

Shree Cement Ltd

Case Study on GHG Management

By
R. Bhargava
 Chief Climate Officer
 Shree Cement Ltd.

Green Cementech 2010 13th & 14th May 2010, Hyderabad

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Shree Cement Ltd

Presentation Sequence

- Shree Cement Ltd. - A snapshot
- Sources of CO₂ generation in cement plants
- Strategies for CO₂ Reduction
- Case Studies
- Futuristic approach to mitigate CO₂ emissions
- Motivation for GHG mitigation

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Shree Cement Ltd

Snapshot

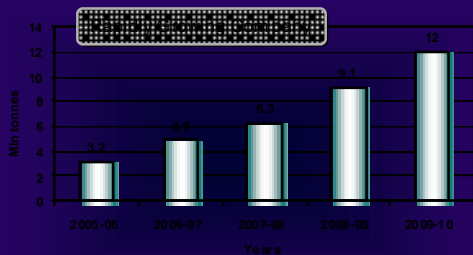
- Among the Top Five Cement Groups in India
- One of the Highest Operating Profit Margin
- Turnover- Rs. 2715 cr. (Prevl. 09-10- Rs. 2600 cr.)
- Largest Cement Player of North India
- Operating at Beawar, Ras & Khushkhera, Suratgarh & ...



An Energy & Environment Conscious, Sustainable & Prosperous Organization

Shree Cement Ltd

Production Trend



Years	Production (Mn tonnes)
2005-06	3.2
2006-07	4.9
2007-08	6.3
2008-09	9.1
2009-10	12

Production tripled in three years

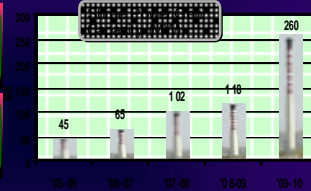
An Energy & Environment Conscious, Sustainable & Prosperous Organization

Shree Cement Ltd

Rising Trend

Addressing Power Shortage in the Country

- India – Facing acute shortage of power
- Requires Large Power Capacity for growth
- Further Augmenting Power Capacity
 - Green Power Capacity up from 4 MW (Mar'08) to 43 MW (Mar'10)



Years	Power Capacity (MW)
05-06	45
06-07	65
07-08	102
08-09	140
09-10	260

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Shree Cement Ltd

Management Systems

- ISO - 9001
- ISO - 14001
- OHSAS - 18001
- SA - 8000



An Energy & Environment Conscious, Sustainable & Prosperous Organization

Product Alliances

Shree Cement Ltd

- First Indian Cement Company to join Cement Sustainability Initiatives of WBCSD
- Member of Cement Sector Task Force of APP-7, formed by Govts. of India, USA, China, Japan, Korea, Canada and Australia
- Global Reporting Initiative for improving sharing of information on Environment and Social Issues
- Endorsed the Global Roundtable Joint Statement on Climate Change to discuss issues for shaping global climate change strategies

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Key Achievements

Shree Cement Ltd

- Appointed Leader of Cement Sector Task Force for the 6th consecutive year by Bureau of Energy Efficiency, Ministry of Power, Government of India
- Highest 4 star rating for 8th consecutive year by Whitehouseman U.K
- One of the lowest Power & Fuel Consumption in the industry
- Shree remains the benchmark for other companies in terms of overall energy efficiency
- Recognized R&D Centre by Govt. of India.

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Environmental Initiatives & Awards

Shree Cement Ltd

1st

- First company in the World to use innovative techniques to reduce CO₂ emissions in cement production
- First Cement company of the World to fetch Certified Emission Reductions (CERs) on its Clean Development
- First Cement plant of 1 MTPA capacity commissioned in world record time of 257 days
- First Indian cement company to issue Corporate Sustainability Report following the highest level "A" for

A GREAT FINISH. EVERY TIME

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Sources of GHG generation in Cement Plant

Shree Cement Ltd

- Calcinations of limes to ne: 50-55%
- Combustion of fuel: ~40%
- Electricity consumption: ~10%
- Transportation of raw materials and products: ~1%

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Alternative Fuels & Waste Heat Recovery

Shree Cement Ltd

Shree philosophy is clean and green is profitable.

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Thermal Energy & Barriers

Shree Cement Ltd

Thermal energy accounts for 20-25% of the cement production cost. To minimize Green house gas emission and dependence on coal, it is necessary to use alternate fuels of

Barriers:


- Reduction of output and increase in power consumption due to
- Low calorific value and
- High volatile material of agro fuel / sludge / municipal waste
- Inter-state transportation of recyclable hazardous wastes
- Handling & Storage

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Case Study: Alternate Fuels Shree Cement Ltd

Solution: Preprocessing of alternate fuel required before use

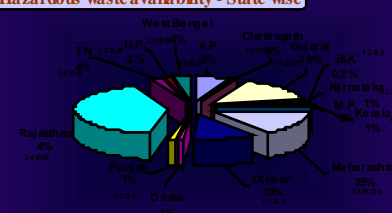
- Screening
- Enrichment of fuel by RDF technology
- Gasification of fuel
- Pollute Pay Principle



