CII initiative on increasing Alternate Fuel and Raw material (AFR) utilisation in Indian Cement Industry



Confederation of Indian Industry CII – Godrej Green Business Centre, Hyderabad

CII- Sohrabji Godrej Green Business Centre Hyderabad



Confederation of Indian Industry

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Project Background

Waste Generation

- **MSW : 140 Million Tons by 2025**
- plastic waste : 15, 000 TPD
- **Hazardous waste : 7.8 Million TPA**
- **Indian Cement industry**
 - \geq Emitted 137 Mt of CO₂, 7% of India's man made emissions
 - **Cement demand : 500-650 MTPA by 2025**
 - Nationally Determined Contribution: Reduce emissions Intensity of its GDP by 33 to 35 Per Cent by 2030 from 2005 Level





Project Objective

Facilitate use of urban & industrial waste as Alternate Fuel & Raw Material (AFR) in Indian cement industry

Supported by Shakti Sustainable energy foundation (SSEF)





Activities carried out

Policy Advocacy

- Developing draft recommendations for inclusion of Co-processing in HWM rules
- Frequent meetings & discussions with various
 Government bodies (MoEFCC, CPCB & SPCBs)
- Stake holders discussions,
 Expert group meetings &
 Industry consultation
- Submissions to MoEFCC & CPCB on promoting co-processing

 Technical Research & Analysis

- Life Cycle approach for AFR utilization in Cement industry
- Status of AFR usage in Indian Cement industry
- Waste forecasting
- Variation in chemical constituents of waste streams

 Capacity Building activities

- National & International missions
- Inventory of waste generation
- Inventory of Coprocessing cement plants
- Technical Publications
- Website on Co-processing





Expert group for Industrial waste management

| | · · · · · · · · · · · · · · · · · · · | | |
|-------|---------------------------------------|--|---|
| S. No | Name | Designation | Organisation |
| | | Chairman – CII Intiative on increasing AFR | |
| 1 | Mr Ulhas parlikar | usage in Indian Cement industry | Geocycle India |
| | | | Ministry of Environment, Forest and Climate |
| 2 | Ms Lakshmi Raghupathy | Ex Director | Change (MoEFCC) |
| 2 | Nau A. Downshound | Chief Fusine unsented Fusine en | Andhua Duadach Dallution Control Deaud |
| 3 | IVIT A Kamchand | Chief Environmental Engineer | Andhra Pradesh Pollution Control Board |
| 4 | Mr R P Tiwari, | Superintendent Engineer | Chhattisgarh Pollution Control Board |
| 5 | Mr P K Gupta | Scientist E | Central Pollution Control Board |
| 6 | Mr V R Ghadge | Senior Environmental Engineer | Gujarat Pollution Control Board |
| 7 | Mr Venkatesh Shekar | Senior Environmental Officer | Karnataka State Pollution Board |
| 8 | Mr PS Bundela | Regional Officer, Bhopal | Madhya Pradesh Pollution Control Board |
| 9 | Mr V M Motghare | Joint Director – Air Pollution Control | Maharashtra Pollution Control Board |
| 10 | Dr Vijai kumar Singhal | Chief Environmental Engineer | Rajasthan Pollution Control Board |
| 11 | Mr S Selvan | Joint Chief Environmental Engineer | Tamil Nadu Pollution Control Board |
| . 12 | Mr Raghunatha Swamy | Joint Chief Environmental Engineer | Telangana State Pollution Control Board |

Round table discussion in Eight states

 Bring waste generators and cement plants together – In presence of State PCB officials & other stakeholders to discuss the following

Understanding barriers & constraints
 Concerns of all stakeholders
 Evolve a roadmap for successful demonstration of co-processing







Recommendations submitted to MoEFCC & CPCB on HWM Rules

- Extensive research work carried in developing recommendations
- Inputs taken from round table discussions, International experts & policy framework adopted in different countries

Missions

- European countries & Southeast Asian countries
- Best plants in India



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| Ulhas V Parlikar Chairman - Cli Initiative on Increasing AFR Usag Da Hand - Can Onlin India | INFORCE SON CONDUCTION OF SON |
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Publications on Co-processing



Website on Co-processing - www.ciiwasteexchange.org



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An Initiative by CII - CMA MAY 2015

Key milestones in the initiative

- **AFR substitution increased from less than 1 % to more than 4% in 2016**
- Recognition for Co-processing in the policy framework
- > 45 Cement plants started co-processing
- State PCB's developed specific action plan & implementation schedule to promote co-processing
- >10 cement plants set up pre-processing facilities
- **CA (Life Cycle approach) considered as a part of manufacturing process**











25% TSR @ 2025 – Anticipated benefits



Coal consumption reduces by 25%

- Land filling area requirement in the country will reduce by 20%
- GHG emissions from fuel reduces by 25%
- Reduce imports & increase economic activity of the country





Objective

Work with Municipalities, regulators and cement plants to consider co-processing as a sustainable solution for MSW management in the country

MSW Potential to replace 14% of total energy requirement of cement plant by 2025





Developing Roadmap for MSW management

- Working with Municipalities in developing sustainable practices for MSW management
- Waste mapping : MSW and cement plants
- Cluster approach : Synergy between authorities & Cement plants
- Capacity building: New policy changes & cement kiln co-processing
- Business models
- White papers on sustainable waste management practices





