



SUSTAINABLE DEVELOPMENT UTILISING ALTERNATE FUEL & RAW MATERIALS IN CEMENT INDUSTRY

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2nd International conference on "Enhanced
Usage of Alternate Fuels and Raw Materials
in Cement Industry

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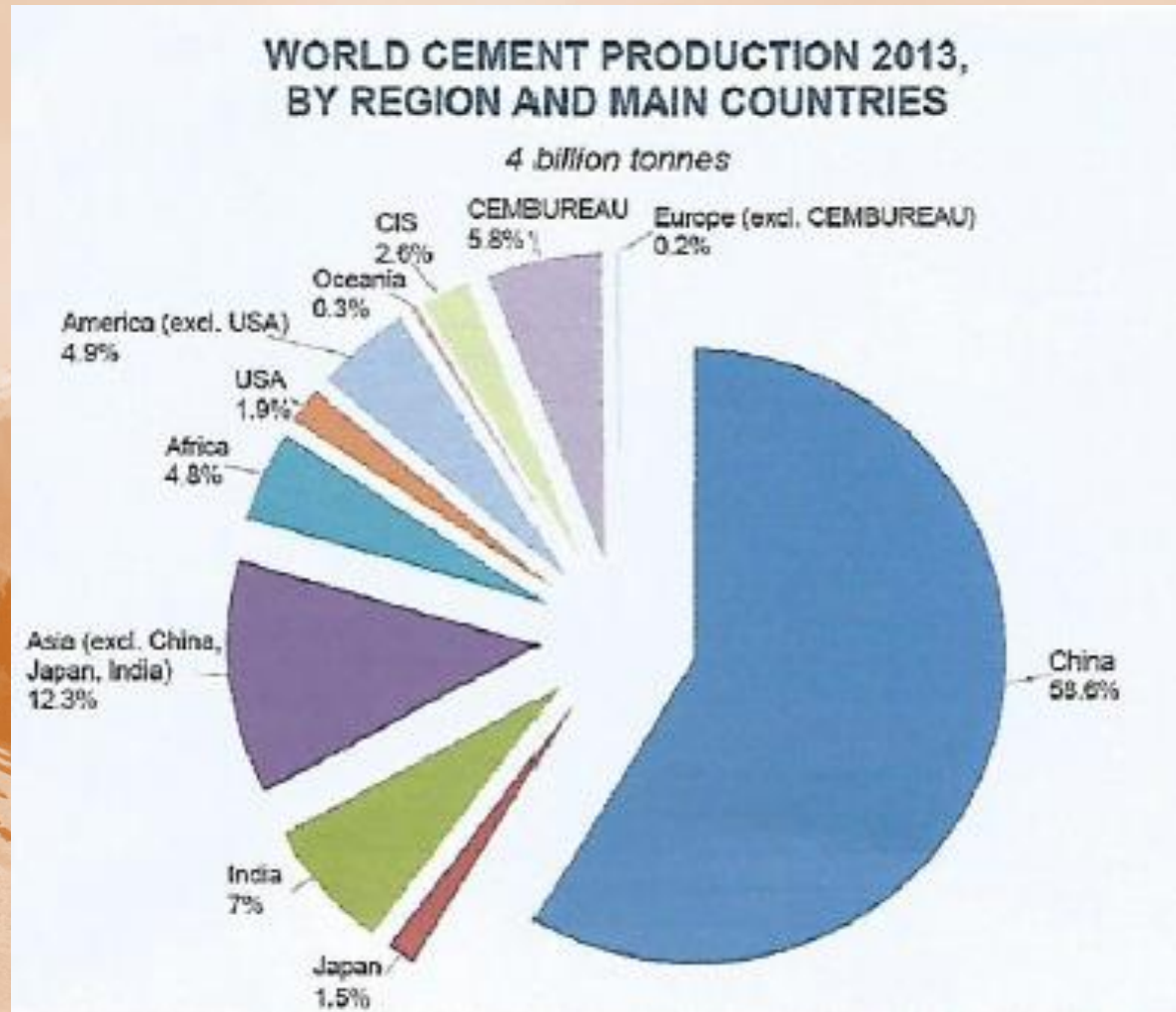
Waste To Wealth

- ❖ Waste of an Industrial Sector can be Wealth for another.
- ❖ Need to Recover , Recycle and Reuse. Potential to invade.
- ❖ Recovery at source keeping in mind that it has useful utilization.
- ❖ Recycle through green process and make it important.
- ❖ Reuse in transformed look to have savings in expensive fuels , raw-materials and additives in manufacturing of the product.
- ❖ Just like energy , it can be transformed as value added product.
- ❖ For Sustainable Development our limited resources of fossil fuel , mines reserve will get enhanced by use of alternate fuels and raw materials.

