Reddipalayam Cement Works

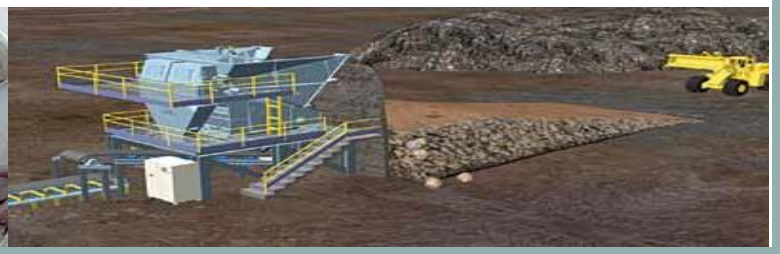
From Waste to Resource Creating a Sustainable System at RDCW





Co-Processing of Alternate Fuel



Safety Pause

•A confined space is a enclosed space large enough for a person to enter,

•Limited or restricted means of entry or exit.
•Not designed for continuous human occupancy .
•It may have contaminated or flammable atmosphere or it may have absence of adequate Oxygen.

ADOPTING SAFETY FIRST APPROACH IN ALL OUR ACTIVITIES

- Isolated from external source of energy
- Emptying the space
- Visibility with 24 volts light arrangement
- Necessary PPE used
- Monitor of oxygen level, flammability level
- Attendant engaged for monitoring the condition and communicating with those inside.

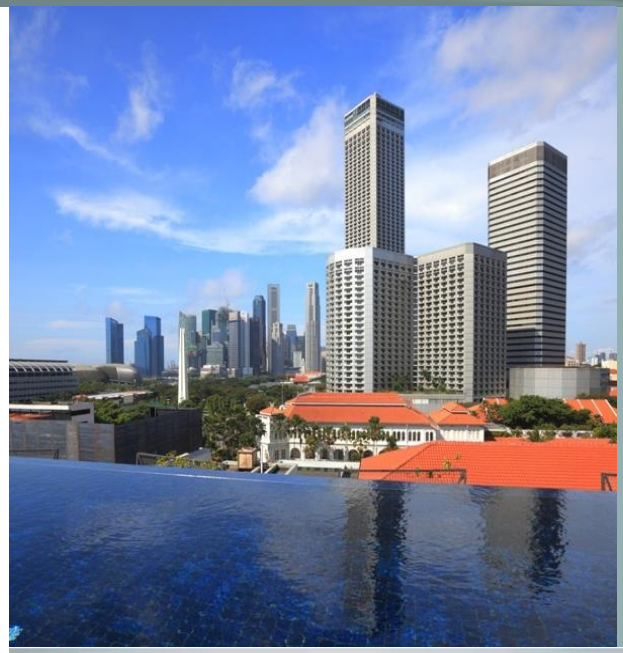
Lineage

UltraTech Cement is part of Aditya Birla Group (ABG)

- ABG is a leading multinational from India
- 50 companies across 6 continents in 36 countries
- A US $ 40 billion corporation
- Over 100 state-of-the-art manufacturing units
- Over 50% revenues from international operations
- Anchored by 136,000 employees belonging to 42 different nationalities

From Foundation to Finish

- Among the top producers of cement globally
- Largest white cement producer in India
- Operations in five countries - India, UAE, Bahrain, Bangladesh and Sri Lanka
- 12 integrated plants, 1 white cement plant, 12 grinding units, 6 Terminals
- More than 100 Ready Mix Concrete plants
- Collaborating with DuPont Sustainable Solutions towards enhancing organizational Safety Best Practices



