

Plastic Waste to Wealth Recovery

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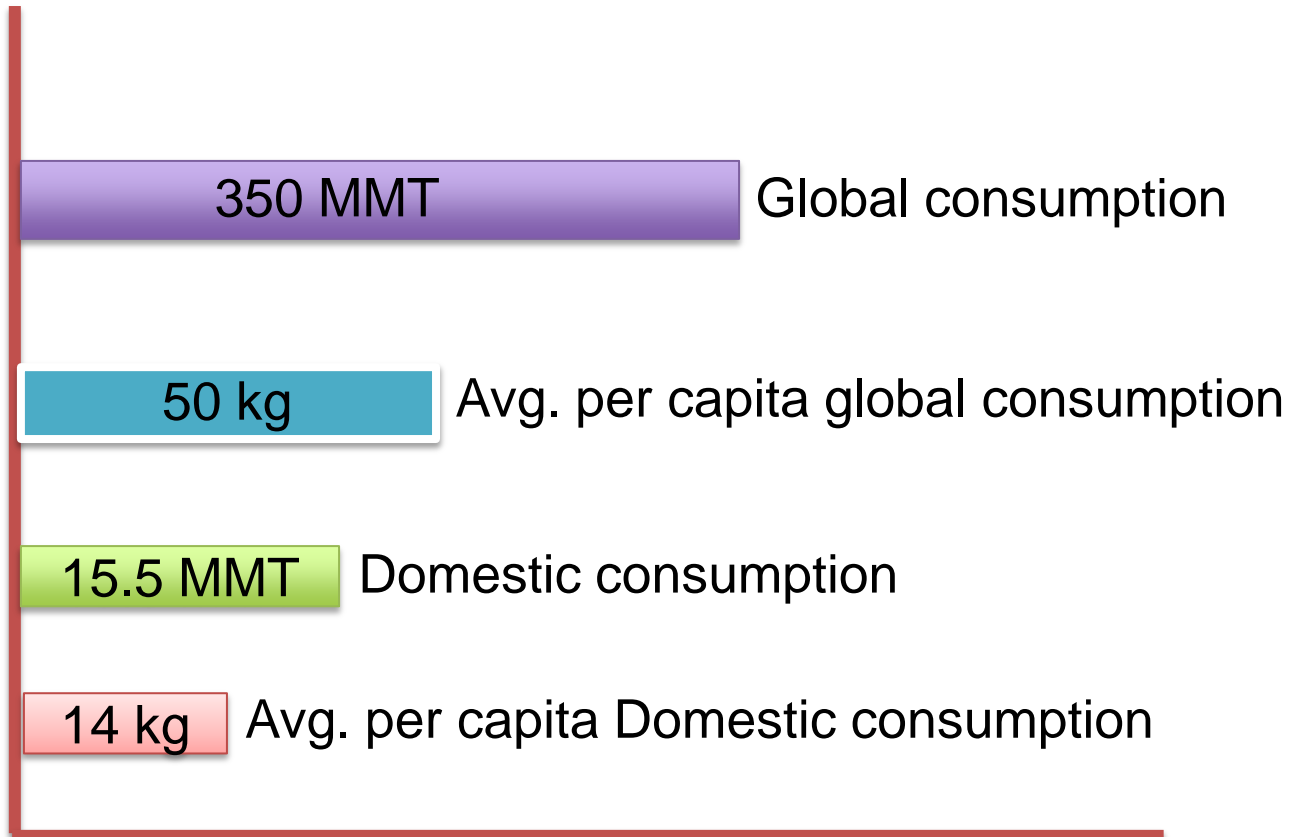
President
Indian Plastics Institute

