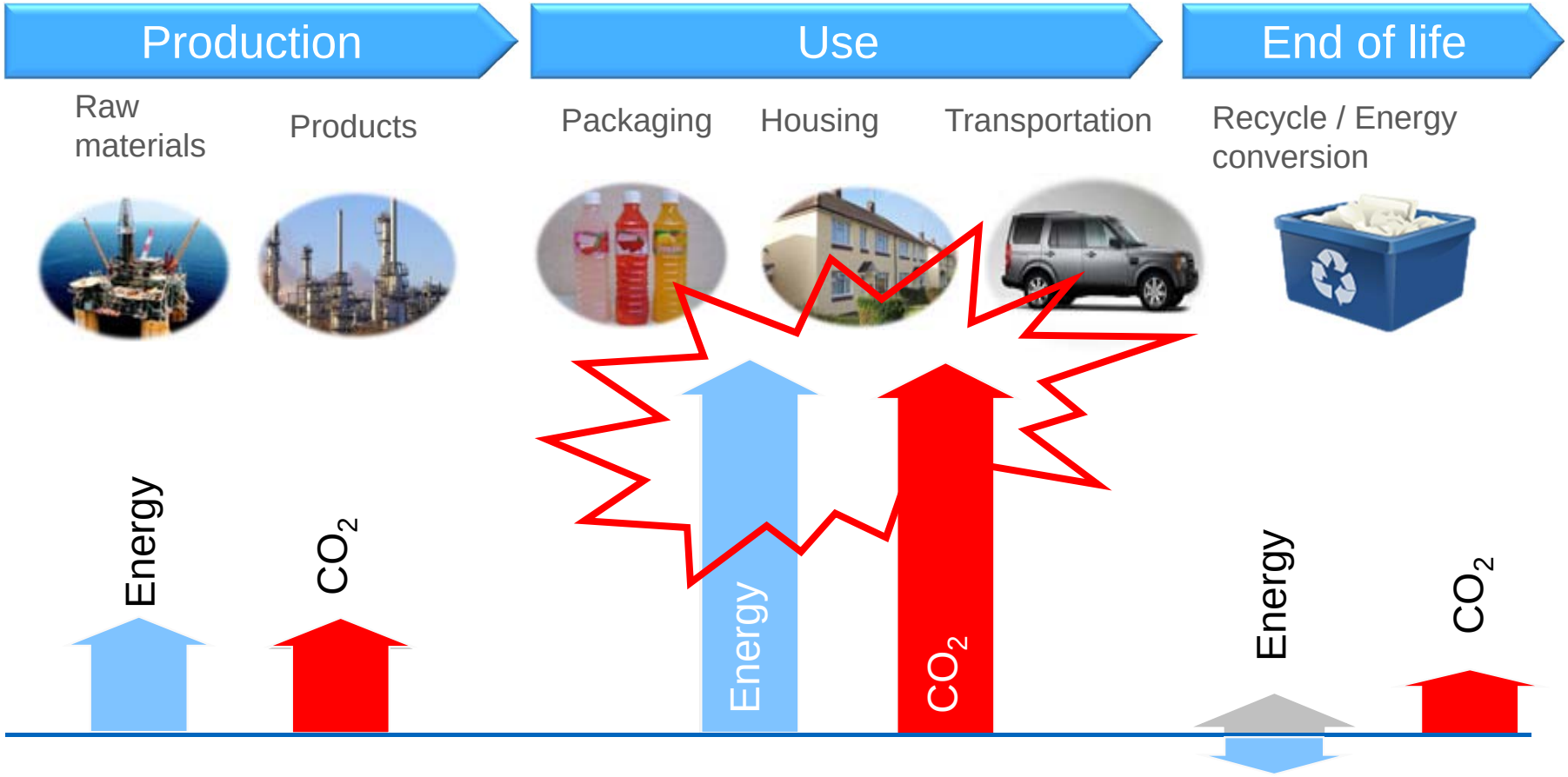


- Improved production efficiency
- Production emissions reduction

- Improved product design with plastics
- Lighter, more efficient products with plastics
- Preserved food by plastic packaging

- Reduced land-fill
- Recycling operations
- Energy reclamation

# Effect of Substitution of Plastics on Mass, Energy Consumption and GHG Emissions

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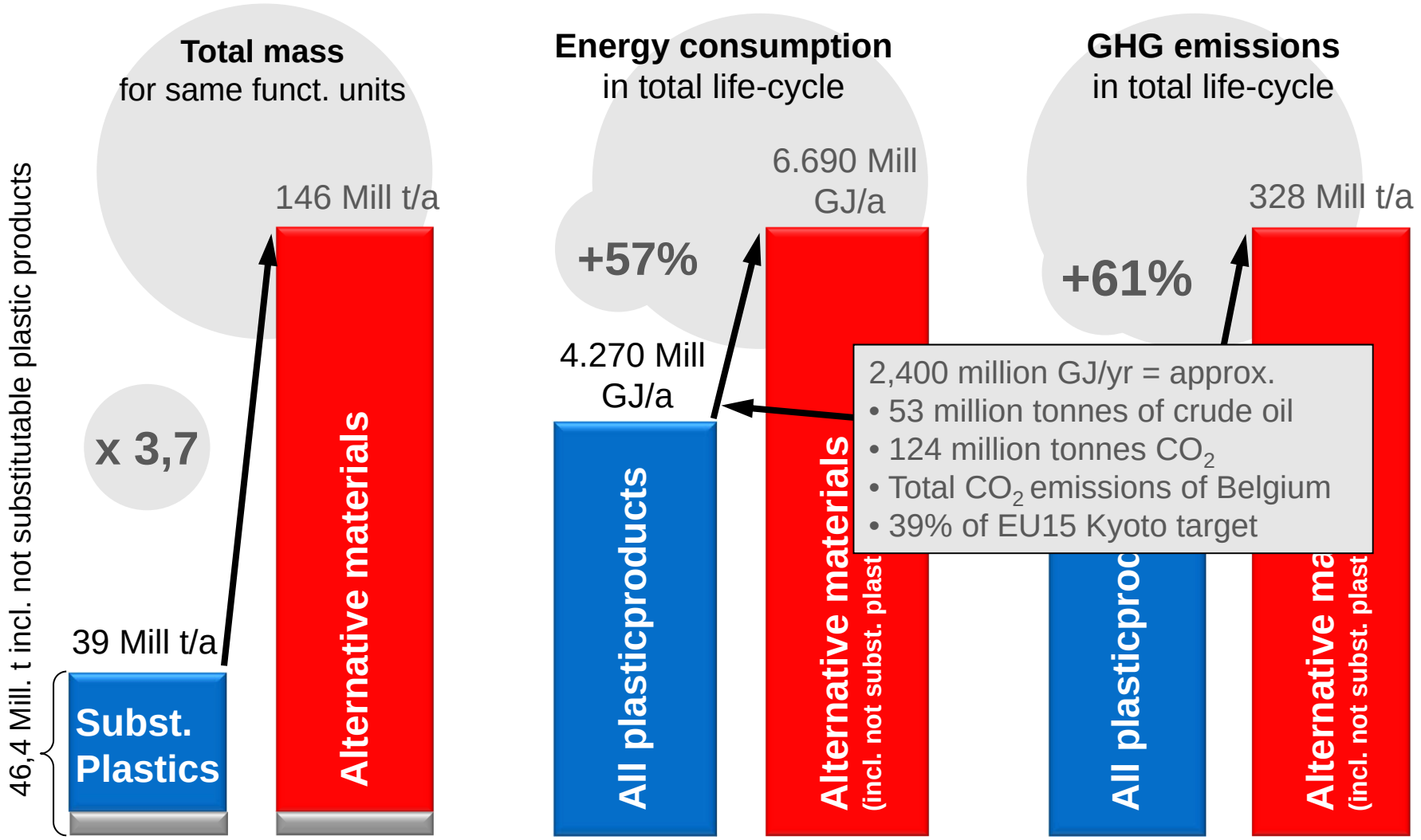

# The Environment – Some Context

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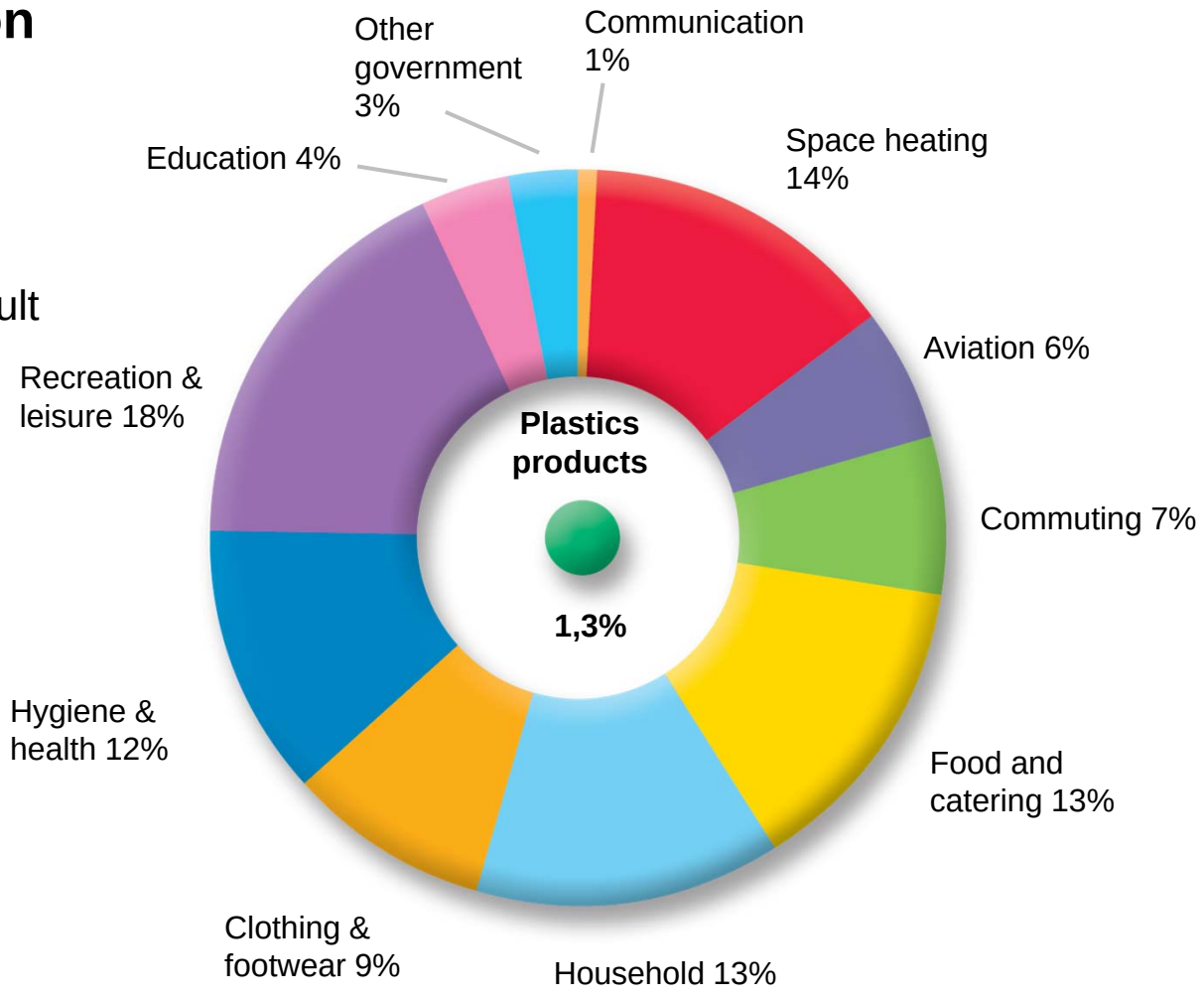
## Average consumer carbon footprint for the EU27+2:

