

Waste Co-processing in Cement Kilns

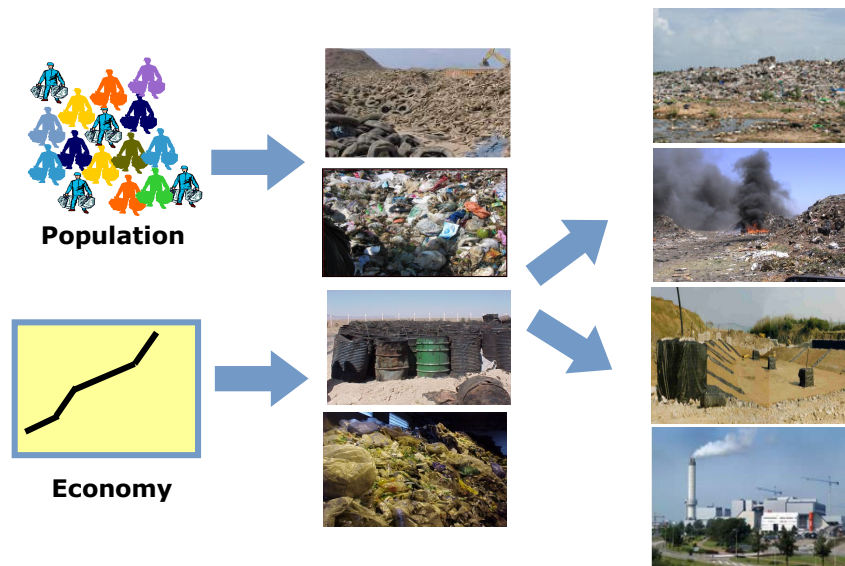
A demonstrated solution for managing wastes in an Environmentally sound and Ecologically sustaining manner

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Growth, Waste & Environment :



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How much waste is getting treated

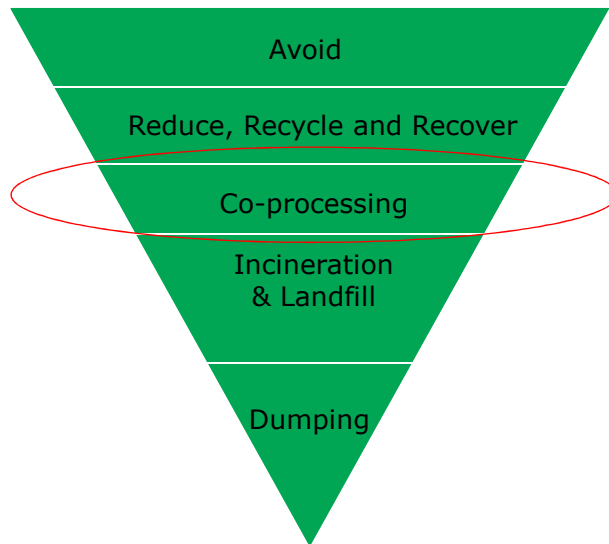
- **Hazardous Waste (Land fillable)**
 - Landfill capacity - 1.50 Million Tonnes /year
 - Generation - 2.73 Million Tonnes/ year.
- **Hazardous Waste (Incinerable)**
 - Landfill capacity - 327705 TPA
 - Generation - 415794 TPA
- **Industrial Waste (Non Hazardous)**
 - Generation - ??????? TPA
 - Treatment capacity - ?????????
- **Municipal Solid Waste**
 - Generation - >40 Million TPA

ALMOST EVERY THING THAT WE GENERATE!!!!!!!!!!!!!!!!!!!!

What does it mean???????????????

- We are not able to conserve about 8-10 Million TPA of Coal.
- We are not able to conserve about 8-10 million TPA of natural resources such as lime, iron, silica, alumina etc.
- We are not able to provide an ecologically sustaining solution for management of different kinds of wastes.
- We are resorting to disposal options that locks up precious land for any further use, makes us spend large amount of expensive fuels and whose cost of implementation keeps on increasing with time.
- Government, Waste generator and Solution provider carry large amount of liability towards refurbishment of damage to the landfill.
- High level of carbon footprint on account of increase in the GHG emissions.
- Ever increasing backyard volumes and associated environmental hazards

Is there a workable alternative???