Co-Chairman
Plastindia Technical Committee

Agenda

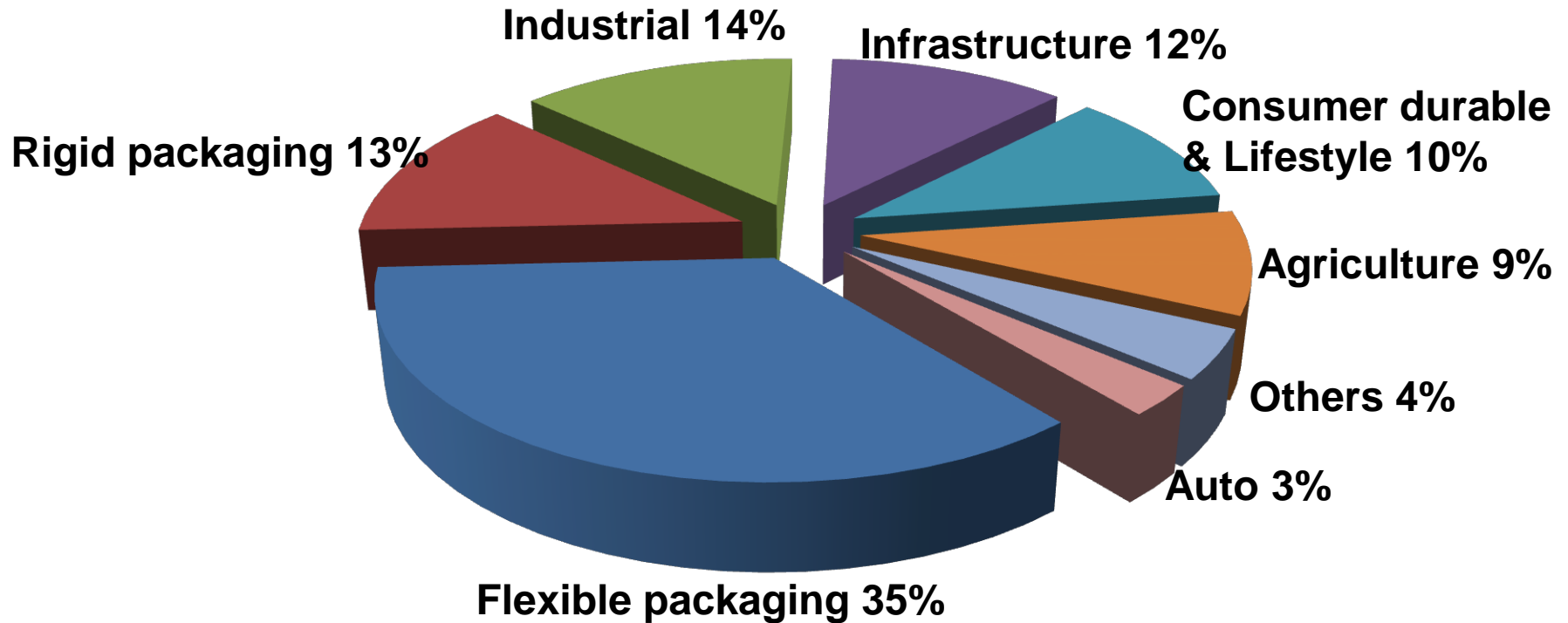
- ◆ Some facts about plastics
- ◆ Plastic waste management
- ◆ Waste to wealth recovery technology

