Presenting

SAFERECYCLER™

International Conference on Plastics & Sustainability

Future Ready Recycling for the Unrecyclable

3 FEB 2023

at The Lalit,
Connaught Place, New Delhi

Supported by

PLASTINDIA FOUNDATION
ISO 9001-2015 certified

GEOMATER™
because earth matters

About Us

SAFERECYCLER™

To transform unrecyclable plastic waste to valuable products, we offer a 'first mile to last mile' technology solution addressing the global plastic waste crisis.

We will work to safeguard our planet by supporting people, business, industry and Government to meet UN SDGs and COP 21 norms by reducing carbon footprint

GEOMATER™
because earth matters

Our world is drowning in plastic waste, causing an irreversible harm to our environment

350 MMT
packaging and non-packaging waste is generated annually (CY 19 est.)

70% **(250 MMT)**
unprocessed and ends up disposed incorrectly into Oceans and Landfills

World will add **~3.0 Bn tons of Plastic Waste** into the environment over the next 10 years

India alone added **~ 50K TPA** of incremental plastic waste during COVID

It is vital to convert this plastic waste into value added products and reintroduce it back into the economy

India Overview

- 4 Million MT per year (FY 20 estimates) of plastic waste is improperly disposed, littered or eventually ends up in landfills.
- COVID has only worsened the problem. India generated daily an additional 50K Tons of PPE waste nationwide.
- The largest percentage of unrecycled plastic waste comprise of Medical Plastics, Personal Protective Items, Primary Packaging including all flexible packaging (small and big) products that are FLEXIBLE and BULKY

FY20 Estimates

17.3 MMT

Total Plastics Consumption in India

11 MMT

Plastic Waste Generated (that should be recycled)

6.8 MMT

Waste Actually being recycled

~4.2 MMT

Unrecyclable Waste that is Improperly Disposed or Littered, that ends up in Landfills and Waterbodies

Unrecycled Commingled Plastic Waste Stream

Global Estimates

CY 2019
257
MMT

→

CY 2030
~385
MMT

India Estimates

FY 2020
4.2
MMT

→

FY 2030
~8
MMT

By 2030, there will be a substantial increase in untreated plastic waste 1.5x globally and 2x in India

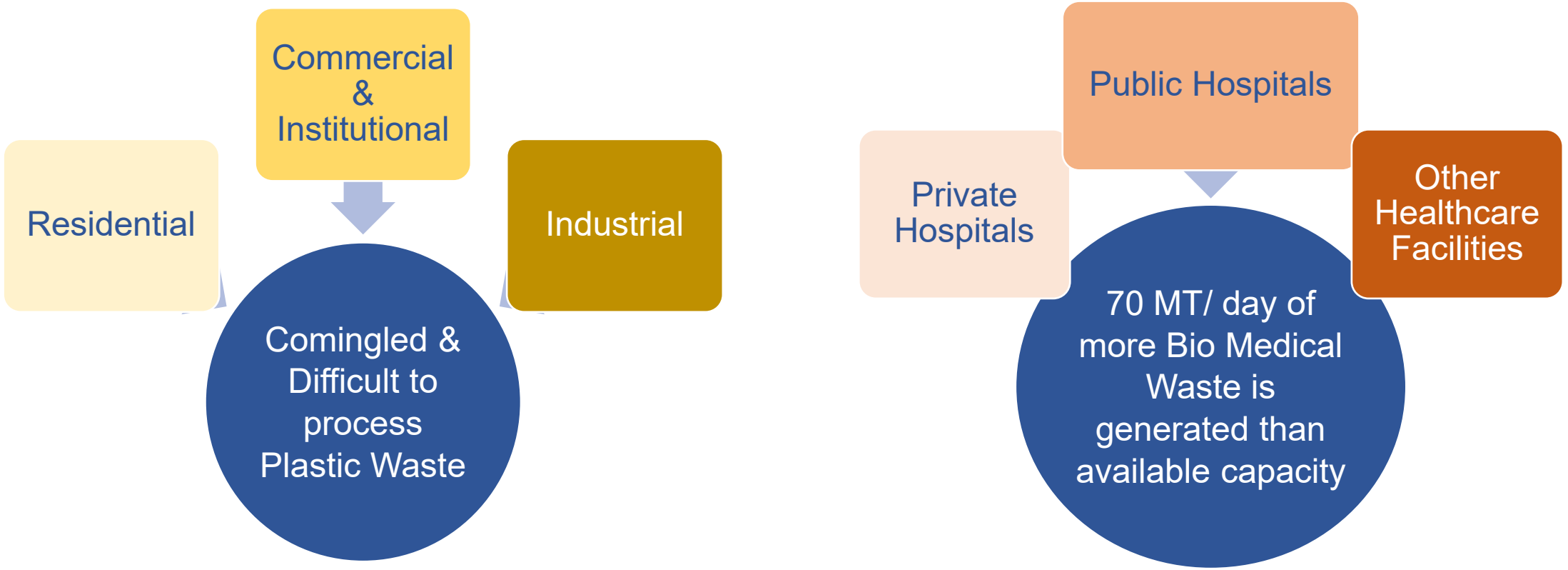
Source: OECD, McKinsey, TERI report, GeoMater estimates.

