

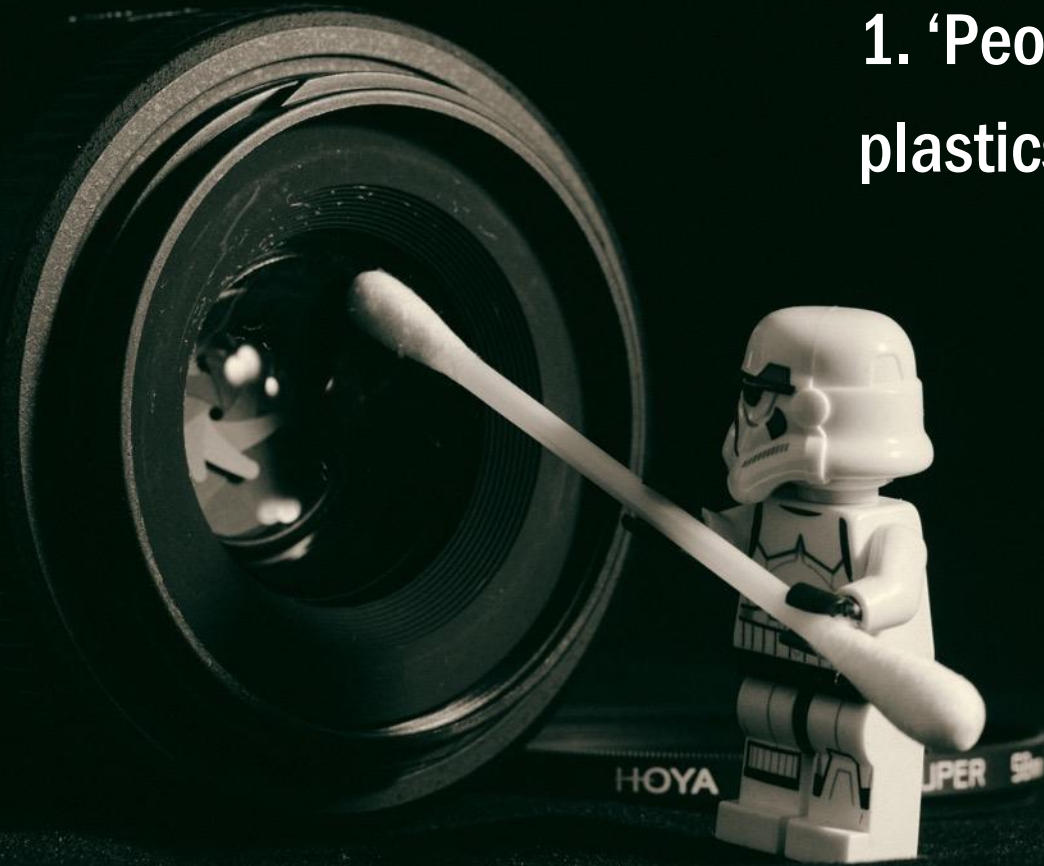


# PLASTICS REHAB

Prof. Kim Ragaert

# A clearer view on today's challenges for a sustainable plastics industry

## 1. 