Plastic Consumption



Rapidly growing market in India

Application Wise Domestic Consumption



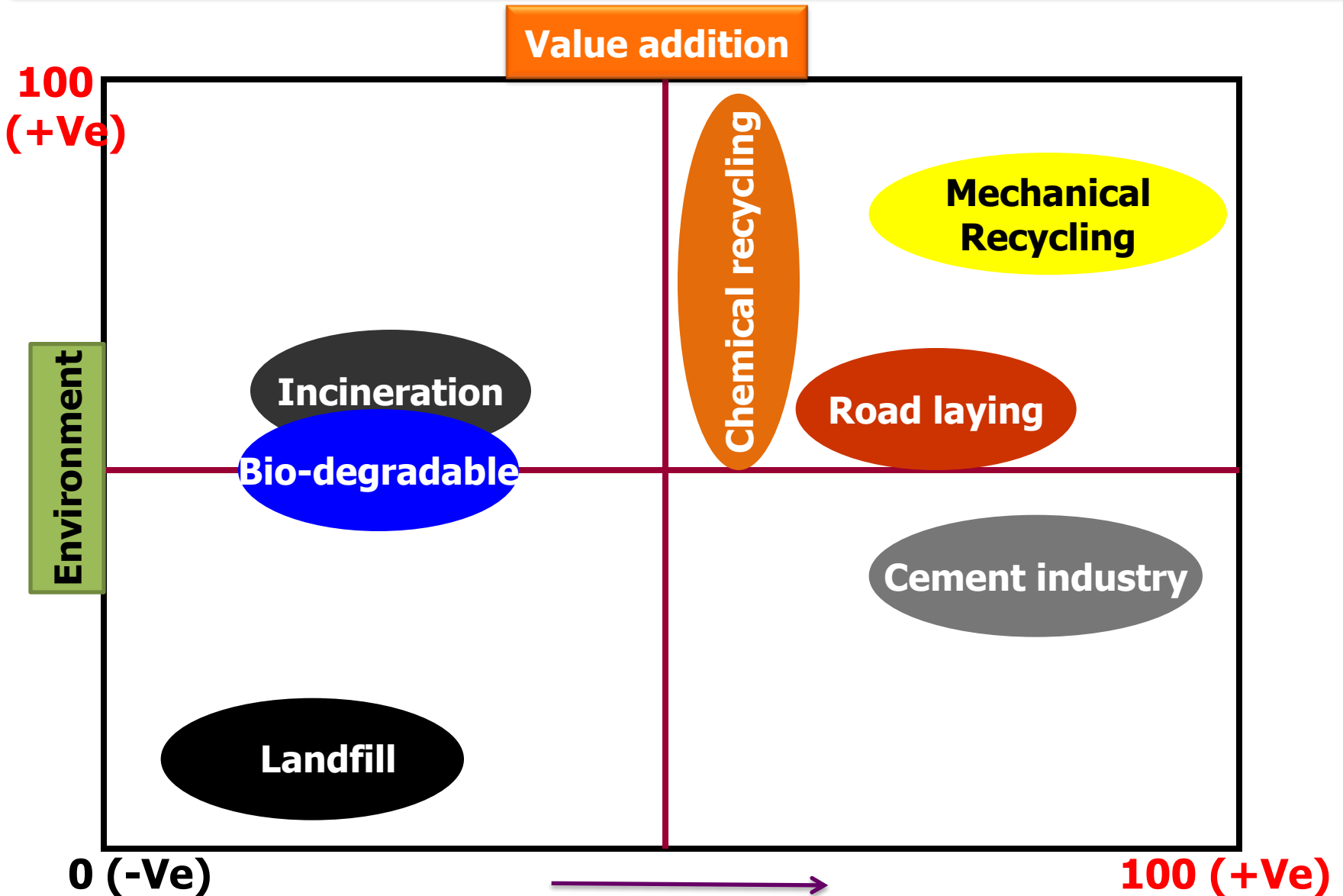
48% Consumption in packaging

Waste Management Principle

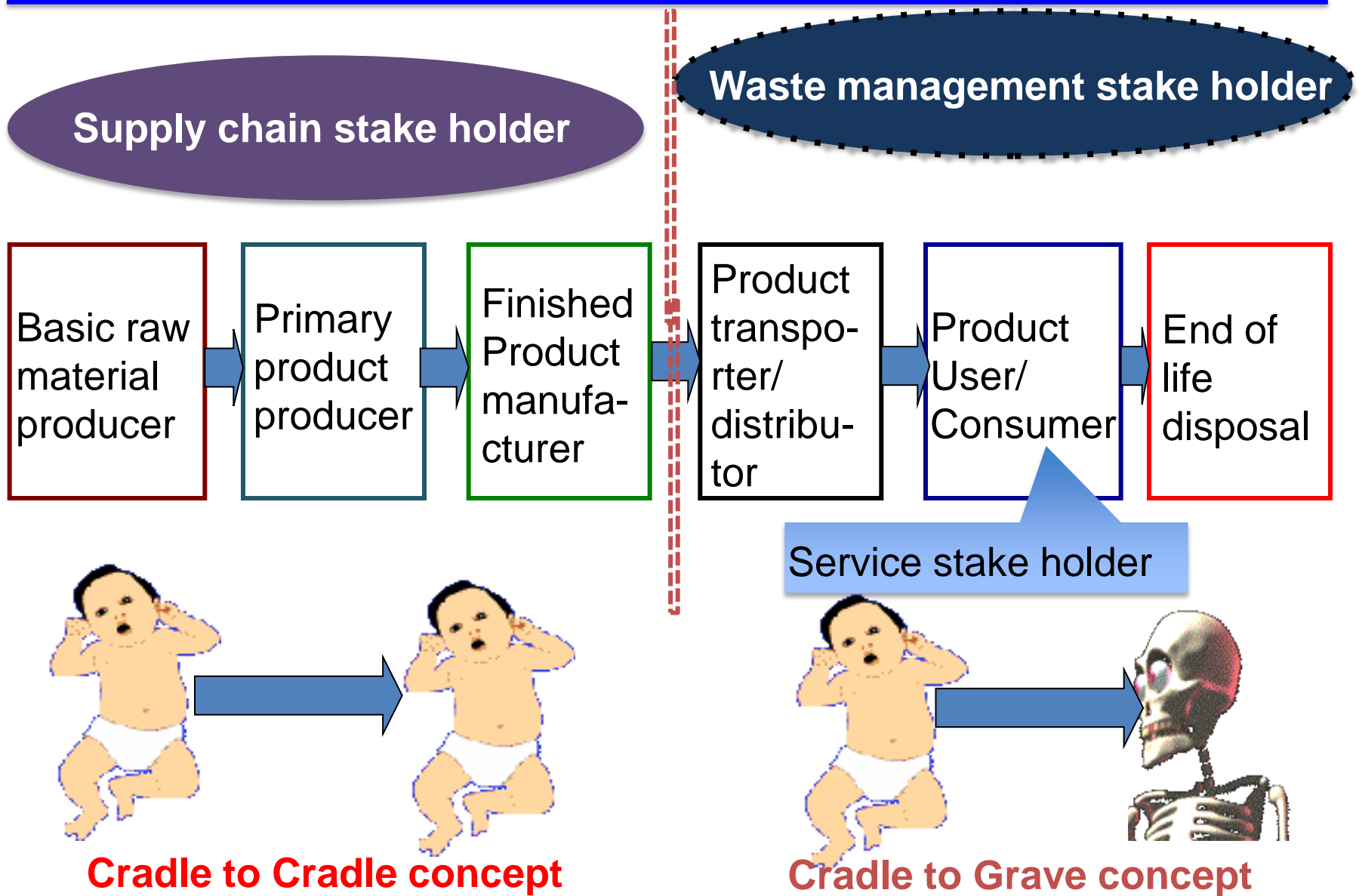
- ◆ Any man made product during production and use creates impact on environment. It is important to consider entire **Life-Cycle** of product.
- ◆ Under the principal of sustainable development, each stake holder in the product Life-Cycle is responsible to minimize the use of energy, resources and finally **regulated disposal**.