International Presence

ETA Star Cement

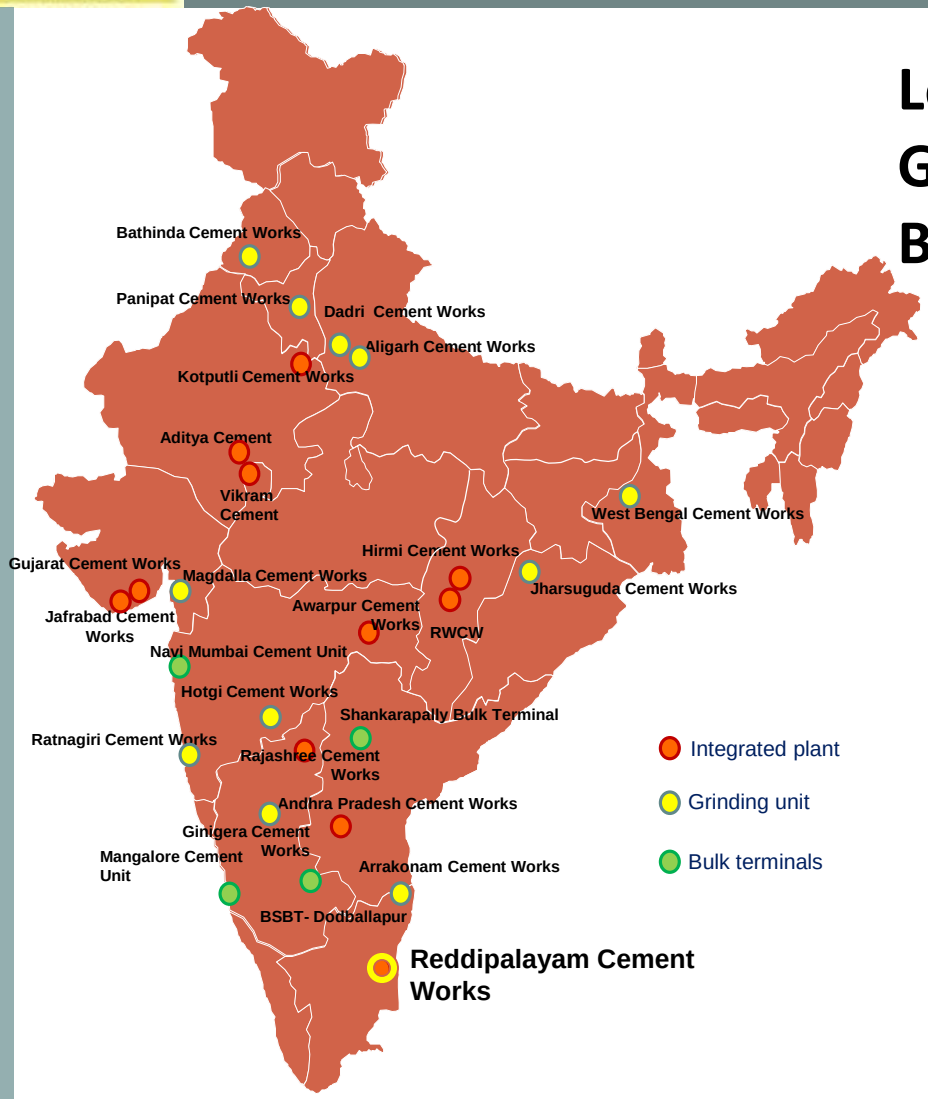
- One of the largest cement manufacturers in the Middle East
- 2 grinding units and 1 clinkerization plant in UAE, and 1 grinding unit each in Bahrain & Bangladesh
- Installed capacity of 3 million metric tonne per annum

Ras Al Khaimah (Clinker), UAE

UltraTech Cement Lanka

- Bulk Terminal with packing capacity of 1.2 MTPA
- 90% of cement supplied towards expansion of Port of Colombo, considered the Gateway to Sri Lanka

UltraTech Cement Reddipalayam – A Feather in Cap



Location of Integrated Plants, Grinding Units and Bulk Terminals

Area of spread	Units
Plant capacity	1.4 MTPA
Area of mines	188.62 Ha
Area of plant	125 Ha
Nearest air port Trichy	75 km

Vision & Mission

VISION

TO BE RECOGNIZED AS THE "MOST INNOVATIVE COMPANY" IN MEETING THE CUSTOMER REQUIREMENTS, USE OF RENEWABLE ENERGY & CONSERVING RESOURCES BY THE YEAR 2015.

MISSION

- ADOPTING CREATIVITY & INNOVATIVE APPROACH IN CONTINUAL IMPROVEMENT OF QUALITY, PRODUCTIVITY, SYSTEMS AND PROCESSES.
- ADOPTING STATE OF THE ART TECHNOLOGIES FOR CONSERVING THE RESOURCES AND USE OF RENEWABLE ENERGY.
- CREATING VIBRANT WORK ENVIRONMENT TO ATTRACT, MOTIVATE & RETAIN EMPLOYEES TO ACHIEVE THE ORGANIZATIONAL OBJECTIVES.
- BUILDING LONG LASTING CORDIAL RELATIONSHIP WITH SOCIETY AND THE STAKE HOLDERS BY PRACTICING SAFE ENVIRONMENTAL STANDARDS.
- ADOPTING SAFETY FIRST APPROACH IN ALL OUR ACTIVITIES .

