Ocean Plastic Turned into an Opportunity in Circular Economy –

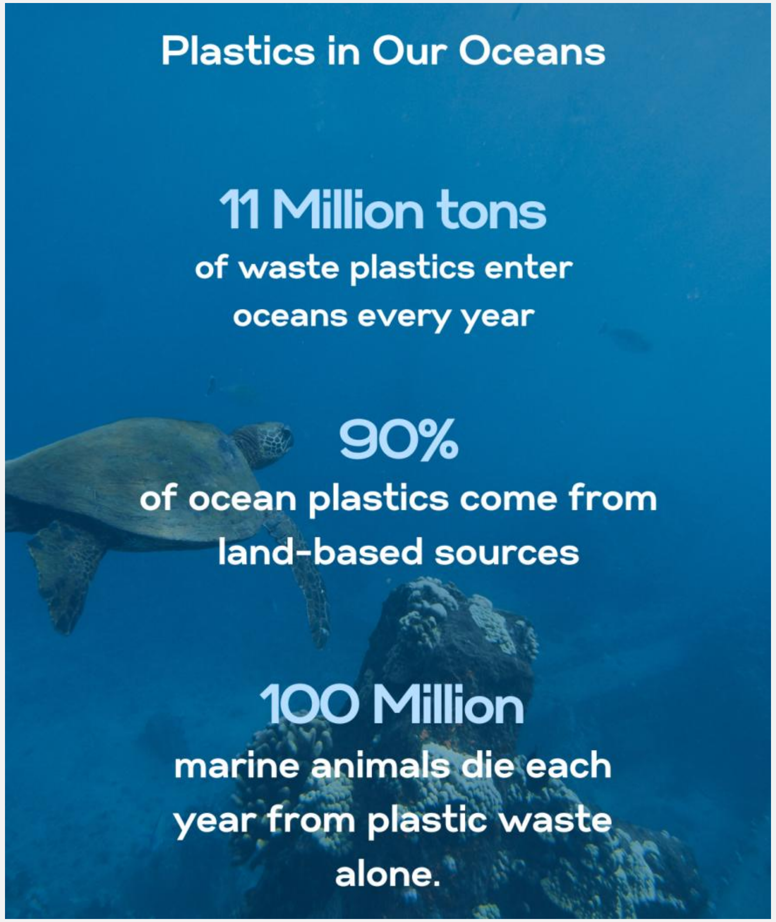
Experiences with Co-processing of plastic containing wastes in India.

Moumita Chakraborty | 27th October 2022

Overview

- The Plastic Waste Challenge
- Co-processing Technology
- Our Circular Approach Towards Plastic Waste Management
- Way Forward

The Global Plastic Waste Challenge



Plastic Waste Challenge in India

Plastic waste generation in India has more than doubled in the last five years, with an average annual increase of 21.8 %

Source: Report by Centre as per a Hindustan Times Article

As per 2019-2020 Central Pollution Control Board (CPCB) report India's annual plastic waste generation is around 3.47 million metric tons

As per 2019-2020 Central Pollution Control Board (CPCB) report around 50 percent of the plastic waste was recycled/recovered with 1.58 million tons of plastic waste being recycled and 1.67 million tons being co-processed

Cement Industry is Well Positioned to Provide Safe & Sustainable Waste Management Solutions that also Capture Resource Value

Co-processing is a globally recognized technology in which waste is treated in energy-intensive industries such as cement

The Kiln – A distinguished advantage

Cement Kilns allow for a complete destruction of waste due to:

- **Temperature**: High temperatures of up to 2,000°C
- **Time**: Long retention time (6s) above 1,400°C

Rapid combustion, complete oxidation and destruction of organic components ensuring full **energy recovery**

Ashes are incorporated in the clinker **recycling all raw material** leaving no residue at all.

