PLASTIC WASTE IN INDIA
AN OVERVIEW

Presented by:

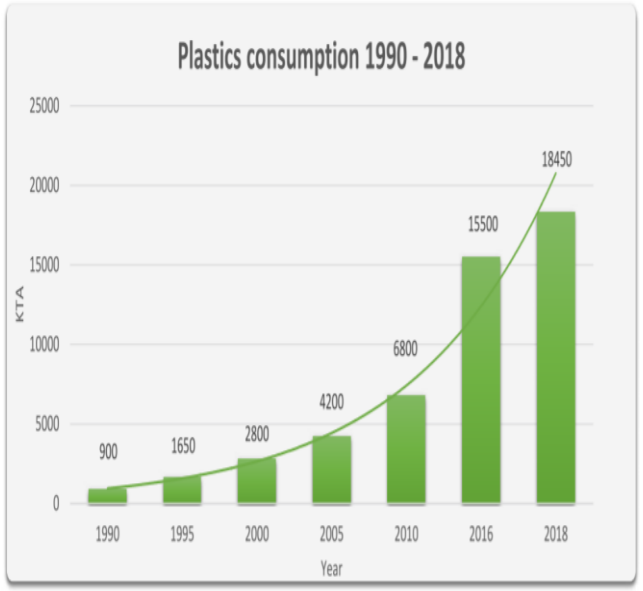
SHAILENDRA SINGH

Founder & CEO
Sustain Mantra

Plastic Consumption Growth In India

POWERING PROGRESS THROUGH PLASTICS

GROWTH OF PLASTICS CONSUMPTION....

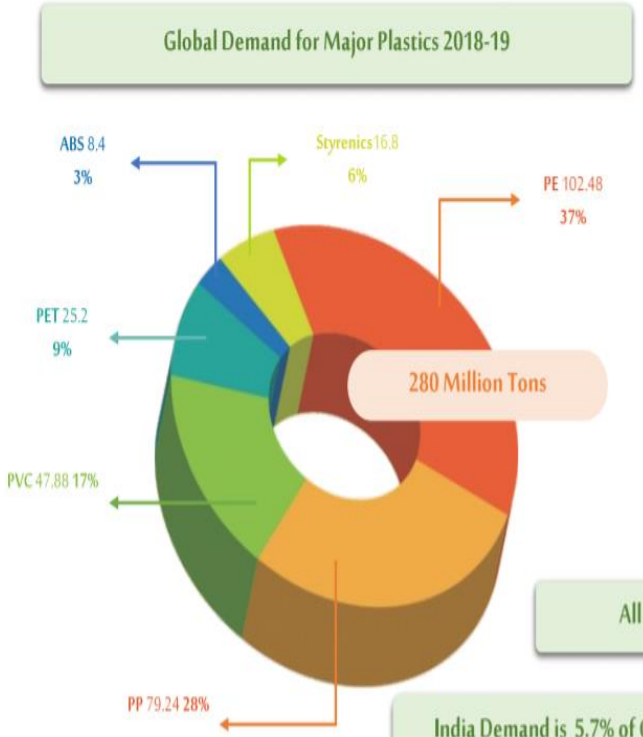


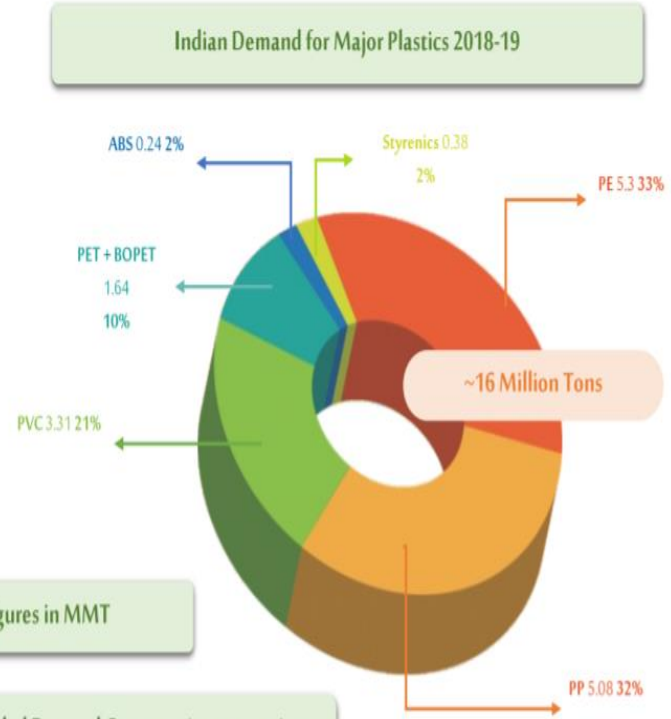
Grown 20 times since 1990....

Source: PLASTINDIA FOUNDATION /Industry Estimate

PLASTINDIA FOUNDATION

COMMODITY PLASTICS DEMAND





All Figures in MMT

India Demand is 5.7% of Global Demand Opportunity to grow in Styrenics

Source: PLASTINDIA FOUNDATION /Industry Estimate

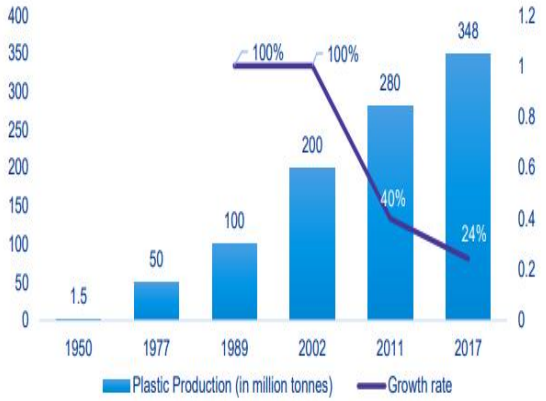
Engineering plastics & Thermosets not included

PLASTINDIA FOUNDATION

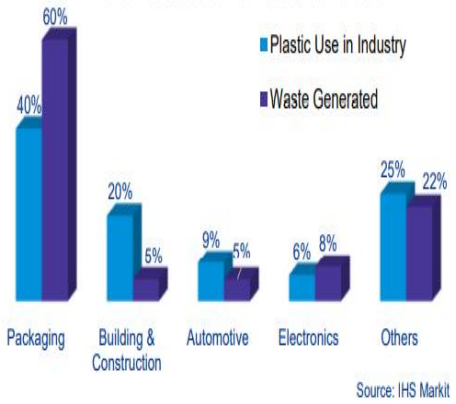
Global Overview of Plastic Consumption & Waste Generation

Being light, durable, and moldable makes it an ideal packaging material and useful across industries like automobiles, electronics, pharmaceuticals etc. Globally the plastic production has grown exponentially from 1950s with a CAGR of 8.47%. At the present rate it is expected to double in the next 20 years.