GROWTH JOURNEY

Capacity 1998

1800 TPD

Installed capacity 2000 - 01

2400 TPD

Instituted WCM

Upgraded 2001 – 02

2800 TPD

Bronze Award

Upgraded 2002-04

3000 TPD

Upgraded 2004-05

3150 TPD

Silver award

Gold & Planet award

2009-11

2012-13

3250 TPD

Brown field project

2015-16 Platinum award

Future Plan

Management System - Certification

ISO : 9001 - Quality

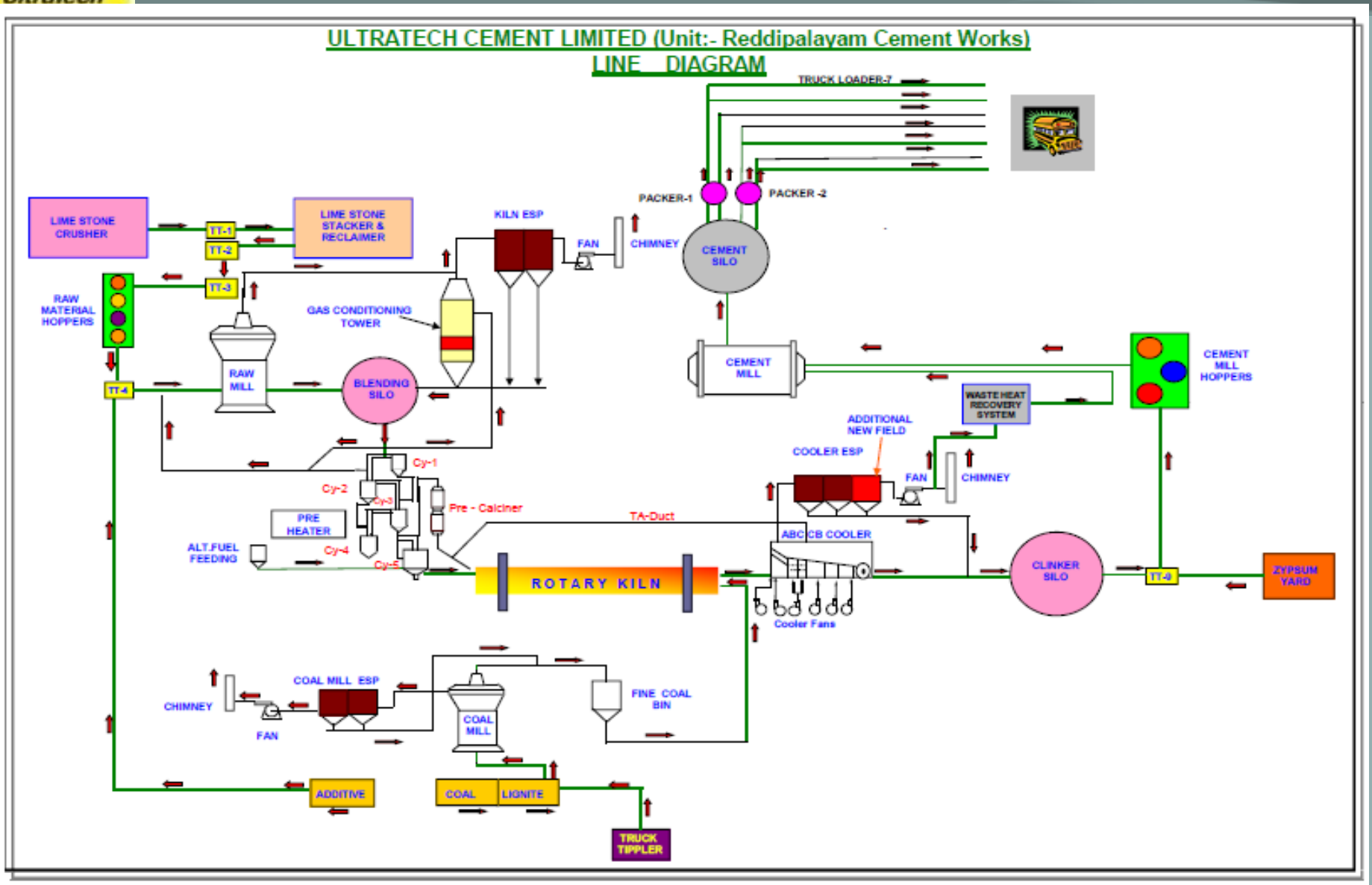
ISO :14001 - Environment

ISO :27001 ISMS

ISO :18001 – Safety

ISO :50001 2011

Cement Manufacturing Process Flow Chart



Plant Unique Features

- State of the art Cement Plant commissioned in the millennium year
- Designed for using multiple fuels.
- Pioneer in using alternate fuel with pre-processing system
- First Plant in the World to get CDM credit for use of Agro waste alternate fuel
- Robo lab for total quality control from sampling to analysis.
- Packing facility with Centralized discharge from cement silo
- No Fatal Accidents since Twelve years
- State of art testing laboratory for Alternative fuels

Plant Salient Features

Safety

WCM

Ripper Dozer for Mining

Covered storage for raw material

Cross Belt Analyzer

Robo Lab for Quality Control

Plant Salient Features

Central Control Room with DCS & PI

Energy Efficient Ball Mill with RP for Clinker Grinding

Micro controller based Electronic Packer

TPP

Clean & Green

1

ECO-Friendly Technological Features

- Ripper Dozer for environment friendly mining operation
- ESP & jet pulse bag filters
- Alternative/Hazardous Fuel Feeding System.
- Covered storage for Fuels.
- Storage silos for raw meal, clinker, flyash and Cement.
- Covered belt conveyors for material transportation.
- Water sprinkler for dust suppression at Crushers.