Note: *Flexible estimated at 60% of TAM 257 MMT (landfill and mismanaged)

India – Challenges related to waste Management

Issues		Comments
Lack of segregation at source		• It is the first step in the recycling process, but often the most neglected. • All kinds of waste is collected and merged together without any regard for the type.
Widespread Littering		• Although its illegal, and there are some legal consequences, no one follows or enforces these rules in general.
Waste Burning		• Waste burning is a perennial issue and one of the main causes for the infamous Delhi Smog.
Poor Landfill Management		• Very few cities in India actually have scientifically designed Landfills. • Cities often dump solid waste in dump yards which are not designed well enough to keep the toxins inside.

Areas of Application



Technology is essential to process difficult to handle commingled waste at the origin and convert into valuable usable products

Tackling the waste crisis at the First Mile @ Source

SAFERECYCLER™

- Eliminate Plastic waste from reaching our Oceans and Water Bodies, Landfills and Mofussil street waste.
- Prevent Pathogens from entering the environment

- Convert comingled plastic waste to sterile and densified plastic chips which can be safely handled and transported
- Eliminate the need to transport bulky, pathogen infected and contaminated waste.

- Convert to a sterile product which is simple to transport.
- Vastly reduce the carbon footprint of transportation in the current recycling system by processing waste

Reduced GHG emission

Introducing **SAFERECYCLER**
Novel Plastic Waste Management Platform

SAFERECYCLER™

Compact
2.5m x 2m

SOLAR IMPULSE EFFICIENT SOLUTION APRIL 2022

10 Kg/Hr Design
Throughput

Non-Industrial Scale, Low
Power Consumption
Noise level < 75dB

Powered by Technology created by:

STEER

Transforming Materials
Transforming Lives

Enables Processing Plastic
Waste @ Source into chips

Pathbreaking Concept

SAFERECYCLER™

- First-of-its-kind Patented Equipment
- Easy to Operate, Fully Automatic
- Twin-screw extruder homogenizes and sterilizes material at 200 deg C (pathogen free)
- Footprint only L x W x H 2m X1m X 2m
- Unique Sterilizing Compactor for converting Comingled Waste into usable form
- Medical Plastics Waste, Mono & Multilayer Packaging and metallized films
- Tolerates metal wires needles
- Works on 40 Amps. Single Phase power source. Noise level less than 78dB

Converting Plastic Comingled Waste into Recyclate ……..having value added downstream applications

Comingled Flexible Plastic Waste

Medical Waste

Post Consumer Waste

Inline Shredding → Sterilization at 200^0 C+ → Compacting

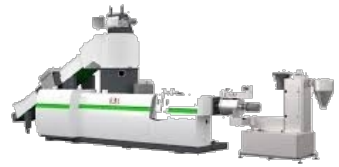
Sterile Plastic Chips

Fuel Substitute for Cement Kilns and Industrial Furnaces and Feed stock for Pyrolysis **(25 cents / kg)**

Structured Products for Building Construction and Infrastructure **(1.5 $ / kg)**