World Production of Plastics[1]



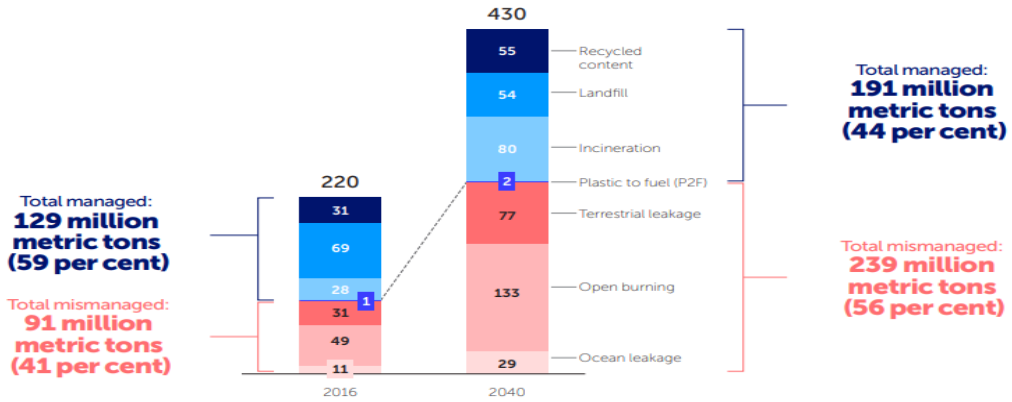
World Plastic Use vs Waste Generation[2]



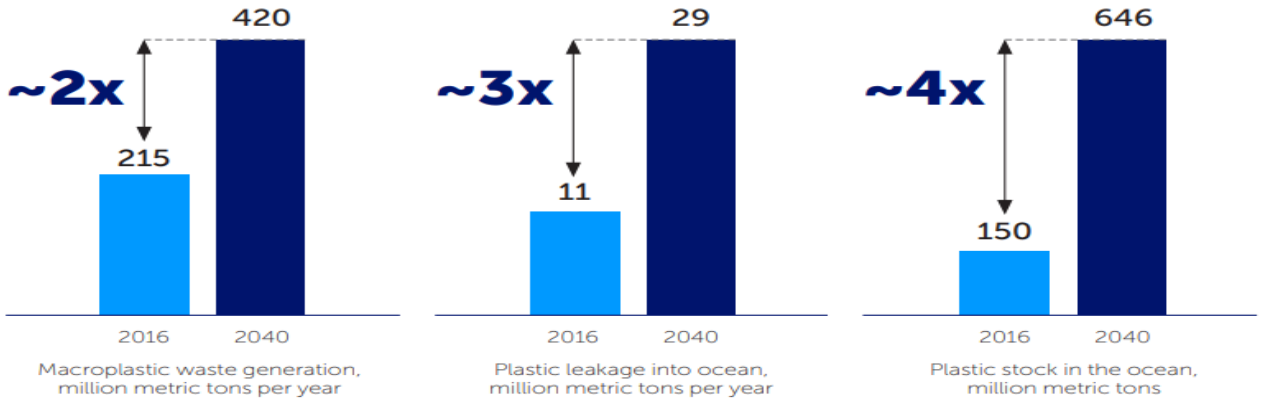
Estimated Global Consumption of Plastic Material by Region* (kg/person)

Mismanaged plastic waste will grow from 91 million metric tons in 2016 to 239 million metric tons by 2040

Million metric tons of plastic waste (macroplastic and microplastic)



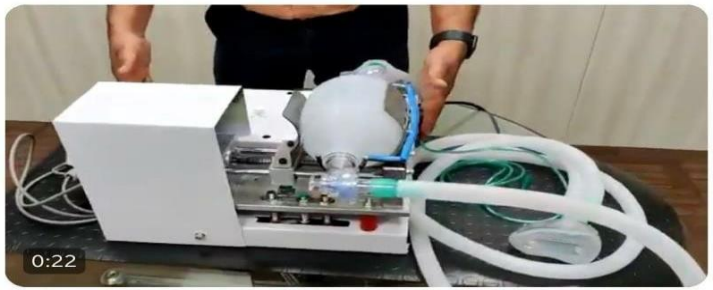
In the next 20 years, plastic waste generation will double, plastic leakage into the ocean will nearly triple, and plastic stock in the ocean will more than quadruple[20]

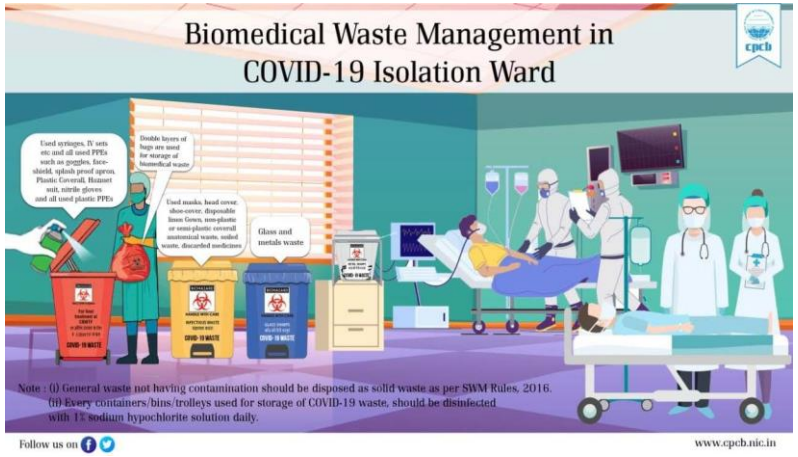


Source : AIPMA webinar/ Breaking the Plastic Wave Report

Plastics the “Hero or Villain”?