Ripper Dozer


Covered Limestone Shed


Covered Conveyors


Storage Silos

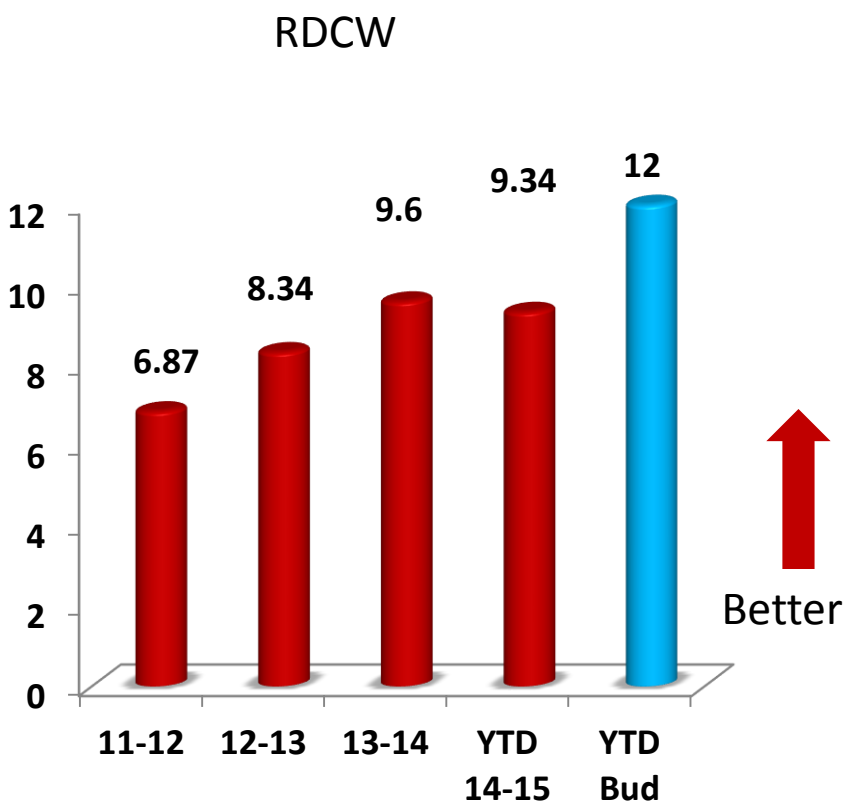

Electro Static Precipitator

1

CO-PROCESSING OF AFR

AFR Consumption – in % of Thermal Substitution Rate (TSR)

Country or Region	% Substitution
Netherland	83
Switzerland	47.8
Austria	46
Norway	35
France	34.1
Belgium	30
Germany	42
Sweden	29
Luxembourg	25
Czech Republic	24
EU (prior to expansion in 2004)	12
Japan	10