Powerful Technology Platform



Machine Name	SAFERecycler	AMB ECOSTERYL Series	Representative (Polystar Repro Air)	Typical Compactor Recycling Unit (with agglomerator)	Typical Simple Recycling Unit
Domestic	✓	✗	✗	✗	✗
Mobile	✓	✗	✗	✗	✗
Fully Automatic	✓	✗	✓	✗	✓
Sterile & Densified Output	✓	✓	✓	✓	✓
No Segregation Required	✓	✓	✓	✓	✗
No Drying Required	✓	✓	✓	✓	✗
Energy Efficient	✓	✗	✗	✗	✗
At source	✓	✓	✗	✗	✗

Source: Respective Publications, Internal Research and Estimates

India: Requirement for Flexible Plastic Waste Recycling at Source

End use Segments	Population Base	Annual Waste Generation	Comments

Medical 	• 69,000 hospitals in India (2019) of which:
	  • 43,000 private
	  • 26,000 public
	• 800,000 clinics and dispensaries
		~360 MT per day
		
		(69,000 Hospitals @ avg. 26 beds/hospital @ 200 g of medical waste per bed/day)
			Hospitals only, excludes clinics and dispensaries

Commercial 	• 150 operational Civil Airports • 20,000 large Office Buildings (with avg. 500 seats each, approx. 10 Mn seats)	**Large Office Buildings** 50 MT/day (5 gms per seat/day)	Large Office Buildings only

Residential 	• 250 Mn H/H
	  • 65 Mn Urban
	  • 185 Mn Rural
		Urban only
		1,300 MT/day
		(65 Mn @ 20 g of flexible waste/urban H/H per day)
			Considering Urban requirement only

Source: SAFEReCYCLER Internal estimates.

A Case Study :
Medical Plastic Waste

Hospital Landscape in India

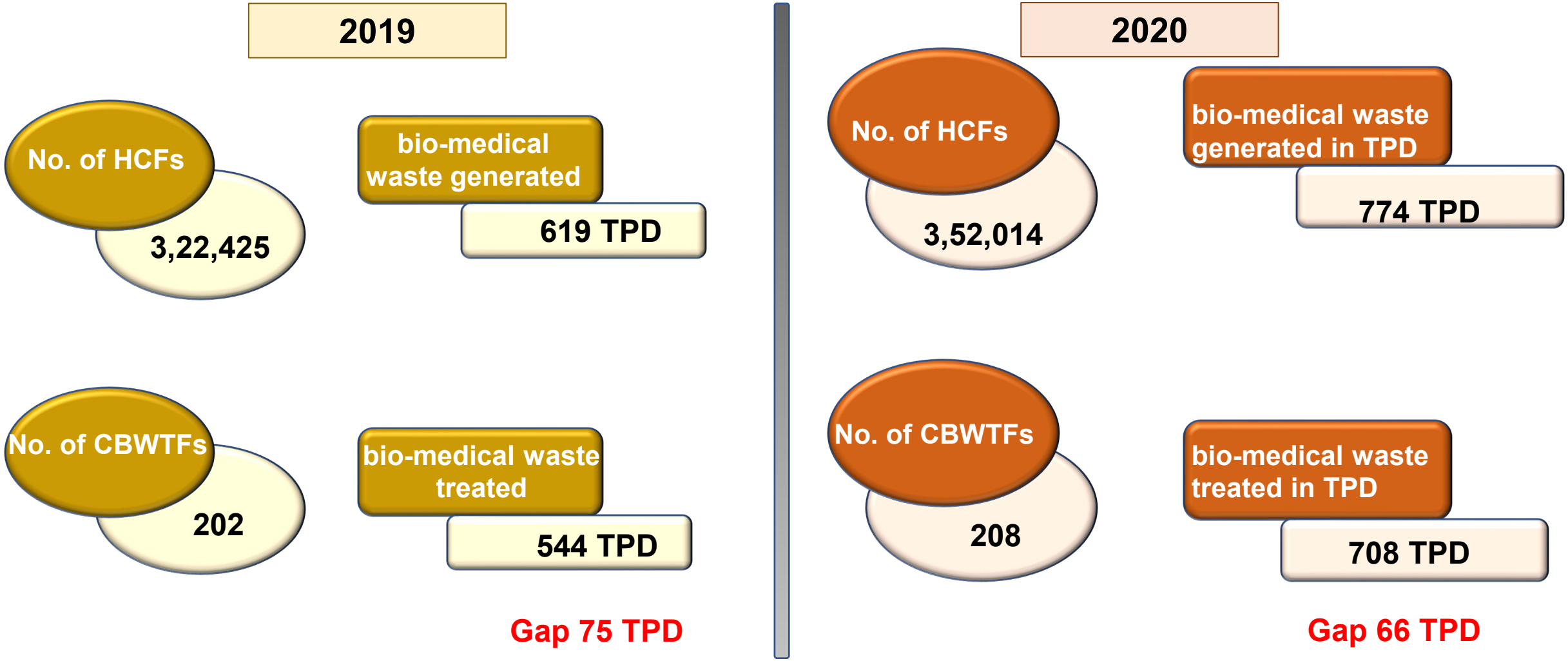
As per our preliminary field survey and desk research of hospitals, following is the Indian Hospital landscape