MSW Mapping – Cluster based approach

1D

| State | Urban Local Bodies | Cement plants |
|----------------|---|---|
| Chhattisgarh | Raipur, Bilaspur, Korba, Raigarh | Ambuja Cements Ltd , Cement Corporation of India , Century Cement, Jaypee Cement, Lafarge India (P) Ltd, UltraTech, |
| Gujarat | Rajkot, Jamnagar, Ahmadabad | Ambuja Cements Ltd , Cement Ltd , Jaypee Cement, JK Lakshmi , UltraTech |
| Karnataka | Gulbarga, Bagalkot, Bellary, Koppal, Bangalore | Ambuja Cements Ltd , Cement Corporation of India , Chettinad Cement, J.K. Cement Ltd, Kesoram Cement , UltraTech, |
| Madhya Pradesh | Satna, Ratlam, Jabalpur, Katni, Rewa | Cement Corporation of India Ltd, Century Cement, Jaypee Cement, Kymore Cement Works, Prism Cement Ltd, UltraTech |
| Rajasthan | Jaipur, Kota, Udaipur, Ajmer, Bhilwara | ACC , Ambuja Cements Ltd , Birla Cement Works , Binani Cement Ltd , J.K. Cement Ltd , Shriram Cement Works , Shree Cement Ltd , The India Cements Ltd , UltraTech , Wonder Cement Ltd, |
| Tamil Nadu | Thanjavur, Tiruchirappalli, Coimbatore, Perambalur, Ariyalur, Madurai | Chettinad Cement, Dalmia Cement (Bharat) Ltd, The India Cements Ltd, Tamil Nadu Cements Corpn. Ltd, UltraTech |
| Telangana & AP | Hyderabad, Warangal, Vijayawada, Kadapa, Kurnool, Guntur | Anjani Portland Cement Ltd, Bhavya Cement Ltd, Cement Corporation of India Ltd, Hemandari Cement Ltd, Jaypee Cement, My Home Industries Ltd, Penna Cement Industries Ltd, Rain Cements Ltd, Sagar Cement Ltd, , , The India Cements Ltd, The K.C.P. Ltd., Zuari Cement Ltd |

MSW mapping in Selected Municipalities

- This mapping will further elaborate on various parameters like
 - Current inventory & MSW management practices
 - Area & Population
 - Growth potential
 - Location of cement plants with capacity
 - Developing different models of MSW management in Clusters
 - ✓ PPP Model
 - ✓ Common Pre processing facility model
 - Business Model
 - Capacity Building requirements



Waste mapping model – Tamil Nadu

| City | Population of 2011 (Nos) | MSW generated TPA in 2011 | No of Cement plants in Vicinity |
|-----------------|-----------------------------|---------------------------------|------------------------------------|
| Thanjavur | 2,22,943 | 43,800 | |
| Tiruchirappalli | 8,47,387 | 2,27,679 | |
| Coimbatore | 10,50,721 | 2,94,202 | 8 |
| Ariyalur | 28,902 | 4,928 | Ū |
| Madurai | 10,17,865 | 2,37,250 | |
| Perambalur | 49,000 | 8,760 | |
| Total | | 8,16, 619 | |





Estimated Thermal substitution from MSW of 6 cities in 1.5 MTPA Clinker unit

| Parameter | Values | Unit | | |
|--|--------|-------------|--|--|
| Total MSW generated from 6 cities | 0.81 | Million TPA | | |
| MSW for RDF generation | 0.57 | Million TPA | | |
| RDF generation | 0.11 | Million TPA | | |
| Energy from RDF | 0.0342 | Million TOE | | |
| Generated RDF used as Alternate fuel in 1.5 Million TPA clinker unit | | | | |
| Clinker production | 1.50 | MTPA | | |
| Thermal Energy required | 0.107 | Million TOE | | |
| Estimated % Energy from RDF of 6 Municipalities as TSR % in 1.5 MTPA cement plant | 31.9 | % | | |
| | | SHAKTI | | |



SUSTAINABLE ENERGY FOUNDATION

Estimated Thermal substitution from MSW of 6 cities in 1.5 MTPA Clinker unit

- ***** MSW generated from 6 cities 0.817 Million TPA
- Sement plants are in nearby clusters
- In a 1.5 Million TPA clinker unit RDF generated from this MSW can substitute
 - > 31.9% of fuel on TSR basis
 - > 60,000 Tonnes of Coal can be substituted annually
 - MSW growth potential :25% by 2031
 - Corresponding TSR substitution can be as high as 40%





Estimated growth potential of MSW & TSR Substitution in 1.5 MTPA clinker unit



*****Working with SINTEF, Norway

*Co-processing of Alternative Fuels and Resources in the Cement Industry

➢ The main objective of the initiative is to strengthen the role and acceptance of co-processing as an option for sustainable waste management, resource conservation and reduction of GHGs in India.





Other AFR initiatives

Major areas of work

Technical support in Sustainable and Environment friendly industrial production.

Demonstrate high thermal substitution rate by co-processing of refuse derived fuels from municipal solid wastes.

> Demonstrate the destruction of hazardous chemicals in cement kilns

Feasibility of utilization of construction and demolition wastes in cement production





Way Forward

- CII will work closely with Urban Local bodies, policymakers, cement industry & other stake holders in promoting sustainable waste management practices
- Cement industry can paly a vital role in making a Green & Clean India
- Co-processing in cement plants : Pillar to support India's journey towards Low Carbon economy
 - Swachh Bharat Mission
 - > NDC





Thank you



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