Nonwoven fabric
Disposable
Medical products

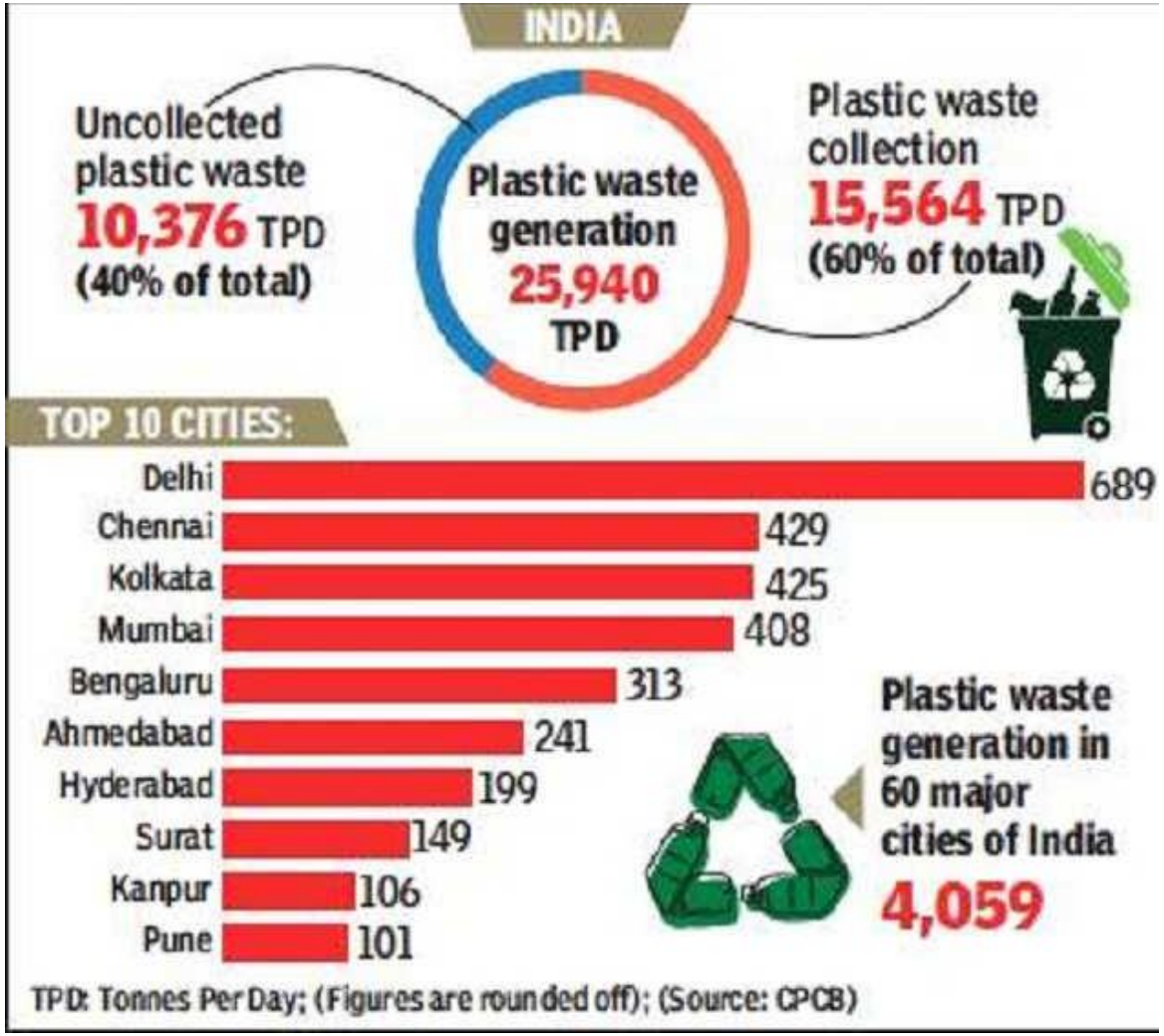




Raised the question & debate again on what is “ single use plastics”?
Is Plastics the villain, or how we handle & dispose of the plastic waste that is the culprit?

Plastic Waste in INDIA

- Plastic waste generation in India was around 9.4 million tonnes.year^{-1} in 2019.
- Global generation rate of more than 380 million tonnes.year^{-1} in 2019. Thus, India's contribution was around 3.1% of the global plastic waste generation.
- Richer states like Goa and Delhi produce as much as **60 grams and 37 grams per capita per day** respectively – against a national average of **8 grams per capita per day**.
- According to the Central Pollution Control Board in India, 60 major India cities produce combined 25,940 tones of plastic waste every day.
- **60% Of the Waste produced is recycled in India.**