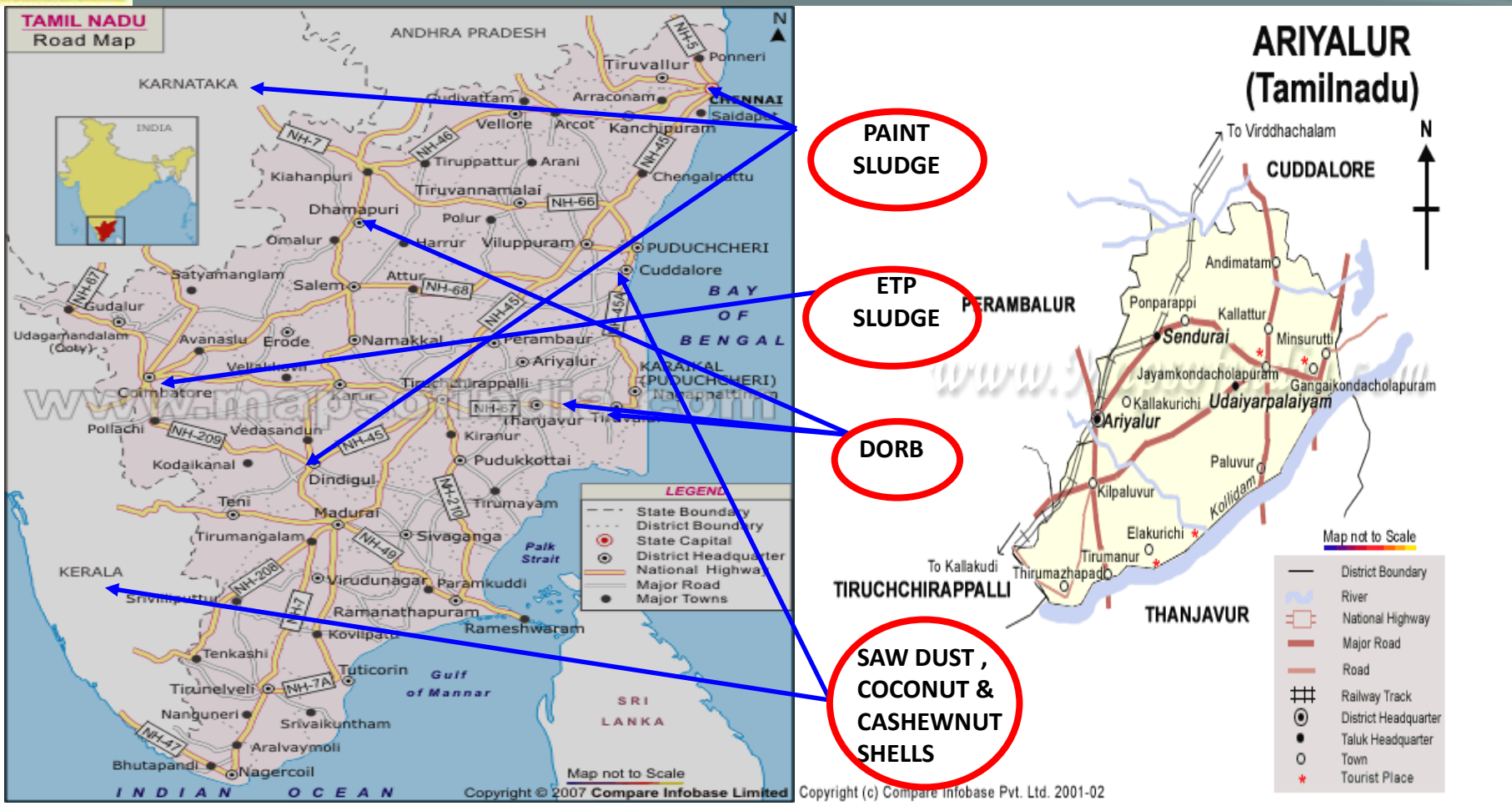
World Benchmark

Alternate Fuel Initiative & Focus Area

The initiatives are taken by RDCW both at unit and corporate level were of multi dimensional few initiatives as follows.

- Explore the availability of different type of alternate fuel.
- Established waste fuel handling system in plant.
- Obtain clearance from STPCB & CPCB for usage of various AFR.
- Installation shredding machine for plastic, paint sludge
- Installation of wood cutting machine
- Established AFR laboratory for detailed analysis of hazardous AFR.

Explore the Availability of different type of AFR.



PAINT SLUDGE

ETP SLUDGE

DORB

SAW DUST , COCONUT & CASHEWNUT SHELLS

RDCW had taken lot of initiatives in exploring the availability of different kinds of alternate fuels to maximize AFR usage

Types of AFR

While exploring the availability, RDCW had considered the logistics so that the transportation cost does not go up and focus on following AFR.


Rice Husk


Wood chips


Shredded Tires


Cut Tires


RDF


Expired Tablets


Hazardous Sludge – Pharma Rejects


Saw dust


Paint Sludge


Plastic chips


Rubber Cuts

QUANTITY & AVAILABILITY

Material Type	Quantity MT / year	Area of Availability	Remarks
Paint sludge	24000	Chennai, Hosur, Bangalore Madurai	
Oily choked cotton	5000	Hosur, Chennai, Mysore	
Tyre	5000	Secundrabad, Hyderabad, Kerela	
Spent carbon	5000	Cuddalore, Pondi, Chennai, Hosur	
Agro waste	125000 (50,000 Available)	TN, AP, KERALA	75,000 tons being used at the generation point
Availability around 30,000 Tons / year at RDCW			

WASTE FUEL SPECIFICATIONS

SL#	Type of Fuel	Moisture %	NCV Kcal/Kg	Ash %	Chloride %
1	Tyre	**2.5**	**7250**	**3.0**	**-**
2	DORB (De oiled Rice Bran)	**17.0**	**2350**	**21.5**	**-**
3	Cashewnut Shell	**7.0**	**4500**	**3.5**	**-**
4	Coconut Shell	**8.1**	**4300**	**2.0**	**-**
5	Wooden Dust	**27.1**	**2910**	**4.2**	**-**
6	Oil Cotton Waste	**11.0**	**2500**	**3.6**	**-**
7	Paint Sludge	**25-30**	**3000**	**39.1**	**< 0.5**
8	Groundnut shell	**12.5**	**3530**	**5.8**	**-**
9	Spent Carbon	**31.8**	**3540**	**3.5**	**< 0.5**
10	Plastic Waste	**0.8**	**7200**	**2.5**	**< 0.5**
11	RDF	**35.0**	**1350**	**29.0**	**< 0.5**
12	ETP Sludge	**<25**	**-**	**-**	**< 0.5**