- Approx. 14 tonnes $CO_2$-equivalents per capita
- Thereof, 170 kg per capita result from plastics consumption
- This equals 1,3% of the total consumer carbon footprint




**Relevance of plastic products in total consumer „carbon footprint“**

# Plastics – Reducing $CO_2$ Output

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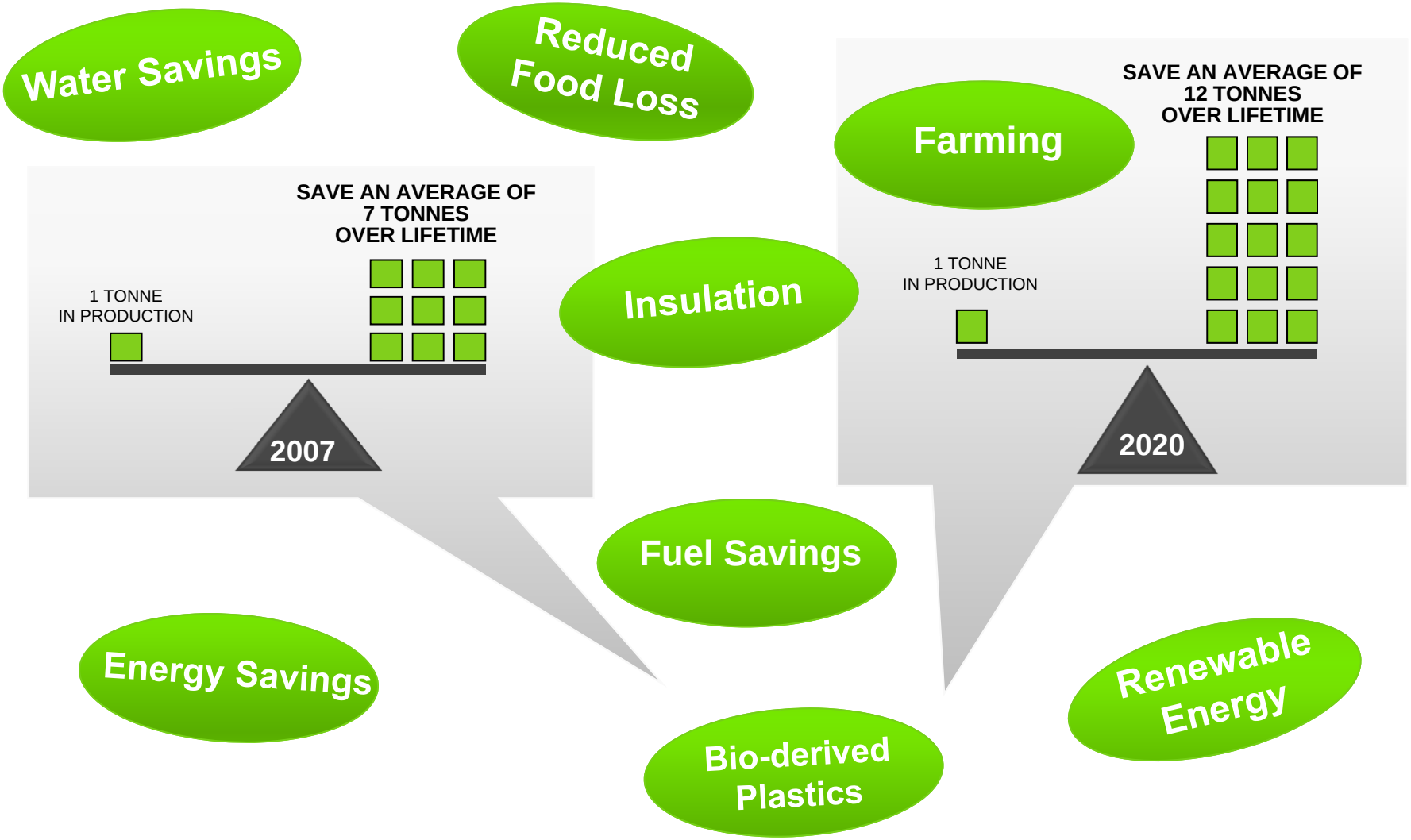


Source: denkstatt

## Carbon Savings From Plastics

# Safeguarding against climate change

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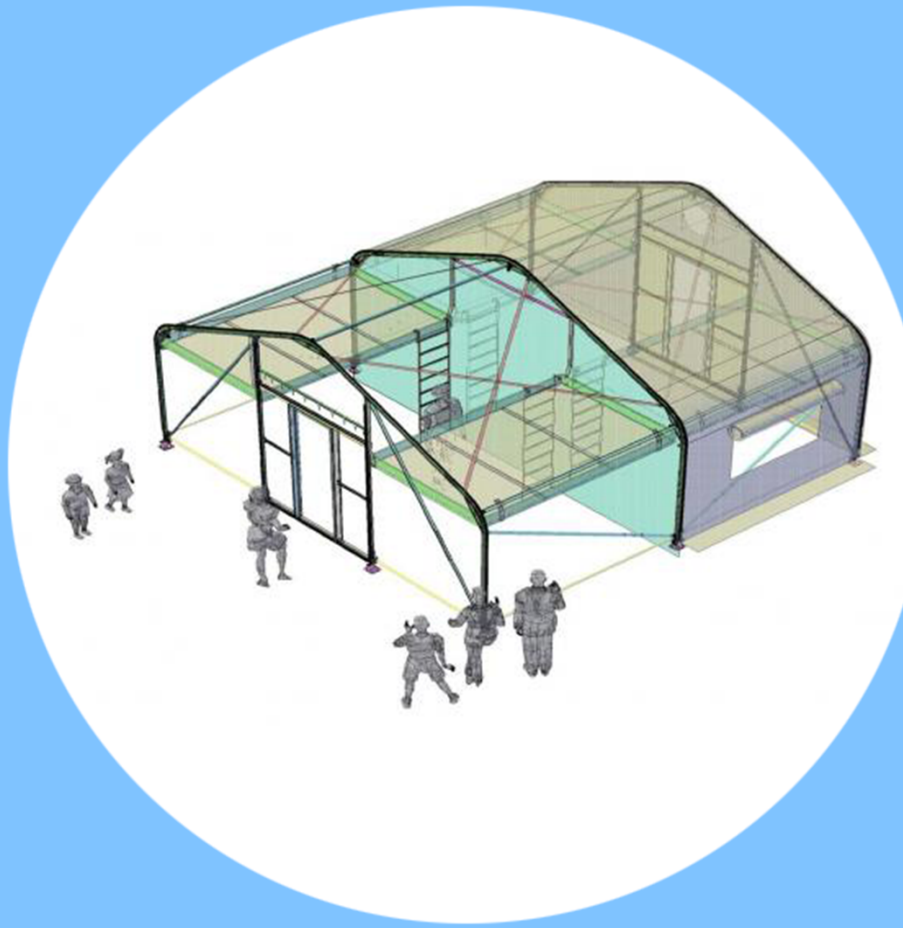
- **Strengthening buildings and flood defences**
  - earthquake resistant buildings
  - storm protection
  - continued land use during flooding
  - floating plastics greenhouses
- **Helping refugees**
  - floating plastic houses
  - artificial islands for climate refugees
  - effective emergency infrastructures
  - Temporary shelters



# Looming energy crisis

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Plastics will help alleviate the looming energy crisis by enabling ground breaking technologies:

- Making renewable energy affordable, more productive
- Improving energy efficiency in housing
- Enabling ground breaking technologies in transport and building & construction

# Example: Plastics packaging

## When more is less

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On average only 1 to 3% of the weight of a packaged product in plastics comes from the packaging:

- A plastic film of 2g packages 200g of cheese
- A plastic Bottle of 35g packages 1.5 liter of drinks