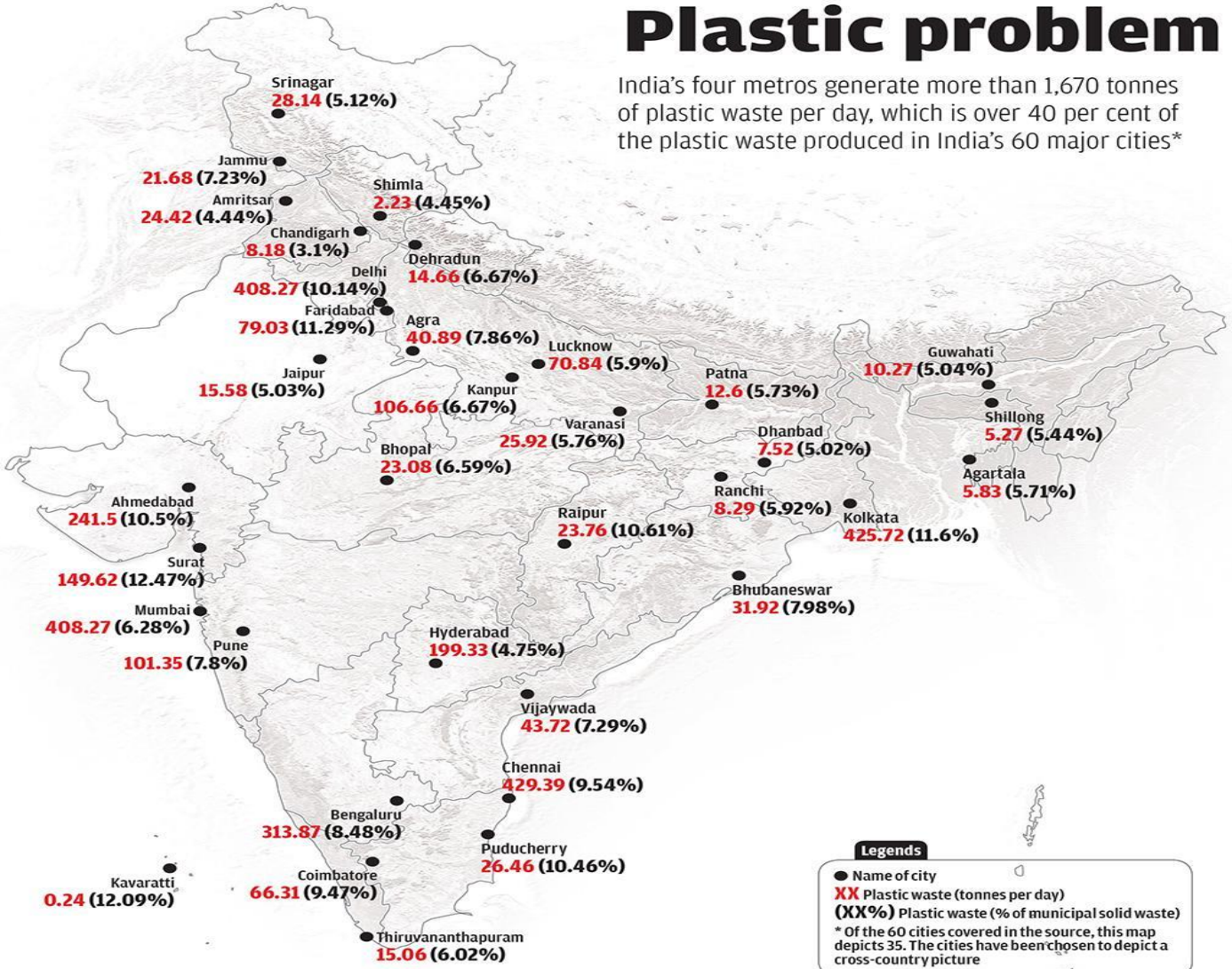


WORLD ENVIRONMENT DAY SPECIAL

POWERING PROGRESS THROUGH PLASTICS

Plastic problem

India's four metros generate more than 1,670 tonnes of plastic waste per day, which is over 40 per cent of the plastic waste produced in India's 60 major cities*



Average plastic waste generation in India (tonnes per day)
4,059.18

Average plastic waste share in municipal solid waste in India
6.92%

Legends

- Name of city
- XX Plastic waste (tonnes per day)
- (XX%) Plastic waste (% of municipal solid waste)

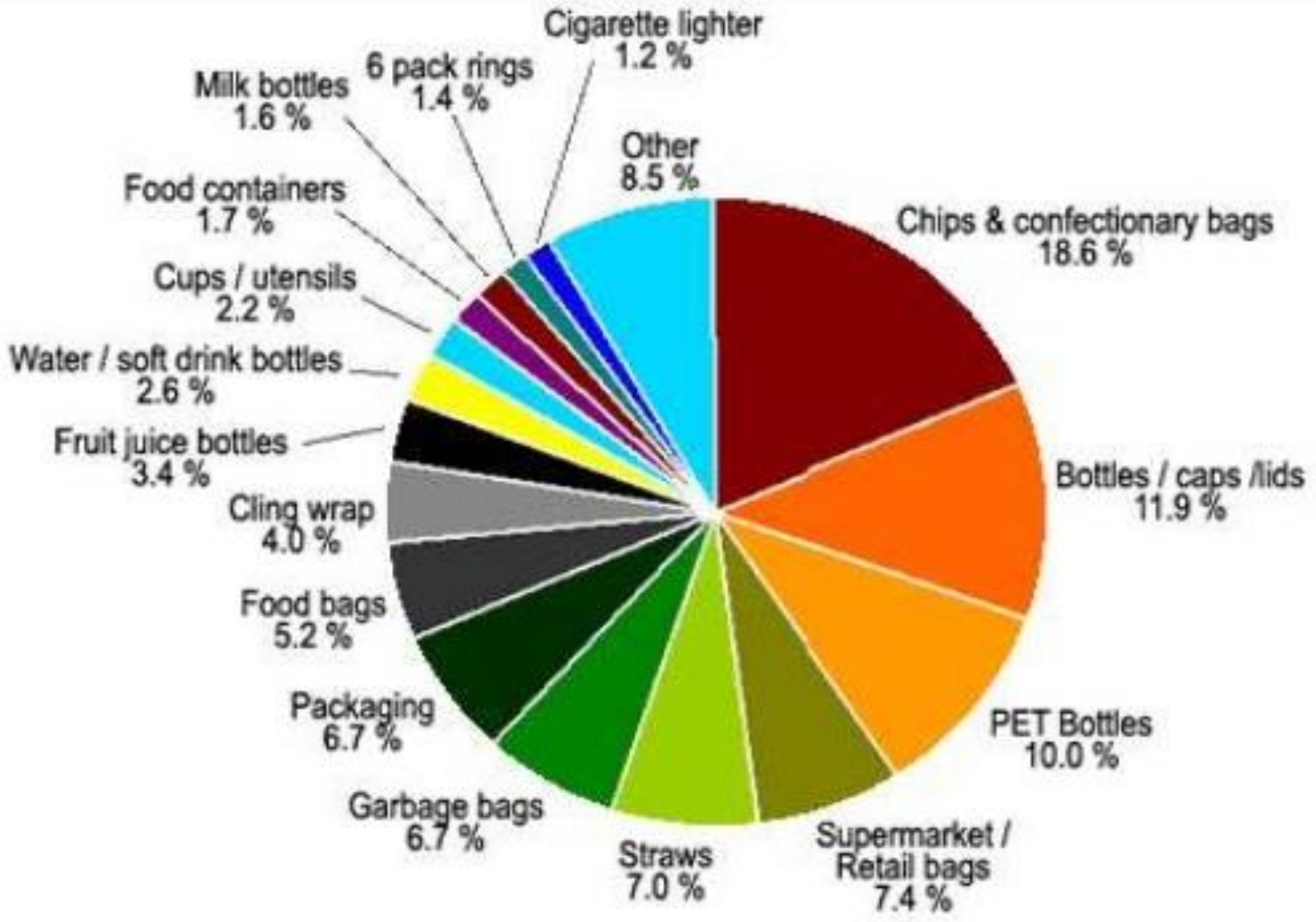
* Of the 60 cities covered in the source, this map depicts 35. The cities have been chosen to depict a cross-country picture

