Water Management At Shree Cement Ltd. Beawar, INDIA

NATIONAL AWARD FOR "EXCELLENCE IN WATER MANAGEMENT" 2007

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SHREE CEMENT LIMITED-

Shree Profile

- Ø Total capacity – 8 MTPA
- Ø Vision for 2012- 20 MTPA
- Ø Captive power plant - 100 MW

- Ø ISO 9001-2000(Quality Management System)
- Ø ISO 14001- 2003 (Environment Management System)
- Ø OHSAS 18001 – (Occupational Health & Safety Management System)
- Ø SA 8000 –(Social Accountability)

Awards received in 2006-2007

- Ø 9TH Golden Peacock Award for environment excellence
- Ø Greentech Gold Environment Excellence Award

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SHREE CEMENT LIMITED

- Ø Shree Cement is among the top ten cement makers in India.
- Ø Ranked the second fastest growing mid-sized company in 2006.
- Ø First cement plant in India, started publishing CSR report from 2004-05.
- Ø Shree is first cement company to register Clean Development Mechanism project with United Nations Framework Convention on Climate Change and having issuance of CERs.
- Ø A participating member of Cement Sustainability Initiative (CSI) of World Business Council for Sustainable Development, Switzerland.
- Ø Member of TERI-BCSD

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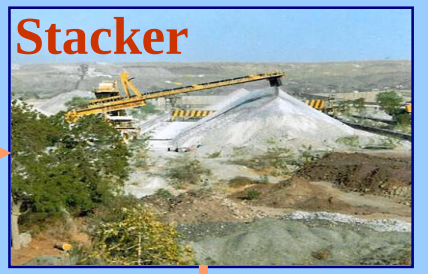
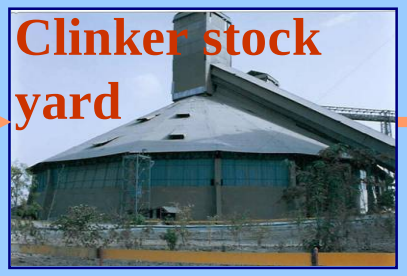
SHREE CEMENT LIMITED

- Ø Leader of Cement sector task force for energy efficiency, by the Bureau of Energy Efficiency, Ministry of Power, Government of India.
- Ø Recently endorsed Global Roundtable Joint Statement on Climate Change.
- Ø Member of Asia Pacific Partnership (APP) of Cement Task Force
- Ø APP 6 Cement task force chosen Shree Cement for Its first visit to a cement company in India.
- Ø Shree notched up a major landmark in 2006-07 with an operating margin of 45%, one of the best in the world cement industry.

"Third Asian Cement Co. and First Indian Cement Co. to join the sustainability movement."

