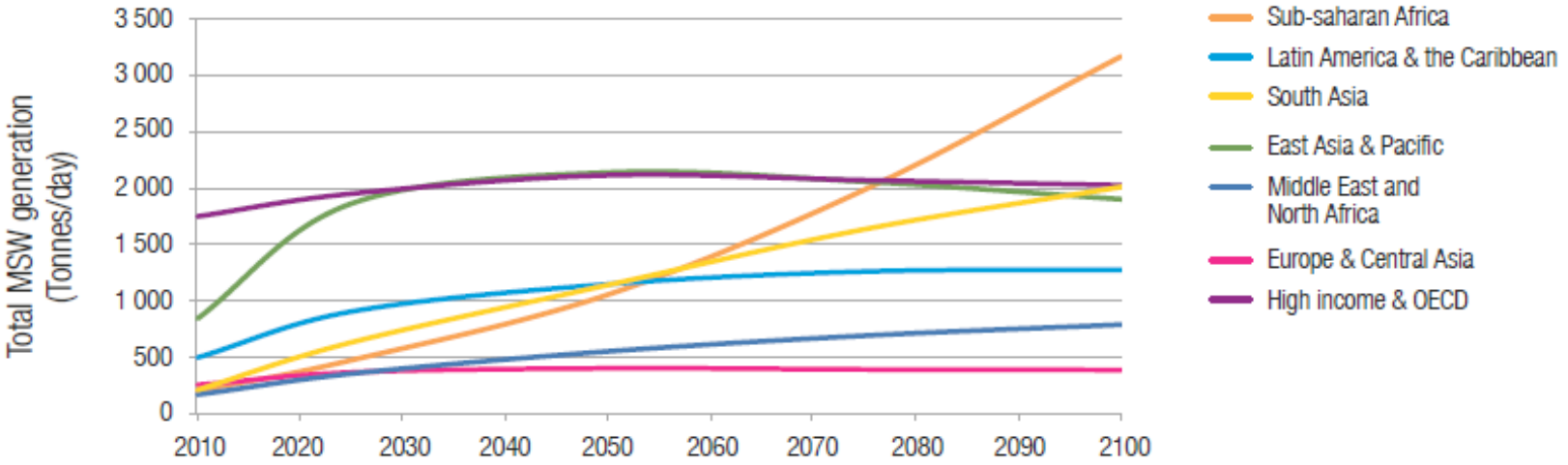
Waste management: Challenge to sustainable urbanisation in South Asia

Suneel Pandey
Director, Environment & Waste Management
2nd August, 2022

Overview

- Introduction to waste management
  - Solid waste
  - Plastic waste
  - E- waste
- Decarbonisation of waste
- Waste solutions for circular economy

Global MSW Generation Scenario



Source: GWMO

- Developing countries are still grappling with uncontrolled dumping, open burning and inadequate access to waste services

MSW: Municipal Solid Waste

Waste Management in Developing Countries

Country	Generation (mi tonnes/Yr)	Legislation	Processing (%)	Disposal (%)
Armenia	0.5	2005	75	25
Bangladesh	14.8	1998	5.3	94
Cambodia	1.0	2000	16	84
Egypt	21.0	1999	20	80
India	168.0	2001, 2016	35	65
Indonesia	65.2	2001	7	93
Pakistan	30.7	1997	10	90

Lower Middle Income Countries as defined by the World Bank

Data source: What a Waste 2.0, 2018

Key Issues in Municipal Solid Waste Management

- Weak implementation of legislation, long time taken for finalizing legislation
- Lack of waste segregation at source, now around 90% HH in some cities but need to improve across cities
- Inadequate disposal – very few sanitary landfills
- Landfill gas emission and leachate discharge causing threat to health of neighborhood population
- Biomedical waste, slaughter house waste, industrial waste often reaching the MSW dumpsites posing potential hazard to sanitary workers and waste pickers
- Requirement of land for disposal for next 20 years could be as high as 66,000 ha (1240 ha per year)

Guiding Legislation - SW Rules, 2016

- Mandates local body and institutions for primary collection, storage, transportation, processing and disposal
- Emphasizes on need for segregation
- Bans organic waste to be disposed in landfills
- Promotes recycling and organic waste processing
- Prescribes standards for landfills and incineration facilities
  - RDF (CV at 1500 Kcal/kg of more) as raw material or as a source of energy in industrial processes
  - The Rule 18 requires all industrial units using fuel and located within 100 km from RDF plant to make arrangements within six months from the date of notification of these rules to replace at least 5% of their fuel requirement by RDF so produced
  - Rule 21 (2) High calorific wastes shall be used for co-processing in cement or thermal power plants