ESTABLISHED AFR HANDLING SYSTEM

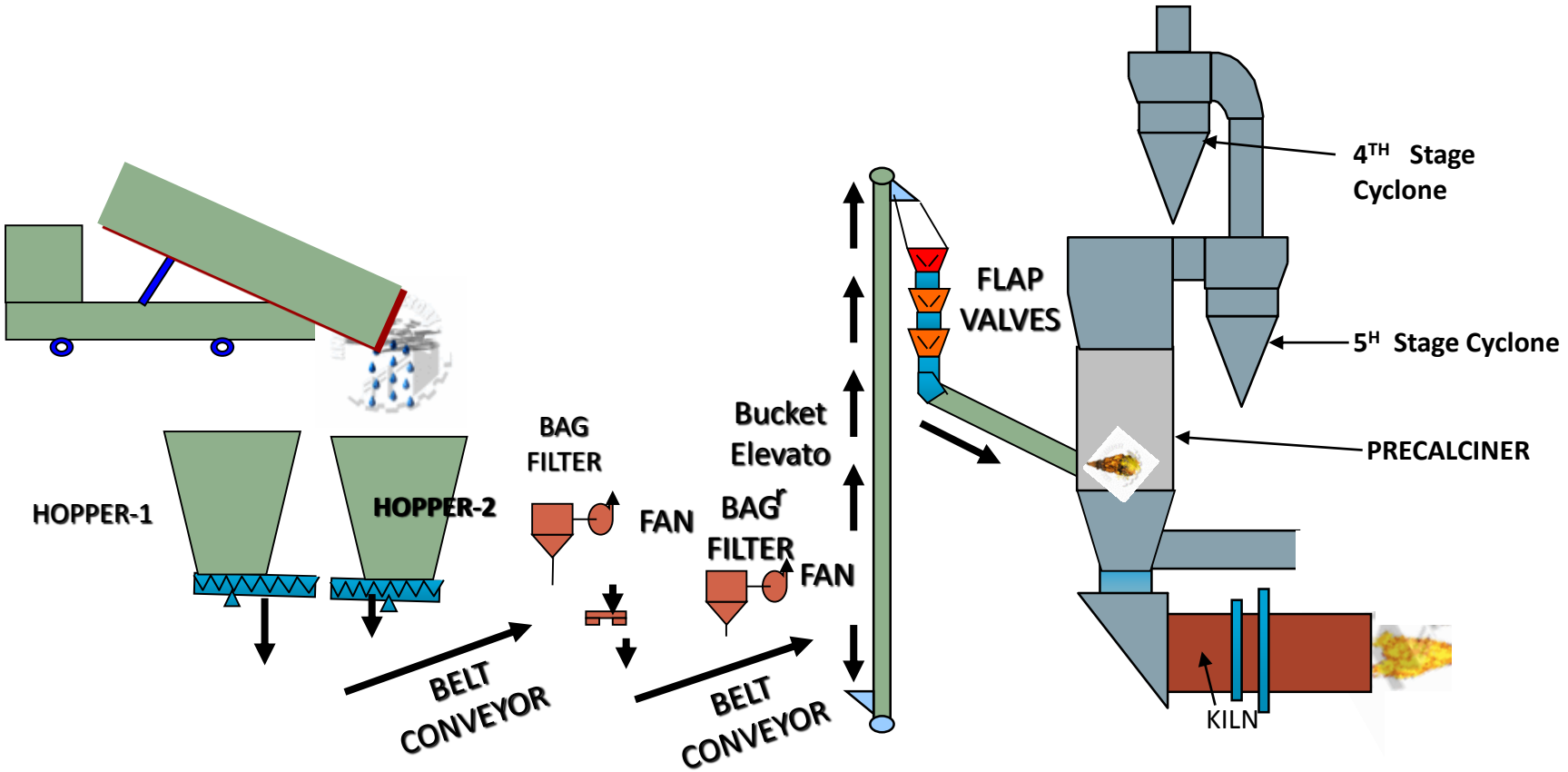
Alternate fuel are collected from different locations through different suppliers, and stored as per allotted space in closed yard. size 25X36 square meters. Presently the unit has three shed of same size.

Size 25X36 square meters. Presently the unit has three shed of same size.

New shredder machine

Oversize material whose size is above 50 mm is shredded through the shredder machine.

ESTABLISHED AFR HANDLING SYSTEM



OBTAINED CLEARANCE FROM STPCB & CPCB

- **Take up the matter with State & Central Pollution Control Boards for obtaining their clearance for usage of the same, which was a major challenge.**
- **D**etailed survey report of availability of alternate fuels was prepared and ensured that such alternate fuels are available for disposal purpose. The study was supported by the data from Indian Institute of Science, Bangalore.
- Presentation were made and shown to regulatory bodies like CPCB, state pollution control board, NGOs and concerned ministry officials to give permission for alternate fuel usage in cement kiln.
- The officials of state pollution control board and CPCB visited the unit for trial run of alternate fuel and its impact on environment.

Consent obtained for following hazardous wastes material. The consent is valid up to 31.03.2015.

1. Paint Sludge, 2. Oily Sludge, 3. Waste/residues containing oil, 4. Oil soaked cotton wastes, 5. Tyre chips, 6. Plastic waste, 7. Used Oil

Types of Alternate Fuel Used

Paint Sludge – It is procured from automobile industries, the calorific value in paint sludge is 3000 kcal. Due to high moisture (25-35%), big size and foreign material pre processing like cutting and shorting is required. It absorbs water and omitted unpleasant odour. Drying and handling of wet paint sludge is difficult so proper storage system for raw and processed paint sludge is required.

Tyre Chips – It is among the most reliable and high CV alternate fuel. It can be stored for long time; covered shed is required to avoid accumulation of water during rain. Because of low ash, high CV and less moisture (2-4%) it provides high thermal substitution rate. Availability is not an issue but cost is at par with pet coke.

Types of Alternate Fuel Used

Plastic waste – It is mainly sourced from plastic industries/municipality and consists of CV around 2500 kcal/kg. The moisture content is about 10-12 %, due to light in weight, it can flow properly from the hopper so it is used with other alternate fuel it comes with free of cost so it is on another advantage to use.