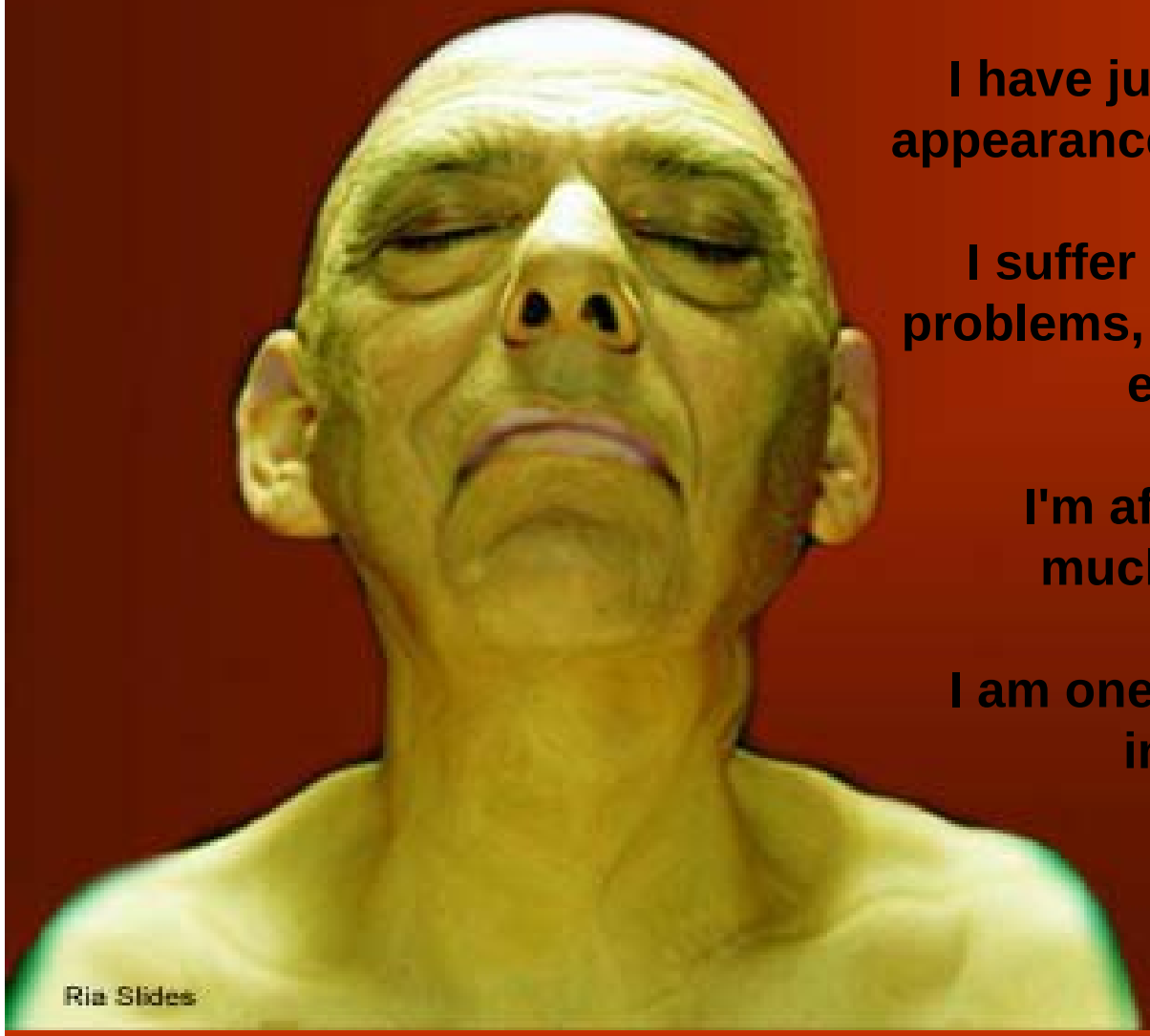
SHREE CEMENT LIMITED





An Energy Conscious & Environment Friendly Business Organisation

HUMAN FOOT PRINT



This is the year 2070

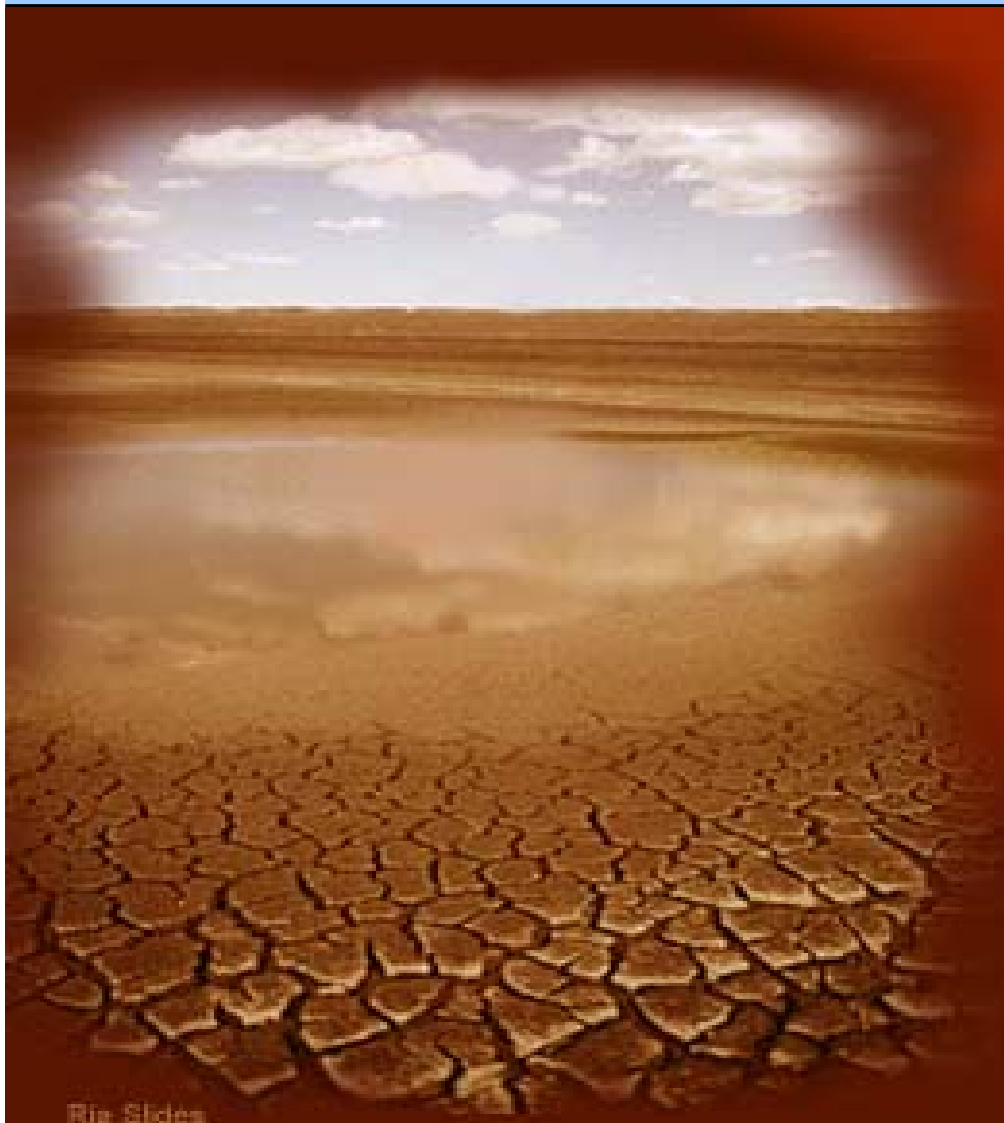
I have just turned 50, but ! my appearance is of somebody of 85.

I suffer from serious kidney problems, because I do not drink enough water.

I'm afraid I do not have much time left to live.

I am one of the oldest people in this society.

HUMAN FOOT PRINT



I remember there were SAVE WATER warnings on outside posters, radio and TV, but nobody paid attention. We thought that water was to last forever.

Now, all the rivers, lakes, dams and underground water beds are either dry or contaminated.

HUMAN FOOT PRINT

Assaults at gun point on the streets for a jerrycan of water are very common.

Food is 80 % synthetic.

Industry came virtually to a standstill and unemployment reached dramatic proportions.
Desalination plants are the main source of employment and workers receive part of their salary in drinkable water.

HUMAN FOOT PRINT

How I would like to go back and make mankind understand…

WHAT WE WANT?

TO

SWIM

OR

SINK

WE SWIM IF.....