Waste Sources & Usage as AFR

SN	Source	Waste / By-Product	Use	Thermal Energy / Compounds
1	Steel Industry	Blast Furnace Slag & Steel Slag	Raw Material / Additive	Si – Al – Ca - Fe
2	Thermal Power Plant	Coal Ash / Fly Ash	Raw Material / Additive	Si – Al – Ca – Fe
3	Foundry Industry	Spent sand / Coating Residues	Raw Material	Clay Mineral(Al_2O_3), Si
4	Fertiliser Industry	Chemical / Phospho-Gypsum	Raw Material / Additive	$CaSO_4$
5	Aluminium Industry	Recycling Sludge , Filter Sludge	Raw Material / Catalyst	Al_2O_3 , CaF_2
6	Agro Industry	Husk & Straws , Corn Residue	Fuel – Heat Energy	3000 – 4000 k.cal/kg
7	Plastic Industry / Municipal Corporation	Industrial Plastic / Plastic all kinds	Fuel – Heat Energy	1500 – 2000k.cal/kg
8	Transport Industry / Public Domain	Used Tire , Carbon Black	Fuel – Heat Energy	7000 – 7500 k.cal/kg
9	Construction Industry	Spent Wood	Fuel – Heat Energy	3500 – 4000 k.cal/kg
10	Municipal Corporation	Lime Sludge (sewage treatment) , Municipal Solid Waste (RDF)	Raw Material / Fuel – Heat Energy	$CaCO_3$, 2500 – 3000 k.cal/kg
11	Metal Industry	Roasted Pyrite/Mechanical Sludge	Raw Material	Iron Oxide – Fe_2O_3
12	Textile Industry	ETP Sludge	Raw Material	Lime CaO