Inclusive the logistic packaging, it grows up to 3.56% on average


Without plastics, retailers' fleets would make **50% more journeys**

# The intelligent choice for innovative retailing

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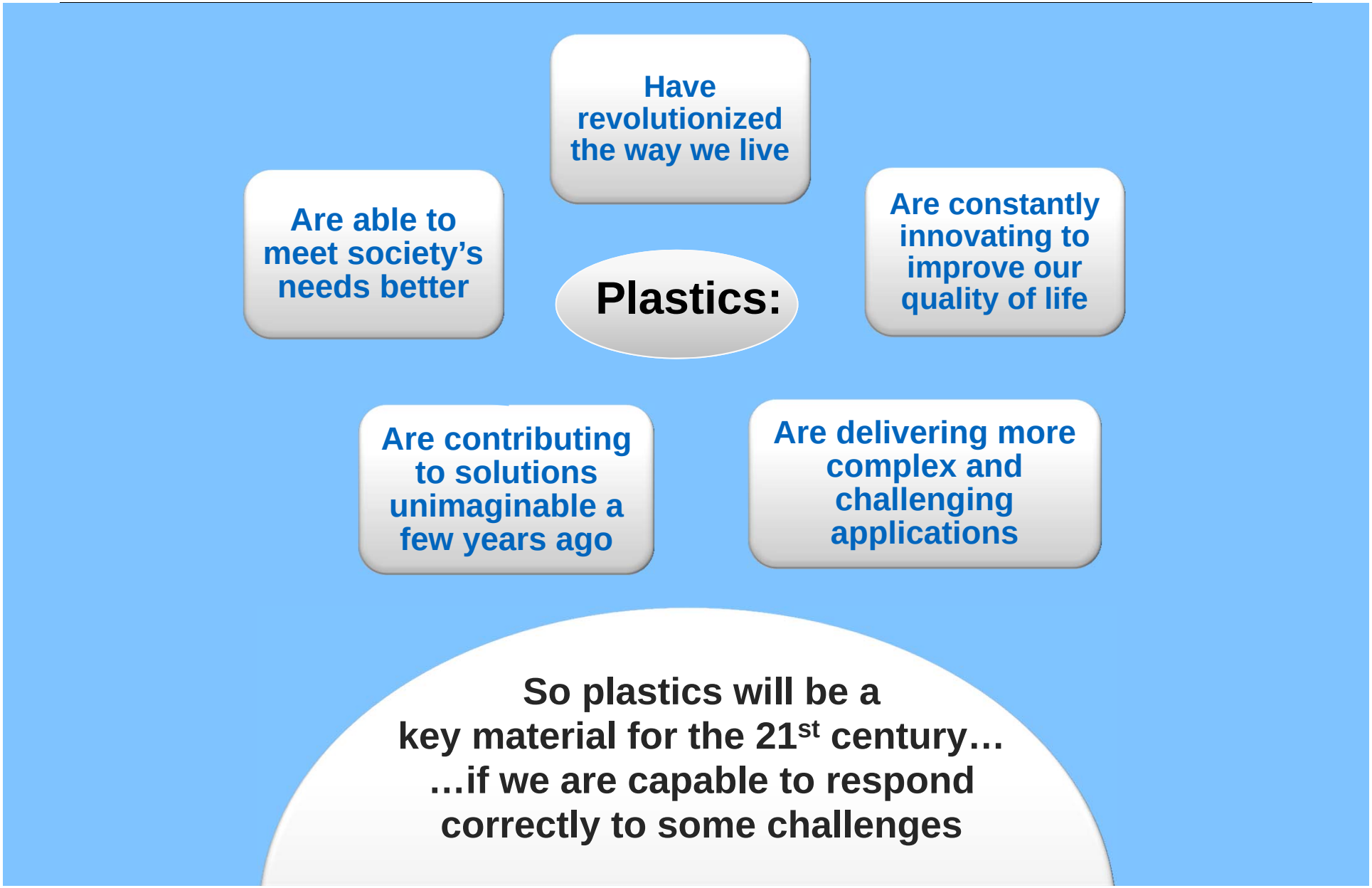
**Improving quality**
**– Increasing shelf life**

- Vacuum packs
- Modified atmosphere packaging
- Breathable pack
- Confectionery flow packed bars

# Conclusion


Have revolutionized the way we live
Are able to meet society's needs better
Plastics:
Are constantly innovating to improve our quality of life
Are contributing to solutions unimaginable a few years ago
Are delivering more complex and challenging applications
So plastics will be a key material for the 21st century…
…if we are capable to respond correctly to some challenges

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Plastics are not sustainable?

**Educate people to think in terms of life cycle**

# Assessing environmental impact
# Need to look at the entire life cycle

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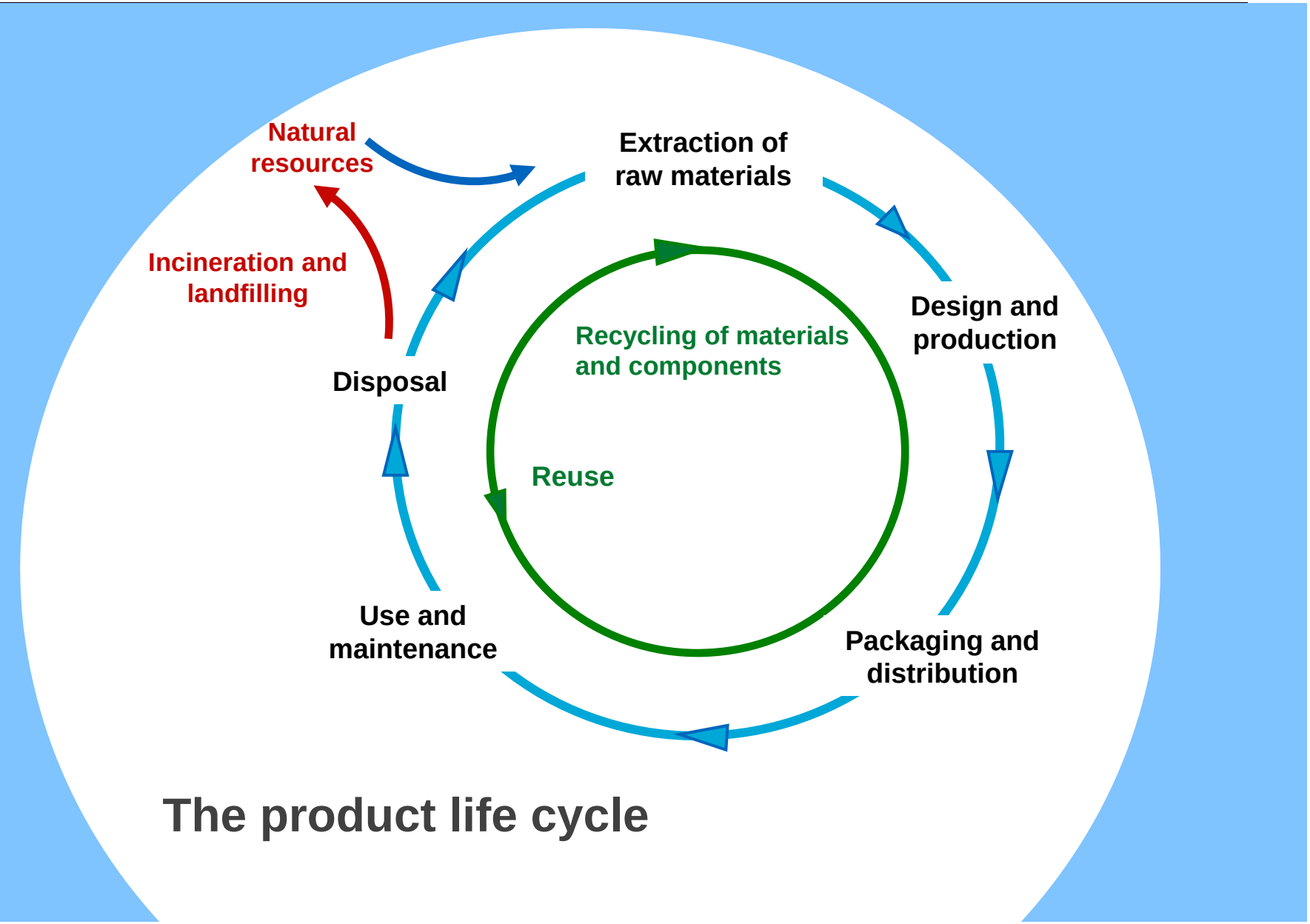
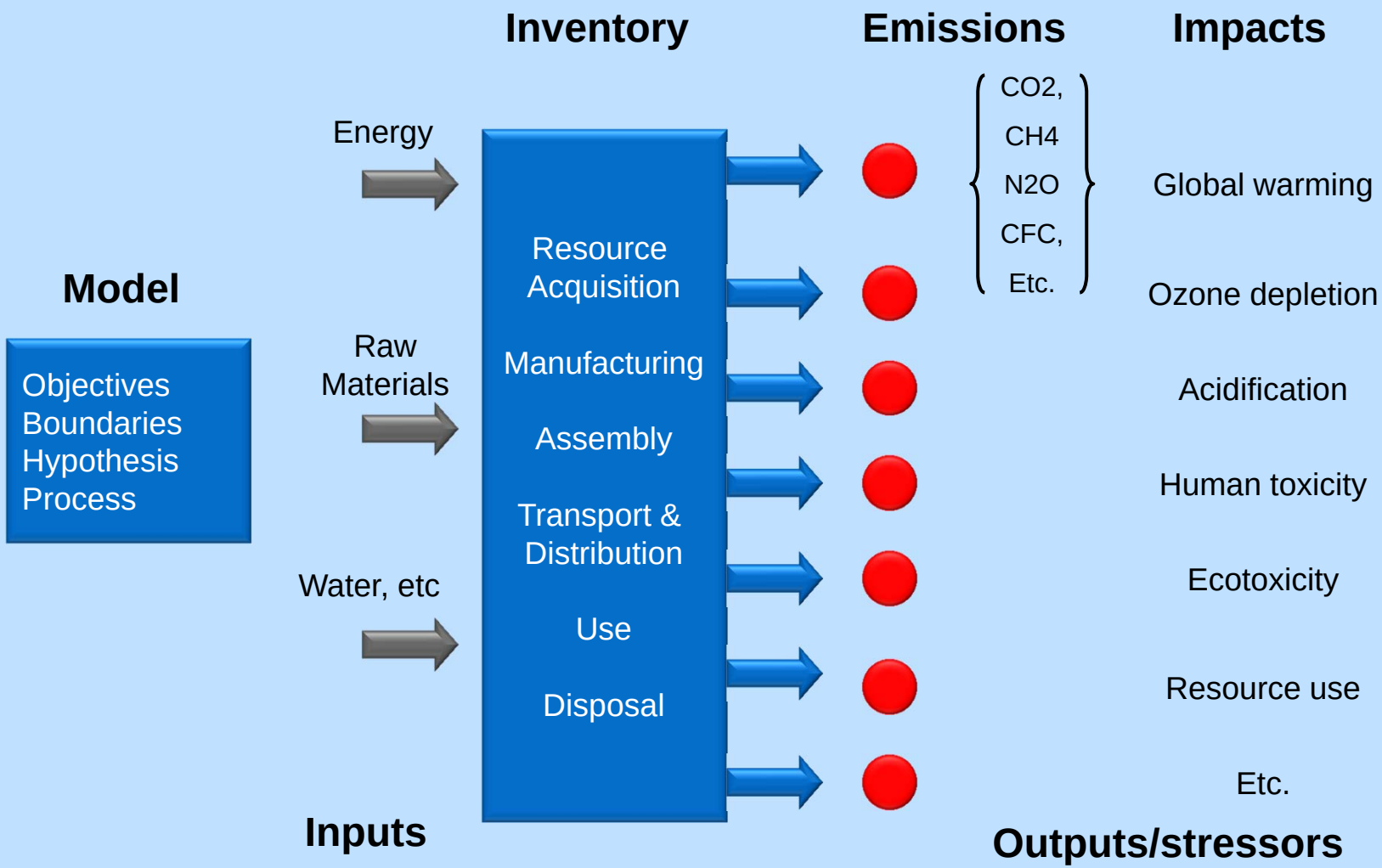



The product life cycle

# Life Cycle Assessment Basics




Source: UNEP – Life cycle initiative 2007

# PlasticsEurope, an early pioneer of the Information Age

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**Tier 1**

**Eco-profiles — Life Cycle Inventory (LCI) Data**
- Fuel consumptions
- Raw material consumptions
- Air emissions
- Aqueous emissions
- Solid wastes

→ **LCA Experts**

**Tier 2**

**Environmental Product Declarations (EPD) Metrics**
- Climate Change, GWP
- Ozone Depletion, ODP
- Acidification, AP
- Nutrification, NP
- Summer Smog, POCP
- Resource Depletion

Possible Additional Metrics
- Land Use
- Water
- Toxicity (Human, Eco)

→ **B2B**

**Tier 3**

**Ecofootprint**

→ **B2C**

## A Natural Progression

# PlasticsEurope‘s Life Cycle Data Environmental Product Declarations

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# Addressing the issues

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If you ask the public about their opinion on "plastics and environment" or "plastics and health", the answer is negative.