WE CONSERVE WATER

SUSTAINABILITY DRIVE

FOOT PRINT

Figures are in LAC m3/annum

Fresh Water receipt 20.56

Old Stock 0.074

Recycled Water 2 .10

(STP + RO Reject + Power Plant Discharge)

Total Water Receipt 22.73

Unit I	Unit II	D.G.	S.K.Mines	Plantation
3.66	2.30	0.058	0. 22	0. 33

Shree Power	W.H.R.S
12.60	0.43

Colony	Temple
1.19	0.17

Total Water Consumption 22. 67

Balance Stock 0. 06

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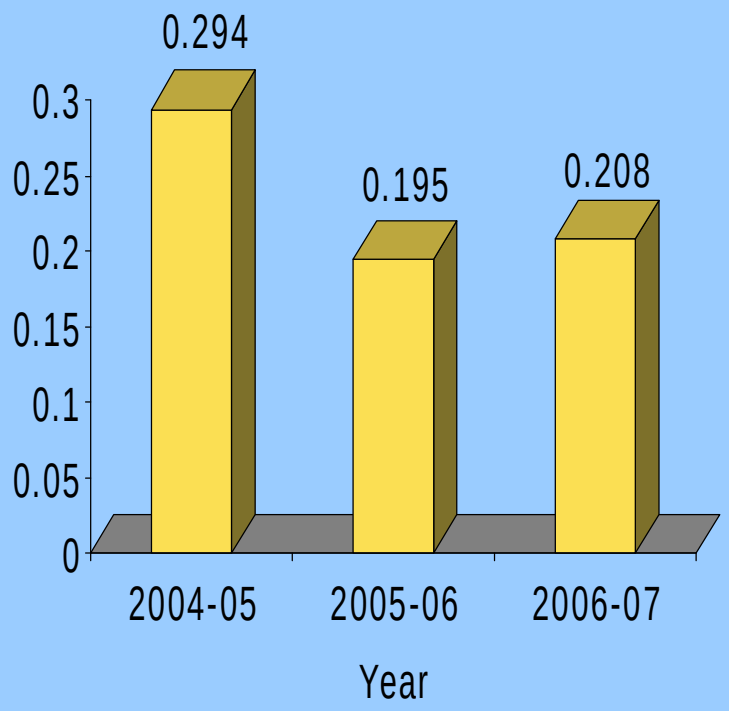
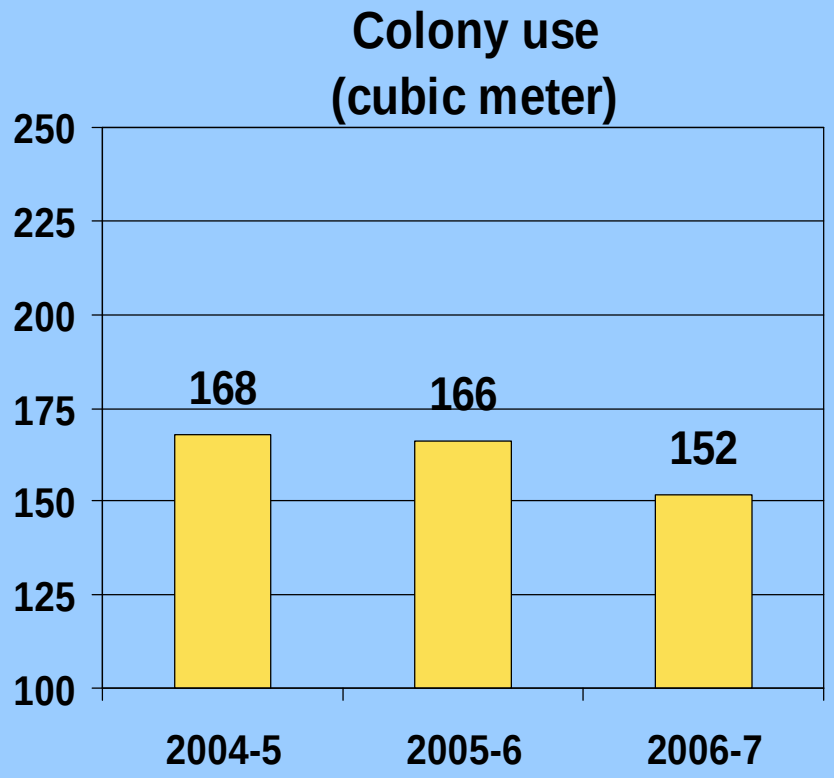
SUSTAINABILITY DRIVE