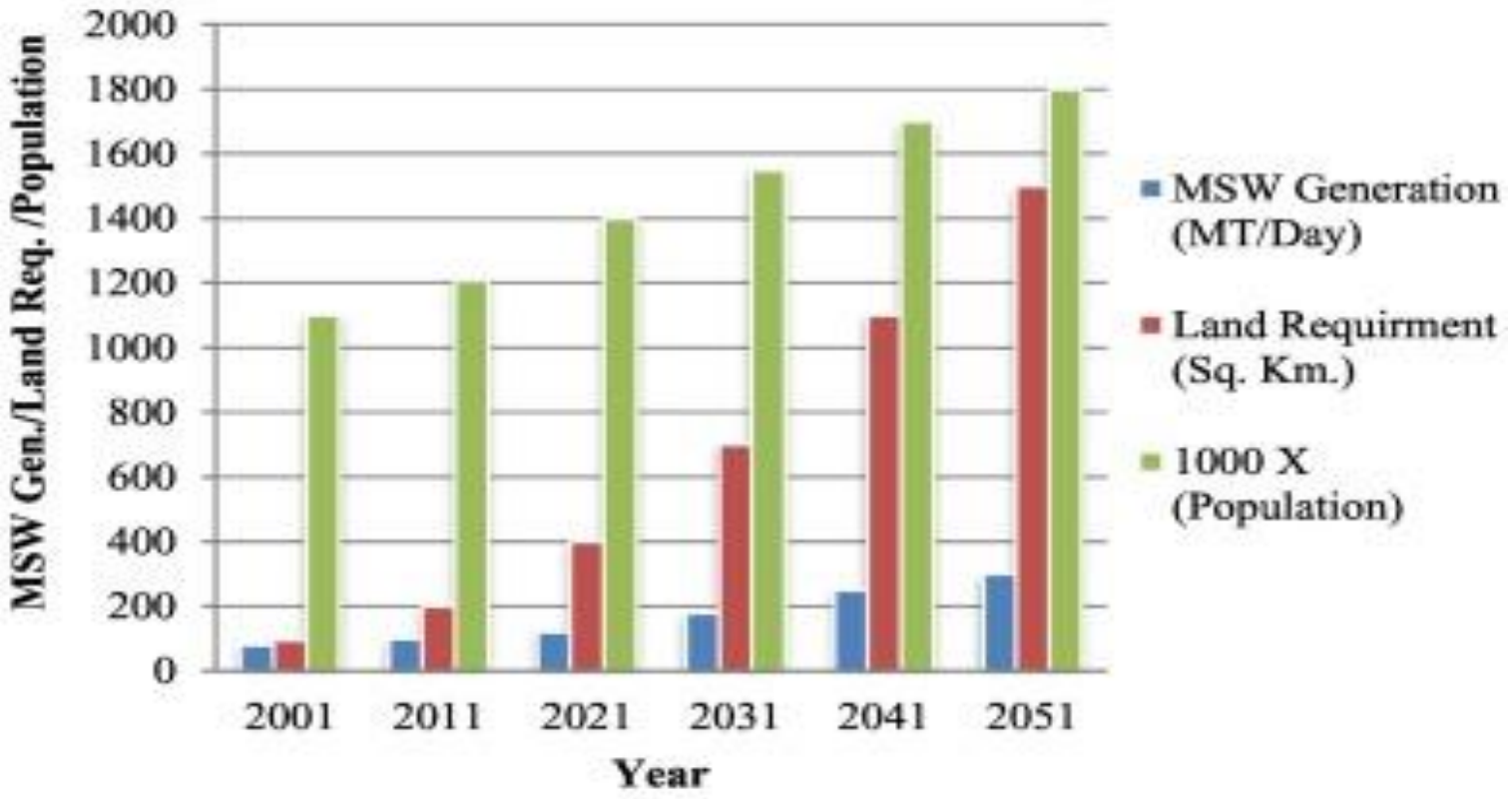
RDF: Refuse Derived Fuel

Guiding Legislation – Draft NRE Policy

- Draft NRE policy
  - Action plan to bring in resource efficiency in key intensive material use sectors to achieve circular economy
  - Sectors include automotive (including EVs), chemical (plastic), building and construction, electronics (including e-waste), solar PV, steel and aluminium
  - The policy advocates enhancing resource recovery and recycling in the sectors indicated above