Prepared by DTE/CSE Data Centre
Infographics: Raj Kumar Singh
Analysis: Snigdha Das

Source: Consolidated Guidelines for Segregation, Collection and Disposal of Plastic Waste, CPCB, September 2017

For more such infographics visit: *www.downtoearth.org.in/infographics*

Source Plastics Waste Materials



Source: http://www.cleanup.org.au/rubbishreport06/sources_rubbish.html

Challenges for Plastic Waste Management Globally

POWERING PROGRESS THROUGH PLASTICS

Plastic wastage is growing at an annual rate of 9% globally.

By 2040, there will be 1.3 billion tones of plastic wastes present in the environment globally.

Only 14% of the world's plastic waste is recycled.

Plastic wastage is growing at an annual rate of 9%.

50% of all plastics produced each year are single-use.

About 500 billion single-use plastic bags are used worldwide every year.

75% of all plastic produced has become waste.

Norway has the highest PET recycling rate of 97%

Every single person uses more than 700 plastic bags per year.

The number of plastic bottles used worldwide per day exceeds 100 million.

About 91% of plastic is not recycled.

What are the Issues to really work on?

POWERING PROGRESS THROUGH PLASTICS

- **LITTERING**
  - **NEEDS BEHAVIOURAL CHANGE IN SOCIETY**

- **LACK OF INFRASTRUCTURE**
  - **URGENT NEED TO CREATE INFRASTRUCTURE FOR WASTE MANAGEMENT URBAN/RURAL**

Failure to collect waste: The real issue?

POWERING PROGRESS THROUGH PLASTICS

Garbage Vans cannot reach in narrow by lanes of slums, where nearly 40% urban population lives. They ultimately dispose their daily garbage collected in plastic bags into sewage. Municipal Corporations can deploy bike based special purpose vehicles for garbage collection from such difficult to reach areas.

Most of the Slums are located next to sewages. The waste generated in these slums is dumped into sewage which causes blockage.

Root Cause is Visible Plastic Pollution

Unique situation in India

Rag-pickers who are the “informal” stakeholders in the waste management system are a vulnerable group in India. This unpaid and unrecognised group form an integral part of the waste management eco-system. The number of ragpickers in India is estimated to range between 1.5 million to 4 million.

SAVIOURS DRIVING WASTE RECOVERY IN IND

RECYCLING CLUSTERS ACROSS INDIA

LOW TECH - LOW COST

ISSUES WITH ENVIRONMENT

SOCIAL SECURITY

Plastics can be Circular too

Circular Economy for Plastics

- The circular economy represents an alternative, more sustainable model to the traditional linear economy.
- In a circular economy, we keep resources in use for as long as possible, extract the maximum value from them while in use, then recover and regenerate products and materials at the end of their service life.
- To improve the circularity of plastics, it is essential to make sure that more and more plastic waste is recovered and doesn't end up in landfill or in the environment.
- The achievement of a circular economy will require not only innovative technical developments, but also major economic investment and changes to business practice coupled with significant changes in social behavior.