'People hate plastics'







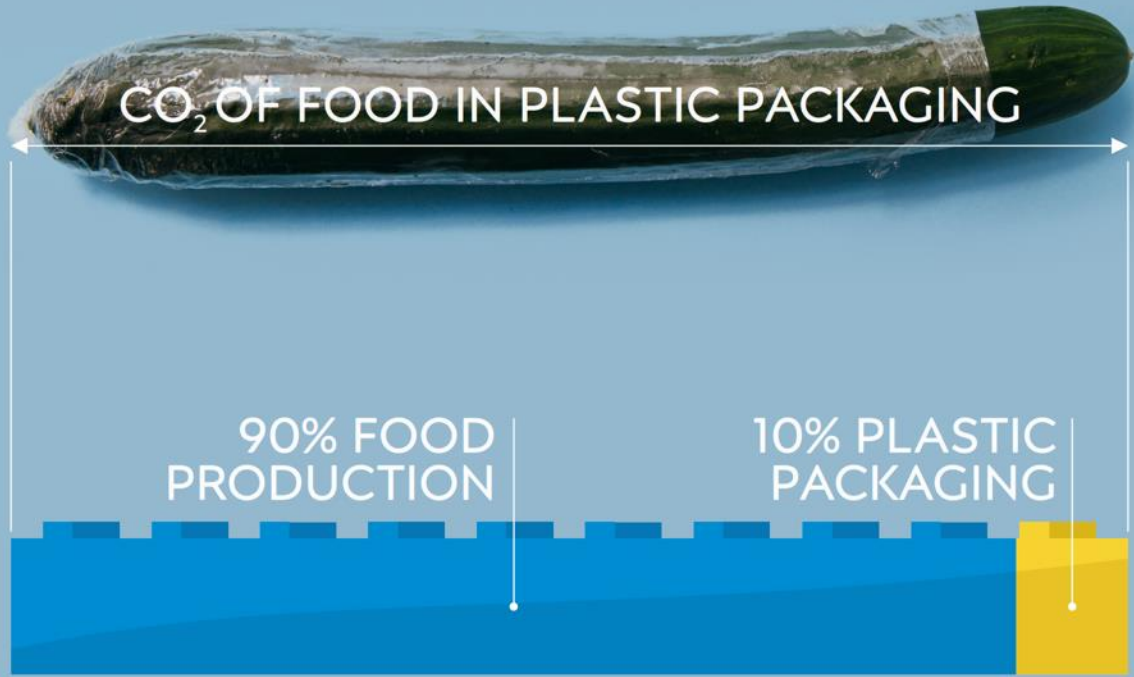
# *Environmental folklore*

# SCIENCE





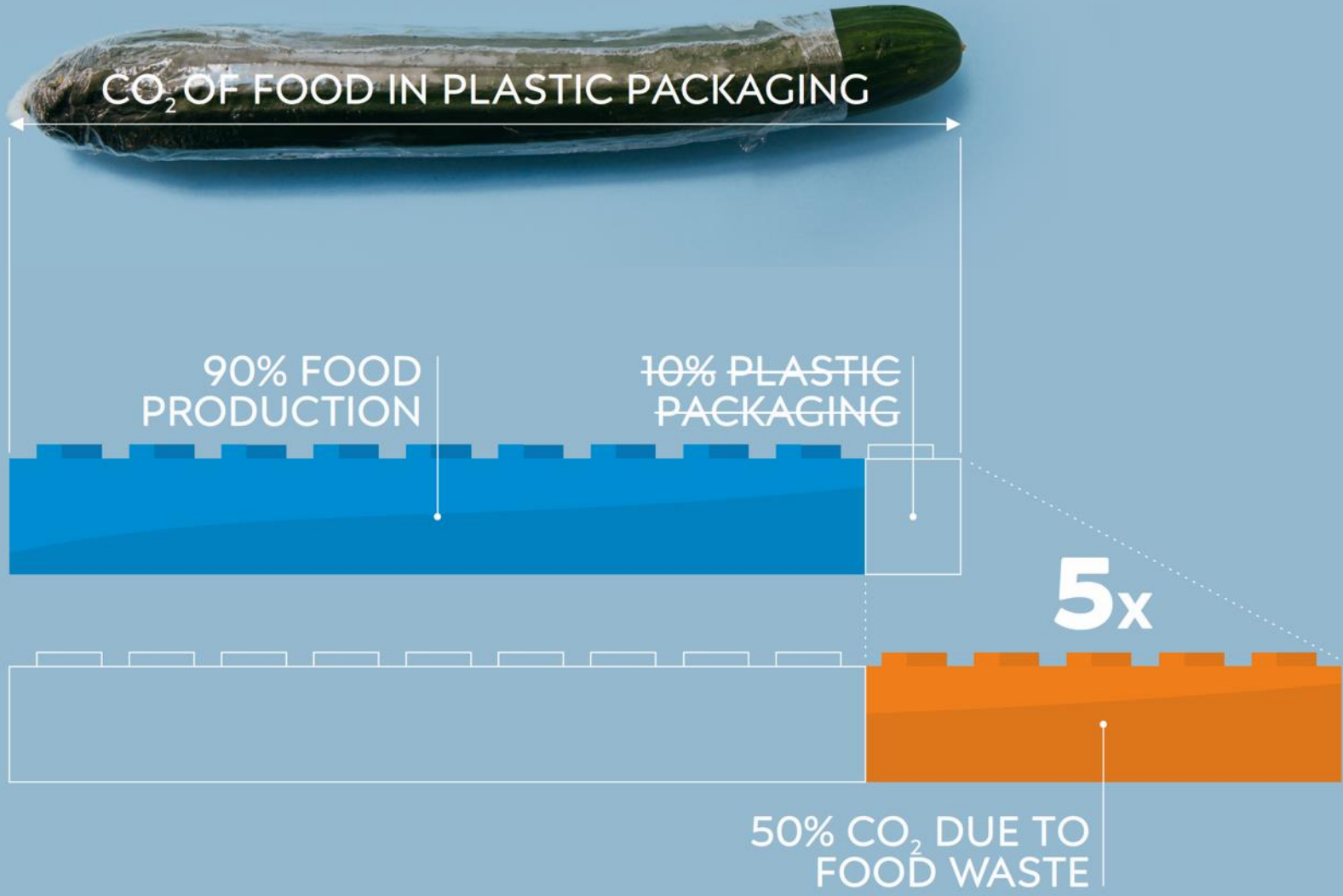
CO<sub>2</sub> OF FOOD IN PLASTIC PACKAGING



