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Plastic waste management: Issues and Opportunities

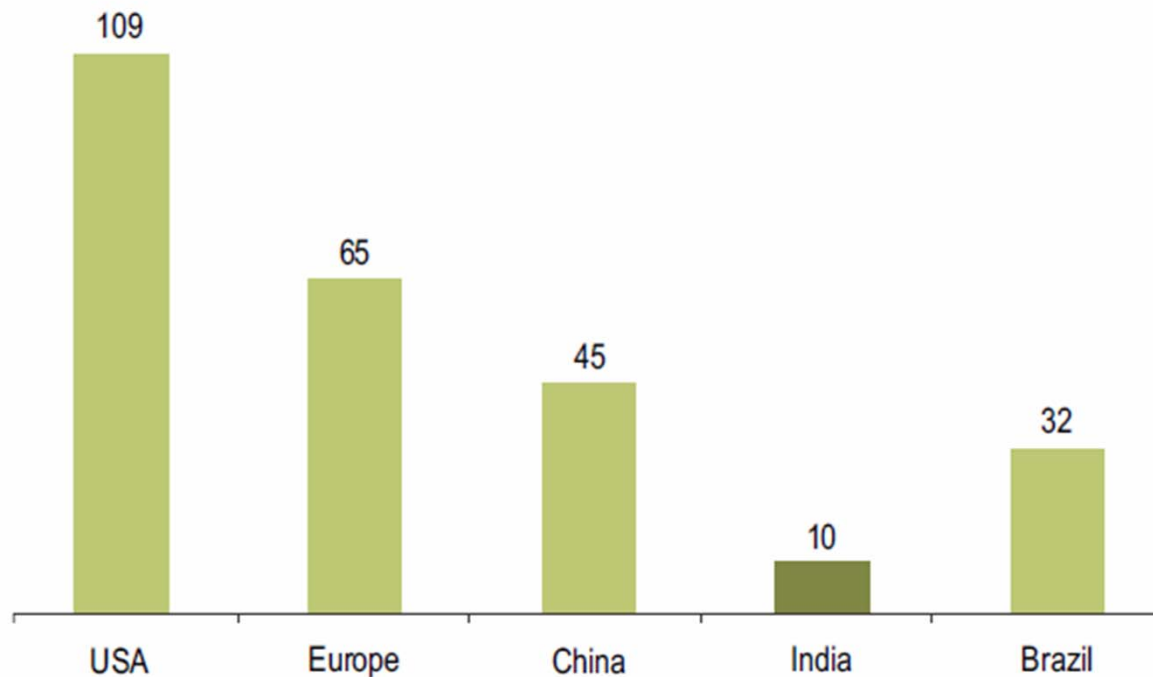
Suneel Pandey

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24th September

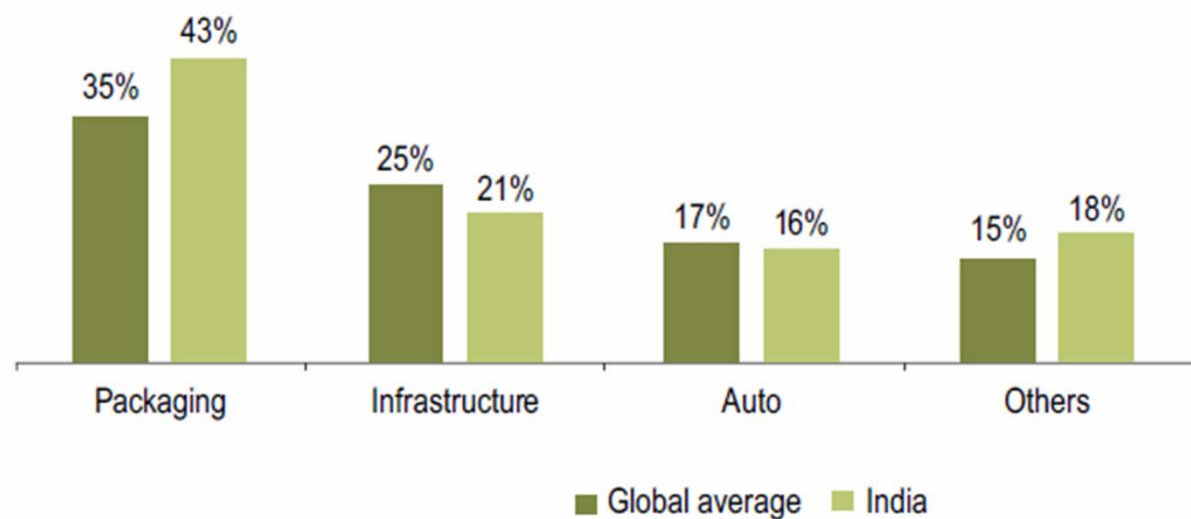
Annual per capita plastic consumption (kg)