Specific Water Consumption

M3/Ton of Cement



Per Capita Water Consumption



SUSTAINABILITY DRIVE

Our Commitment

WATER POLICY

To provide sufficient and safe water to people & plant as well as to conserve water, we are committed to efficient water management practices viz.--

- *Develop means & methods for water harvesting.*
- *Treatment of waste discharge water for reuse.*
- *Educate people for effective utilization & conservation of water*
- *Water audit & regular monitoring of water consumption*

Water adds value to people & organization, Conserve it intelligently

SUSTAINABILITY DRIVE

Creating awareness

- Celebrate environment day to create awareness among employees, Contractors & near by communities.
- Rally involving members of Shree family.
- Organized essay, poster and slogan competition.
- A Booklet on water conservation has been released.

SUSTAINABILITY DRIVE

Adopted ten principles for water conservation

- Develop a set of global, regional and industry specific indicators and report standards.
- Work with stakeholders to select and report indicators.
- Determine the water foot prints of products and services.
- Minimize the negative impact on water ecosystems.
- Work in partnership to develop innovative solutions for regional water issues.
- Educate employees to improve use of water resources.
- Middle management to understand the need for, and demonstrates, good water management.
- Raise the issue of water management in business forums to share best practices.
- Encourage suppliers and customers to adopt these water principles.
- Work together.

SUSTAINABILITY DRIVE

Water conservation measures

1. **Removal of insulation from preheater outlet duct.**

Problem:

- Due to insulation of preheater outlet duct to GCT, large quantity of water was required to cool down the gases to meet the requirement of E.S.P.

Solution

Removal of insulation from preheater outlet to GCT inlet duct.

Benefits

Water saving:- 33000 KL Per annum

Power saving:- 5.04 Lacs KW

Total investment:- 80,000 Rs.

SUSTAINABILITY DRIVE

2. Installed drip irrigation system to minimize water consumption.

3. Constructed concrete roads resulting in direct saving of water required for dust suppression.

SUSTAINABILITY DRIVE

Case Study: - Recycling of R.O.reject water.

- **1st step:- A 2nd Reverse Osmosis (R.O.) unit was installed.**

  27 KL/Hr out of 45 KL/hr reject water from RO-1 is further treated in RO-2. The capacity of RO-2 is 27 Kl/hr and recovery is 67%. Total waste coming out from this plant is around 196 KL/Day.

- **The quality of water is TDS: 26000 ppm, Hardness: 8000 ppm, Chlorides: 8000 ppm. Due to heavy scaling problem It is very difficult to use this water.**