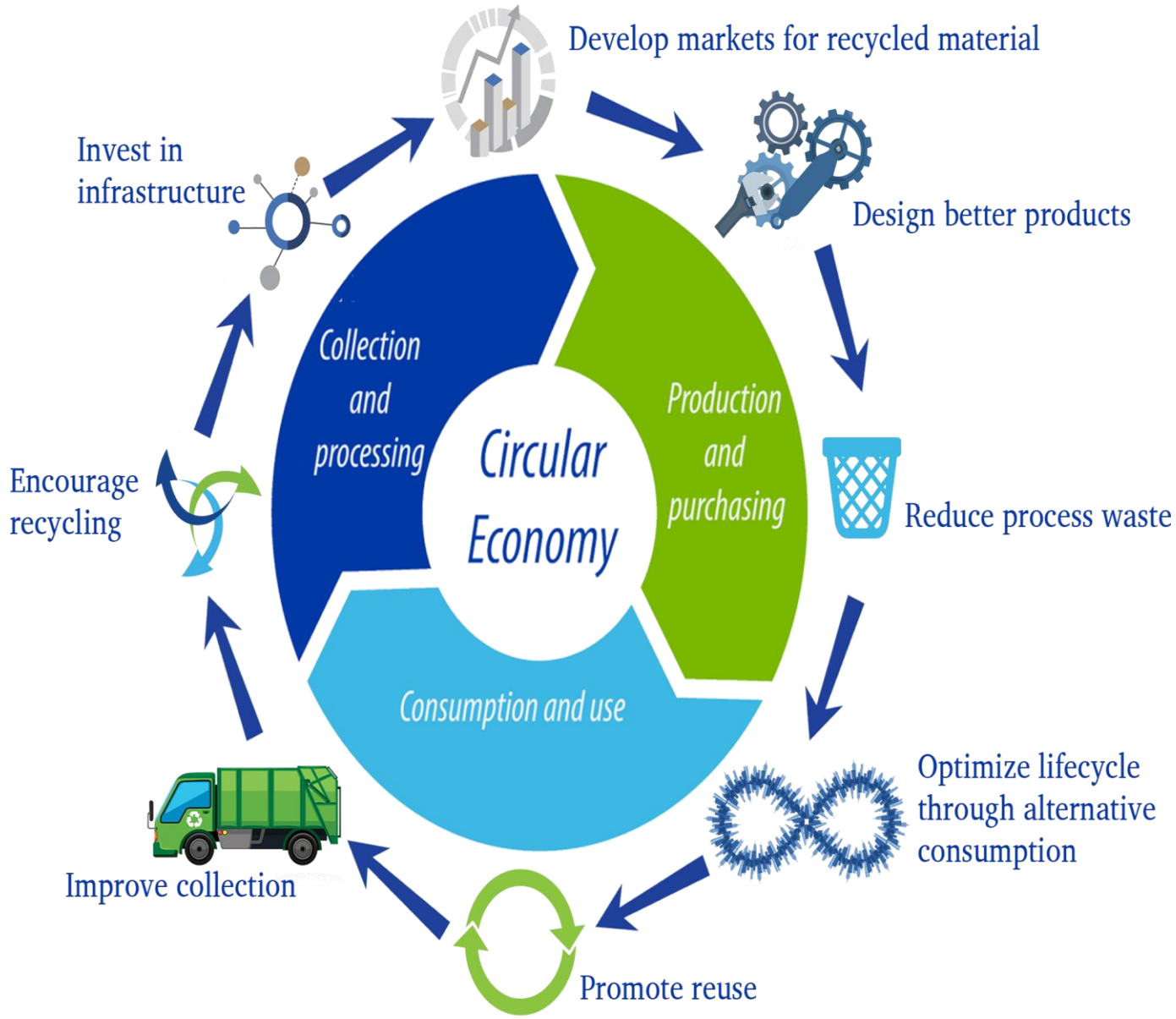


Image: Sustainable Global Resources Ltd.
Recycling Council of Ontario

Most favoured option

Reduce lowering the amount of waste produced

Reuse using materials repeatedly

Recycle using materials to make new products

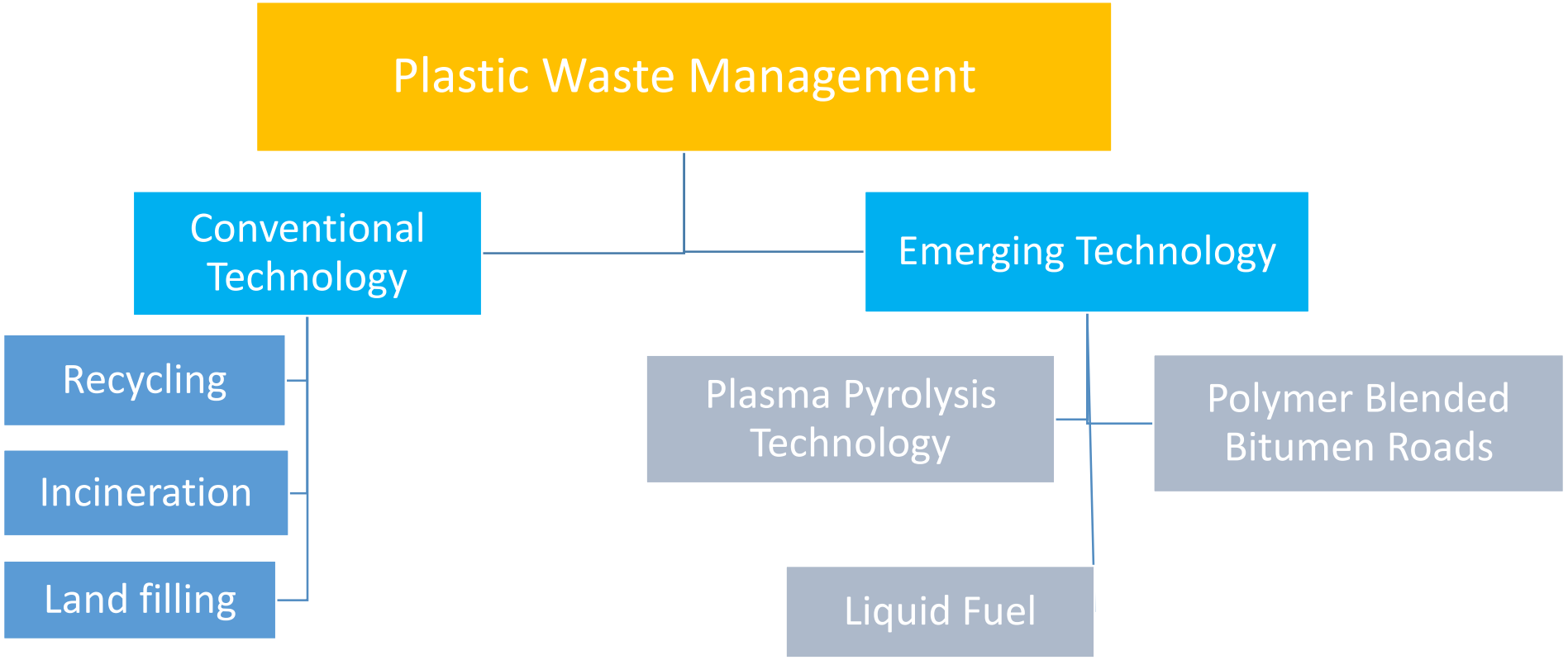
Recovery recovering energy from waste

Landfill safe disposal of waste to landfill

Least favoured option

POWERING PROGRESS THROUGH PLASTICS

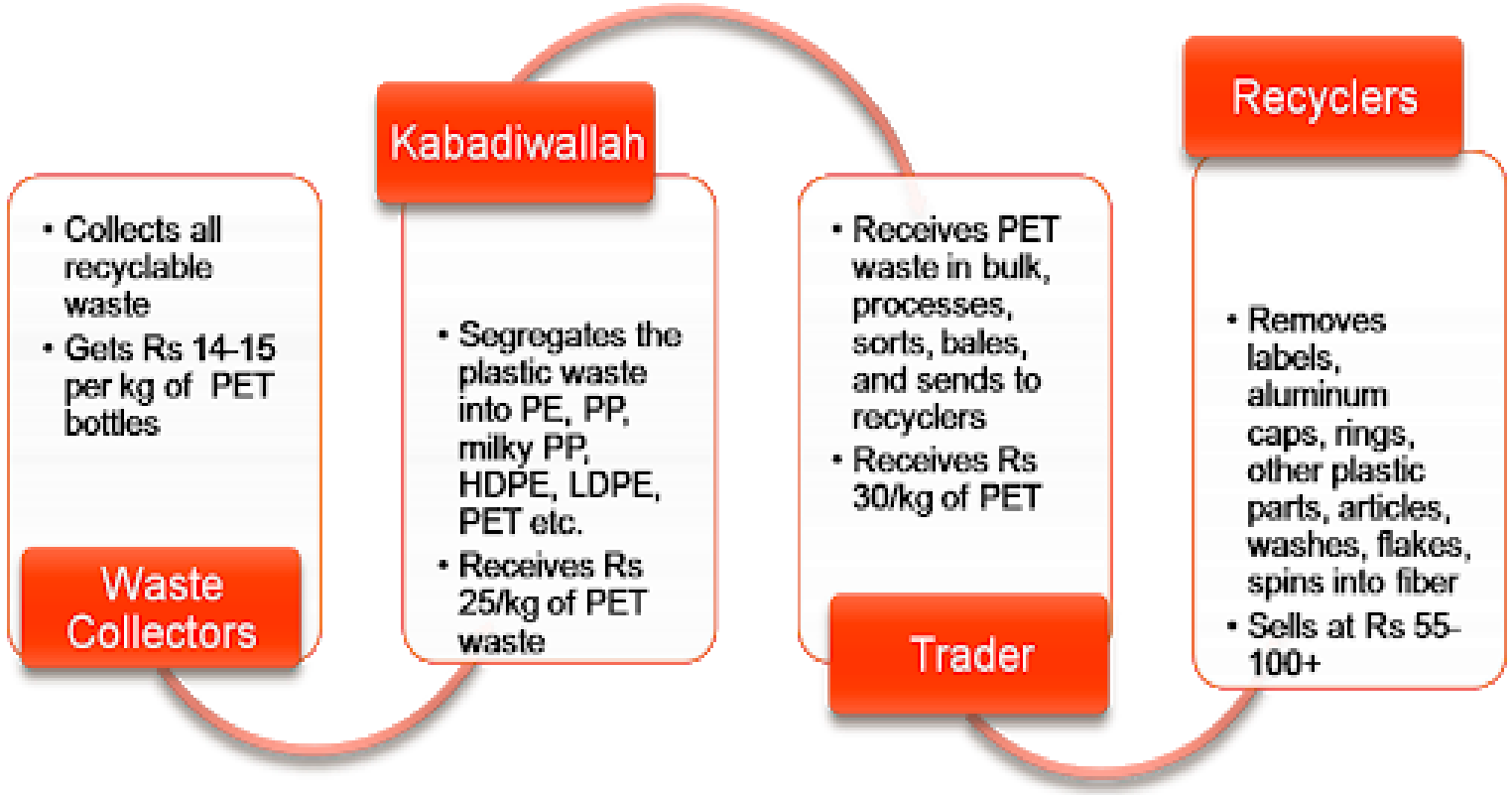
Turning Challenges in Opportunities



Reference- Recycling and recovery routes of plastic solid waste (PSW): A review, S.M. Al- Salem , P.Lettieri, J. Baeyens

Plastic Waste Recycled in India

- **About 60 percent of plastic waste in India is recycled, according to various estimates.**
- **India's segregation and recycling system operates through an informal chain of workers-from rag pickers who sort through waste to dealers who sell the plastic to plants.**



Plastic Waste Recycled in India

Out of the 60% of recycled plastic:

- 70% is recycled at registered facilities
- 20% is recycled by Unorganized Sector
- 10% of the plastic is recycled at home.

Source: http://cpcb.nic.in/Plastic_waste.php/

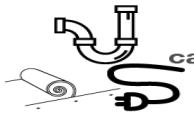