No significant increase of Emissions

Waste management & the cement industry

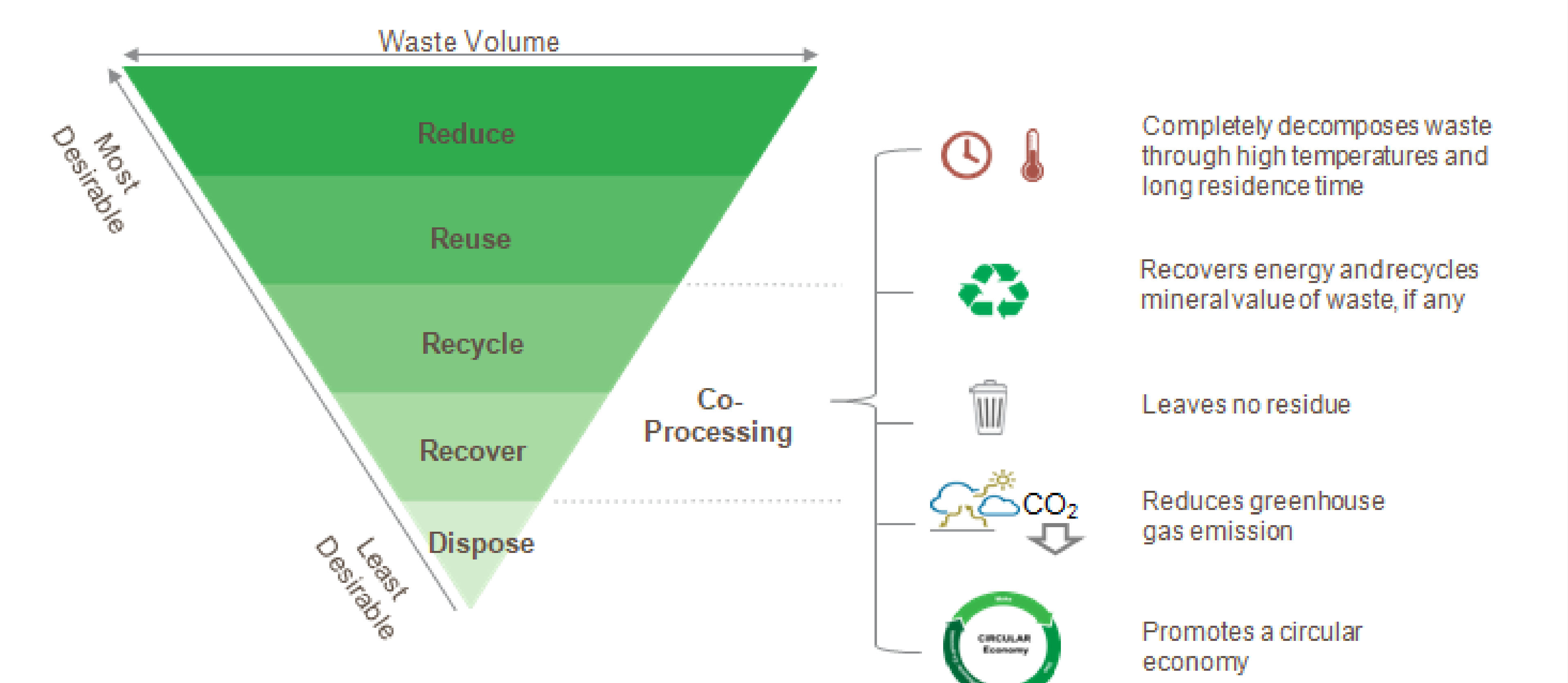
The cement industry offers a unique value proposition for management of Industrial & Municipal waste

Primary fuels/raw materials can be substituted with waste derived alternatives, leading to conservation of natural resources

