ZERO WASTE MODEL FOR PLASTIC RECYCLING

CIPET Workshop

- **World Environment Day Programme**
- **2nd June 2018 Vigyan Bhavan Hall # 5**

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PLASTINDIA FOUNDATION

'The New Plastics Economy: Eco-solutions for balancing economic and environmental sustainability'

and

'Waste to Resource (W2R): A conceptual framework and entrepreneurship opportunities'

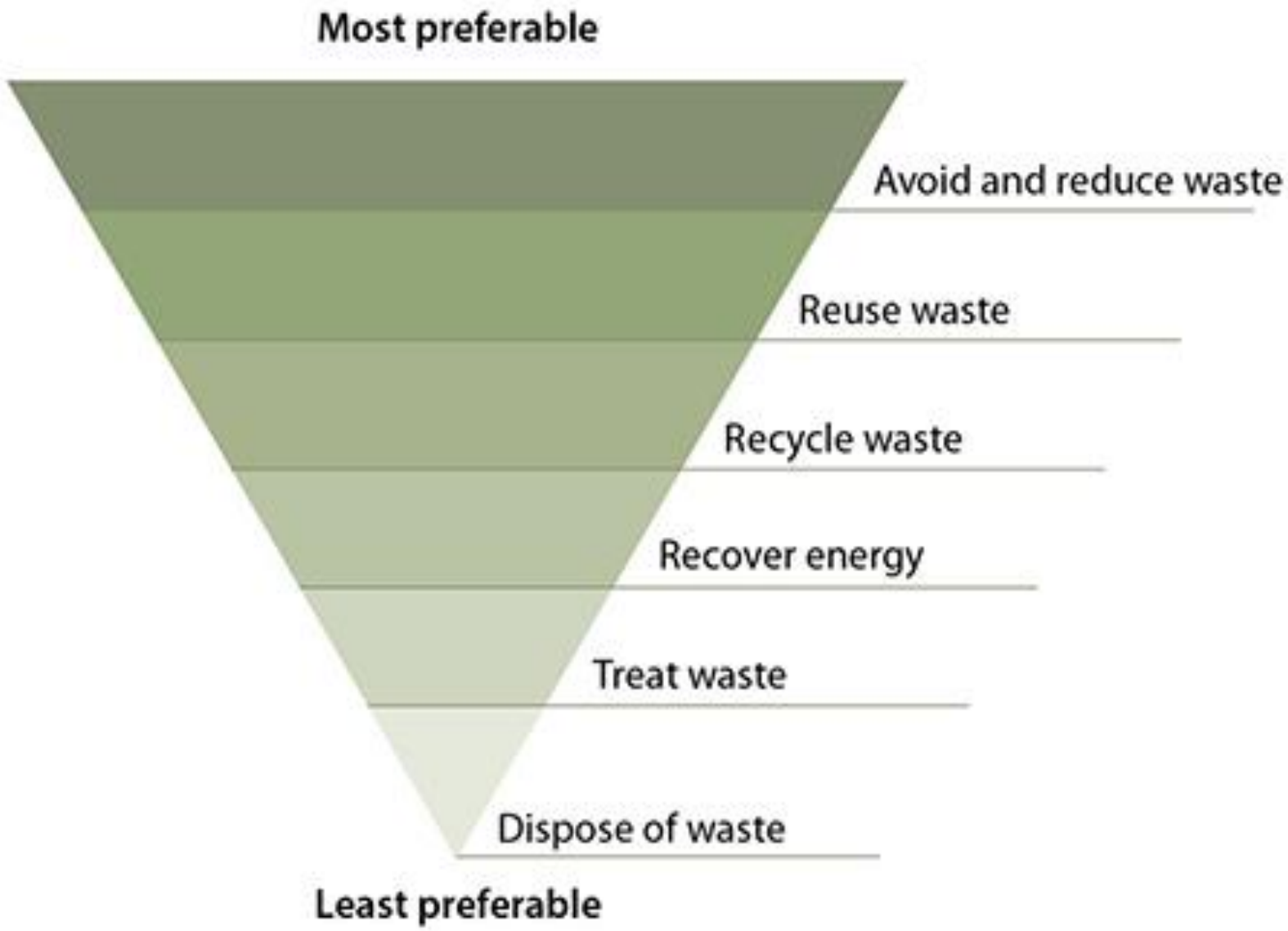
Recycling is fundamental in promoting a **Circular Economy** which is **New paradigm of Sustainability** which is to reduce environmental implication of products we put in the market

What is Zero Waste Model ?