An Energy & Environment Conscious, Sustainable & Prosperous Organization

Case Study: Alternate Fuels Shree Cement Ltd

Hazardous waste availability - State wise



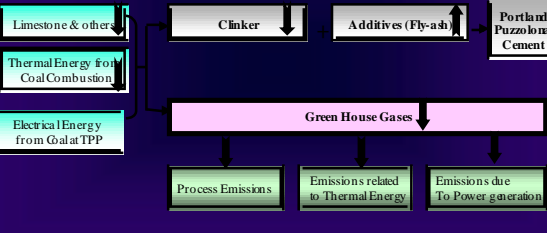
Total HW generation 6.23 Million Tonnes from 36,165 Units.
Source: CPCB, 2008

Shree use Petcoke, bio mass, chemical sludge etc. as fuel.

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Case Study: Production of Blended cement Shree Cement Ltd

Increase use of supplementary cementitious material such as fly ash and slag 'waste of power and steel industries' in blended cement result in significant reductions of CO₂



An Energy & Environment Conscious, Sustainable & Prosperous Organization


Case Study: Production of Blended cement Shree Cement Ltd

Barriers:

- Quality variation
- Non availability of dry flyash
- Acceptance for Market of Blended cement

Solutions:

- Use of Dry Flyash
- Introduction of mechanized system for accelerated feeding
- Chemical & mechanical activation of flyash

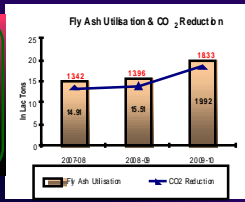


An Energy & Environment Conscious, Sustainable & Prosperous Organization

Case Study: Production of Blended cement Shree Cement Ltd

Results:

- Increase in production
- Reduction in limestone consumption
- Reduction in CO₂ emissions



An Energy & Environment Conscious, Sustainable & Prosperous Organization

Case Study: Production of Blended cement Shree Cement Ltd

- Adoption of modern technology
- Better operational control and optimization
- Better monitoring and management information system
- Active participation of employees and their continued Training for quality improvement
- Participation in benchmarking studies

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Shree Cement Ltd

Energy Saving - Case Study - I

Use of natural draft by increasing cooler stack

Before increasing of cooler stack	After increasing of cooler stack
Height of stack = 39.40 m (U-I)	Height of stack = 47.20 m (U-I)

Saving in Power Consumption of fan = 14.85 MW/Annum

*Reduction of CO2 Emission = 19.30 Ton / Annum

An Energy & Environment Conscious, Sustainable & Prosperous Organization Cont..

Shree Cement Ltd

Energy Saving - Case Study - II

Redesigning the Air Pipe Sealing in Pfeiffer Raw Mill

Before Project Implementation	After Project Implementation
-------------------------------	------------------------------

Problems: This arrangement leads to wear of the piping and results in

- Loss of air for sealing of roller bearing
- Entry of the fine particles leading to wear of sealings & subsequent stoppage of mill. The mill has to be replaced of time to time.

Installed the piping outside the mill housing. This has been done for the first time in Pfeiffer mills and recommended Pfeiffer to provide such type of arrangement in future mills.

Production Gain	
(Raw Meal)	: 19200 tons
(Clinker)	: 12230 tons

An Energy & Environment Conscious, Sustainable & Prosperous Organization Cont..

Shree Cement Ltd

Improving Production - Case Study - III

Installation of 3rd Cyclone in parallel to the existing twin cyclone at the top stage (1st Stage) Preheater


Before the installation of triplet cyclone	After the installation of triplet cyclone
Pressure drop across preheater	Pressure drop across preheater

Saving in Pressure Drop = 62 mm WG

Saving in Power Consumption of PH fan = 86 kWh

Saving in Specific Power Consumption = 0.69 kWh / t Clinker

*Reduction of CO2 Emission = 943 Ton / Annum



An Energy & Environment Conscious, Sustainable & Prosperous Organization Cont..

Shree Cement Ltd

BS-EN 16001 - Case Study IV


Identification of Energy conservation areas in the plant

- Prioritization of identified energy conservation areas.
- Finding out of technical feasibility including market availability and cost benefit analysis.

Benefits:

- Implementation of Energy Monitoring Plan and energy analysis.

First Process & Cement manufacturing industry in World to be awarded BS-EN 16001-2004



An Energy & Environment Conscious, Sustainable & Prosperous Organization Cont..

Shree Cement Ltd

Energy Saving - A Case Study

Efforts	Power Saving (MW/Annum)	CO2 Saving (Ton/Annum)
Installed air dryer and controller in 1000 bags	5574	7375
Replaced roller table liner in Coal Mill 2 with new one	897	1166
Installed VFD in 6 Dust collectors at 1000 bags	914	1054
Replaced old motors with energy	772	1004
Optimized Belt Conveyor speed & controller in 1000 bags	206	285
Installed High Efficiency Fan in main ESP Bag in 1000 bags	350	467

An Energy & Environment Conscious, Sustainable & Prosperous Organization Cont..

Shree Cement Ltd

Improving Production - Case Study - V

Flue gases are released from preheater and cooler. WHR can be installed for the recovery of the waste heat from exit gases.