Waste co-processing in cement kilns leads to overall reduction of CO2 emissions

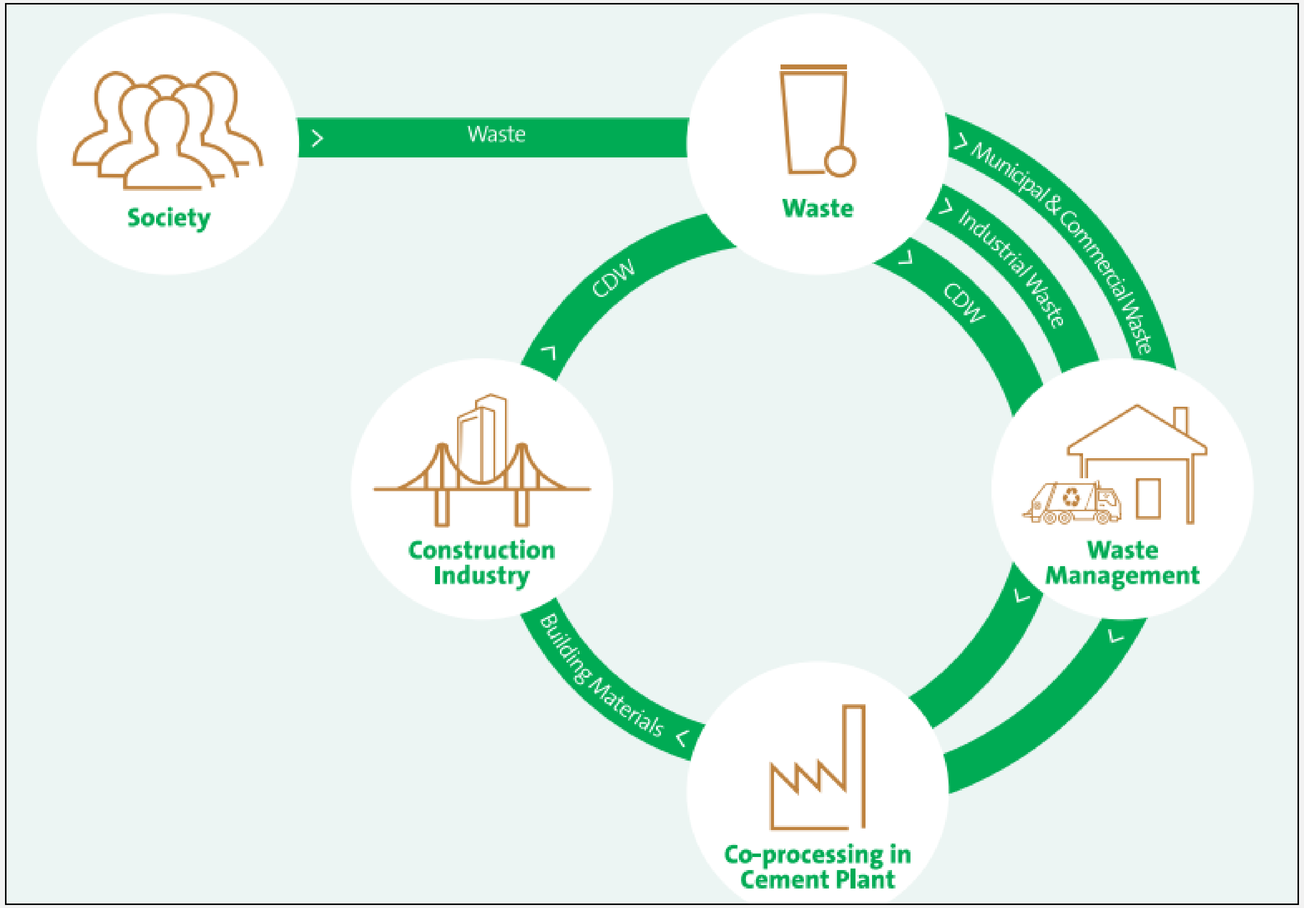
It saves public funds as construction of incinerators and other such waste management infrastructure can be avoided

Co-processing Technology



Waste Management Hierarchy

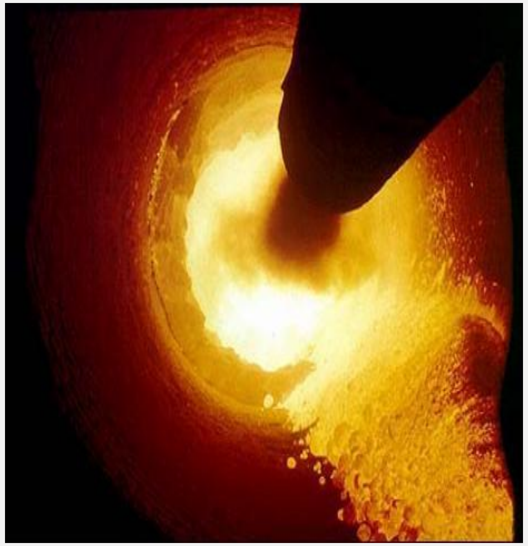
Contributing to a circular economy



- Our world is only 9% circular (circularity gap Report 2019)
- A circular economy is the only solution that can match the scale of the plastic pollution challenge
- Cement industry is a key contributor towards creating a circular economy for various waste streams.
- For non-recyclable plastics co processing is a readily accessible and efficient treatment technology enabling dual capture of energy and material value.