Here are some of the remarks made with respect to plastics:

- They affect your health
- There is too much plastics
- They pollute
- Plastics are not recyclable
- Plastics use most of the oil

# Let’s address those issues!

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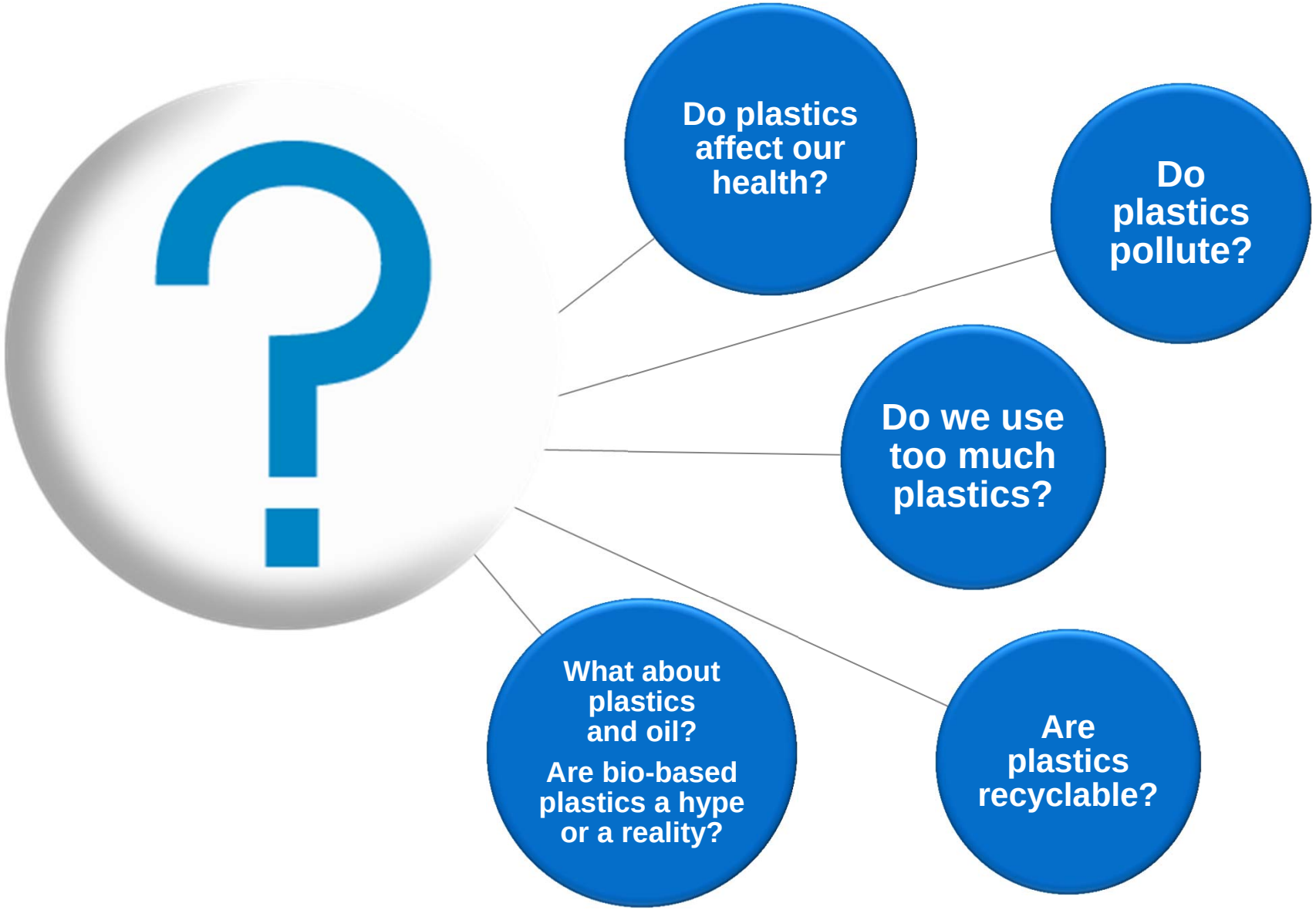

# 1. DO PLASTICS POLLUTE?

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Plastics do not pollute as such, but are unfortunately littered and ending up in oceans

# 1. Environmental pollution and its reasons

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**Plastics are too Valuable to be wasted! It is a Resource… ”My Waste is Your Material”: Eco-Industry**

Waste collection systems working badly

Improper use of landfills

Behavior

→ Environmental pollution is a behavioral problem and a problem of bad waste management

# 1. 80% of marine litter originates from land

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# 1. What is the Industry doing about this?

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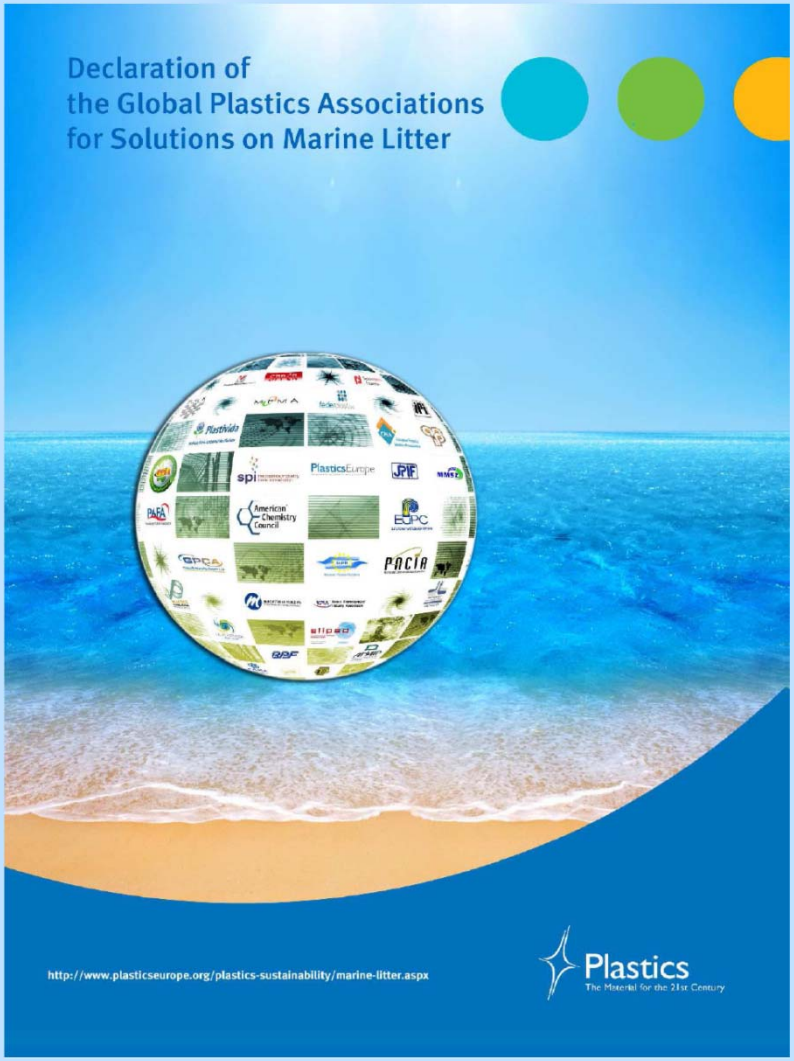


www.marinelittersolutions.com

# 1. What is the Industry doing about this?

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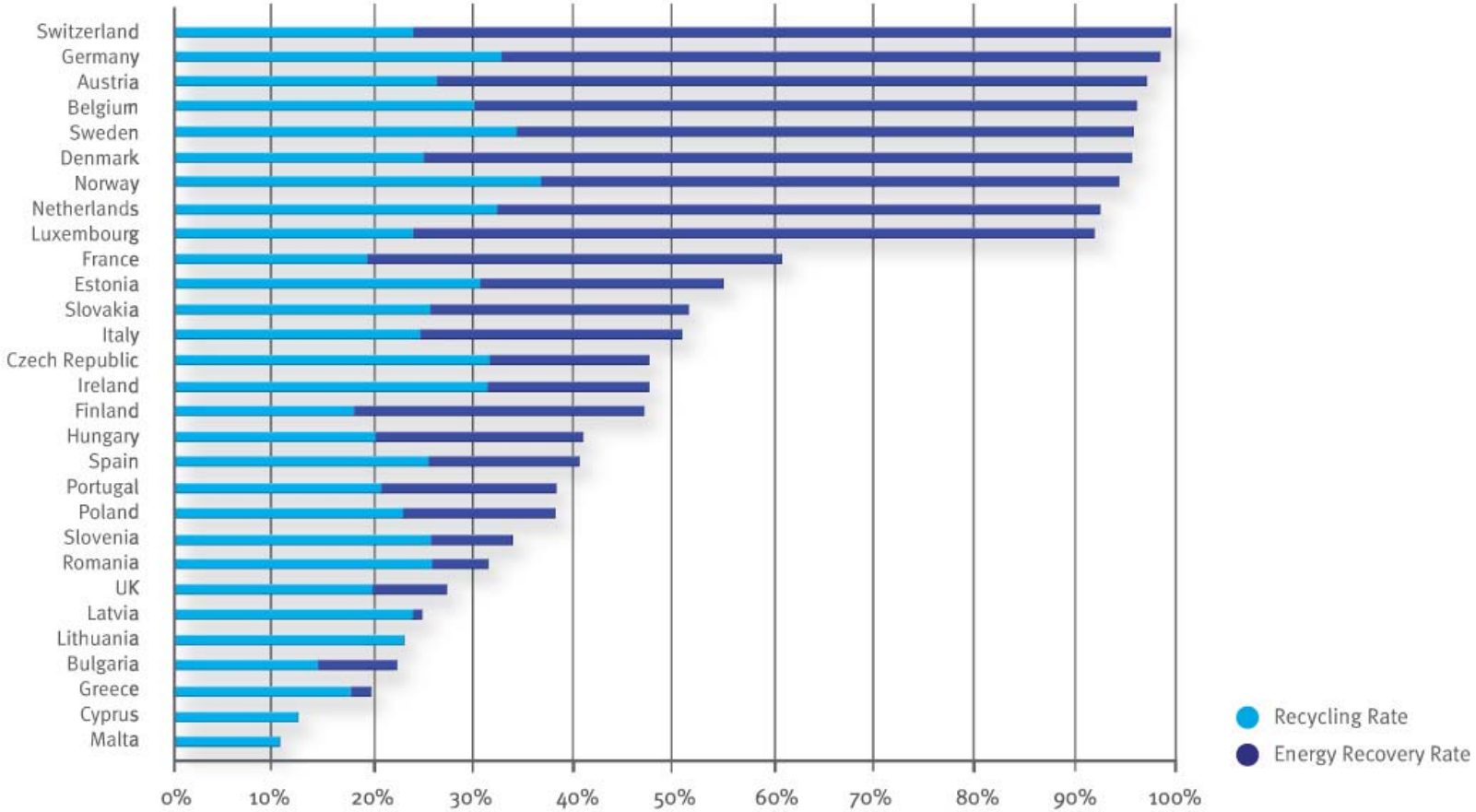
## Advocates for "Zero Plastics to Landfill by 2020"