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Co-processing Addressing Sustainability Issues

- ▶ Decreases (largely) the costs of waste management
- ▶ Regional job creation in waste collection and pretreatment etc.
- ▶ Zero-emission technology
- ▶ Leads to fewer landfills and reduces pollution caused by dumping
- ▶ Reduces greenhouse-gas emissions, thereby fighting global warming
- ▶ Reduces the environmental impact of extraction (mining/quarrying), transporting and processing of raw material
- ▶ Conserves natural (non-renewable) energy and material resources



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Mechanism of Waste Management Through Co-processing In Cement Kiln

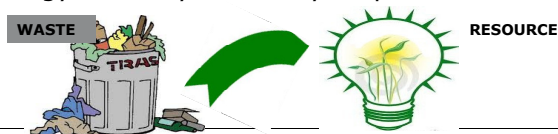
- The organic constituents are completely destroyed due to
 - high temperatures,
 - long residence time and
 - oxidizing conditions in the cement kiln.
- Acid gases such as HCL and SO₂ are absorbed and neutralized by the freshly formed lime and other alkaline materials within the kiln.
- The inorganic constituents react with the raw materials while heavy metal becomes immobilized in clinker matrix

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Geocycle: Exploring a greener waste management pathway through cement kilns

- Geocycle is an environmental management initiative of Holcim
- It was recognized that the challenge of increasing waste volumes on one hand and fast depletion of natural resources on the other hand can be addressed through innovative green thinking of **co processing wastes as Alternative Fuels and Raw materials** in the cement kilns
- **ACC Limited and Ambuja Cement Ltd.** are the two group companies of Holcim. They have taken up this Geocycle initiative in the country for providing waste management solutions for achieving green transition in our economic development
- This initiative solves a growing problem of waste management by encouraging the philosophy of **industrial ecology**.
- Wastes from industries or society which would otherwise have been disposed through, dumping, land filling or incineration without any resource/energy recovery are safely co-processed in our cement kilns.



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Geocycle India : Initiatives for Safe Waste Co-processing



Establishment of Laboratories & facilities for assessing co process ability and acceptability of wastes



Collection of safety data and preparation of relevant safety documents for all wastes co-processed



Designing safety in operations with required precautions during waste transportation, use of right PPEs , relevant safety trainings to personnel handling waste



Implementation of Pre-processing platforms

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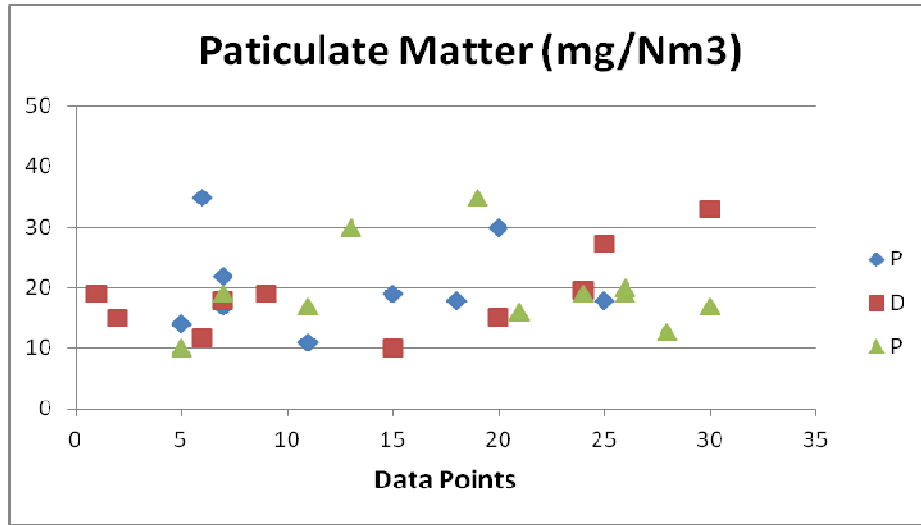
Emission concerns during Co processing

- Emission results of ten co processing trials are evaluated.
- CPCB defined Trial protocol was used for emission monitoring. (Pre processing – 1 day, Co processing – 3 days, Post co processing – 1 day).
- Emissions monitored – Particulate matter, SO_x, NO_x, HCl, HF, TOC, Heavy Metals, Dioxin / Furans
- Emission monitoring from the cement kiln stack was carried out by two CPCB approved agencies.
- Seven different types of waste streams were used representing five industrial sectors – Engineering, Steel, Chemicals, FMCG & Pharma
- Trials carried out in five different Cement plants.

