

# **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



**“Centre of Excellence” for Energy, Environment, Green Buildings,  
Renewable energy & Climate change activities in India**



# Project Background

## ❑ Waste Generation

- MSW : 140 Million Tons by 2025
- plastic waste : 15, 000 TPD
- Hazardous waste : 7.8 Million TPA

## ❑ Indian Cement industry

- Emitted 137 Mt of CO<sub>2</sub>, 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 Co-processing cement plants
- Technical Publications
- Website on Co-processing





# Expert group for Industrial waste management

S. No	Name	Designation	Organisation
1	Mr Ulhas parlikar	Chairman – CII Initiative on increasing AFR usage in Indian Cement industry	Geocycle India
2	Ms Lakshmi Raghupathy	Ex Director	Ministry of Environment, Forest and Climate Change (MoEFCC)
3	Mr A Ramchand	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 P S 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

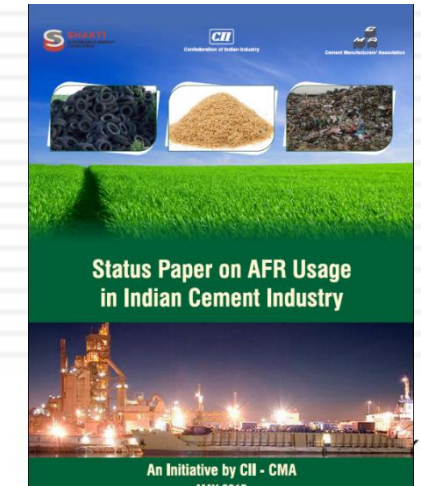
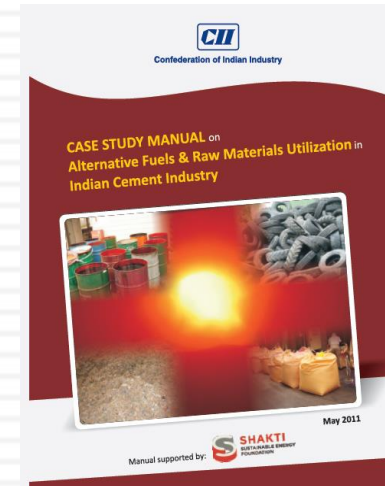
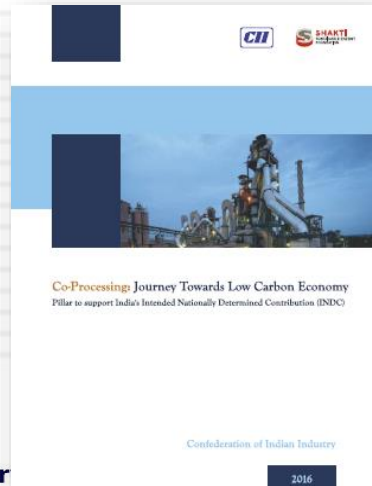