Total Recovery Rate by Country 2011
(Referred to Post-Consumer Plastic Waste)
Source: Consultic

# 1. ALL recovery options apply for plastics

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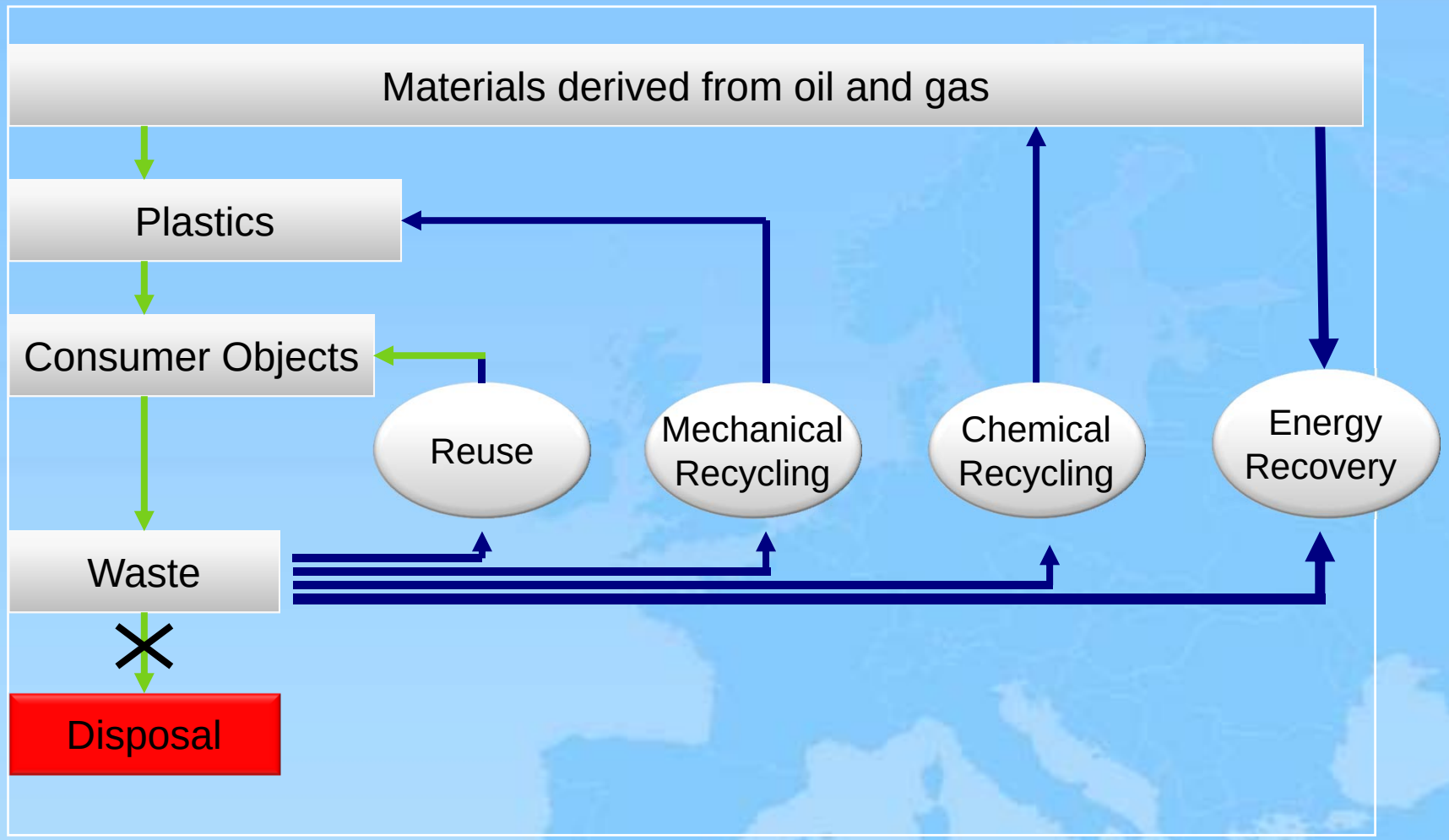

# 2. DO PLASTICS AFFECT OUR HEALTH ? CHEMOPHOBIA

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*The emotional dimension*

# 2. The DHMO hoax

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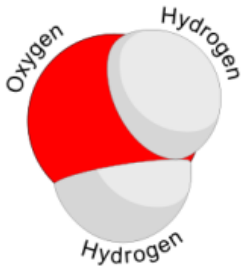
**First appeared in the Pittsburgh post gazette**

Pittsburgh Post-Gazette
ONE OF AMERICA'S GREAT NEWSPAPERS

## *DHMO has been found in over 95% of all fatal cervical cancers!*

The figures are astonishing - DHMO has been found in over 95% of all fatal cervical cancers, and in over 85% of all cancers collected from terminal cancer patients. Despite this, it is still used as an industrial solvent and coolant, as a fire retardant and suppressant, in the manufacture of biological and chemical weapons, in nuclear power plants - and surprisingly, by elite athletes in some endurance sports. However, the athletes later find that withdrawal from DHMO can be difficult, and sometimes, fatal. Medically, it is almost always involved in diseases that have sweating, vomiting and diarrhoea as their symptoms.




National MP Jacqui Dean has been caught out by a long-running hoax that seeks to trick gullible MPs into calling for a ban on "dihydrogen monoxide" — or water.

A letter, signed by Ms Dean and sent to Associate Health Minister Jim Anderton, the minister in charge of drug policy, asked if the Expert Advisory Committee on Drugs had a view on banning the "drug".

**It kills thousands each year.**

## 2. Risk versus Hazard

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**Risk = Hazard x Exposure**

Hazard vs Risk exposure

# 2. Understanding the concept of Risk & Hazard is key

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**Hazard**

high

low

| | |
|---|---|
| Hazard**:** | **high** if hungry |
| Exposure: | **low** in Europe |

**Risk = Hazard *x* Exposure**

| | |
|---|---|
| Hazard**:** | **low** |
| Exposure: | **high** in Europe |

low

high

**Exposure** in Europe

# 2. Handle with care…

Statements containing **“without”** or **“free of”** should be used with caution.


They must

- *not be misleading*,
- *be objectively verifiable* and
- *not discredit or denigrate a competitor*.

Any statement supporting the absence of certain substances may incorrectly imply that products which contain such substances are dangerous for human health and that products not containing these are (much) safer.

This could be perceived as supporting unproven bans or restrictions on chemicals contained in plastic products.

# 2. Some Context

## Stringent and Transparent Legislations in Place

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Unique for Plastics is the stringent Plastics in contact with food Regulation (1)

Materials in contact with drinking water (2)

Medical devices (all food grade) (3)

Toys Regulation (4)

REACH (5)

European Food Safety Authority (EFSA) training about safety (6)

***Chemical & Plastics Industry have responsible care and product stewardship programmes***

(1) http://ec.europa.eu/food/food/chemicalsafety/foodcontact/eu_legisl_en.htm
(2) http://www.umweltbundesamt.de/wasser-e/themen/trinkwasser/4ms-initiative.htm
(3) http://ec.europa.eu/health/medical-devices/index_en.htm
(4) http://ec.europa.eu/enterprise/sectors/toys/documents/directives/index_en.htm
(5) http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm
(6) http://www.efsa.europa.eu/en/news/videos.htm?utm_source=newsletter&utm_medium=email&utm_content=video&utm_campaign=20120717&emt=1