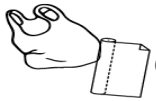
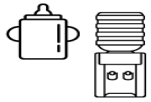
Plastics Recycling Hubs India

S.No	State	Location	S.No	State	Location
1	Bihar	Patna	26	Maharashtra	Aurangabad
2	Chattisgarh	Raipur	27	Maharashtra	Solapur
3	Chattisgarh	Bilaspur	28	Maharashtra	Kolhapur
4	Daman	Daman	29	Odisha	Bhubaneswar
5	Delhi	Tikri Kalan	30	Odisha	Cuttack
6	Delhi	Kamruddin Nagar	31	Odisha	Balasore
7	Delhi	Vishwas Nagar	32	Punjab	Amritsar
8	Delhi	Shahdara	33	Punjab	Khanna
9	Gujarat	Dhoraji	34	Punjab	Dhuri
10	Gujarat	Ahmedabad	35	Punjab	Ludhiana
11	Gujarat	Bhavnagar	36	Punjab	Moga
12	Karnataka	Belgaum	37	Punjab	Jalandhar
13	Karnataka	Dharwad	38	Rajasthan	Jaipur
14	Karnataka	Shivamogga	39	Tamilnadu	Chennai
15	Karnataka	Mangaluru	40	Tamilnadu	Coimbatore
16	Karnataka	Davanagere	41	Tamilnadu	Madurai
17	Karnataka	Tumakuru	42	Tamilnadu	Tiruchirappalli
18	Karnataka	Bengaluru	43	Tamilnadu	Tirunelveli
19	Karnataka	Mysuru	44	Tamilnadu	Salem
20	Kerala	Kochi	45	Telangana	Hyderabad
21	Madhya Pradesh	Indore	46	Uttarpradesh	Kanpur
22	Madhya Pradesh	Bhopal	47	Uttarpradesh	Meerut
23	Maharashtra	Dharavi	48	Uttarpradesh	Lucknow
24	Maharashtra	Malegaon	49	West Bengal	Kolkata
25	Maharashtra	Jalgaon			