Life cycle analysis is very important to determine fate

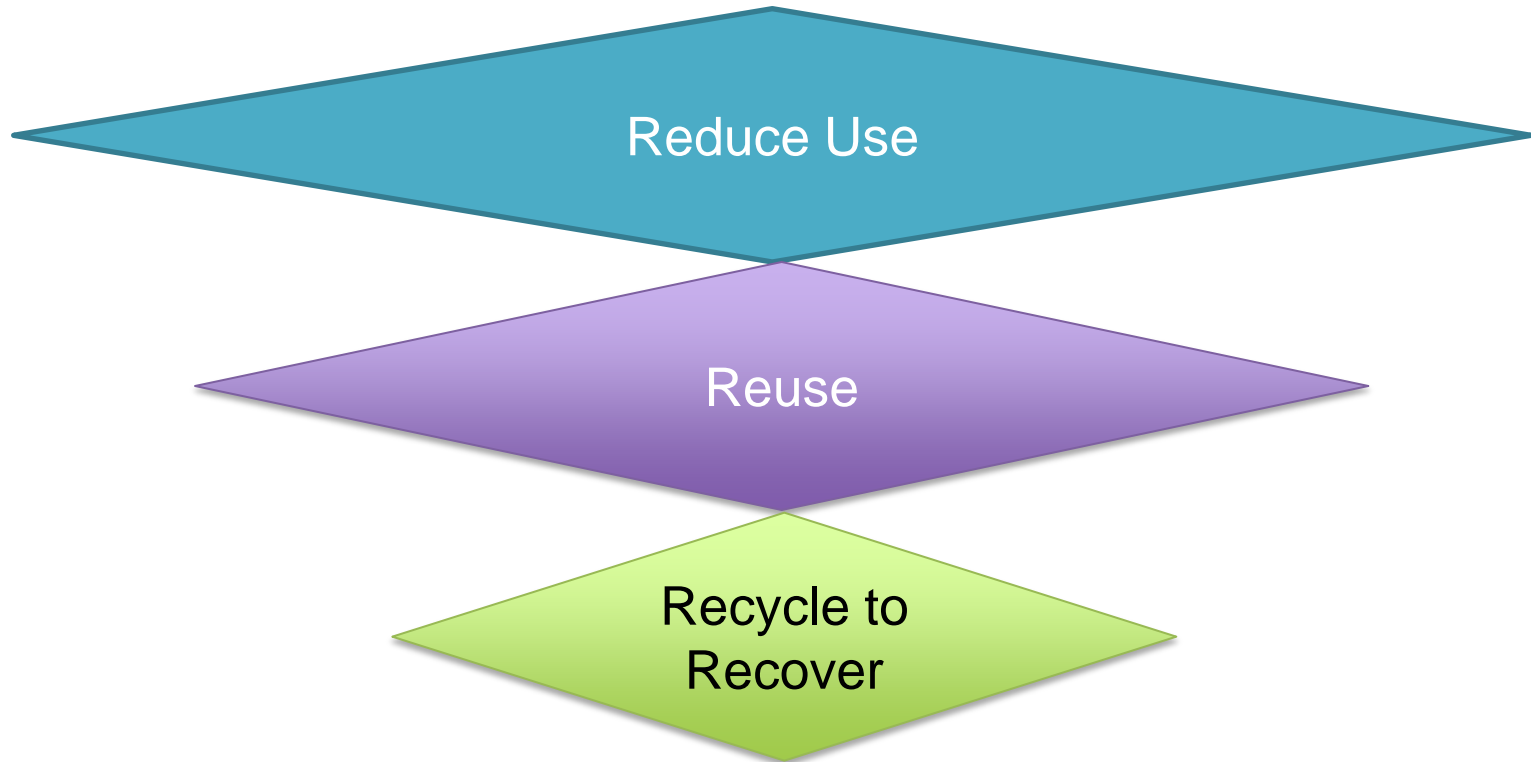
Economic Viability vs Environment Impact



Life Cycle Analysis



End of Life Cycle Analysis



3-R concept in plastic waste management

Recovery Technology

Material Recovery

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graph TD; MR([Material Recovery]) --> R[Recycling]; MR --> ER[Energy Recovery]; R --> MR1[Mechanical recycling to produce different products]; R --> MR2[Chemical recycling to recover same raw material]; ER --> FR[Fuel recovery]; ER --> PAE[Production of alternate energy];
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The diagram illustrates the classification of Recovery Technology. It starts with a central yellow oval labeled 'Material Recovery'. Two purple arrows branch out from this oval to two rectangular boxes: 'Recycling' (blue border) on the left and 'Energy Recovery' (light blue border) on the right. From the 'Recycling' box, a dark red arrow points down to a blue 3D box labeled 'Mechanical recycling to produce different products'. Another dark red arrow points down from this box to another blue 3D box labeled 'Chemical recycling to recover same raw material'. From the 'Energy Recovery' box, a dark red arrow points down to a light blue 3D box labeled 'Fuel recovery'. Another dark red arrow points down from this box to another light blue 3D box labeled 'Production of alternate energy'.