Zero Waste is a goal that is
ethical,
economical,
efficient and
visionary,
to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use

The Hierarchy

- 1 Prevention
- 2 Minimization
- 3 Reuse
- 4 Recycle
- 5 Down-cycling
- 6 Energy Recovery
- 7 Disposal


Most preferable
Avoid and reduce waste
Reuse waste
Recycle waste
Recover energy
Treat waste
Dispose of waste
Least preferable

Video.mp4

If trained even monkeys change behavior

MIXED PLASTIC PACKAGING WASTE
The Challenge of Poor Segregation

Solutions require a full view of the integrated life cycle.

There is no perfect plastic material.

Its residual value depends on how the plastic is used, which is typically just one of several criteria considered when designing a product. Sometimes less material is hard for any single player in the value chain to independently drive full-life-cycle improvements.

Need for **multidimensional decision making** means progress requires an **unusually high degree of supply-chain cooperation**.

Recycling Options in India

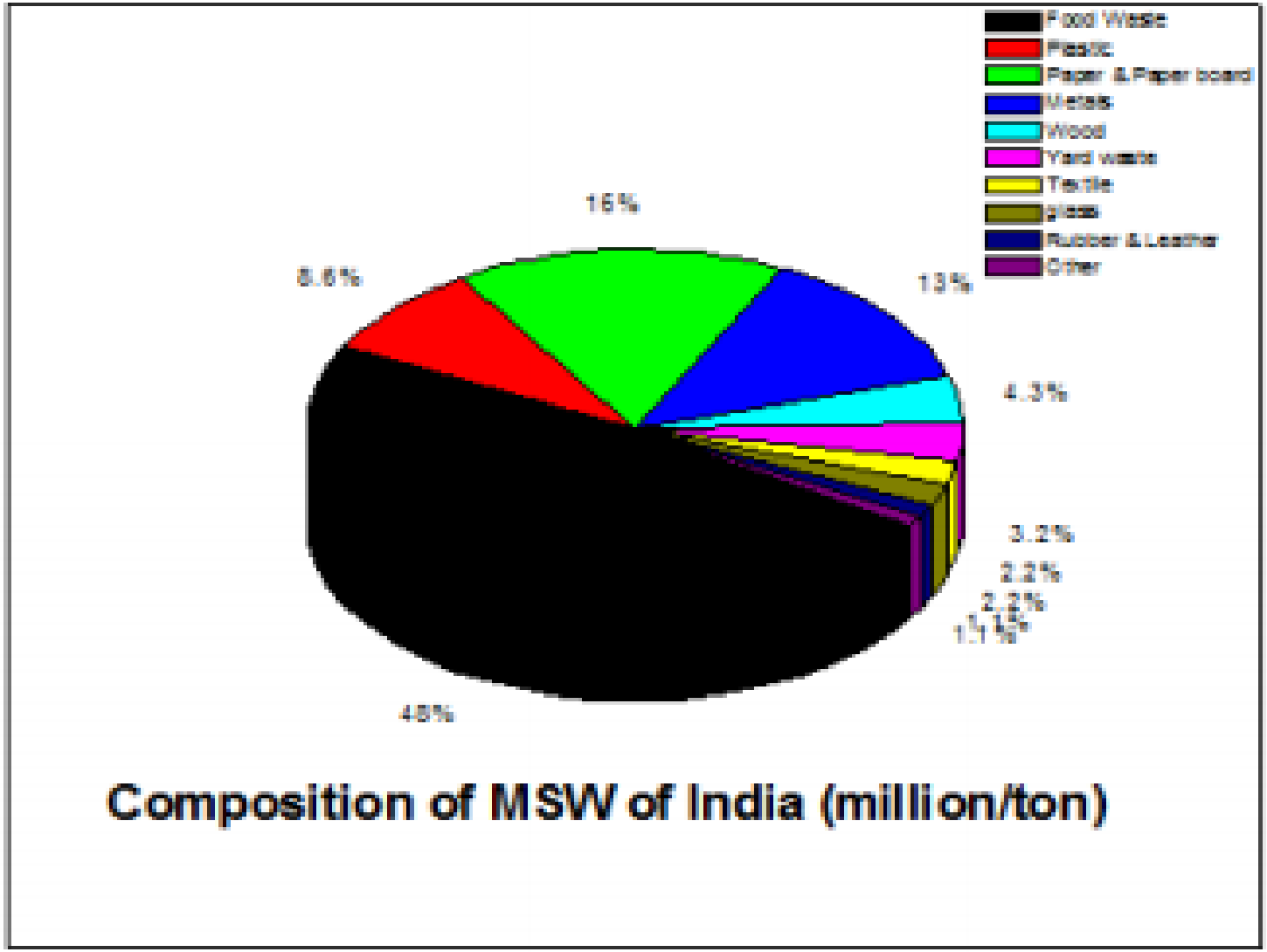


Fig.1: Composition of MSW in India [2]