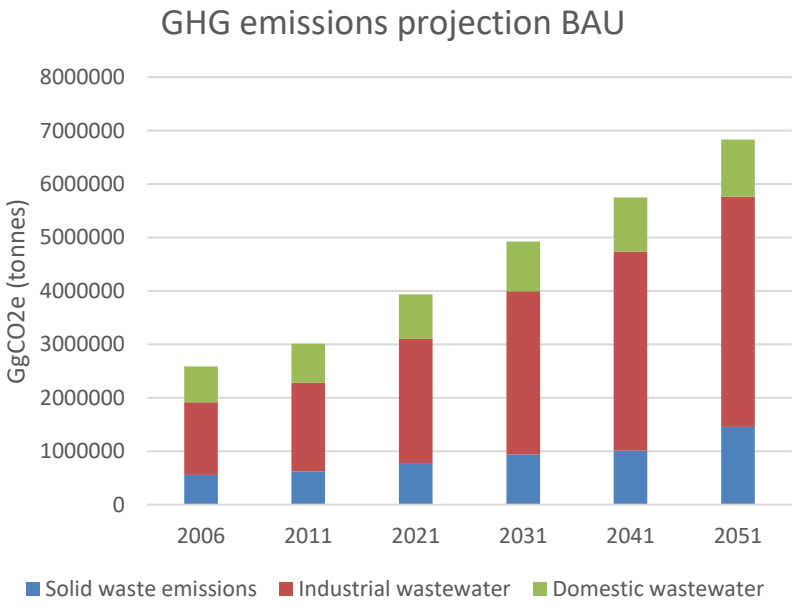
NRE: National Resource Efficiency Policy

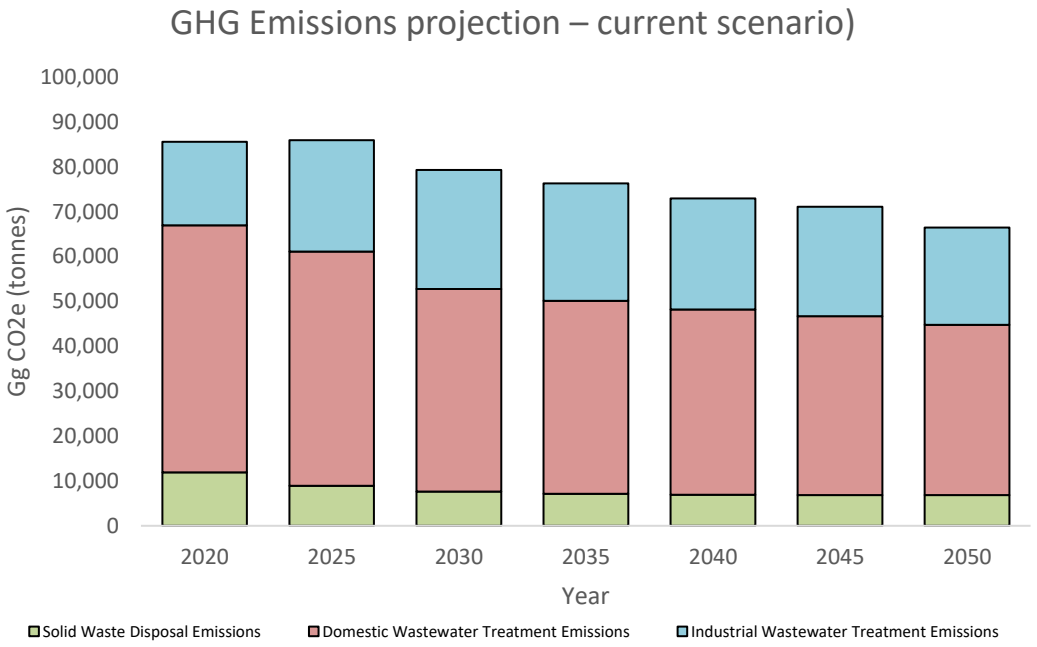
Municipal Solid Waste Generation Trends in India