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Particulate Matter

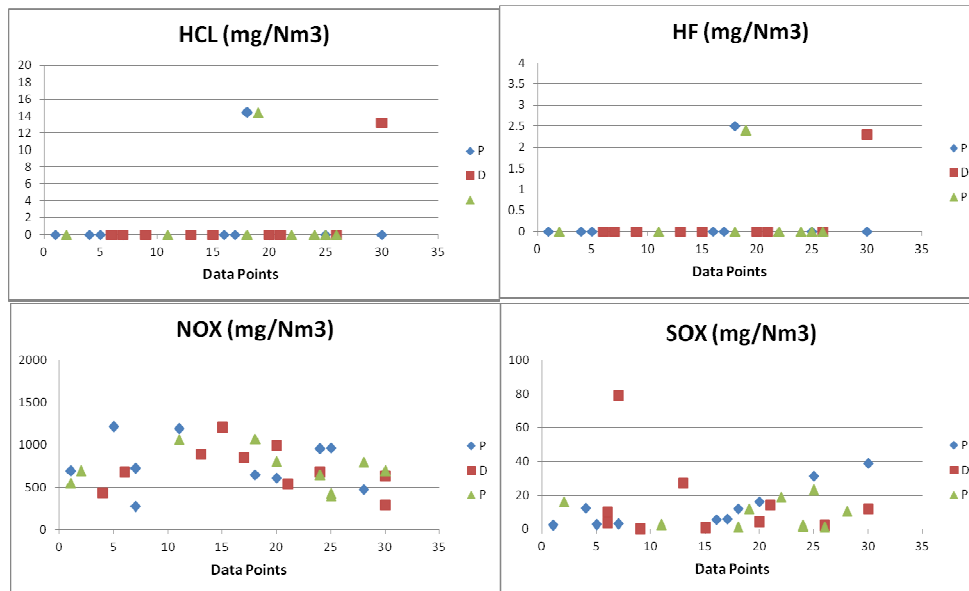


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SOX, Nox, HCL & HF

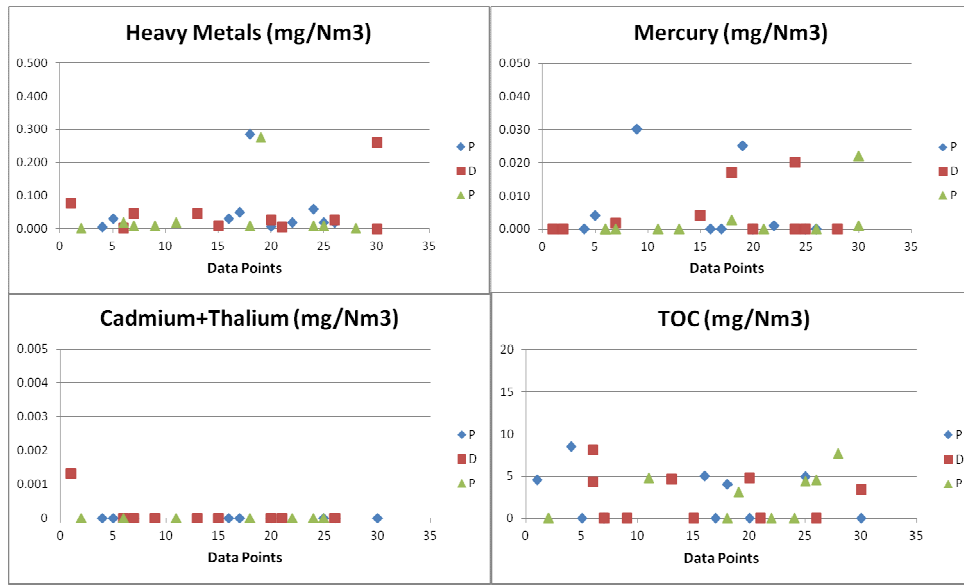


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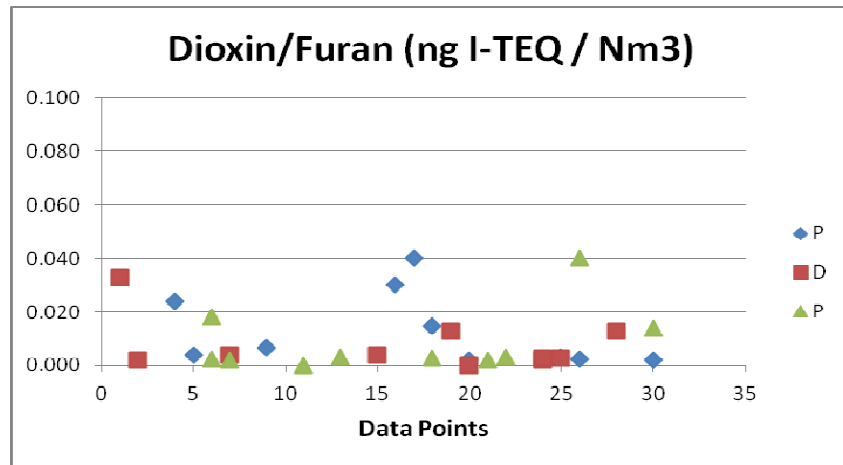
Heavy Metals and TOC



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Dioxin/Furan



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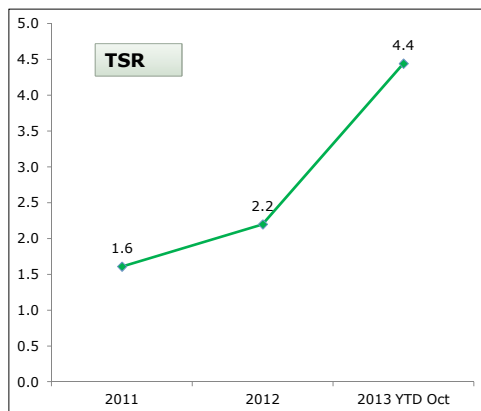
Illustrative Examples of wastes co processed



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Journey so far



- More than 5 Lakhs ton of AFR utilized
- More than 1400 industries mapped
- More than 2000 waste streams evaluated for co processing acceptance.
- 125 long term agreements signed
- 126 streams are introduced for co-processing.

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Stake Holder Engagement

Communication



- Total of eight stakeholder meets organized in association with CPCB and respective SPCBs
- More than 150 awareness presentations made in different forums.

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Volumes Co processed