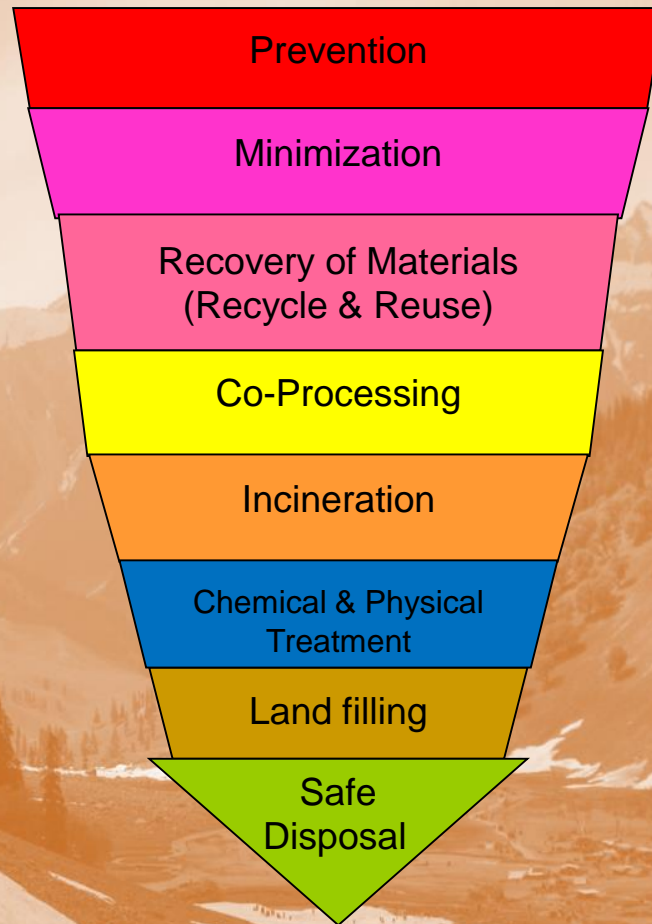
Global Cement Industry



Indian Cement Industry

- ❖ Installed Capacity of 373 million tons as of March'14 and expected to grow to 550 million tons per annum by 2020 with CAGR of 6.8% as per market study.
- ❖ Will require approximately 575 million tons per annum of limestone with the present ratio of OPC , PPC and PSC production , 72 million tons per annum of coal and 5200 MW of electric power.
- ❖ Reducing clinker usage from present approximately 75% to 65% by enhancing PPC and PSC use in construction by 2020 , limestone requirement can be reduced by approximately 80million tons per annum and 24 million tons per annum of carbon dioxide emission.
- ❖ Present Thermal Substitution Rate in Indian Cement Industry by use of alternative fuel is in range of 0.5 to 1% , setting a target of 20% by 2020 , fossil fuel requirement can be reduced by 20million tons per annum.
- ❖ Thermal Power Plants generated 163.56 million tons of Fly Ash during financial Year 2013 and its utilization was only 61.37 % , out of which 41.18% was in Cement Industry.

Waste Management



Conducive Conditions for Alternative Fuels

- ❖ The Clinker reaction temperature of 1450°C allows absorption of ashes , and in particular , chemical binding of metals to the clinker.
- ❖ Different feed points , can be via main burner , secondary burner , precalciner burner , etc.
- ❖ Waste material more than 1% of halogenated organic substances , expressed as chlorine should be fed only through Kiln main burner.
- ❖ With the large mass of clinker inside the kiln , there is huge thermal inertia eliminating the possibility of thermal swings in temperature.
- ❖ Cement Kiln operates at negative pressure and hence prevents generation of fugitive emission.
- ❖ Waste Material should be fed into Kiln , only when feed point temperature is above 850°C .

Sustainability Development With AFR

- ❖ Foremost, good understanding between the waste generator and waste user.
- ❖ Joint interaction between the Industry , Pollution Control Authority , respective Civil Society , Technology Supplier to address following
 - ❖ Waste Management and Central Collection System.
 - ❖ Inventory Status.
 - ❖ Waste Characterization.
 - ❖ Operational Health & Safety Requirement.
 - ❖ Pre-Processing Technology.
 - ❖ Suitable Regulation to deal with environmental implications.
 - ❖ Co-Processing Technology.
- ❖ Generation of solid waste in urban areas has reached critical stage , open dump sites within a time frame should be closed and controlled dump sites to be designated.
- ❖ NGO's along with local government body can play an important role to make it happen.
- ❖ Municipal Corporations to have material segregation facility (MSF) for segregation of waste , collection of biodegradable and recyclable components.
- ❖ District Municipal Corporations may have facility to produce residue derived fuel (RDF) from the solid waste having thermal energy in range of 2000 – 3000kcal/kg and can be suitably used as an alternate fuel in cement plants.

Sustainability Development With AFR

- ❖ In India , cement plant are in cluster in regions Madhya Pradesh / Chattisgarh , Rajasthan , Karnataka , Orissa which gives good opportunity to put up tyre shredding facility for supply to cement plant to be used as alternate fuel. Good partnership can be developed.
- ❖ National Policy to enhance usage of PPC and PSC in infrastructure projects including construction of concrete roads and restricting use of OPC.
- ❖ Thermal Power Plants to discontinue dumping of fly ash as pond ash incurring cost in handling , pumping , use of huge quantity of water as well as creating pollution hazard. Collection as pond ash has multiple problems / wastage
 - Double Handling
 - Spillage and pollution when transporting.
 - User need to dry it spending energy or keep in open for sun dry creating further pollution.
- ❖ Must be mandatory for Thermal Power Plants to have dense phase system for collection / storage of fly ash with bulk loading arrangement and agreement with cement plant / group of cement plants to supply Fly Ash and share transportation cost if distance is more than 200kms.
- ❖ Must be mandatory for Steel Plants to have Slag Granulation Facility with drier and suitable storage system.

CONCLUSION

- ❖ Enhancing usage of Alternative Fuel & Raw Materials through a determined action plan will bring industries closer for solution to a common cause.
- ❖ A comprehensive guideline / manual will be useful which addresses to following stakeholders
 - ✓ Waste Generators Industries
 - ✓ Potential Waste User Industries as Alternative Fuel or Raw Material
 - ✓ Municipal Corporations and local bodies .
 - ✓ Government Organizations and Institutions.
 - ✓ Non Government Organization (NGO's).
 - ✓ Local Communities & Civil bodies.
- ❖ Cement Industry do not generate process waste but has appetite to consume waste generated by other industries and innovative partnership can be developed joining hands together.
- ❖ Key Role of regulatory bodies is required to frame user friendly policy enhancing AFR usage.



THANKS

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