Addressing the Plastic Waste Challenge in India

- Plastic waste (both industrial and municipal in origin) is a growing challenge in India.
- Some fractions of industrial plastic waste gets managed - regulatory mandate for industries, higher access to waste management solutions.
- Large portion of municipal plastic waste gets dumped or littered - high volumes of waste, high costs of collection, segregation & treatment, lack of budgets, lack of access to efficient waste management solutions.
- In India, MSW generation is pegged at 55-65 million metric tons.
- 3.5 million metric ton of plastic waste is generated (predominantly as part of MSW) in the country (CPCB Report 2019-20). Plastic waste constitutes 5 to 6% of MSW.
- Recyclable fraction gets easily segregated out of the waste - through formal and informal channels.
- Non-recyclable fraction often leaks into the natural environment or goes to landfills due to lack of economic incentives for collection.
- Co-processing in cement kilns is an ideal solution for this fraction as it recovers the resource value and is a zero-residue solution.



Regulatory Framework in India : A step in the right direction

Guidelines for Co-processing of Plastic Waste in Cement Kilns

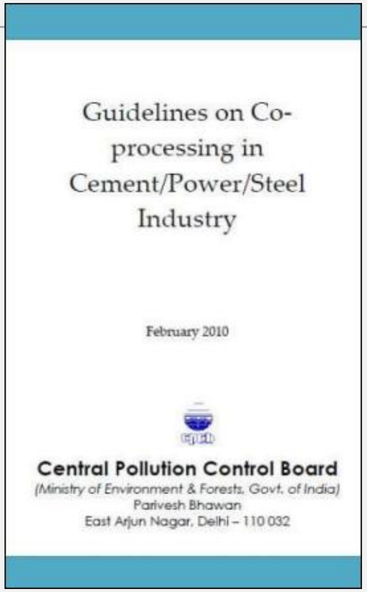
- Accepts co-processing as a more environment friendly option for non-recyclable plastics compared to incineration and landfilling
- Provides protocol to be followed by different stakeholders in co-processing of plastic waste in cement kiln

Plastic Waste Management (Amendment) Rules, 2022

- Amended the original rules (Plastic Waste Management Rules 2016) to fast-track the elimination of single use plastics and promote alternatives.
- Introduced concept of EPR

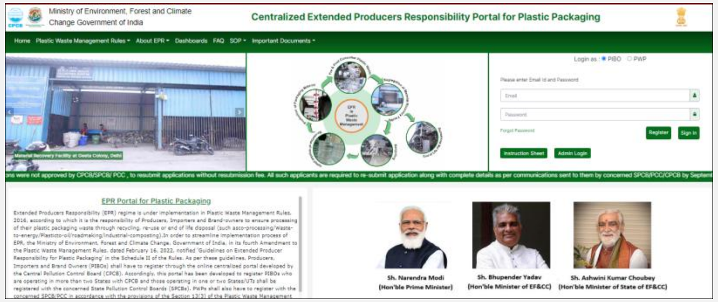
Guidelines on Extended Producer Responsibility for Plastic Packaging

- The Guidelines provide framework to strengthen circular economy of plastic packaging waste,
- The producers, importers and brand owners are responsible for plastic waste minimization by design innovation, source segregation, collection and processing either directly or through PROs
- The Guidelines prescribe a framework for levy of environmental compensation based upon polluter pays principle, with respect to non-fulfilment of EPR responsibility
- Established a centralized online portal for the registration & filing of annual returns by producers, importers and brand-owners, plastic waste processors