# 3. DO WE USE TOO MUCH PLASTICS?

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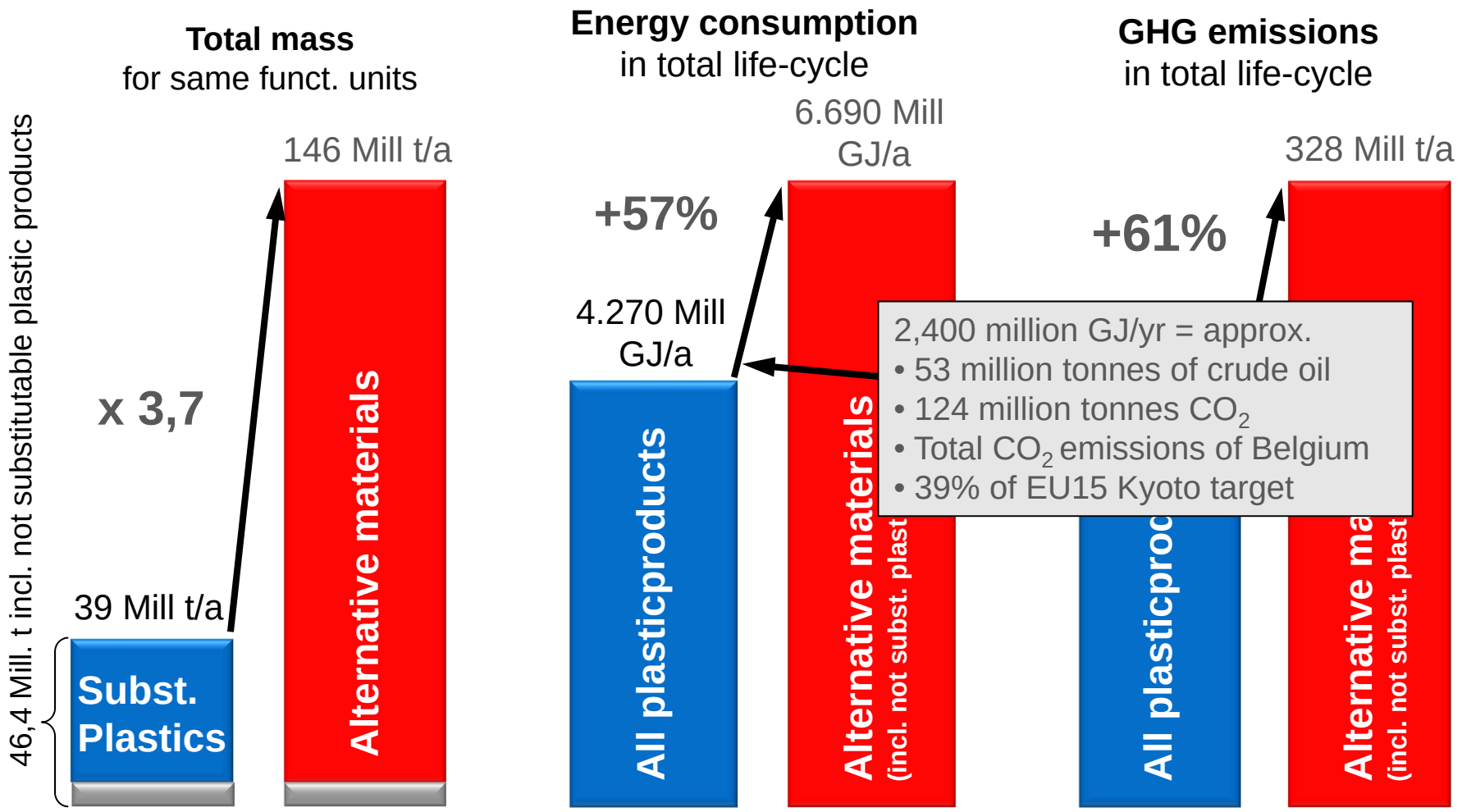
**The Plastics Paradox is that the "more" we use, the "better" for the environment**



# 3. More with less

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MORE PLASTIC = LESS WASTE


Average weight needed to pack 100grams of  product

# 3. Plastics excel at all levels of the waste hierarchy – except landfill…

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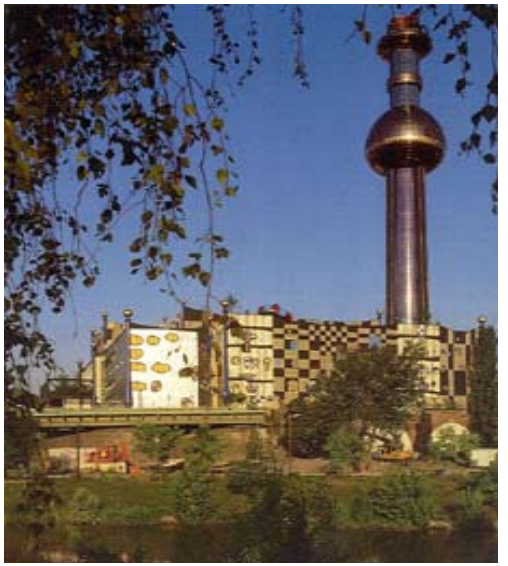
- **Reduce**
  + less polymer
  + less wastage
  + less transport
- **Reuse**
  + beverage bottles
  + shopping bags
  + trays and crates
- **Recycle**
  + bottle, industry film and window frames
- **Recover**
  + EfW plants
  + SRF for industry



# 3. Important is to take proper care of the plastics we use

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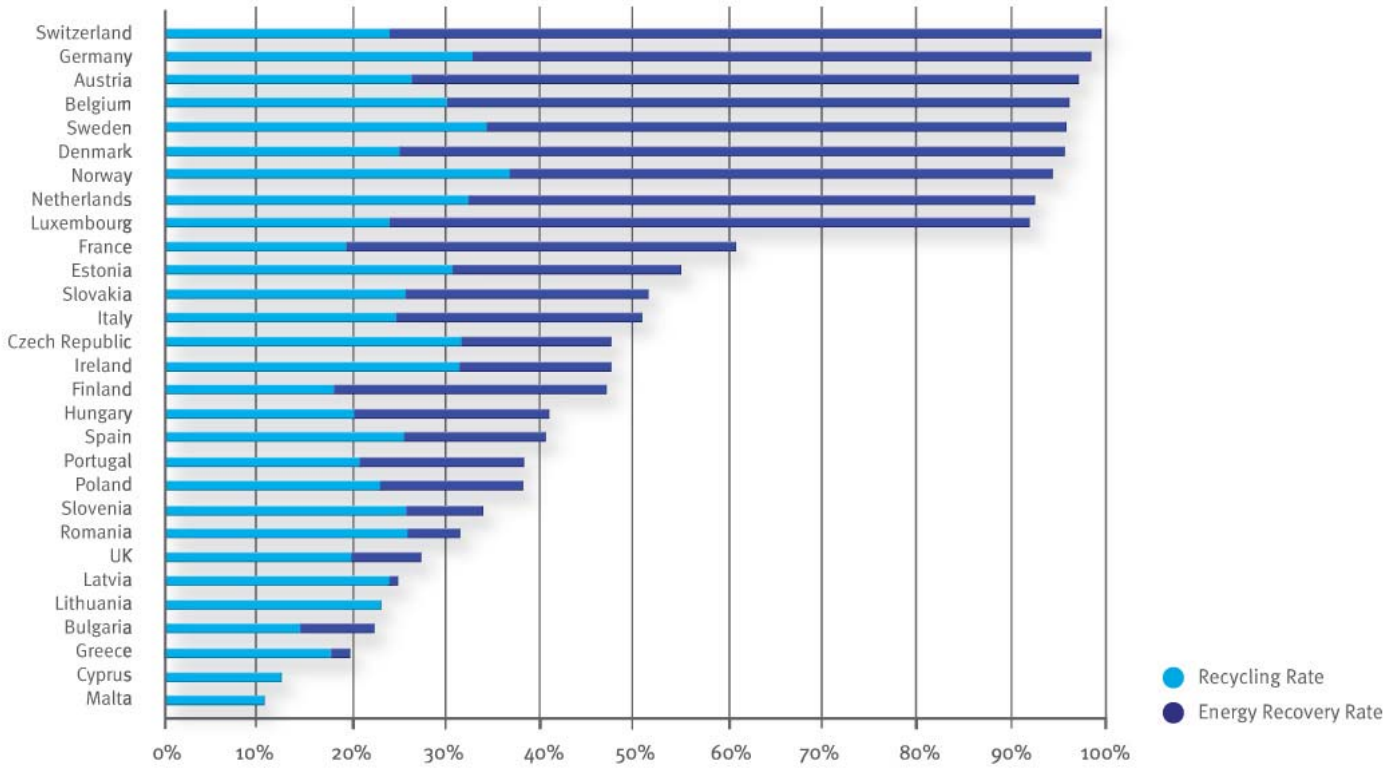
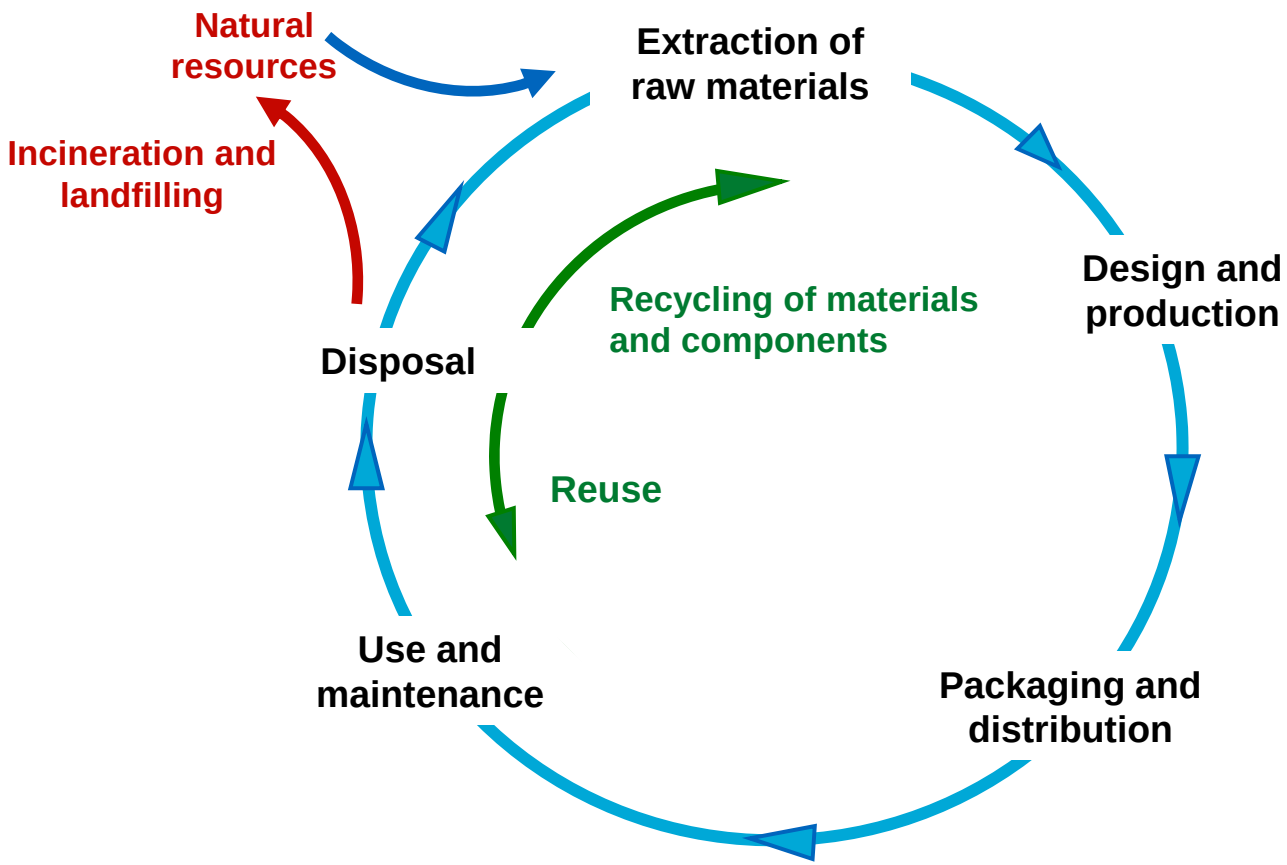
## We need to reach "Zero Plastics to Landfill by 2020" and "Zero Plastics Litter"




Total Recovery Rate by Country 2011
(Referred to Post-Consumer Plastic Waste)
Source: Consultic

# 3. And that we design products for sustainability…




…taking the full product life cycle into account

# 4. Are Plastics recyclable?

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**All polymers are in principle recyclable**

But, you recycle objects and not polymers and polymers are not all mixable.