# Publications on Co-processing



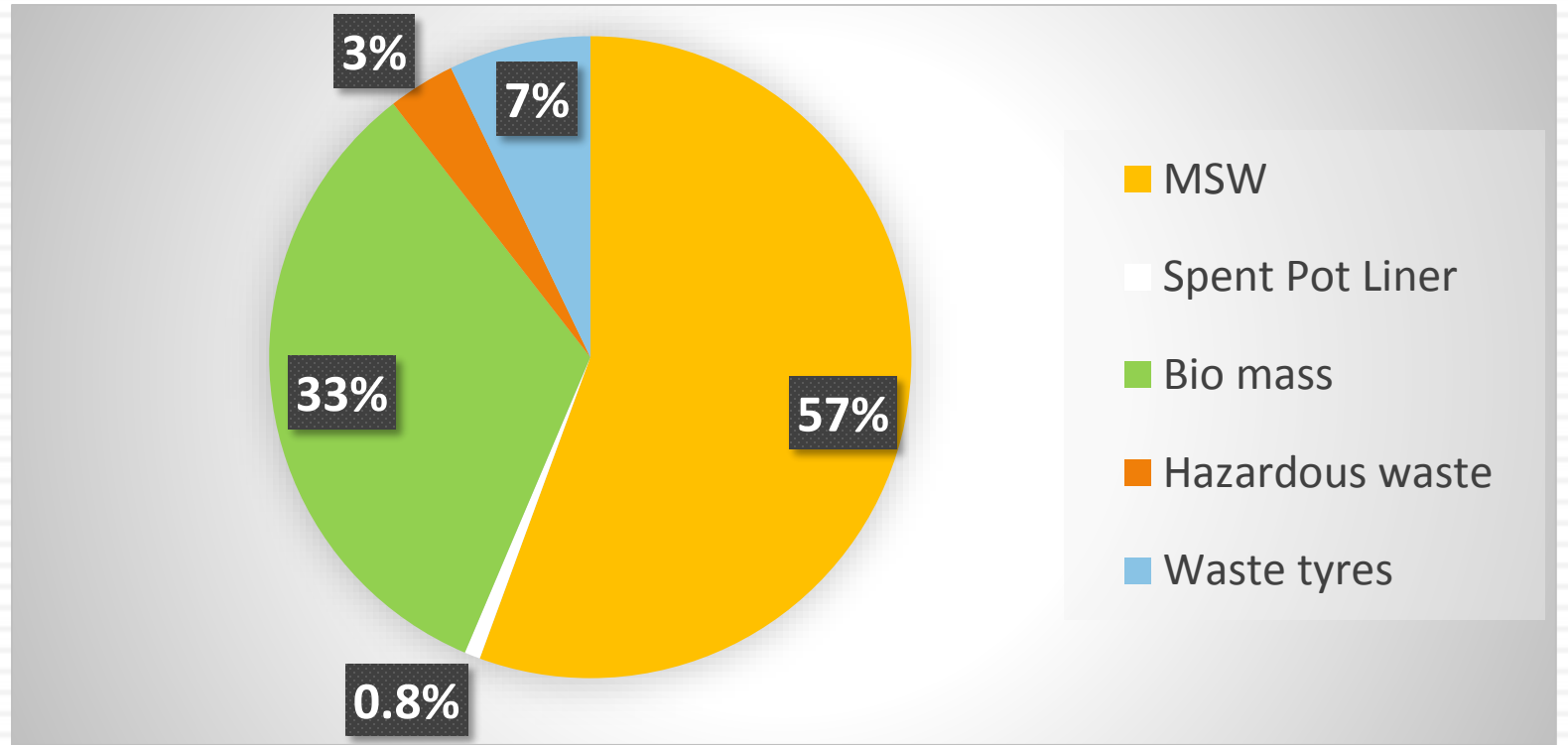
Website on Co-processing - [www.ciiwasteexchange.org](http://www.ciiwasteexchange.org)



# Key milestones in the initiative

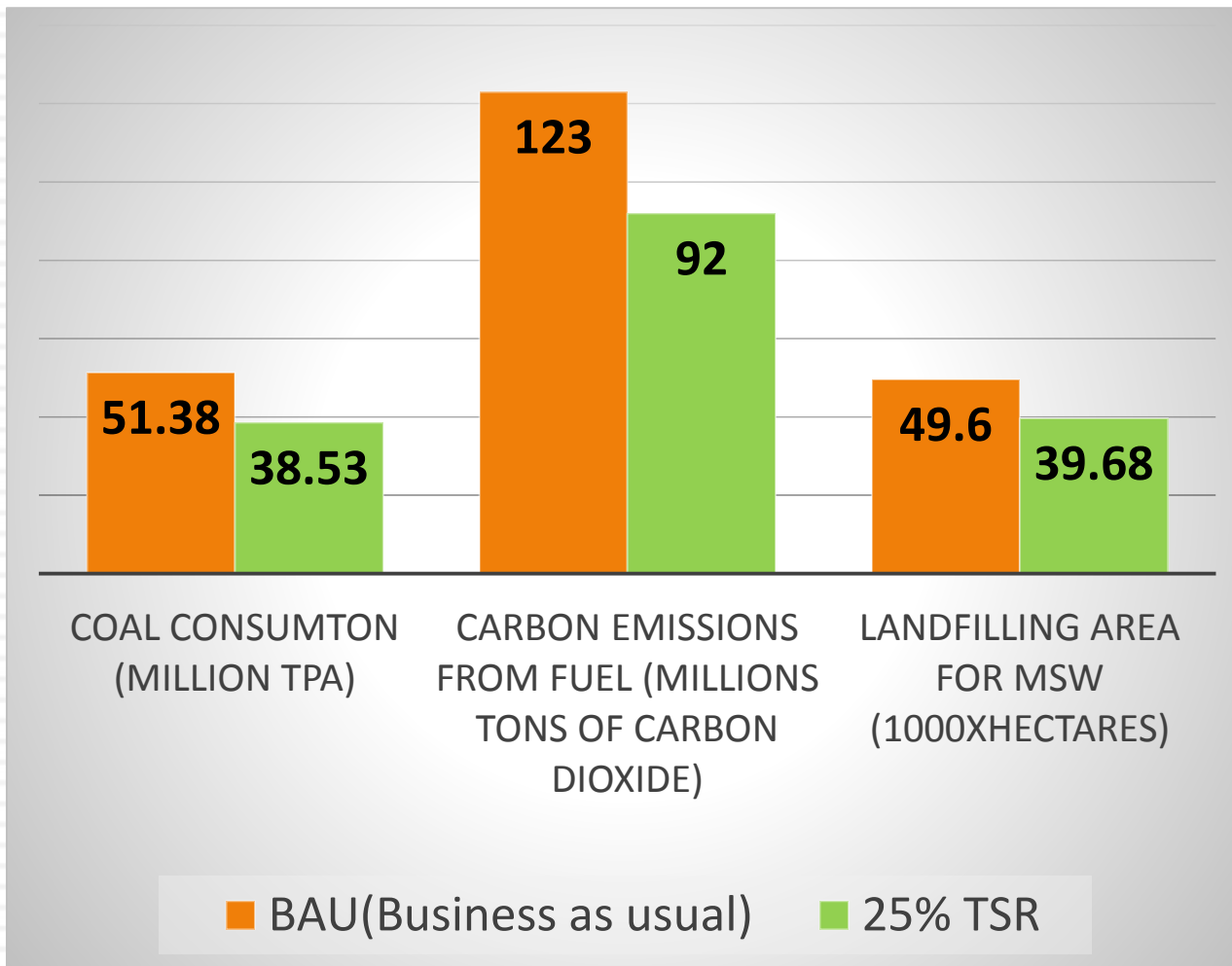
- ❖ AFR substitution increased from less than 1 % to more than 4% in 2016
- ❖ Recognition for Co-processing in the policy framework
- ❖ > 45 Cement plants started co-processing
- ❖ State PCB's developed specific action plan & implementation schedule to promote co-processing
- ❖ >10 cement plants set up pre-processing facilities
- ❖ LCA (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

