# Squaring the Circle of Responsible Packaging

## Challenges for the Industry

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# Sustainable Development Goals

# Circular Economy

# Actions for Achieving Sustainability & Circularity

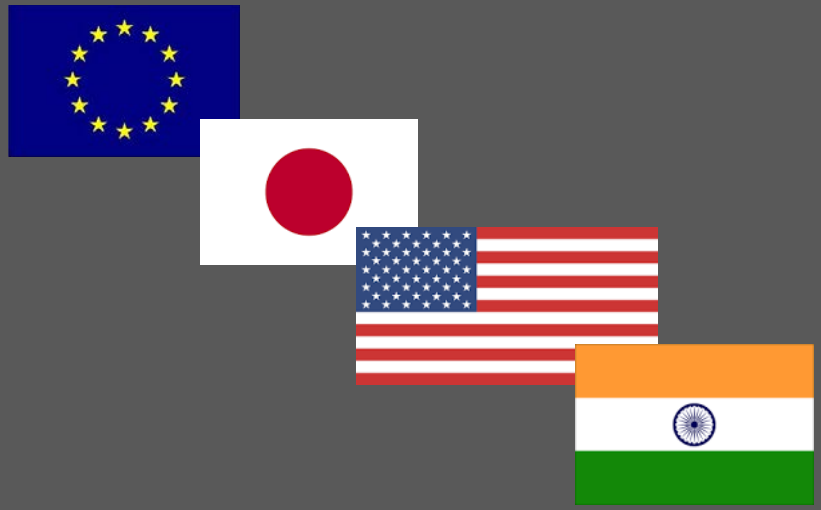
Design
Customer experience
Invention
Technologies

# Walking the tightrope for the packaging future

Consumer confusion
Industry investment
Policy contradictions
Environmental upheaval
Global concern

# Packaging trends in global economies:

- Europe
- Japan
- USA
- India



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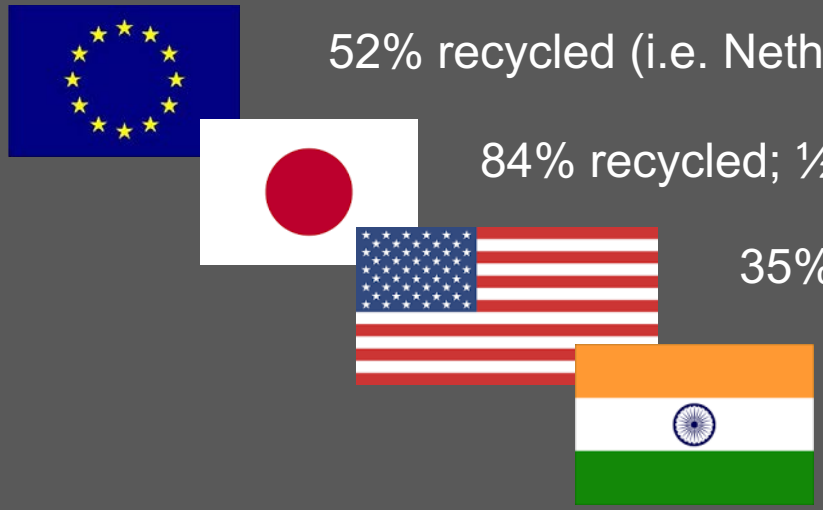

52% recycled (i.e. Netherlands)

84% recycled; ½ is incinerated

35% recycled

9.4 million tonnes of plastic/year
60% recycled

# India

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India generates 9.46 million tones of plastic waste every year, of which 40% remains uncollected.
43% is used for packaging, most of it single-use.

“India's war on single-use plastics is already on. Prime Minister Narendra Modi has called for a mass movement against single-use plastics from October 2…”

# Packaging is the “FRENEMY”

# Social Trends:

Direct to consumer
Rising middle class
Customer convenience
Mobility
Consumption, GDP

# Packaging Benefits:

Customer Value

- Product protection & safety
- Convenience & lifestyle uses
- Shelf life, quality, authenticity, trust
- Package appeal, structure & uses
- Brand value

# Packaging Benefits:

Industry Advantages

- Reduced product waste & losses
- Product protection, safety & authenticity
- Supply chain controls & logistics
- Capacity, production & scaleability
- Reduced weight, volume, cost (plastics)

# Packaging Benefits:

Efficiency & Consumption

- Traceability and “smart packaging”
- Branding and graphics, retail presence
- Reliability, functionality, consistency
- Multi-use, single-use, re-use

# Packaging Challenges:

Environment

- Pollution - air, land, rivers, lakes, oceans
- Air quality (landfills & burning)
- Infrastructure (lacking & complex)
- Degradation time & long term impacts

# Packaging Challenges:

Cost of Waste Produced

- Sorting
- Recycling, especially multilayer films
- Collecting
- Reuse, re-purpose & up-cycling