**Some considerations:**

- Objects can be difficult to collect (small, light)
  - Ex: for iron you collect cars but not paperclips
- Plastic Objects can be complex and made out of different polymers
  - Choices to be made **thinking full life cycle**
    Ex: multilayer plastic barrier film to increase shelf life of food
    - Saving Food
    - But, not recyclable.
    Better to recover energy for this particular object

# 4. Recyclability put into Perspective: Light weight plastics saves lots of fuel

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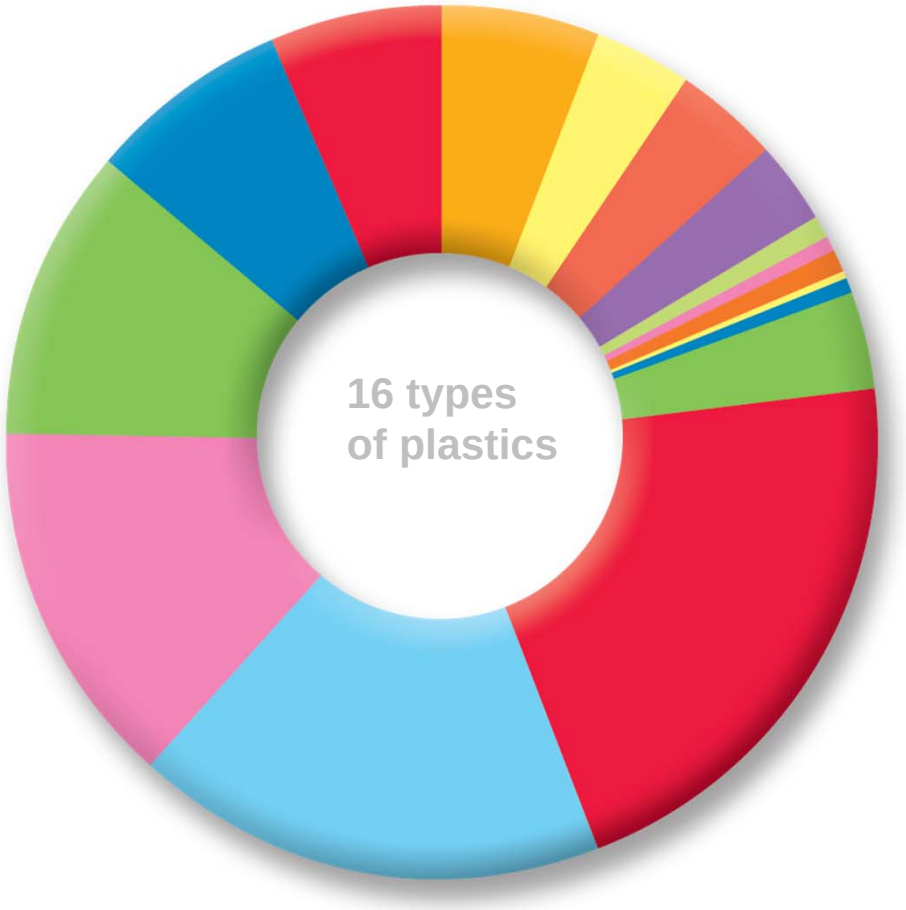
**BMW 3 series (from year 2002):**
**160 kg plastics of a total of 1400 kg (11,6 %)**




# 4. All recovery options apply for plastics

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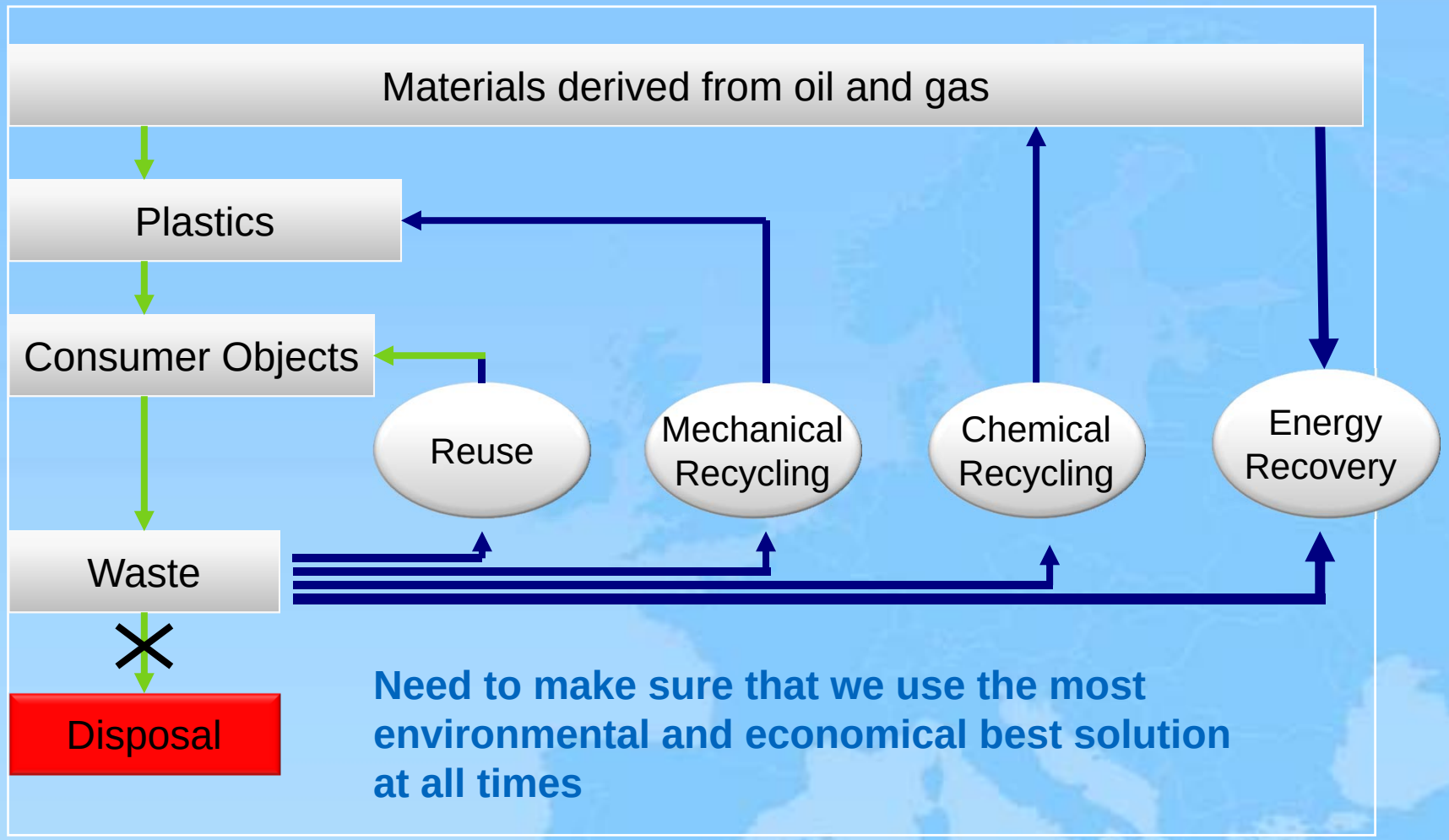

# 5. What about Plastics & Oil? And are bio-based plastics a hype or a or Reality?

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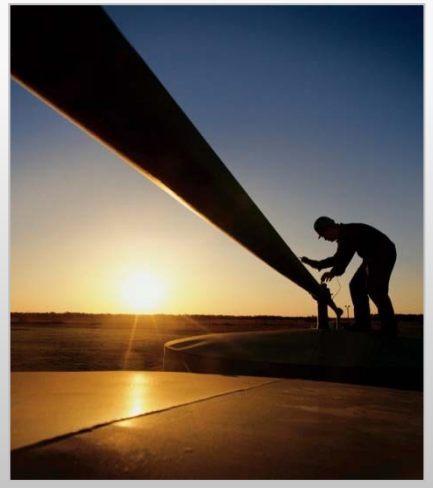
**Plastics can be produced from different raw materials**