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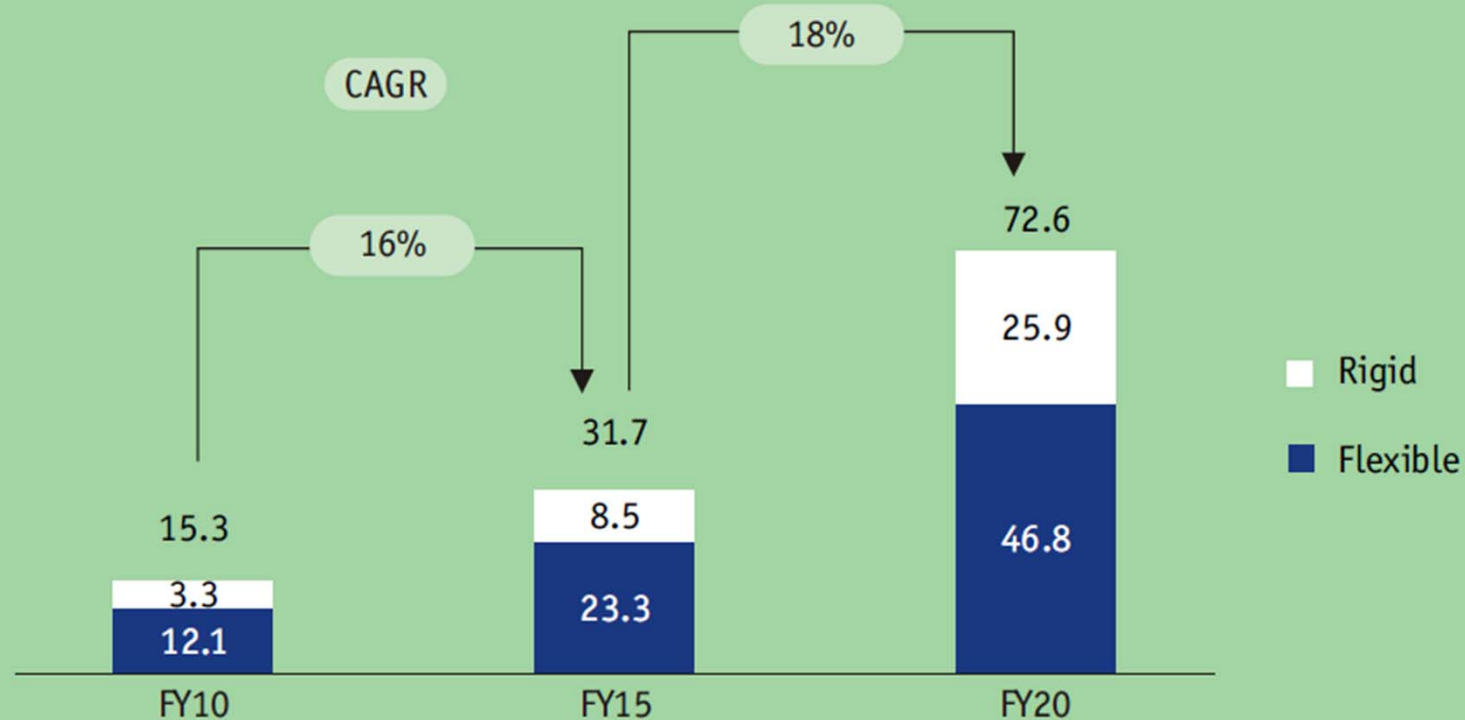
Source: Plastindia, Business press, research by Tata Strategic