Preheater Gas 300 - 400°C, 180 - 250 Kcal/Kg	Cooler Gas 200 - 300°C, 80 - 130 Kcal/Kg
---	---

Barriers:

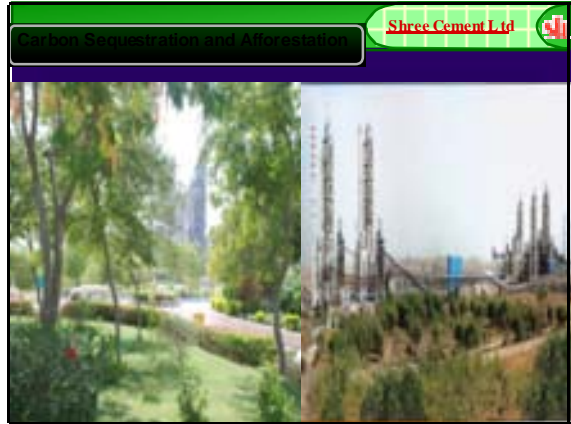
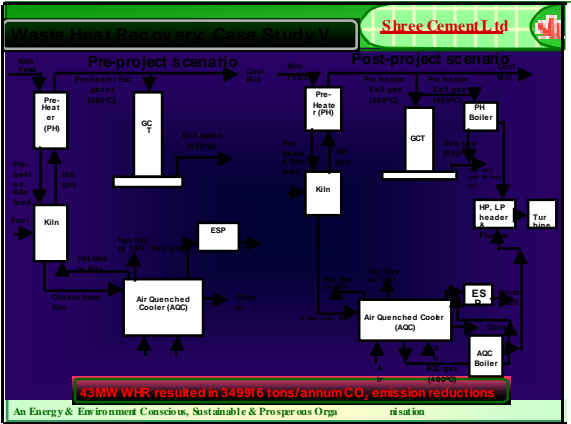
- High Dust Content
- Low heat content in gases that exit from 6 stage PH

Solution:

- Hammering system
- Specific design of boiler in view of high dust load



An Energy & Environment Conscious, Sustainable & Prosperous Organization Cont..



Green Belt Development

Shree Cement Ltd

Developed 35% of plant area as Green Belt

66.52 hectare reclaimed and planted 84866 saplings. No abandoned area

36729 Tons of CO₂ has been sequestered.

Chinese delegation appreciated "Shree Plants as 'Plants in Garden'"

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Futurestic Approach to mitigate CO₂

Shree Cement Ltd

- Environment friendly technologies will be the prime mover for the viability of the industry on the global canvas.
- More research is needed regarding new cements, nano cement, algal farming, clinker process modifications etc.
- Cost effective & efficient technologies for

An Energy & Environment Conscious, Sustainable & Prosperous Organization

Need to Develop Advanced Technologies

Shree Cement Ltd

Product Development	Process Development	Concrete Development	Environment Development
Feasibility of use of Geo-polymer	Stationary fluidized bed cement kiln	Optimization of Structural Design	Utilization of CO ₂ as Coal equivalent fuel
Eco-friendly Low-energy Cement	Horomill for fine grinding	Mechanization of Concrete	Utilization of industrial wastes as
Cement based on Nanotechnology	Radiation synthesis of clinker by high energy beam of accelerated electrons and use of ultra high temperatures obtained by high frequency DC plasma	Alternate Sources for Aggregates	Use of waste derived Combustibles/ Alternative Fuels
Urea and Methanol from CO ₂ reduction		Robotization of Testing & Evaluation	Hybrid Solar Lighting and Light Emitting Diodes (LED)


An Energy & Environment Conscious, Sustainable & Prosperous Organization

Renewable Energy CDM Projects

Shree Cement Ltd

- Renewable energy and CDM projects should be tax free. This will encourage investment in Renewable energy and CDM projects.
- Fly ash to be supplied free of cost to cement industry.
- Encourage construction of concrete roads.


An Energy & Environment Conscious, Sustainable & Prosperous Organization

Shree Cement Ltd 

Government of India


- Fiscal incentives to invest in renewable energy by private players
- Long term stability in tariff policies.
- Energy efficient plants should be duly incentivised under PAT scheme.
- Incentives should be based on normal industry benchmark.

An Energy & Environment Conscious, Sustainable & Prosperous Organisation

Shree Cement Ltd 

Government of India

- **Excellent Water Efficient Unit** – Awarded by CII
- **Golden Peacock Award-2009** – For climate security
- **EDGE Award 2009** – Awarded by Network Computing Magazine for "Top IT Implementations in India"



- **National Safety Award** – Awarded by Hon'ble President of India, Smt. Pratibha Patil.
- **Energy Conservation Award** - First prize for Energy Conservation by Bureau of Energy Efficiency.
- **Energy Efficiency Award** - Awarded by CII
- **Sustainability Award** Commendation Certificate for Strong Commitment for Sustainability by CII

An Energy & Environment Conscious, Sustainable & Prosperous Organisation

THANK
YOU

Website www.shreecementltd.com

33