90% FOOD PRODUCTION

10% PLASTIC PACKAGING

CO<sub>2</sub> OF FOOD IN PLASTIC PACKAGING





1



# PLASTIC BAG

20 GRAM  
100% NEW MATERIAL  
USED ONCE  
INCINERATION

4

173

1



### PLASTIC BAG

20 GRAM  
100% NEW MATERIAL  
USED ONCE  
INCINERATION



### PAPER BAG

50 GRAM  
100% RECYCLED

1734

1



### PLASTIC BAG

20 GRAM  
100% NEW MATERIAL  
USED ONCE  
INCINERATION

4



### PAPER BAG

50 GRAM  
100% RECYCLED

1

7



1



### PLASTIC BAG

20 GRAM  
100% NEW MATERIAL  
USED ONCE  
INCINERATION

4



### PAPER BAG

50 GRAM  
100% RECYCLED

17

3



### COTTON BAG

250 GRAM  
REUSE

**1**

**PLASTIC BAG**


20 GRAM  
100% NEW MATERIAL  
USED ONCE  
INCINERATION



**4**

**PAPER BAG**

50 GRAM  
100% RECYCLED



**173**

**COTTON BAG**

250 GRAM  
REUSE





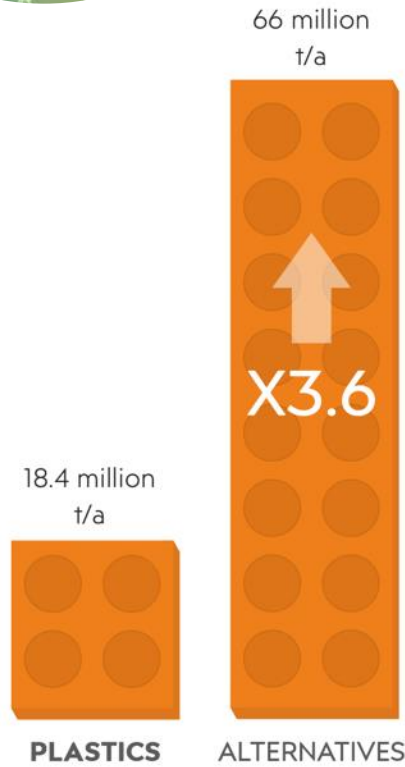
A photograph of a beach heavily littered with plastic waste, including a white plastic jug, a blue container, and various pieces of debris. In the background, there are palm trees and the ocean under a clear blue sky. A yellow text box is overlaid on the image, containing the text '80% IS YOU & ME'. A yellow downward-pointing triangle is positioned below the text box.