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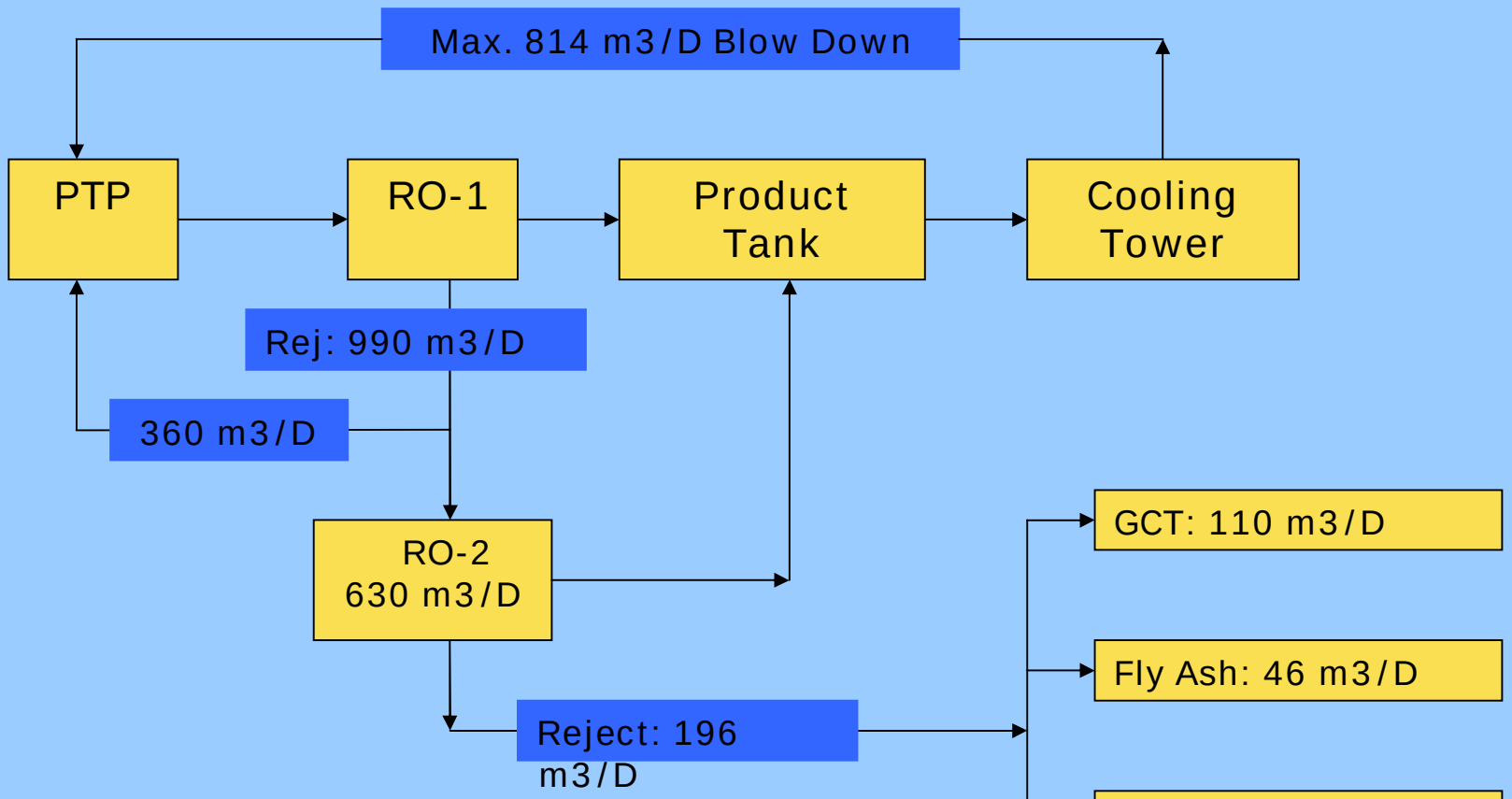
SUSTAINABLITY DRIVE

Waste Water Management



Waste water flow diagram

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SUSTAINABLITY DRIVE

- **2nd Step:- To distillate this water Cooler gases (Unit II) are vented out at a temperature of 220-230 °C.**
- **Waste heat gases are drawn from cooler ESP outlet Chimney into heat exchanger through fan with a capacity of 42000 m3/hr.**
- **Inlet temperature of heat exchanger is approx. 220 °C. and outlet temp. is 100-110 °C.**
- **Outlet gases are again fed into same chimney through outlet duct of heat exchanger. This project was economically not feasible.**

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SUSTAINABILITY DRIVE

- **3rd Step:- Experiments conducted to replace fresh water with R.O reject water at Gas Conditioning Tower. As R.O. water may lead to Process abnormality, E.S.P tripping & scaling of distribution line, etc.**

- **Following remedial measures taken to overcome these problems :**
  - Frequency of distribution line cleaning increased from 1 week to once in two days
  - Modification in nozzle diameter
  - Replacement of distribution line from Mild Steel to Stainless Steel
  - Cast iron pump is replaced by SS 316 pump
  - Steel spray nozzle is replaced by tungsten carbide.