Guidelines on Co-processing in Cement/Power/Steel Industry

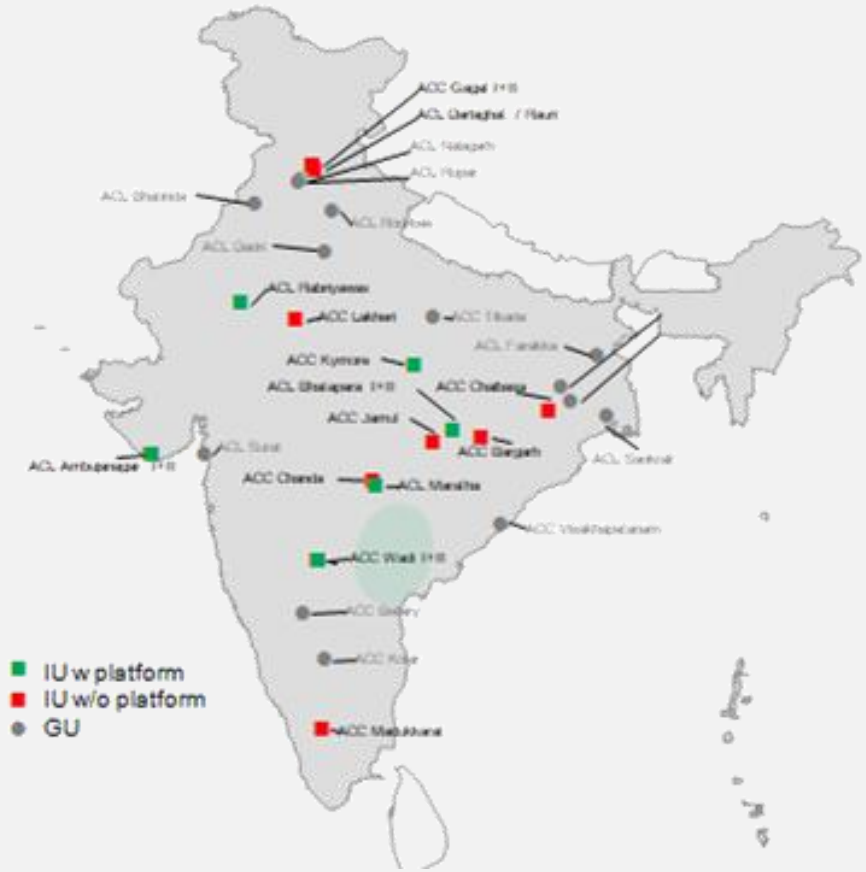
February 2010

Central Pollution Control Board
(Ministry of Environment & Forests, Govt. of India)
Parivesh Bhawan
East Arjun Nagar, Delhi – 110 032



Our Footprint

- 2nd Largest Cement producer
- 60MioT clinkerization capacity
- 46% market share
- 6 Pre processing and 14 co-processing facilities



Our Circular Approach towards Plastic Waste Management

Industrial Plastic Waste Management

- Plastic waste generated during production
- Collected & transported directly from waste generator site to pre-processing facilities

Post Consumer Plastic Waste Management

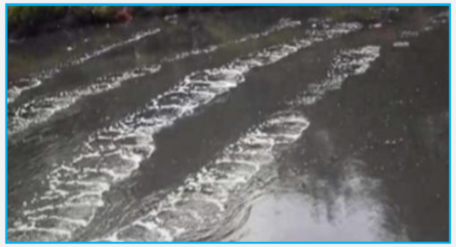
- Post consumer plastics collected from various sources
- Enabling collection of non-recyclable plastic waste leaking into environment
- Comes under the ambit of EPR guidelines

Municipal Solid Waste Management

- Bulk waste collected by Municipalities
- Transported to MSW processing facilities
- Site generates employment and can manage huge volumes
- Segregated non-recyclable plastic waste taken for co-processing

Diverting Waste from Legacy Dumps

- As per CPCB report, 3084 dumpsites in the country
- Govt is working towards their remediation
- Bio-mining helps in reclaiming precious land, as well as capturing value of waste lying in dumpsite
- Combustible non-recyclable fractions are safely co-processed



Bubble Barrier

- Non-invasive technology for collection of plastics from water bodies
- Helps in cleaning up water bodies and avoids plastics reaching oceans.