Kumar & Agrawal, 2020

GHG Emissions for Waste Sector in India



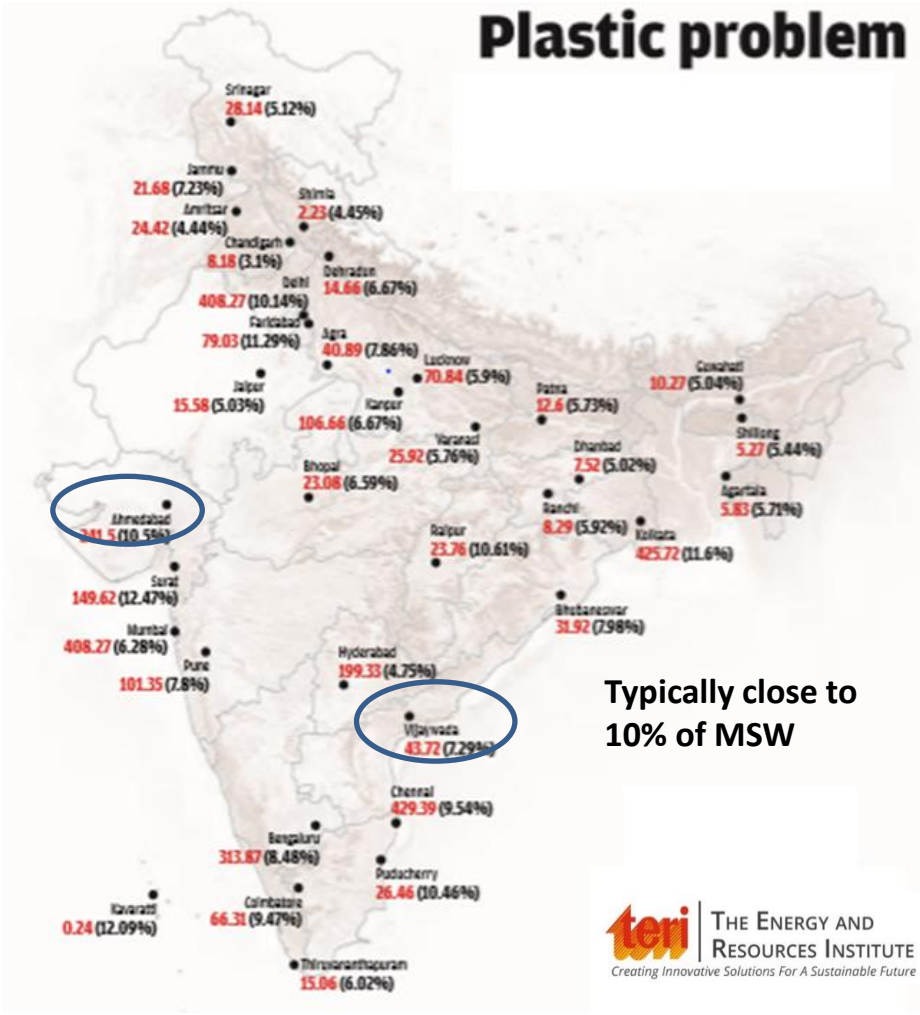


TERI estimates based on IPCC;
Reduction largely due to recent Government Initiatives

GHG: Greenhouse Gas Emissions

The Indian Scenario

Urban India generates close to **62 MTA** of Solid waste out of which **9.4 MTA is plastic waste (26000TPD)**



Issues with Packing Waste

- Generally, all the packaging material used end up as packaging waste
- Sometimes they are reused, mostly recycled.
- Low-cost packaging waste or waste which is too dirty to recycle ends up in landfills and sometimes in drains clogging it
  - Cause of fires at then landfills and hence pollution
- Open burning of packaging waste is also a matter of concern
- Biggest concern is that all such leakages finally lead to marine waters
- Recycling of packaging waste in the informal sector is of concern due to obsolete technology and pollution issues
- Multi-layered packaging is also a matter of concern as it is neither economical to collect it nor recycle it

Plastic waste leaking to coastal waters

PWM Rules 2016 and amendments

- The **thickness** of plastic carry bags **increased** from 50 microns to 75 microns from 30 September 2021, and to 120 microns from 31 December 2022
- Each Plastic bag or MLP shall have the information printed in English namely: Name, Registration Number of the Manufacturer and thickness of the bag
- No manufacturer shall manufacture carry bags or recycled plastic bags or MLP unless the person has obtained registration from the state PCB
- Every retailer/street vendor selling or providing plastic carry bags or MLP or plastic sheets that are not labelled is liable to pay fines under the bye laws of the ULBs
- Individual and bulk generators like offices, commercial establishments, industries are to segregate the plastic waste at source, handover segregated waste, pay user fee as per bye-laws of the local bodies.