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	8
Tiruchirappalli	8,47,387	2,27,679	
Coimbatore	10,50,721	2,94,202	
Ariyalur	28,902	4,928	
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
<b>Generated RDF used as Alternate fuel in 1.5 Million TPA clinker unit</b>		
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	%



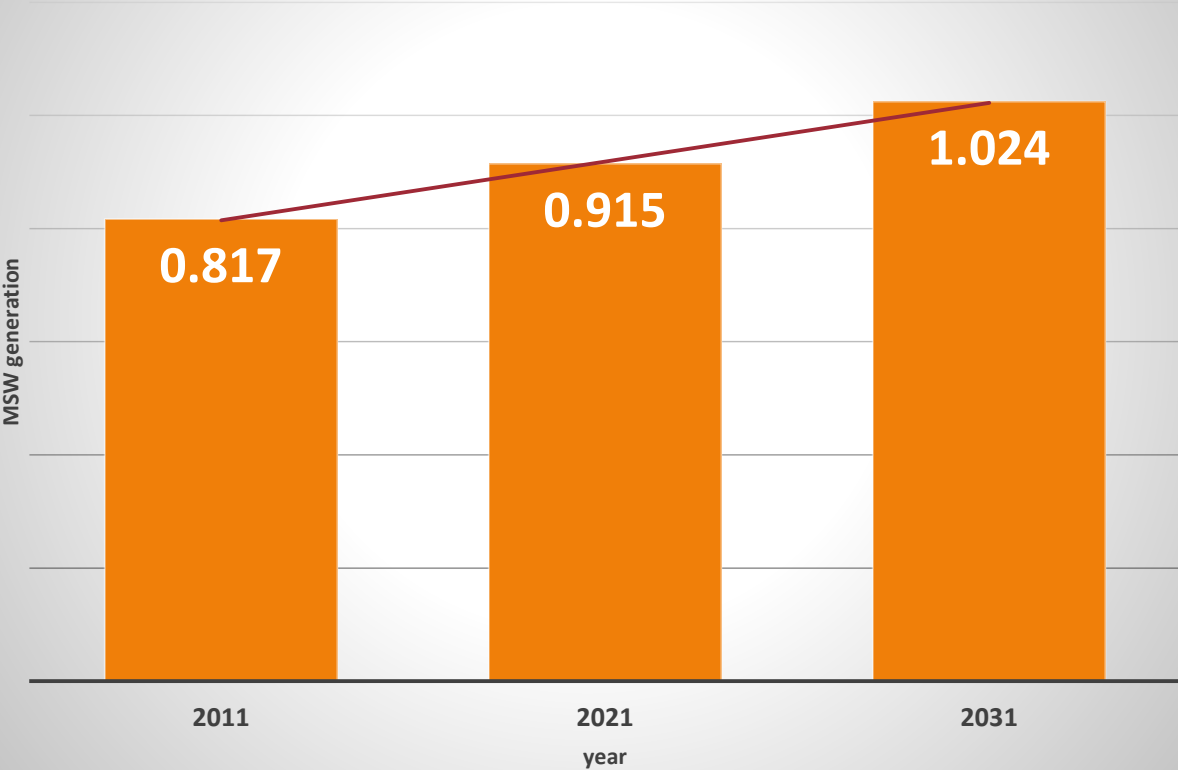
# Estimated Thermal substitution from MSW of 6 cities in 1.5 MTPA Clinker unit