Breakup of polymer utilisation



Plastic packaging industry outlook

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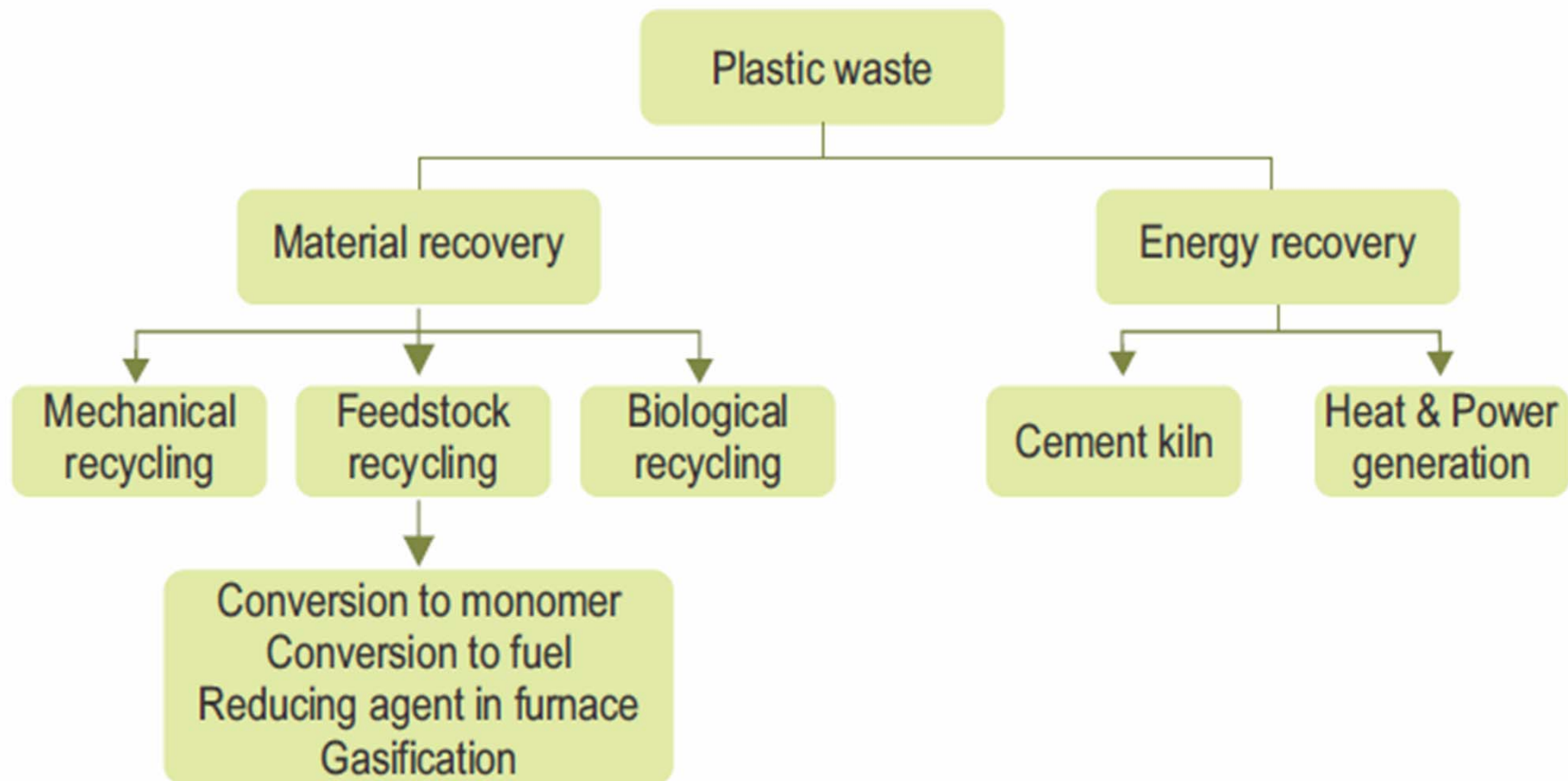


Source: IBEF, Industry Reports, Analysis by Tata Strategic

Plastic recycling flow diagram



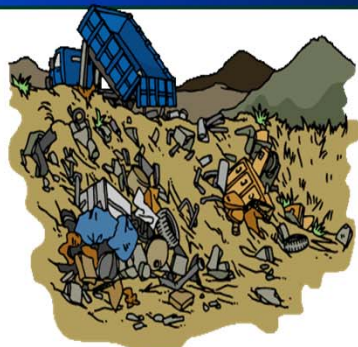
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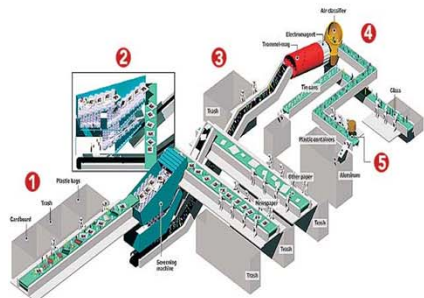
Recycling and Job Creation...



