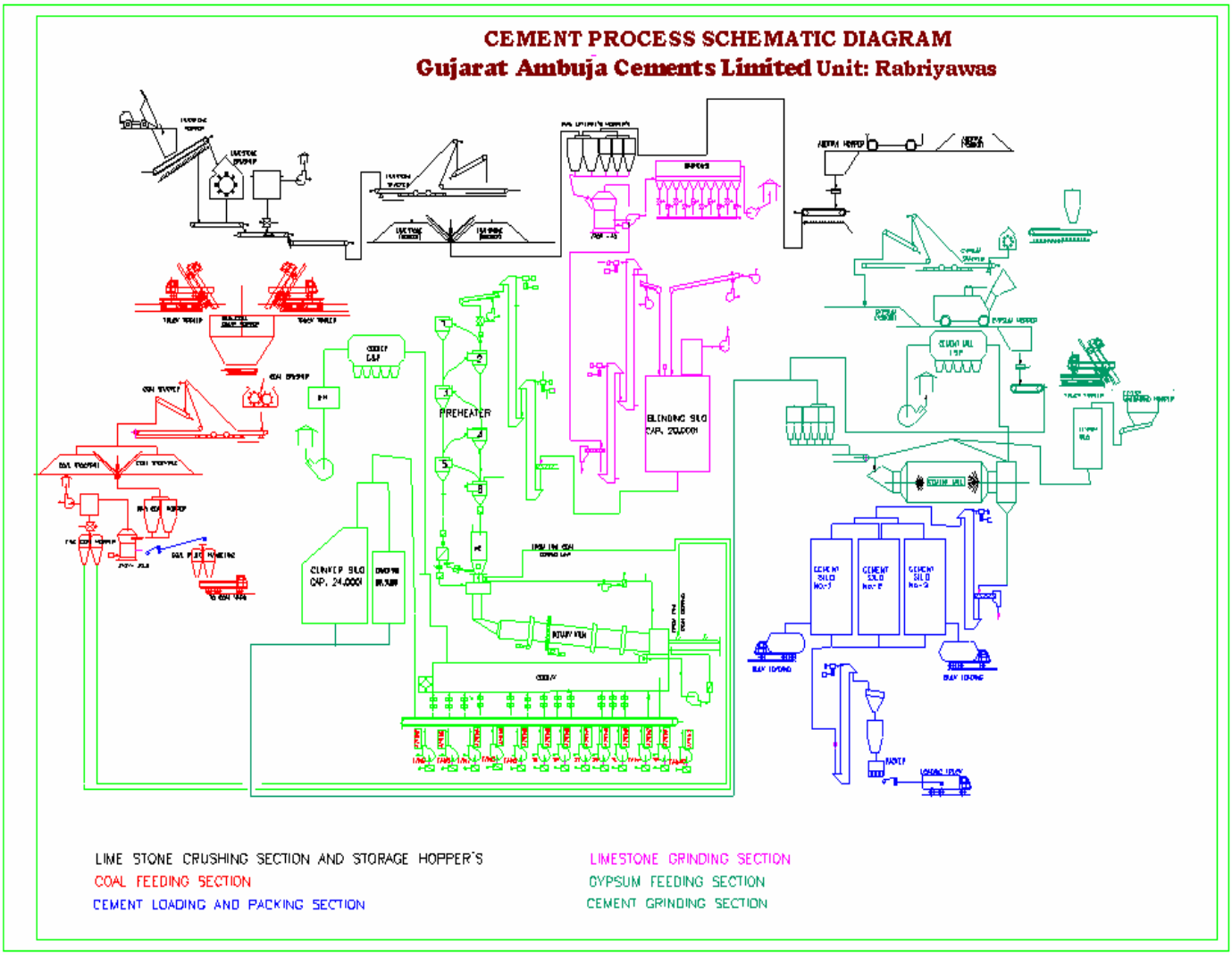


- Covering a strong brand

◈ Gujarat Ambuja Cements Limited better known as Ambuja Cement establish first modern cement plant of 0.7 MTPA capacity in 1986 at Ambujanagar, Dist. Junagarh, Gujarat. Within 18 years period, company increased its installed capacity upto 14.86 MTPA. Presently, Ambuja Cements Plants are located at following places:

Location	Installed Capacity (MTPA)	Type
Gujarat	4.5	Cement Plant
Himachal Prades	1.16	Cement Plant
Punjab (Ropar)	2.5	Cement Grinding
Punjab (Bhatinda)	0.5	Cement Grinding
Rajasthan	1.8	Cement Plant
Maharashatra	2.4	Cement Plant
Chhattisgarh	1.0	Cement Plant
West Bengal	1.0	Cement Grinding
Total	**14.86 Million Tonnes per Annum**	

◈ Gujarat Ambuja Cements Limited is in the business of manufacturing & marketing of Ordinary Portland Cement (OPC) & Pozzolana Portland Cement (PPC) with total sales turnover of around 3152 crores is the leader in high strength cement production, and fourth largest cement producer in India.