Plants	2012	2013	Highest ever	
	Tons	Tons	Tons	Year
Gagal	64503	25638	101681	2007
Kymore	49989	50549	79023	2009
Lakheri	146565	81351	146565	2012
Tikaria	130	703	5263	2010
Chanda	54609	35497	54609	2012
Wadi	20971	63588	63588	2013
Madukkarai	5048	13901	23265	2009
Bellary	264	2120	2120	2013
Jamul	36507	44888	46984	2009
Bargarh	51498	125081	125081	2013
Chaibasa	37993	49497	49497	2013
Sindri	1717	2521	2521	2013
Damodhar	3061	5973	5973	2013
Vizag	0	2152	2152	2013
ACC	472855	503459	708322	2013
Future Opportunity based on capability proven				
Gagal	- RDF, pine needle, Industrial waste			
Kymore	- Industrial waste			
Tikaria	- Carbon black, Biomass			
Lakheri	- Industrial waste			
Madukkarai	- Biomass and industrial waste			

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Different Wastes Preprocessed to AFR



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Pre-processing Platforms under implementation

- **ACC**
 - Wadi
 - Kymore
 - Madukkarai
- **ACL**
 - Ambujanagar
 - Rabriyawas
 - Maratha
 - Bhatapara

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Co-processing of wastes shall surely go a long way in turning cement from Grey to Green in the Indian Cement industry.