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Dumping 10,000 tons of waste in
a landfill
6 Jobs

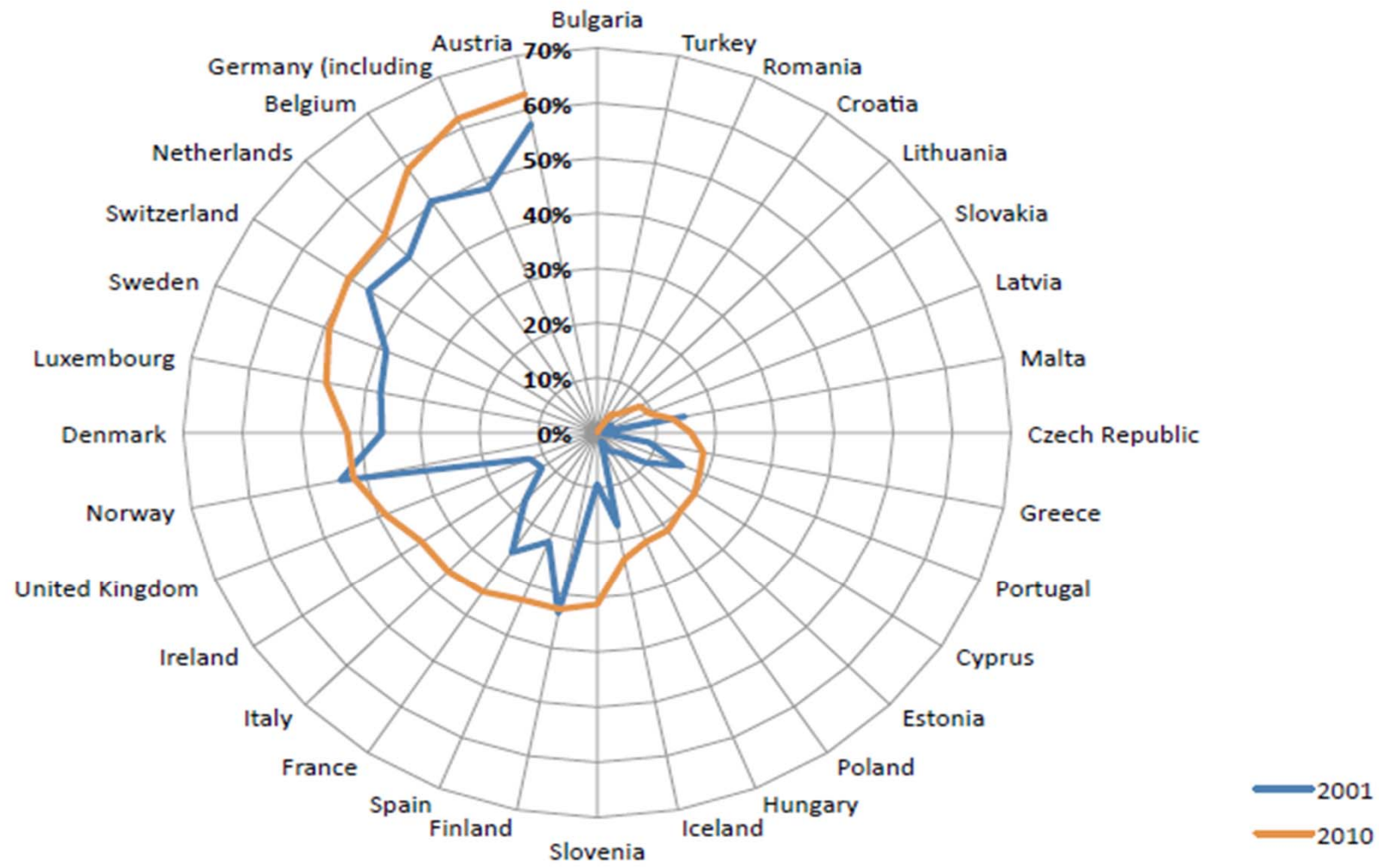


recycling
Of 10,000 tons
of waste
36 Jobs

**Recycling generates more jobs (at higher income levels) than
other forms of waste management**

Waste recycling trends in Europe

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Source: EU

Indian scenario



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- Generally, all the packaging material used end up as packaging waste.
- Some times they are reused, mostly recycled.
- Packaging waste too dirty to recycle end up at landfills and some times in drains clogging it
- Recycling of packaging waste in informal sector is of concern due to obsolete technology and pollution issues
- Open burning of packaging waste is also a matter of concern
- Multi-layered packaging is also matter of concern as it is neither economical to collect it nor recycle it



Some Indian examples

Example 1: PET waste pre-processing

The earlier in the process foreign substances are removed, and the more thoroughly this is done, the more efficient the process is.