Recycling

Mechanical recycling
to produce different
products

Chemical recycling to
recover same raw
material

Energy Recovery

Fuel recovery

Production of
alternate energy

Chemical Recycling

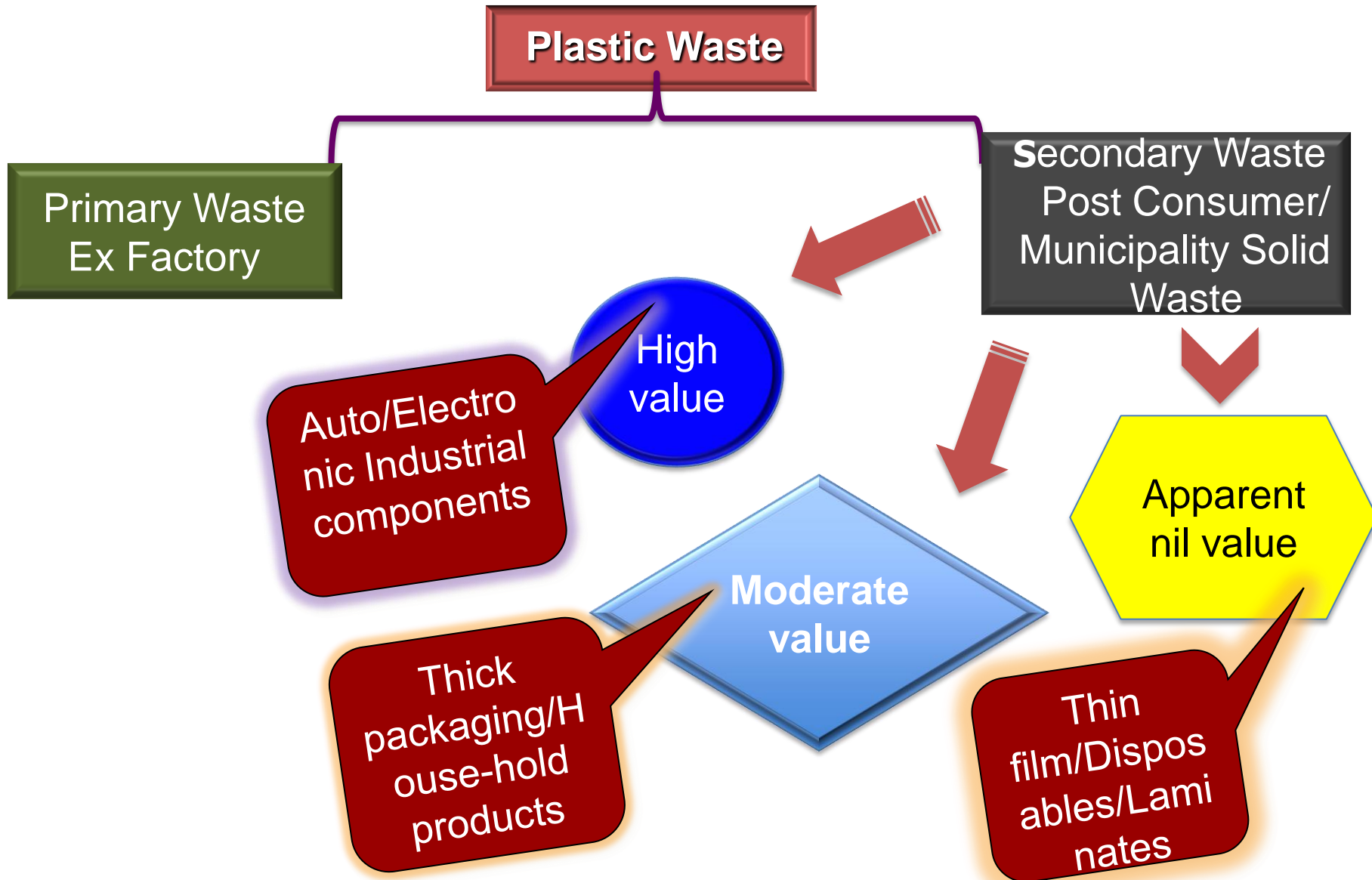
➤ **Chemical Recycling** where plastic waste will be transformed into a raw material using thermochemical process. This raw material can be used as a Feed-stock to produce a different material.



Chemical Recycling

- This technology may be able to convert PET bottles into its basic components, i.e Ethylene Glycol and Terephthalic Acid, using microwave radiation to speed-up process.
- One of such technology is called as DE-polymerization by Microwave E-technology.