Recycling Options in India

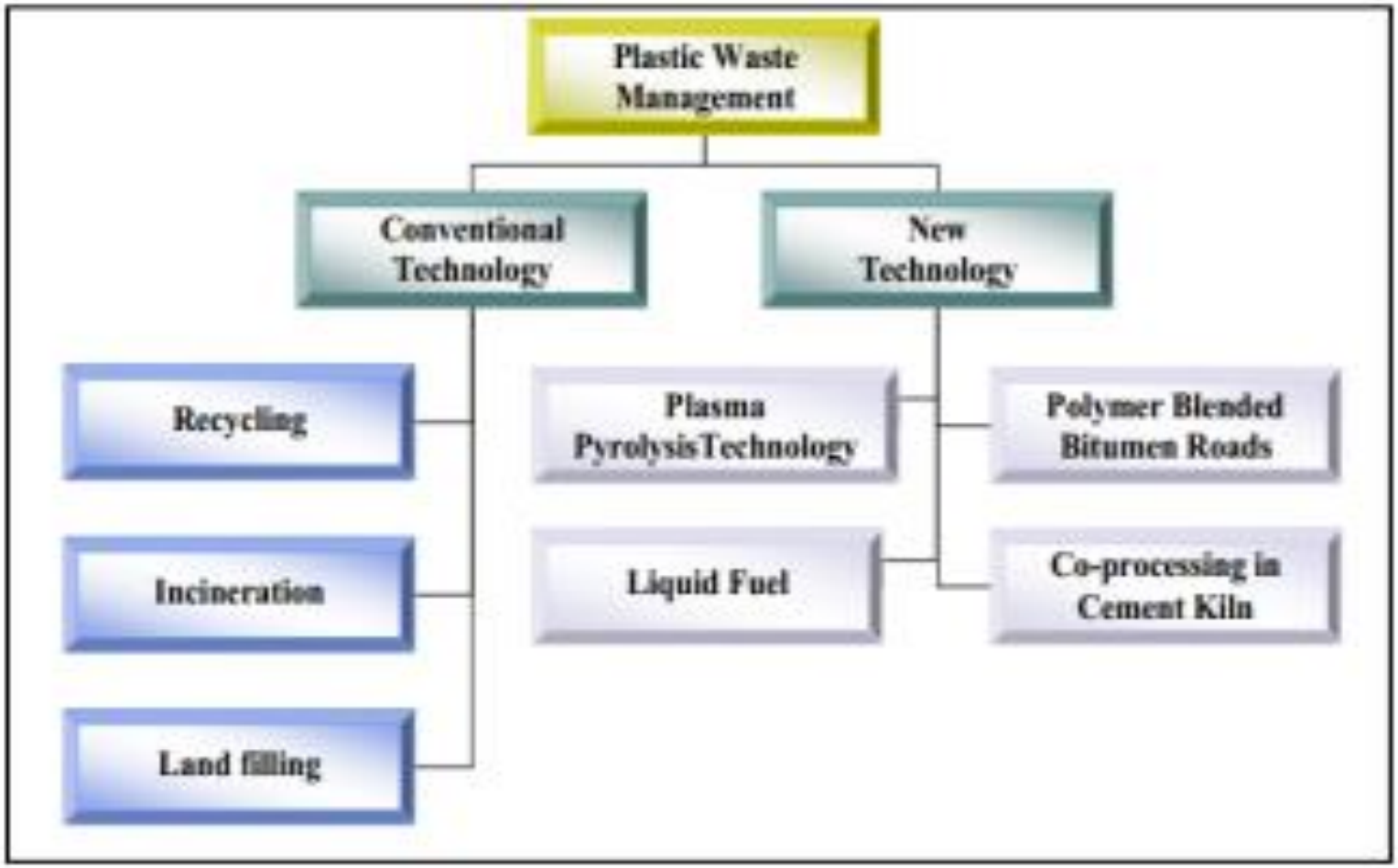


Fig. 2: Plastic Waste Management [3]

IV CO-PROCESSING OF PLASTIC WASTE IN CEMENT KILN

Summary of techniques for recycling

Technique ---Advantages ---Challenges

Mechanical recycling Cost-effective, efficiency, well-known Deterioration of product's properties, pre-treatment

Chemical recycling Operational for PET, simple technology Mainly limited to condensation polymers

Energy recovery Generates considerable energy from polymers

But Generally not ecologically acceptable

The steps involved in Mechanical Recycling

Applications of recycled plastics.

PET PETE, detergent bottles, clear film for packaging, carpet fibers, drink bottles

PVC Packaging for textile, medical materials, footwear ,stationary, flooring .