- De-Oiled Rice Bran (DORB)
- Shredded Tyres
- De-oiled Cashew nut shell (DOCS)
- Saw Dust
- Refinery Sludge
- Groundnut shell
- Coconut shell
- Match stick waste
- Wood strips
- Leco fines
- Municipal waste (RDF Fluff)
- Coir waste/dust
- Corn waste
- Rice Husk
- Rubber trimmings/liquid
- Chilly stump
- Bio-compost
- Banana waste
- Wood char coal
- Tyres powder

Quantity of AFR Usage- MT

Sl.No	Material	2009-10	2010-11	2011-12	2012-13	2013-14
	Agro/Indl. Waste					
1	Dorb	3097	6609	6380	3477	1417
2	Cashew nut shell	5235	1103	19	283	Nil
3	Shredder Tyre	3116	3008	1877	3655	696
4	Wooden dust	370	5	2	Nil	Nil
5	Groundnut shell	0	140			
6	Char coal	64				
7	Palm seed Punch		35.86			
8	Fibre waste		23.35	55.64		
9	Rubber bush			1.97		
10	Carbon Powder		116			
11	Herbal waste				238.6	
12	coffee Husk				29.64	
	Municipal Waste					
13	RDF			38	2930	1132
14	Plastic waste		3.31			141
	Hazardous Waste					
15	Plaint Sludge	2546	3235	2290	6453	2510
16	Oily cotton waste		13.76	46.93	77.31	57
17	Spent carbon			10	874	
18	Unilever				9.97	
	Total	14428	14294	10718	18133	5953

INSTALATION OF PRE PROCESSING EQUIPMENTS

Installation of Plastic shredding machine:

In this machine hazardous plastic materials are shredded to small pieces and dispose in calciner for combustion process.

Capacity 500 kg/Hour.

Wood Cutting machine:

With the help of wood cutting machine scrap woods cut down to small pieces and fed to calciner for combustion.

Capacity 300 Kg / Hour.

INSTALATION OF PRE PROCESSING EQUIPMENTS

Dump hoppers

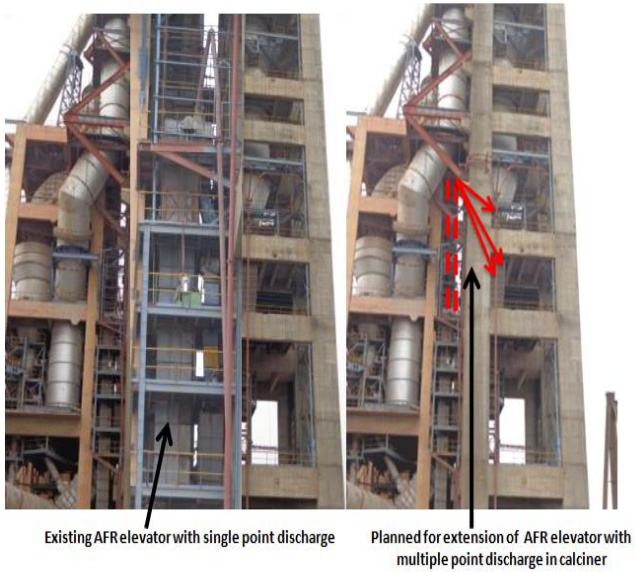
INSTALATION OF PRE PROCESSING EQUIPMENTS

New Chaff Cutter for Agro Waste

Bob Cat for AFR Feeding

New shredder machine
Capacity – 5 TPH

Multiple AFR feeding arrangement in precalciner:



Key Technical Challenges & Action Taken

There are several challenges associated with using industrial waste in kiln. It is a highly heterogeneous in nature which makes difficult to maintain kiln stability. Several efforts are underway to overcome the challenges; some of the key challenges are as follows.

Challenges	Action taken
Calciner Temperature Fluctuation: There was huge fluctuation in calciner temperature followed by CO generation at kiln inlet during AFR (industrial waste) injection in calciner.	VFD installed in AFR feeding conveyor belt. Interlock provided to reduce belt speed by 50% and weigh feeder set point to minimum (i.e. 1 MT) whenever calciner temperature exceeds 900^0C. To avoid variation in CV, to minimize CV variation mixing of high and low CV alternate fuel started with help of wheel loader.

Key Technical Challenges & Action Taken

Challenges	Action taken
Issue related to Size and flowability of solid AFR Flowability was a bigger issue during AFR feeding, due to bigger size in solid AFR and high moisture content the material frequently stuck up at the hopper discharge chute.	To improve the flowability, hopper chute is modified. Slant inclination of hopper was modified and made vertical. A new shredder machine with mechanised system for feeding to shredder and discharge from shredder is installed. This helps to reduce the size of solid AFR less than 50mm. A new apron feeder width 1200 mm is installed and commissioned on date 02.01.2014

New apron feeder commissioned on 02.01.2014

New shredder machine

ESTABLISHED AFR LAB

On 12th Sep 2014, RDCW inaugurated UltraTech cement Limited's first AFR (Alternate Fuel & Raw Material) Testing Laboratory.

CHNS-O analyzer for Ultimate analysis

- **Laboratory is well equipped with all sophisticated and imported instruments like**
- Gas Chromatography with FID & ECD
- ICP-OES
- UV vis spectrophotometer
- CHNS-O analyser
- TGA Analyser
- Automatic Bomb Calorimeter
- Auto Flash Point Tester
- Karl Fischer Titrator
- Ion Selective Electrodes etc.,