# Packaging Challenges:

Health Hazards

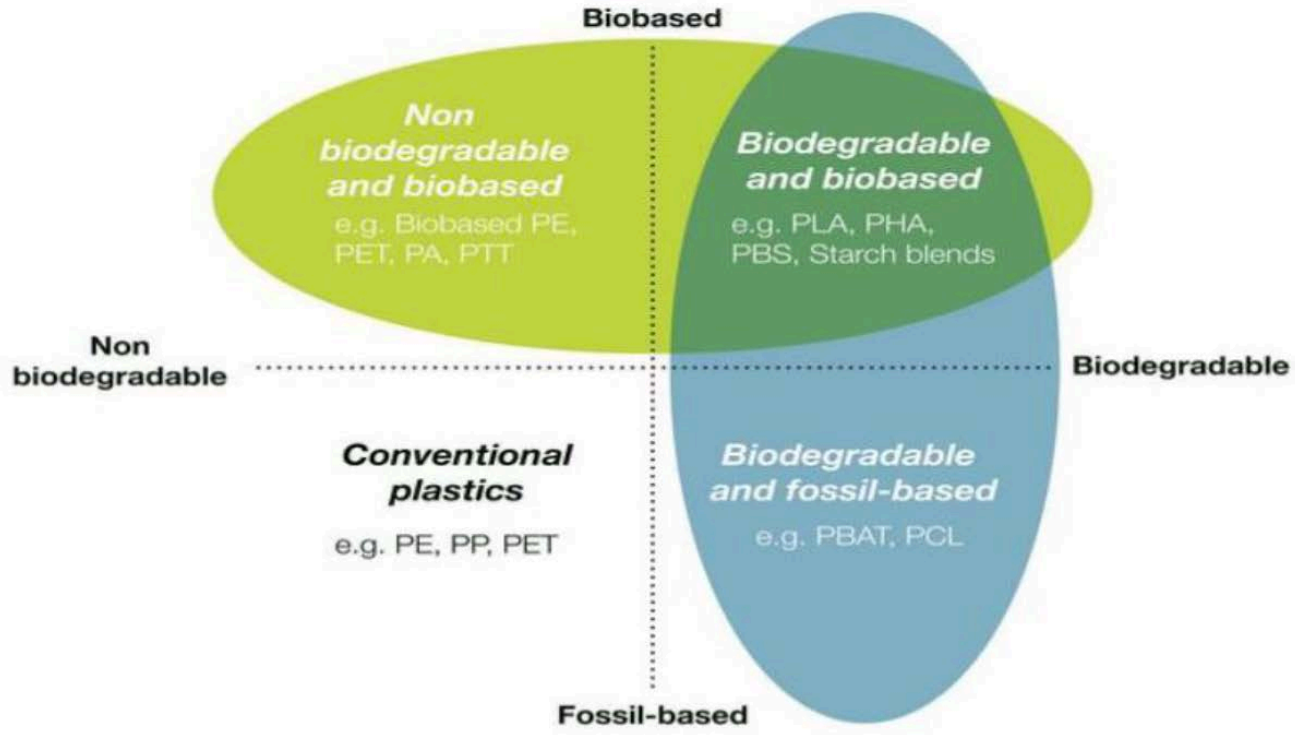
- Human health injuries (opening)
- Animal health hazards (eating)
- Microplastics?
- Worker conditions for waste pickers

# Packaging Challenges:

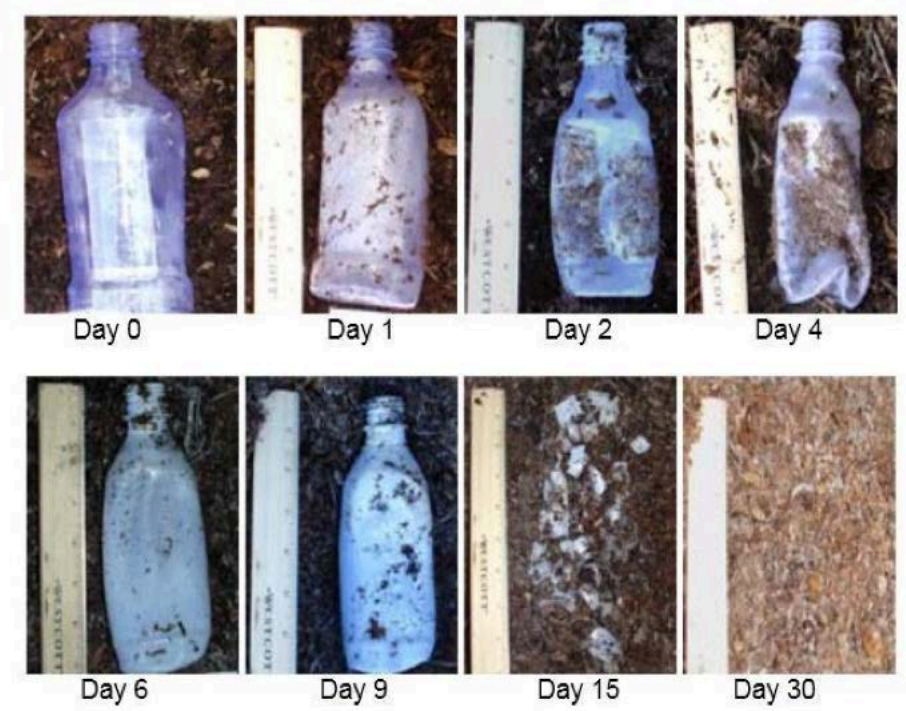
Plastics, Films, Materials, Production

- Exponential waste streams & landfills
- Increasing materials use
- Bio-based and Biodegradable (emerging)
- Plant-based versus food crops & forests
- Use of water, energy & resources

# Plastic Materials



# Plastic Composting




Disintegration profile of a PLA bottle under industrial composting conditions.