Solution for Industrial Plastic Waste

- Plastic waste is generated from many industrial sectors including paper & pulp, packaging, textile, food & beverages, FMCG, etc.
- Process generated plastic waste presents a challenge since it may be contaminated with other wastes
- Through co-processing, part of this plastic waste which is non-recyclable can be recovered
- ACC and Ambuja are providing solutions for industrial plastic waste for more than a decade

Case Study

Background

- Vapi and nearby industrial areas are a hub of recycled paper production
- Typically, plastic is around 1-2 per cent of the total paper going for pulping

Challenge

- The waste was highly heterogeneous and stored loose
- No proper treatment options – waste was either landfilled or stored on site by waste generators
- Waste had high moisture up to 70%

Solution

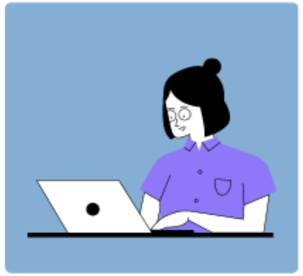
- Waste is successfully being co-processed by local cement plants
- We have co-processed more than 2,50,000 tons of this plastic waste since 2011

Partnering for a Clean India: EPR Services

- Around 43% of manufactured plastic in India is used for packaging purposes, and is mostly single-use plastic (Indiaspend.com) – Managing this plastic is a challenge
- EPR is providing much needed momentum to plastic waste management in India
- Producers, importers and brand owners (PIBOs) are assigned targets for collection of plastic waste applicable to both pre-consumer and post-consumer plastic packaging waste
- Co-processing serves as a much-needed solution to capture leaking volumes of non-recyclable plastic waste

ACC & Ambuja **partner with more than 15 PIBOs** to help meet their EPR requirements

Providing services for **collection, transportation, storage, treatment and disposal** of MLP and Post Consumer Plastics



Experienced professional team of plastic experts to assist through the process

Collection of plastic waste from varied sources through a well-established value chain

Transparency and Traceability Documentation

Safe final treatment
A circular solution

Capturing Value from Municipal Solid Waste

Solutions for Fresh MSW

Challenge:

- Large volumes, lack of landfill space
- Sorting and segregating fresh MSW leads to 3 different fractions : compostable, recyclables, non-recyclables
- Not enough solutions for non-recyclables which end up getting landfilled

Benefits:

- The combustible non-recyclable fraction / RDF can be easily co-processed
- Helps in landfill diversion and captures value from non-recyclable fraction
- ACC and Ambuja are providing solutions for fresh MSW at more than 20 sites across the country
- Our cement kilns coprocess more than 2,00,000 tons of RDF every year

Solutions for Legacy Waste Dumps: Bio-mining

Challenge:

- Many old waste and landfill sites require clean-up due to environmental concerns or their attractive location for urban development
- In India more than 3000 dumpsites existed in 2020 (out of which around 90 have so far been remediated)

Benefits:

- Stored waste in dumps is relatively easy to handle due to low moisture and less odour
- Co-processing captures inherent value in waste
- ULBs can manage waste with zero liability and high compliance while reclaiming valuable land resource
- ACC and Ambuja are providing solutions for 12+ legacy waste sites across the country

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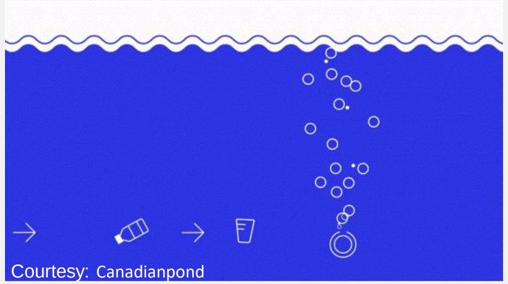
Cement

Cleaning Up our Rivers: Bubble Barrier

- Provide an **Integrated Waste Management Solution** for River Plastic Pollution
- Piloted the first of its kind river cleaning project in India to stem the flow of plastic waste to oceans
- Bubble Barrier technology collects the plastic waste from rivers
- Post collection and segregation plastics are managed as per the waste management hierarchy

Current & Future Projects	Agra	SunderNagar	Varanasi
	Location: Mantola Nalah **Project Phase:** Running successfully	**Location:** Finalized **Project Phase:** NOC obtained, equipment to be ordered	**Location:** Finalized **Project Phase:** Under discussion with Nagar Nigam



Way Forward: Continuing our support towards a Clean India

- Scale up solutions to Municipalities (SCF, RDF, Landfill mining)
- Expand our EPR solutions
- Capacity to absorb 1000TPD of sorted MSW across India
- Continue support to industrial partners and help them achieve 100% compliance to Central and State laws and regulations
- Support the Clean India initiative

THANK YOU

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