India Hospital Sector Landscape		
Total No. Of Hospitals in India (Govt & Private)	~82,000 hospitals, 2 Mn beds	
Hospital Size (# of Beds)	**No of hospitals (estimated)**	**Medical Plastic Waste (Red Waste)**
1-100	53,000	<200 gms per bed per day
101-300	26,000	250 to 300 gms per bed per day
300+	3,000	400+gms per bed per day

Installation of SAFEReCYCLER solution not only prevents possible spread of pathogens, but also provides economically viable solution

Source: Indian Medical Association Report and On Field Research

Bio Medical Waste Management Scenario



Large Gap in Bio Medical Waste Generation and Treatment

Annual Report on Bio Medical Waste Management, CPCB, 2020

Approval for **SAFERECYCLER** with State authorities – under progress

- At present, as per Bio Medical Waste Management Rule, 2016, Rule 7(1) Healthcare & CBMWTF have to treat and dispose of Bio Medical Waste in accordance with Schedule I
- These processes include autoclaving, micro-waving or hydroclaving followed by shredding or mutilation or combination of sterilization and shredding

SAFERECYCLER is the best suited technology

✓ It is automatic, self-contained and compact sterilising medical plastic waste into dense chips in solid-state

✓ There are no air emissions or water discharge from the equipment hence no requirement for notifying any environment standards

Clarifications from CPCB under BMW 2016 is positive
Pollution Control is mainly a State Subject and discussions are under progress

Hospital Use Case dynamics

No. of Beds	200	250	300	350
Expense for Disposal per month (Rs.)	50,000	61,875	81,000	1,10,000
Waste Generated (Kg / Day)	55	69	80	123
Waste Generated (Kg / Month)	1650	2,070	2,700	3,690
Cost per KG	Rs. 30			
Machine Hours per day	7	9	11	15
Money Saved / Month	39,744	50,514	67,157	92,612
IRR	0%	11%	32%	71%

Key Assumptions	
Machine Price	Rs. 25 Lakhs
Output	8 KG / Hour
Power Consumption	5 KW / Hour
Power Cost	Rs. 8 / Unit
Manpower	Rs. 500 / 12 hour
Maintenance	Rs. 40,000 Annually
Interest	12%

Any hospital which has 200+ beds can save money by replacing their current recycling process with *SAFEReCYCLER*

Source: Industry Analysis and Internal estimates.

In Conclusion….

The Problem	**Commingled and contaminated plastic waste material is entering our landfills and oceans from around the world**	**Post COVID urgency for safe solution for pathogen ridden plastic waste in hospitals and communities**
The Solution	**SAFERe**CYCLER enables the conversion of mixed, commingled, multilayer, contaminated plastics waste into a sterile, valuable raw material - - A first mile @ source solution	
Leveraging Advanced Technology & Product Platforms	**SAFERe**CYCLER converts unsorted, non-segregated, not-cleaned mixed plastics waste streams consisting of medical plastic waste, that contain mixtures of polymers such as PP, PE, PET, PU, Nylon, PVC, Rubber and others into a sterile and dense chip. These chips commingled plastics chip are a coal substitute or a usable pyrolysis feedstock or a valuable raw material for intelligent inline compounding to structured products.	

THE WASTE-2-VALUE PLATFORM

...ENSURING A CLEANER & GREENER TOMORROW...
OUR RESPONSIBILITY TO THE FUTURE GENERATIONS

Thank you

Contact
sanjay.shah@steerworld.com