HDPE Detergent bottles, mobile components, agricultural pipes, compost bins, pallets, toys

PP Garbage bins, Recycling crates Hangers

PS Stationary items, Disposable cutlery, toys

LDPE Bottles, plastic tubes, films for packaging

Feedstock or Chemical Recycling

Chemical recycling is defined as the process in which polymers are chemically converted to monomers or partially depolymerized to oligomers through a chemical reaction. The resulted monomers can be used for new polymerizations to reproduce the original or a related polymeric product. This method is able to transform the plastic material into smaller molecules, suitable for use as feedstock material starting with monomers, oligomers, or mixtures of other hydrocarbon compounds

Positive Developments

Plastic Waste Indian Scene

Over last decade tremendous success with

1. PET to Fibre & Textiles

Good use of Dirty comingled waste for

2. Road Making

Success with many Energy Recovery

3. Cement Units Co-Processing

& Safe Environmentally

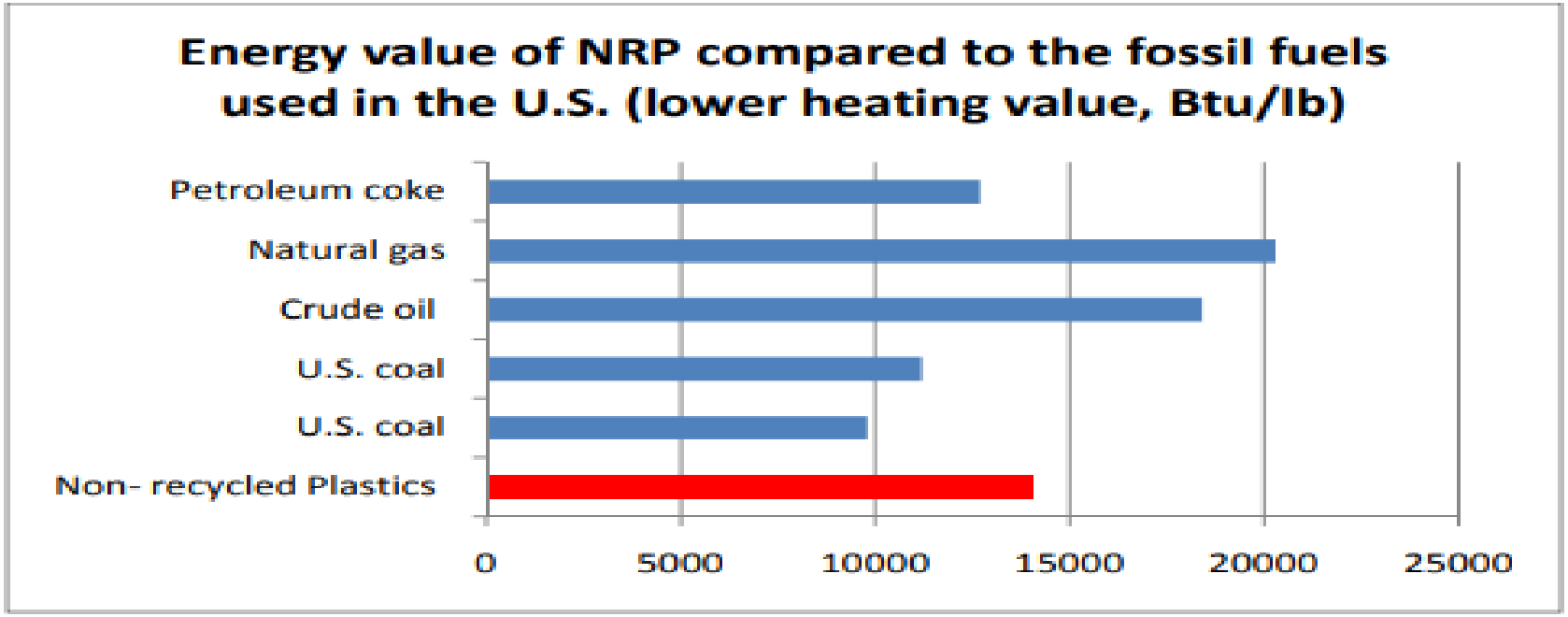
If plastic waste collected in India

All Can be Put to Full Use

35 PET Recycling units produce fibre, matresses & also great fabrics in India. Bottle Waste to Colourful Garments.

Comparative Heating Value from different fuels & figure for plastic waste

- Natural gas: 20,300 Btu/lb
- Crude oil: 18,400 Btu/lb
- Non-recycled plastics (NRP) 14,000 Btu/lb
- Petroleum coke: 12,700 Btu/lb
- Coals: 9,800-11,200 Btu/lb
- Wood: 6,000 Btu/lb



YES WE CAN

- India has the best plastic recycling record of it's own waste
- It can be improved & go towards **Zero Waste**

  if all stakeholders join in

- **Awareness**
- **Legislation**
- **Infrastructure**
- **Compliance**
- **Enforcement**

THANK YOU