Oil

Gas



Coal

Renewable Raw Materials

Fossil Raw Materials
Renewable Raw Materials → Chemical Modification → Products

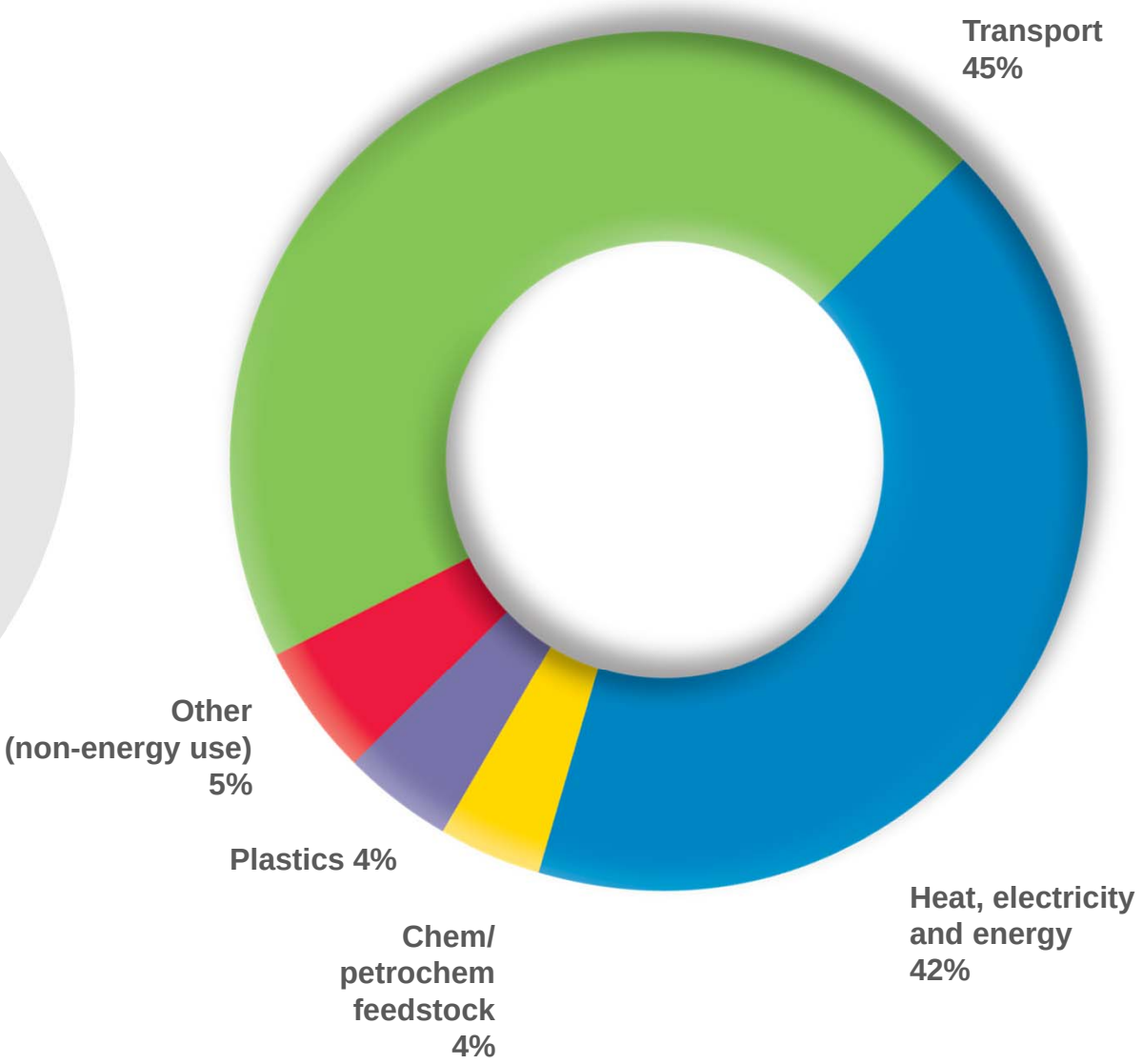
→ Raw materials change brings challenges but also opportunities for the development of new technologies and new materials

# 5. Remember

Only 4% of oil and gas in Europe are used for manufacturing plastics

**and…**

plastics contribute significantly to energy savings and emission reductions



# 5. Are bio-based plastics a hype or a or reality?

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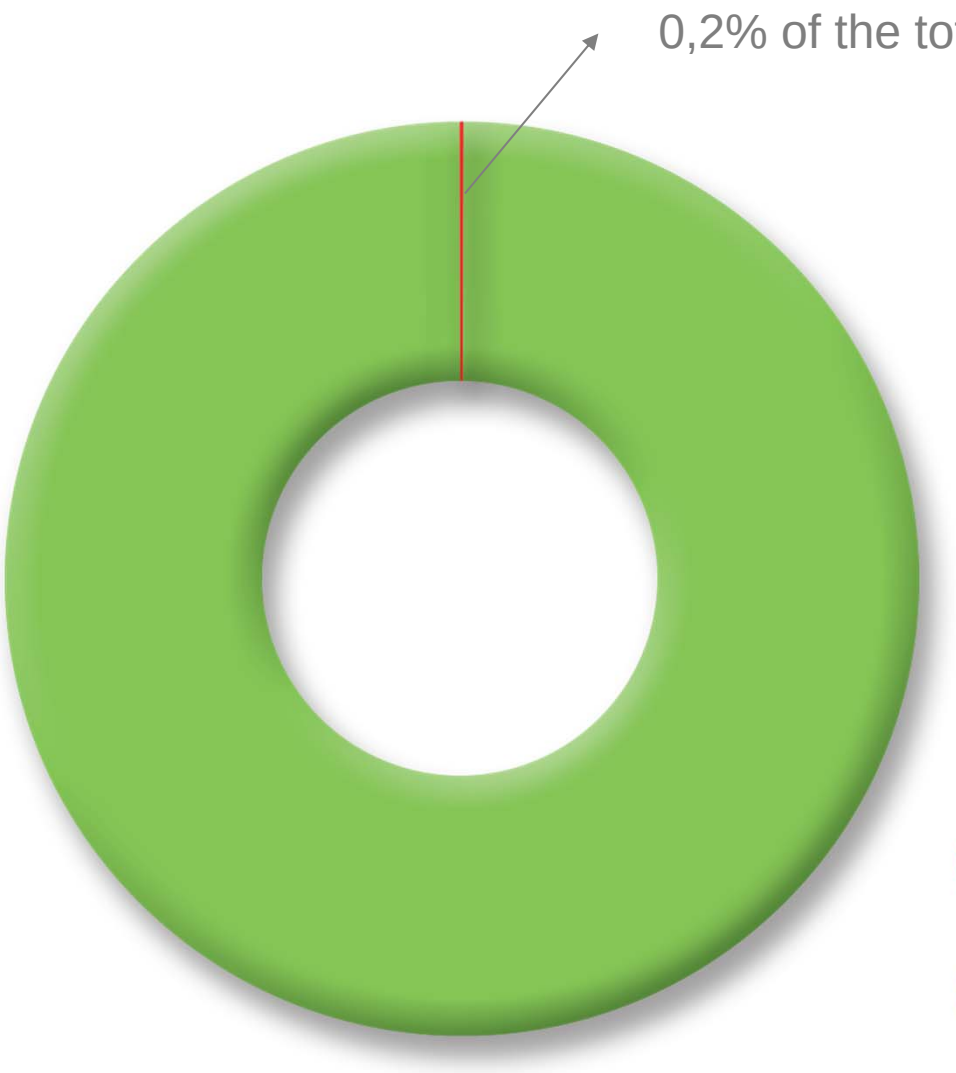


Today Plastics produced from renewable raw materials is still a niche but a growing opportunity

Renewable Raw Materials

Fossil Fuel Raw Materials

# 5. Driving forces for the bio-based plastics market

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| | |
|---|---|
| **Cost competitiveness** | • Polymers and building blocks produced via bio routes become cost competitive with products produced via fossil fuels-based routes |
| **Feedstock flexibility** | • Chemical companies want to decrease their dependence on fossil fuels with alternative production processes/feedstock |
| **Customer demand** | • Increasing interest of brand owners and retailers in market differentiation → Bioplastics = Premium products |
| **Innovation** | • Technology progress including access to new applications, feedstocks and increased production capacities |
| **Regulation pressure** | • Pressure from regulators by law/mandate to enforece use of bio products (e.g. biofuels) or to stimulate products with innovation subsidies |

Source: McKinsey & Company, 2011

# 5. Taking out confusion when talking about Bioplastics

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The term „Biobased & Biodegradable Plastics“ is ambivalent and calls for a differentation, in respect of raw materials and functionality:

**Biobased plastics** are plastics made in whole or partially from biological resources

**Biodegradable plastics** are plastics degraded by microorganisms into water, carbon dioxide (or methane) and biomass under specified conditions.

**Biodegradability and compostability** are defined by internationally recognized standards: e.g. EN 13432, GreenPla, AS 4736 and ASTM D6400

**Biodegradability** is an intrinsic property of the material, independent of its origin. Biodegradable plastics can be from fossil or renewable resources.

# Biodegradable versus biobased plastics

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„Bio-plastics“

**Most cellulose derivatives,**

Bio-PE, Bio-PVC,

Bio-PU, Bio-PA

reference to „biomass“

**Starch blends, cellophane, PLA, PHA**

**Chitin, Chitosan**

**not biodegradable**

**biodegradable**

**PE, PP, PVC, PS, ABS, PET, PMMA, PUR, PA, ...**

reference to „fossil“

**PCL, PBAT, PBS, ....**

**PVOH/PVA, PGA, ....**

# Imagine a world without plastics

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## Slide 55

**P3** ensure falsh movie is embedded....
PVA; 13/09/2012

# What can each of you do?

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- Please take care of this valuable resource and tell your friends and family
  - Prevent: DON'T USE resources you do not need
  - Re-use wherever possible, collect and recycle… DON'T LITTER

Dialogue with your friends and families

- Read claims, literature and media with care
- Ask experts around you or mail to PlasticsEurope if you are concerned and/or have a question with respect to :
  - Plastics and health issues
  - Choice of materials based on environmental claims (claims should be verifiable)

***info@plasticseurope.org***

# Remember: Mega Trends Opportunities for Plastics

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## Population Growth & Changing Societal Demographics

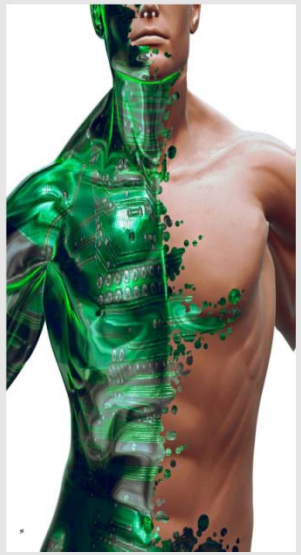
- Combating shortages of food
- Combating shortages of drinking water
- Increasing the productivity of land

## Globalization Urbanization

- Creating jobs
- Facilitating mobility and communications

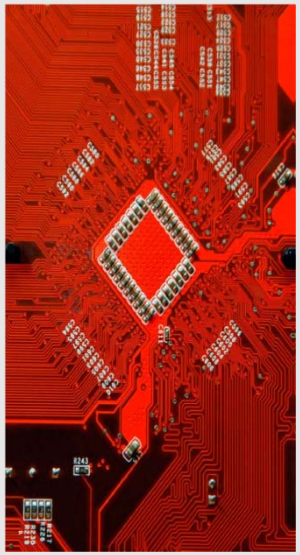
## Climate Change: Global Warming Energy Shortage

- Improving the energy efficiency of homes and workplaces
- Facilitating the search for more fossil fuel Resources
- Supporting the search for a new energy mix
- 100% recovery from plastics waste



## The Healthcare Revolution & Consumer Protection

- Facilitating diagnosis and treatment
- Making more effective and life-like prostheses
- Enabling higher quality of life for aging population



## Accelerating Technological Change

- Opening up new possibilities with nanotechnology
- Developing faster, cheaper chips using conductive plastics


Plastics
The Material for the 21st Century