- **These changes resulted in saving of 196 KL fresh water per day.**

Shree Cement-Shree Power is a combination of zero disposal on land

SUSTAINABLITY DRIVE

- **Sewage treatment plant has resulted in saving of 55000 m3 of water annually.**

- **For plantation STP treated water is used inside plant & colony which resulted in saving of 46495 M3 fresh water in 2006-07**

SUSTAINABILITY DRIVE

Water Conservation Projects – Investment & Saving

Sl No	Title of Water saving project implemented	Annual Water Saving		Invest. Made (Rs. Lakhs)	Payback Period (Months)
		M^3	Rs. Lakhs		
1	Sewage Treatment Plant	55000	8.80	55.00	75
2	Modifications of water spray system & construction of roads	35000	5.60	~300	643
3	Removal of insulation from GCT	33186	5.31	0.80	~2

SUSTAINABLITY DRIVE

Water harvesting management

- Constructed earthen dams/ masonry check dams at plant mines and colony area.
- Constructed Injection wells for ground water recharge.
- Constructed roof water harvesting structures to store rainwater.
- Constructed bore well recharges.

SUSTAINABLITY DRIVE

Check Dams

SUSTAINABLITY DRIVE

Injection Wells

SUSTAINABLITY DRIVE

Bore Well Recharges

SUSTAINABILITY DRIVE

Green Belt Development

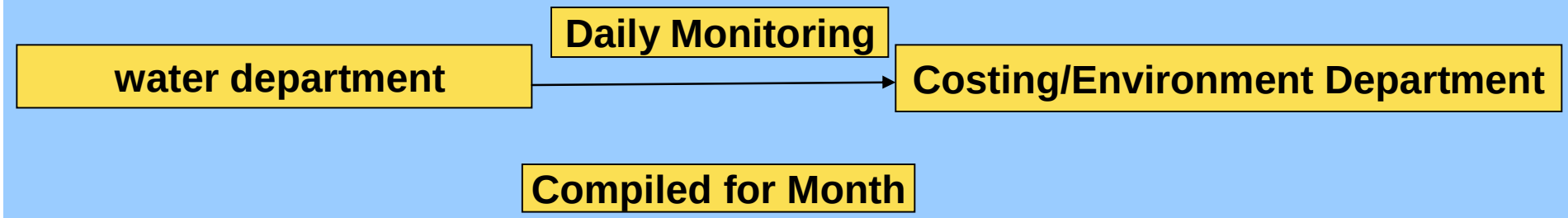
- Intensive plantation is done to increase the green belt area in and around the plant premises. About 16723 plants were planted during 2003 to 2007 making 78.73 Hact. Green belt area out of total 229.13 Hact. Plant area.

- In mining 41,000 plantation has been carried out in 45.1Ha area

SUSTAINABLITY DRIVE

Monitoring & Reporting Systems

- Ø The monitoring & reporting of water consumption is carried out by separate water department.
- Ø They monitor the consumption on daily basis & report to costing & Environment department on monthly basis.
- Ø From costing department the data is circulated to other departments.



SUSTAINABLITY DRIVE

Future projects:-

- **Installation of waste heat recovery boiler to utilize Preheater waste gases**

  Water saving: 900 KLD

  Fuel savings :14051T/Annum

  CO2 emission reduction: 43979T/Annum

- **To install 1000 KLD Sewage treatment plant for handling Beawar city waste.**

- **Constructing 3 Anicuts for rain water storage.**

Thank You