**80% IS  
YOU & ME**



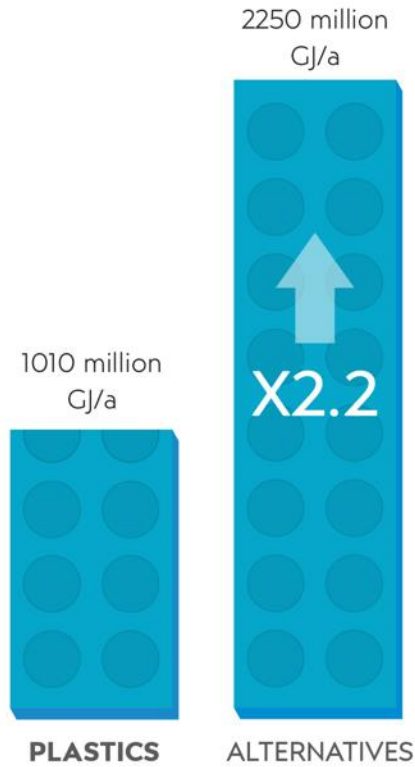
## ASSES

TIONAL UNITS



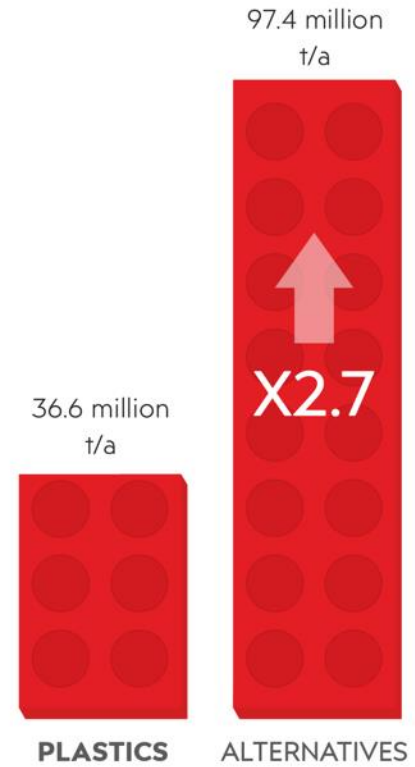
## ENERGY

IN TOTAL LIFE-CYCLE



## CO<sub>2</sub> EMISSIONS

IN TOTAL LIFE-CYCLE





# A clearer view on today's challenges for a sustainable plastics industry

## 2. Effective recycling rates are low

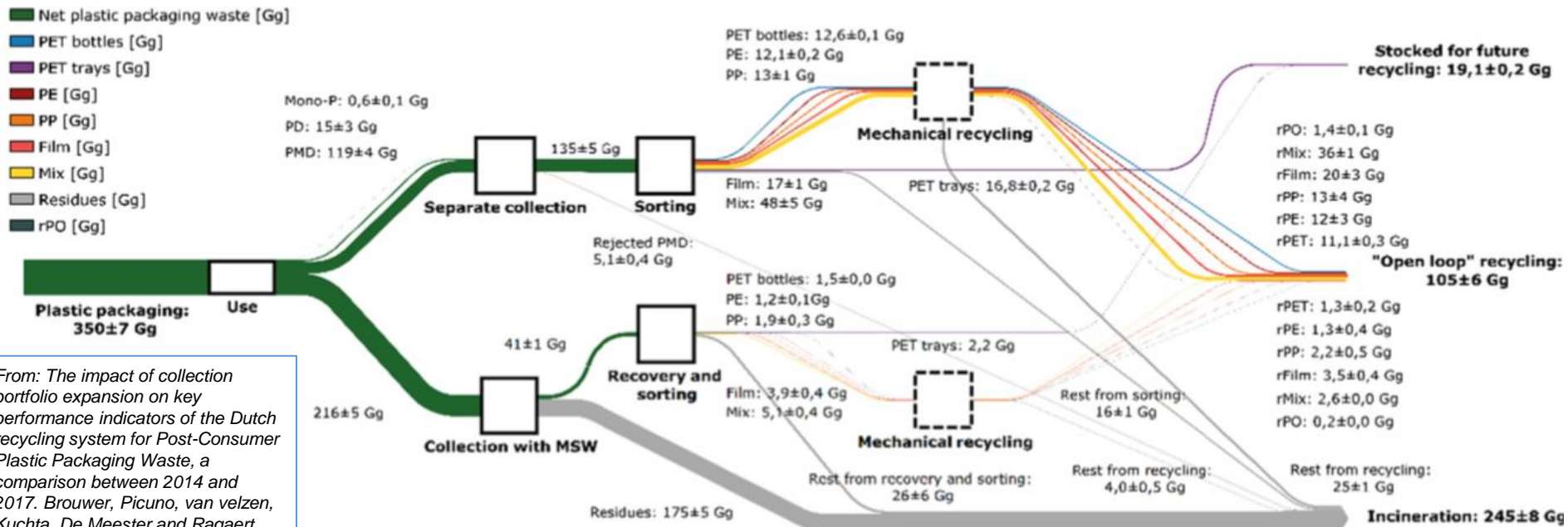


# EFFECTIVE RECYCLING RATES ARE LOW

From recent analysis of plastic packaging waste flow in NL:

Only 26% of available plastics packaging is effectively recycled

Average polymeric purity of these is 90%



From: *The impact of collection portfolio expansion on key performance indicators of the Dutch recycling system for Post-Consumer Plastic Packaging Waste, a comparison between 2014 and 2017.* Brouwer, Picuno, van velzen, Kuchta, De Meester and Ragaert. Waste Management, 2019.