PWM Rules 2016 and amendments

- To promote use of plastic waste for road construction as per Indian Road Congress guidelines or energy recovery, or waste to oil
- To bring in the responsibilities of producers and generators, both in plastic waste management system and to introduce collect back system of plastic waste by the producers/brand owners, as per the EPR
- The amendments recognize the SUPs as contributor to marine litter

India's commitment with SUP phase out

	SUP category	Code	SUP items
1	Plastic Sticks	1a	Ear buds.
		1b	Balloons, candy
		1c	Candy
		1d	Ice-cream
		1e	Straw
2	Carry bags <75 µ		
3	Plastic sheets<50 µ		
4	Cutlery Items	4a	Plates
		4b	Cups
		4c	Glasses
		4d	Spoons
		4e	Forks
		4f	Knives
		4g	Trays
5	Plastic wrapping packaging films	5a	Sweet box,
		5b	Invitation Cards
		5c	Cigarette Packets
6	Others	6a	Plastic flags,
		6b	PVC banners < 100 µm
		6c	Polystyrene for decoration

Zero waste stores

Initiatives with E-retailers (1/2)

Platform	Policy	Initiatives
Amazon India	Amazon India's long term sustainable packaging initiatives to eliminate single use plastic packaging by June 2020	Replacing plastic dunnage with paper cushions; ensuring 100% recycled corrugate boxes and paper cushions; recycling plastics used in packaging mailers and bubble bags; collecting plastic equivalent to plastic packaging material used by Amazon Fulfillment network in India from September 2019; developing plastic free alternatives for packaging mailers, bubble bags, stretch wrap and tape
Flipkart	Plastic free packaging in the supply chain by 2021	Eliminated SUP packaging by introducing eco-friendly paper shreds, replacing poly pouches with recycled paper bags, replacing bubble wraps with carton waste shredded material and 2 Ply roll; compliance with all EPR regulations by recycling equivalent quantity of SUPs going to consumers; 'E-commerce ready packaging'- wherein 15% of products are shipped without adding secondary layer of packaging. Preventing deforestation by scaling packaging from recycled and alternative materials.
Hindustan Uni-Lever (HUL)	100% of the company's plastic packaging is reusable, recyclable, or compostable by 2025	In-store vending machine for home care products enabling customers to refill Surf Excel, Comfort and Vim bottles; incentivising consumers by providing discount of ₹30 on the MRP at the store if they get their own bottle and ₹15 for purchasing the Smart Fill bottle; transitioning to recyclable bottles made from 50% post-consumer recycled (PCR) plastic; using 100% biodegradable actives in its formulation.
IRCTC	Use of plastics of less than 20-micron thickness in packaging is banned	Using single-use biodegradable trays, bowls and boxes for serving pre-packed meals to passengers.

Initiatives with E-retailers (2/2)

ITC	ITC's Sustainability 2.0 vision aims to ensure that 100% of its packaging is reusable, recyclable or compostable in the next decade	Development and commercialisation of new biopolymer paper products providing bio-degradable/ compostable products including food service ware, food packaging, personal care product packaging and other FMCG packaging.
ITC	ITC's Sustainability 2.0 vision aims to ensure that 100% of its packaging is reusable, recyclable or compostable in the next decade	R&D led-initiative of ITC's Paperboards and Packaging division- Development of eco-friendly packaging, Filo Series, as an alternative to SUPs in the foodservice segment; development of Omega Series, substituting plastic coated container and cups. ITC has partnered with INVEST INDIA for crowd sourcing solutions.
TATA Chemicals	As part of their Sustainability initiative	Development of a recyclable laminate for packaging of consumer products
Big Basket	Green Big Basket Initiative	Deliver groceries to our customers in open crates & not plastic bags; paper-based packaging, biodegradable plastic and corrugated boxes that are recyclable;

E-waste Rules 2016

- The rules empower the concerned state agencies to control, supervise and regulate relevant activities connected with e-waste management such as collection, segregation, dismantling and recycling
- EPR central theme for the Rule
- Provision of registered dismantlers and recyclers
- Targets for reduction in hazardous components in different products
- Hazardous component of waste to disposed in secured landfills

Key issues in e-waste

- One of the fastest growing waste streams, so urgent action if required
- Transboundary movement for resource recovery
- Improper recycling in the informal sector is still rampant
- As a result, soil and groundwater contamination & human health issues

Need to decarbonise waste sector

- According to the Third Biennial Update Report, landfilling of MSW led to around 15.8 million tons of CO2e emissions in 2016 which is expected to increase to 41.1 million tons by 2030
- India's NDC prioritizes reducing waste-related emissions through promoting waste to wealth conversion and the abatement of pollution
- Low carbon, circular economy waste solutions thus look at measures focusing on diverting waste from landfills and maximizing resource recovery

Waste solutions for circular economy

- Reducing resource consumption
- Strategies looking at product designs to reduce waste and increase recourse recovery
- Setting up of Material Recovery Facility and processing the sorted waste through
  - Biomethanation
  - Aerobic Composting
  - Recycling and
  - RDF for co-processing in cement kilns




Thank You