Polyethylene terephthalate

Possible commercial products from PET waste



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Ganesha Ecosphere

Do you know that Indian cricket team's uniform, made by Nike, is produced from recycled PET bottle

Example 2: Refuse derived fuel co-processing in cement kilns



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Advantages of co-processing



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- High flame temperature (2000°C) – ensures complete destruction of harmful pollutants
- High residence time >5 sec in oxygen rich atmosphere - ensures complete destruction of organic compounds including dioxins and Furan
- Total neutralization of acid gases, sulphur oxides and hydrogen chloride- by the active lime in the kiln load.
- The biggest advantage is that co-processing leaves no residue to be land-filled.

Example 3: Use of plastic in road making



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USE OF WASTE
PLASTIC IN ROAD
CONSTRUCTION

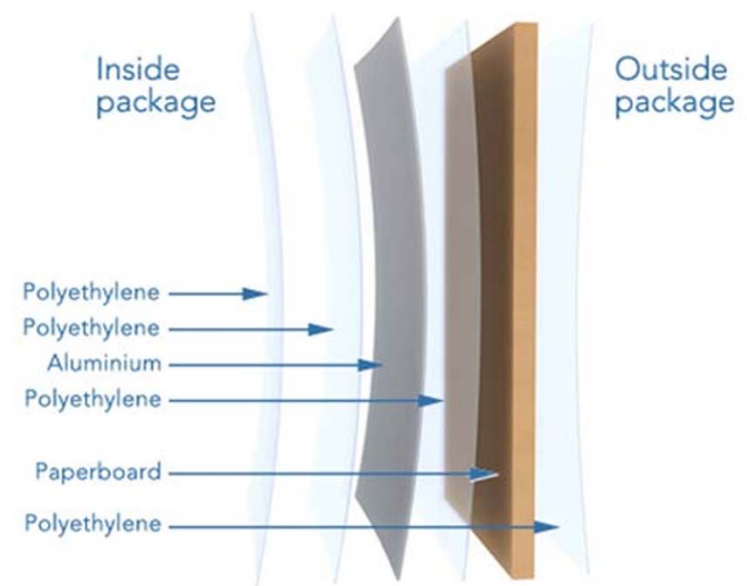
The implementation of plastics in roads also opens a new option for recycling post consumer plastics

Example 4: Tetra Pak PCC Recycling



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- Tetra Pak cartons are primarily made from paper. 75% of the Tetra Pak carton is made from paperboard, 20% of polyethylene and 5% of aluminum.