# Bio-degradable Polymers

- Petrochemical raw materials
- Renewable raw materials

1. Starch based biodegradable plastics
2. Cellulose based biodegradable plastics
3. Biodegradable plastics obtained via chemical synthesis
4. Biodegradable plastics produced by bacteria
5. Biodegradable plastics of petrochemical origin

# Bio-Polymer Possibilities:

Algae, Corn, Agri-Food Waste, Grasses, Hemp, Potatoes, Cąstor Beans, Cassava, Casein, Sawdust, Soybeans, Sugar, Bagasse, Wood, Fruit Peels, Seaweed, etc., and polymers that dissolve in water.

# The Circular Economy

“Business as usual” results in 2.12 billion tons/year of waste into landfills

470 million tons – today!

# The Circular Economy

3 million metric tons of plastic packaging used by Coca-Cola in 1 year

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* Ellen MacArthur Foundation

# Highlights:
# The New Plastic Economy

## Ellen MacArthur Foundation Global Commitment Report 2019

# The New Plastic Economy

## #1 Design, Innovation & Utility:

Eliminate problematic or unnecessary plastic packaging.

# The New Plastic Economy

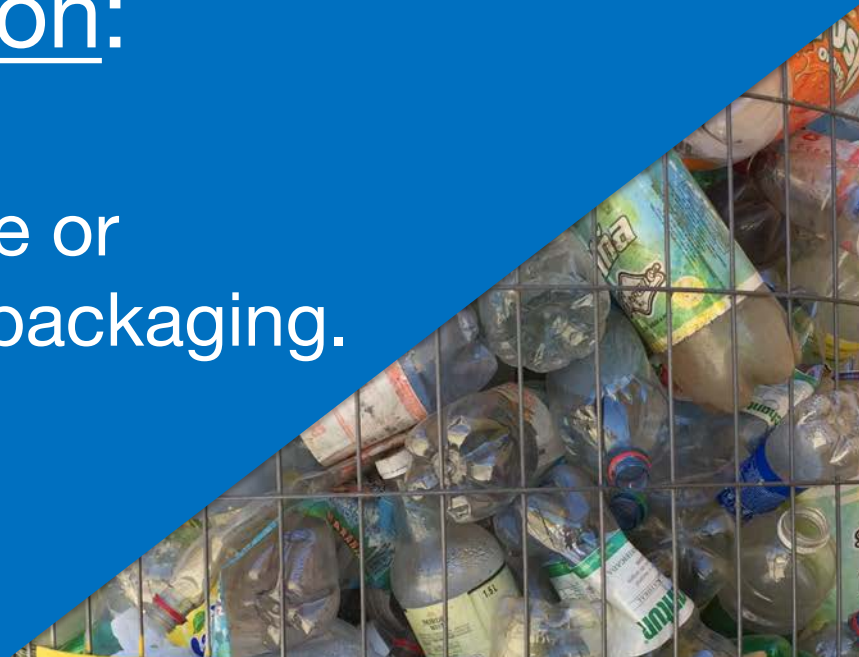
## #2 Reduce Single Use; Encourage Re-use

Models are applied where relevant, reducing the need for single-use packaging.

# The New Plastic Economy

## #3 Materials Production:

(100%) Reusable, recyclable or compostable for all plastic packaging.



# The New Plastic Economy

## #4 Implementation:

Reuse, recycle, or compost
– without waste to energy.

# The New Plastic Economy

## #5 Resource Consumption:

Utilize renewable resources.
Plastic use is fully decoupled from the consumption of finite resources.

# The New Plastic Economy

## #6 Safety:

Eliminate health and worker hazards.
All plastic packaging is free of hazardous chemicals; the health, safety and rights of all people are respected.

# Approach to Solutions:

Policy & Philanthropy
Alignment & Collaboration
Cultures & Behaviors

# Approach to Solutions:

Science into Practice
Invention to Commercialization
Risk strategy

# Approach to Solutions:

Design Systems
Localize Production
Quality & Value
Active & Intelligent
Efficiency of Resources

# Approach to Solutions:

Incentives for Participation
Feedback Loops
Wastefulness to Sustenance
Coalitions to Partnerships
Leverage & Scale

Vivia VENTURES

Vivia FOUNDATION

PopPack

# CleanWorks

# Smarter Packaging

# Squaring the Circle of Responsible Packaging

Thank you for participating –
take action to achieve solutions!