Concern & Future Plan in AFR Usage

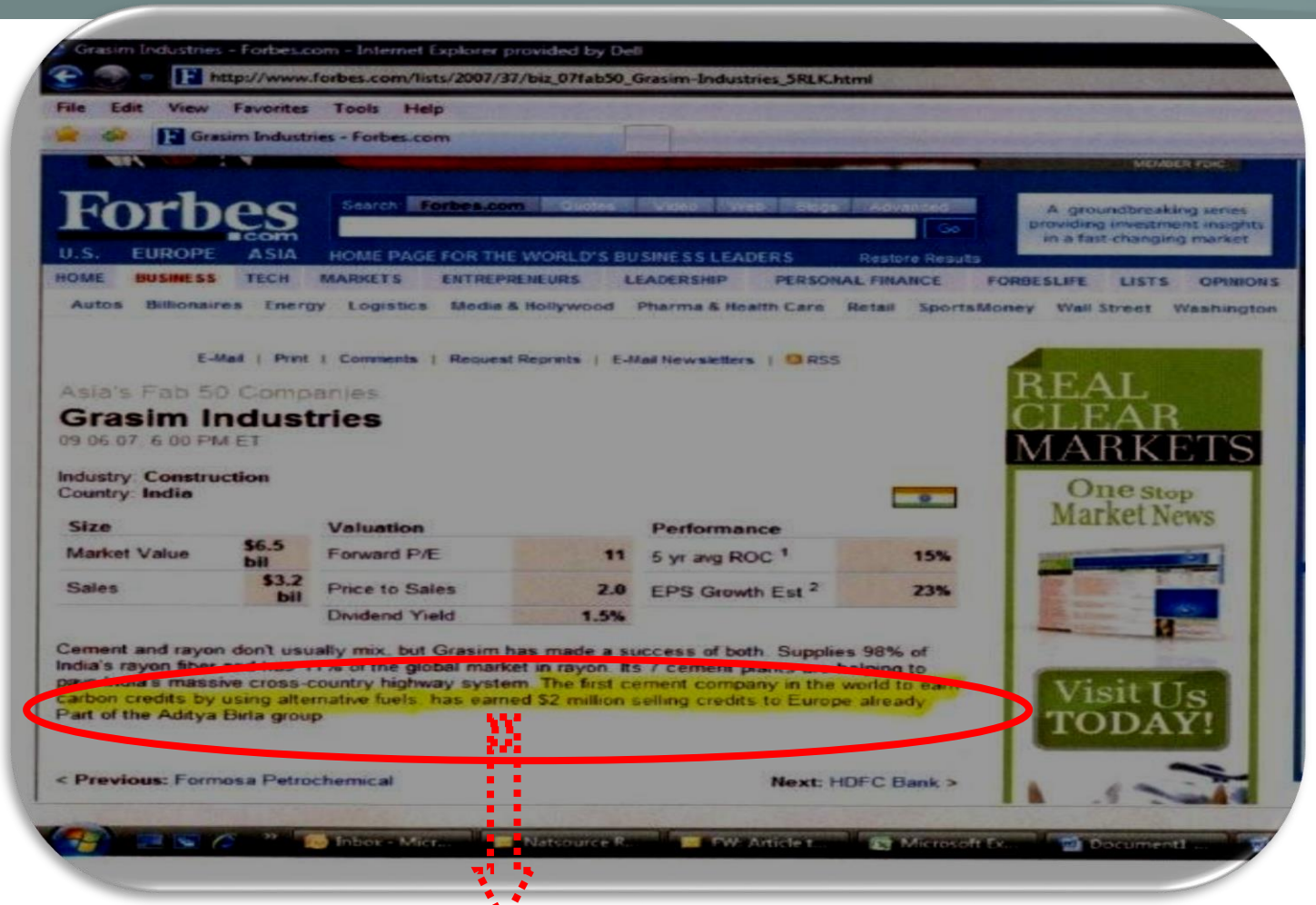
Concern

- Lower availability, higher costs
- Unprocessed Material

Future Plan

- Identification of material and close liasioning required.
- New plastic shredder machine to be installed.
- Pumping system to be installed for carbon powder.
- Increase of alternate fuel through cultivable biomass.

RECOGNITION



The First Cement Company in the World to earn Carbon Credits by using alternate fuels and earned 52 million selling credits to Europe already part of the Aditya Birla Group

AWARDS & ACCOLADES
ENERGY

- Global Cement Awards, Lowest Specific Energy consumption, clinker grinding – 2006.
- Lowest Specific Energy Consumption, raw meal grinding - 2006.
- National Energy Efficient Unit Award by CII (2004 & 2006,2007 , 2008 ,2012 & 2013)
- National Excellent Energy Efficient Unit Award by CII – (2009 , 2010 , 2011)
- NCCBM Best Electrical Energy Performance Award 2008-09
- NCCBM Second Best Improvement in Thermal Energy Performance Award 2008-09

CII Energy Award 2013

NCCBM Award 2009

AWARDS & ACCOLADES

Frost & Sullivan Green manufacturing award - 2013 & 2014

2013

2014

AWARDS & ACCOLADES

ENVIRONMENT

- Tamil Nadu Pollution Control Board - Green Award 2012
- GreenTech Environment Excellence - Silver Award 2006 & 2009 & Gold -2012
- Global Cement Award Lowest specific CO2 emission - 2006
- Most Innovative Scheme for environmental impact abatement - 2006.
- FICCI Environment Sustainability of Business Award 2006 – 2007 .

FICCI AWARD

TNPCB GREEN AWARD

Thank You