India has highest plastics recycling rates

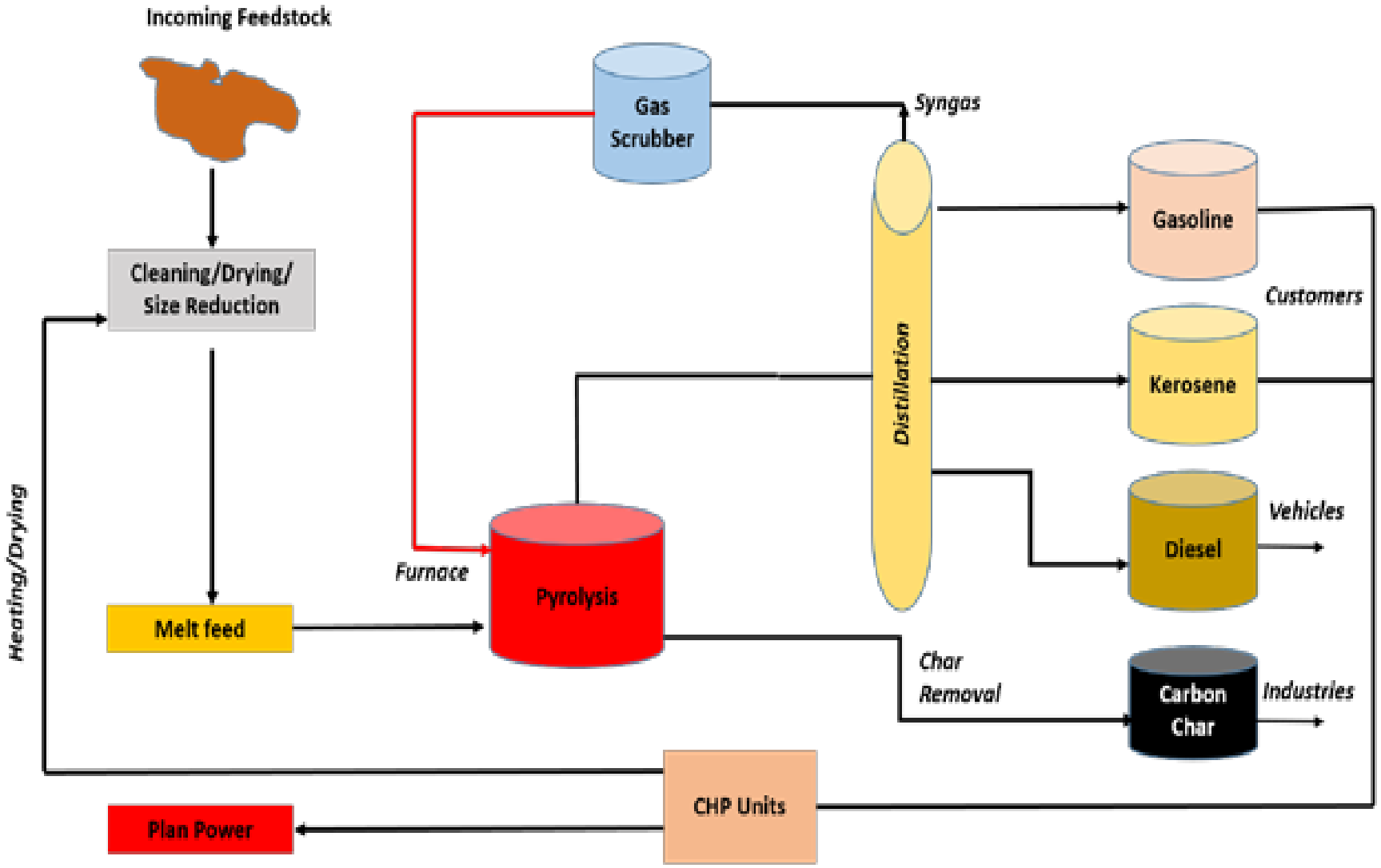
Which plastics are recyclable?

Summary of plastic polymer groups, their common uses, properties and recyclability. Numerical coding (from 1-7) is typically provided on plastic items and gives information of their polymer grouping below. Recyclability is based on common recycling schemes but can vary between countries as well as regionally within countries; check local recycling guidelines for further clarification.

Symbol	Polymer	Common Uses	Properties	Recyclable?
1 PETE	Polyethylene terephthalate	 Plastic bottles (water, soft drinks, cooking oil)	Clear, strong and lightweight	Yes; widely recycled
2 HDPE	High-density polyethylene	 Milk containers, cleaning agents, shampoo bottles, bleach bottles	Stiff and hardwearing; hard to breakdown in sunlight	Yes; widely recycled
3 PVC	Polyvinyl chloride	 Plastic piping, vinyl flooring, cabling insulation, roof sheeting	Can be rigid or soft via plasticizers; used in construction, healthcare, electronics	Often not recyclable due to chemical properties; check local recycling
4 LDPE	Low-density polyethylene	 Plastic bags, food wrapping (e.g. bread, fruit, vegetables)	Lightweight, low-cost, versatile; fails under mechanical and thermal stress	No; failure under stress makes it hard to recycle
5 PP	Polypropylene	 Bottle lids, food tubs, furniture, houseware, medical, rope, automobile parts	Tough and resistant; effective barrier against water and chemicals	Often not recyclable; available in some locations; check local recycling
6 PS	Polystyrene	 Food takeway containers, plastic cutlery, egg tray	Lightweight; structurally weak; easily dispersed	No; rarely recycled but check local recycling
7 OTHER	Other plastics (e.g. acrylic, polycarbonate, polyactic fibres)	 Water cooler bottles, baby cups, fiberglass	Diverse in nature with various properties	No; diversity of materials risks contamination of recycling

THE ALL INDIA PLASTICS MANUFACTURERS' ASSOCIATION
AIPMA
ESTD 1945
POWERING PROGRESS THROUGH PLASTICS

Plastic Waste to Fuel



Pyrolysis Process of generating fuel oil from the waste plastics

Utilization of Plastic Waste in Road Construction

In 2015, Government of India has **mandated** all road developers in the country to use **waste plastic for construction** within 50 km of cities with more than five lakh people.

This ‘plastic road’ technology was developed and patented by Padmashri Professor **Rajagopalan Vasudevan**, Professor of Chemistry at Thiagarajar College of Engineering, Madurai. He is also referred as the Plastic Road-maker of India.

First **100% recycled road of 500 meters** trial run stretch has been laid by KK Plastic Waste Management Ltd. for **Karnataka State Highway Improvement Project** under World Bank Funding.

Flowchart of Plastic Bitumen Road process

Plastic waste collection segregation and storage

Cleaning and drying of plastic waste

Shredding plastic waste into required size

Stone aggregate heated to around 160-170°C

Shredded polymer waste is added to heated stone aggregate for 30-40 sec and mixed for uniform coating

The Coated aggregate is mixed with hot bitumen at temp 155-163°C

The mix known as waste plastic-aggregate bitumen mix can be used for road laying at 110-120°


Thank
you