Reprocessed product



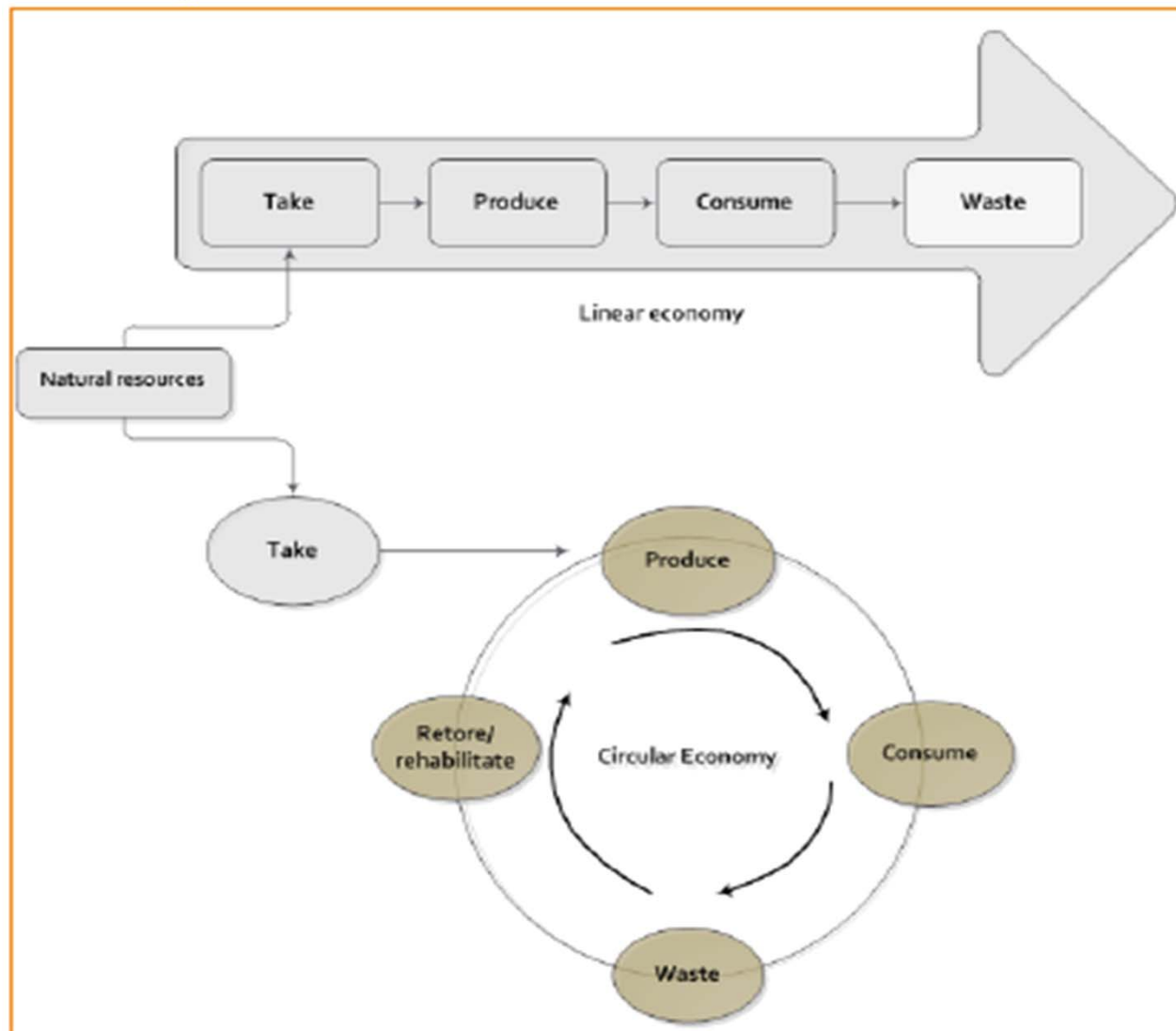
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Need to shift from linear to circular economy



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Adapted from Sempels and Hoffmann (2013)

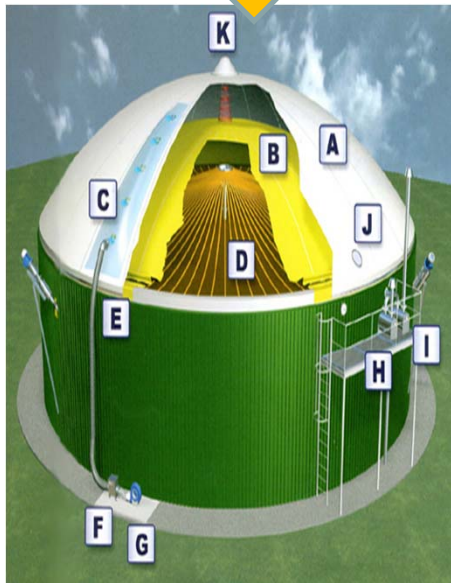
Organic waste



Landfill free cities



Biogas Plant



- A outer membrane
- B inner membrane
- C air flow system
- D belt system
- E anchor rail
- F non return valve
- G air blower
- H vacuum valve
- I over pressure valve
- J inspection window
- K ultrasonic



Bio CNG



Customized manure

Benefits

- Reduction in uncontrolled methane emission
- Reduction in landfill fires
- Minimizing waste to landfills
- Resource recovery from waste
- Creation of green jobs

- In fact, filled up dumpsites need to be characterised for combustibles including plastics, rags, leather, etc.
- These can be mined and used for RDF preparation while organic degradable portion can be composted and inerts can be used in construction
- This would free up valuable space which can be used for developing integrated waste management project



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Thank you



Inexpensive litter bins



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