# LEGISLATION

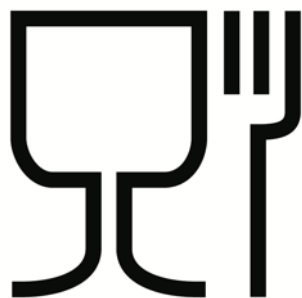
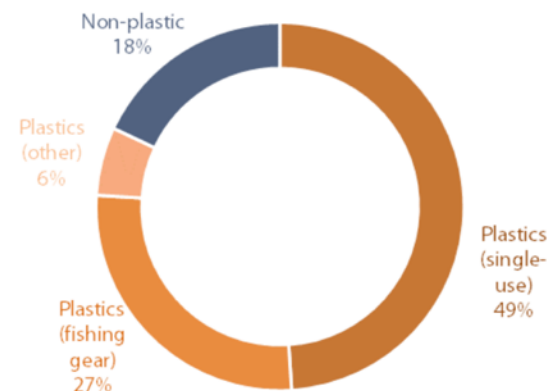


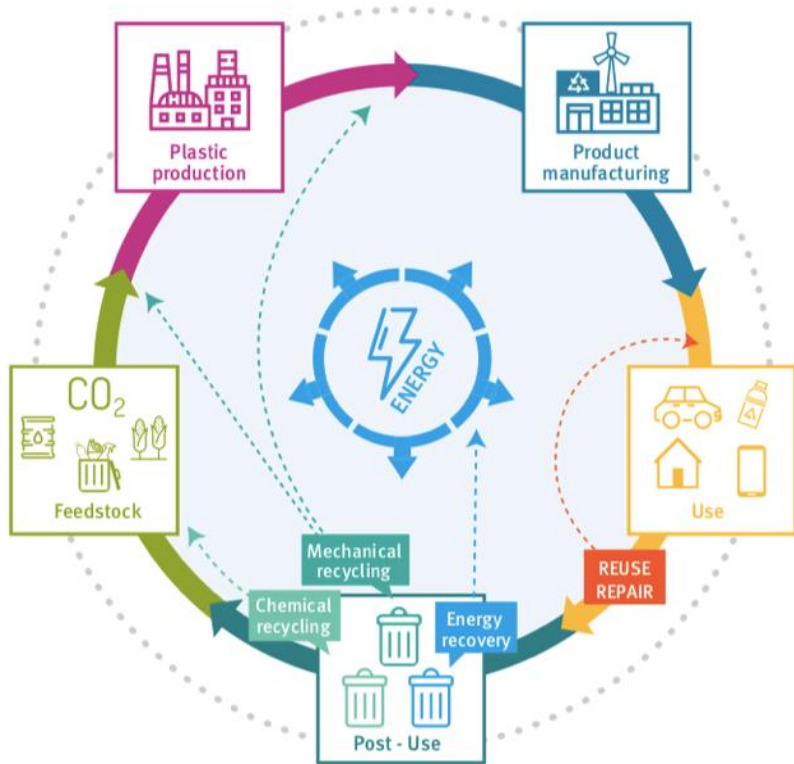
Figure 1 – Marine litter on EU beaches, by count (2016)



Data source: [European Commission](#).



# CHEMICAL VS. MECHANICAL RECYCLING: FRIEND OR FOE?



Chemical and mechanical recycling have the potential to be complimentary pathways to Circular Plastics.  
Some loose thoughts...

- Chemical recycling is not a silver bullet
- What if they compete for the same streams?
- Food contact is (would be) much easier for chemical recycling: no EFSA approval needed
- Longer-term technical and economical validity remains to be demonstrated for chemical recycling

...how to make strategic decisions?



# INNOVATION. DESIGN FOR RECYCLABILITY

Plastics recycling would benefit from:

- A reasonable reduction/harmonisation of plastic types
- Avoiding catastrophic contaminators, like PVC in packaging
- Innovative Design for Recyclability strategies:
  - can we reduce layers without losing functionality?
  - engineer virgin for recycling
- Non-disruptive uptake of biobased materials

– ....

IS PLASTICS INDUSTRY ABOUT TO BE  
CRUSHED ?



# WHAT CAN PLASTICS INDUSTRY DO?



1. Educate
2. Innovate
3. Participate



MORE THAN  
EVER...  
THE TIME IS NOW





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