- ❖ MSW generated from 6 cities 0.817 Million TPA
- ❖ 8 Cement 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%

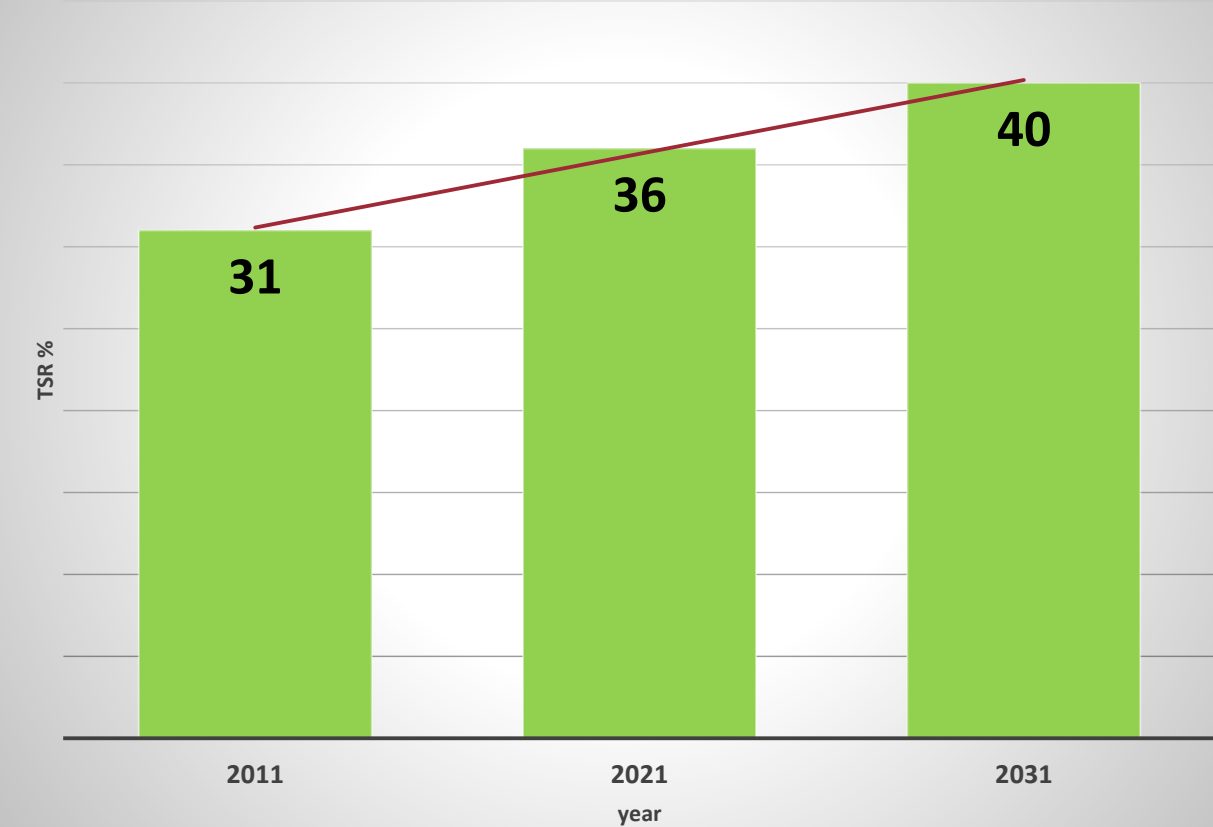


# Estimated growth potential of MSW & TSR Substitution in 1.5 MTPA clinker unit

### Estimated Quantity of MSW generated (MTPA) in six ULBs



### Estimated TSR % in 1.5 MTPA Clinker production





## Other AFR initiatives

- ❖ **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 play 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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