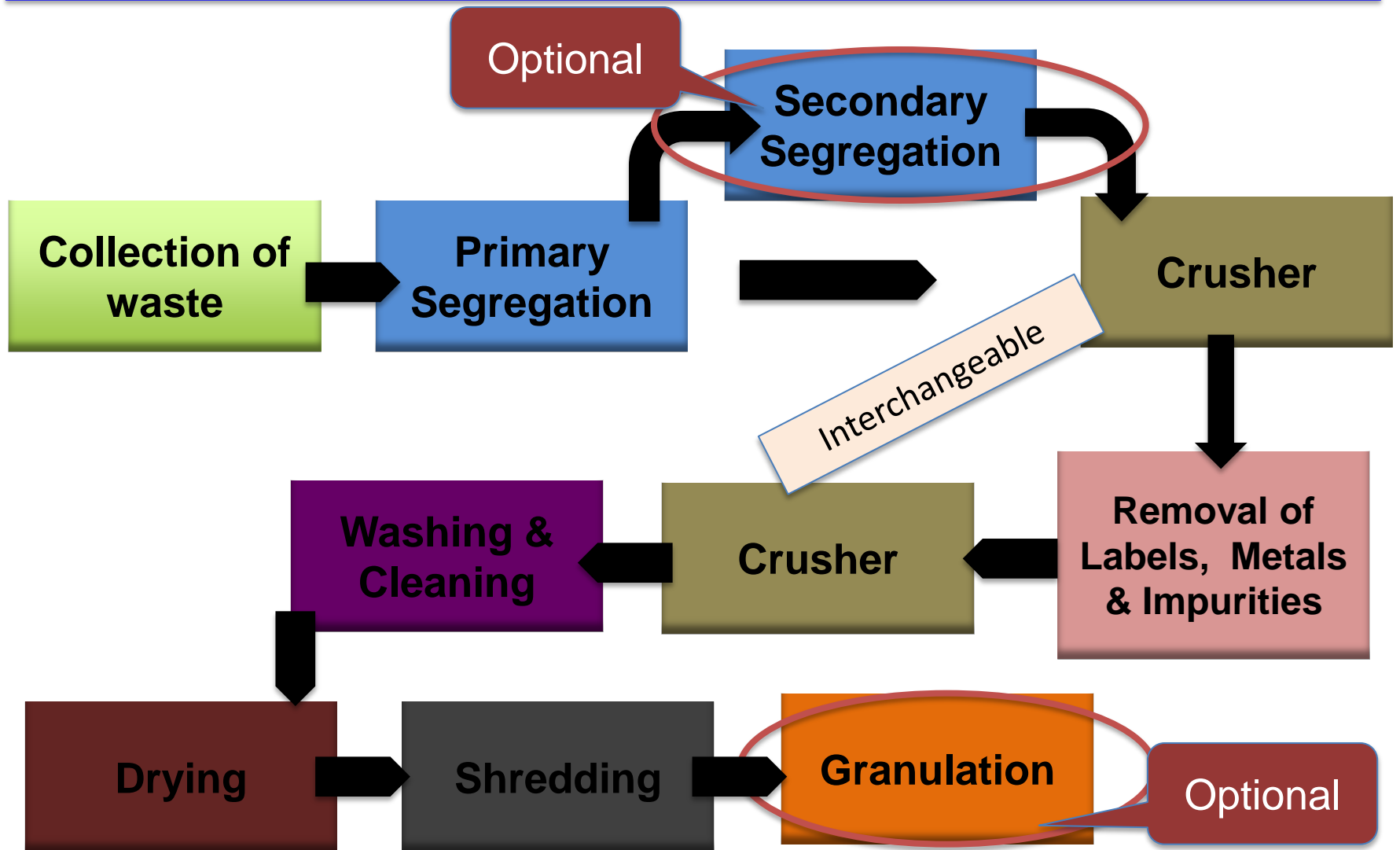
What Are Those Plastic Waste



Mechanical Recycling

- **Mechanical Recycling** is a method by which waste materials are converted into new secondary raw materials, without changing the structure of material.
- It is easy to recycle ex-factory wastes. But it is a challenge to recycle post consumer wastes. Such wastes are non-homogeneous and contaminated. House-hold wastes composed of various types of materials.
- Mechanical recycling is possible only for Thermoplastics. Thermosets are not possible to recycle.

Basic Steps of Mechanical Recycling



Post Consumer waste



Segregation Technique

- Primary segregation is carried out manually on a conveyor belt to segregate desired scrap from others.



- Secondary segregation through instruments like **colour sorter**, “Near-Infra” **optical sorter**, etc.

Crusher



Washer



- High speed friction wash.
- Cold wash.
- Hot wash.
- Hot wash with detergent.

Shredded Material



Granulates



Automobile Recycling



Electronic Recycling



Thank you for your attention