◈ In 1993, GACL setup a whole new way of transporting cement – bulk cement transportation by sea. It includes a dedicated port at the Gujarat plants and unloading terminals in Mumbai and Surat. All of them are fitted with mechanized conveying system. It also includes special bulk cement ships. GACL is also the largest exporter of Cement in India.

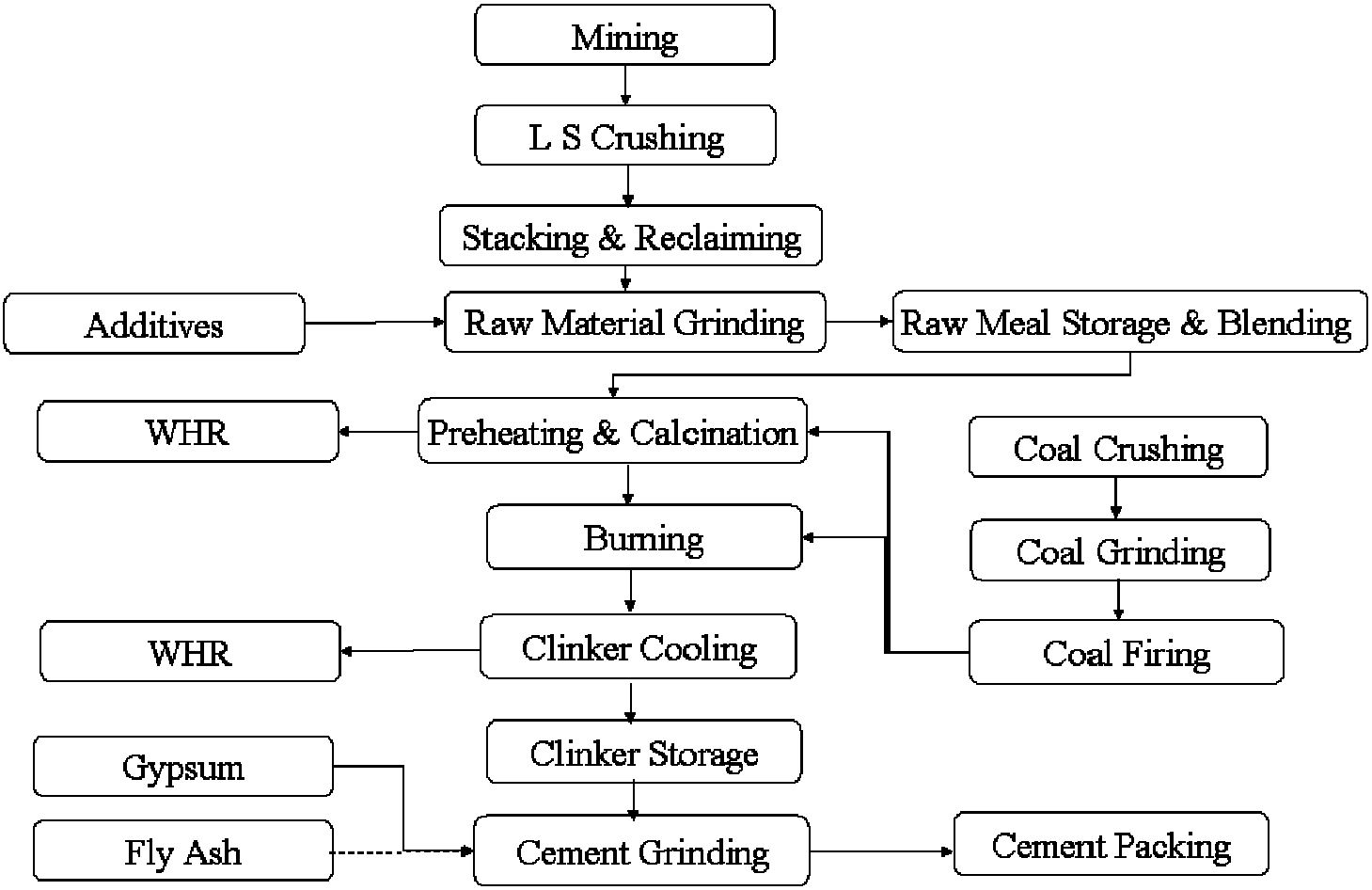
Unit Profile:

- GACL acquired 1.80 MTPA cement plant from the management of M/s DLF Cement Ltd. Rabriyawas, Rajasthan in the year 2000. Three waste heat recovery systems are installed in cement plant right from beginning to utilize waste gas heat temperature for heat-up of feed water for boiler.

- GACL, Rabriyawas unit **Received** "Second Best Improvement in Electrical Energy Performance" award for the year 02-03 from NCBM and "Excellence Award for Productivity" for the year 02-03 from Rajasthan State Productivity Council.

- GACL, Rabriyawas unit has also successfully obtained certification of ISO 9001:2000 by BVQi.

Process Flow Chart:



Brief Cement Manufacturing Process:

Identified captive lime stones after assessing the required quality are drilled, blasted and transported to single impact crusher hopper, where $1m^3$ LS boulder is crushed by 700TPH impact crusher and converted to 70-100 mm sizes. The crushed limestones are transported to lime stone yard (capacity 2 x 60000 MT) through a series of belt conveyors and store in a pile through an automatic stacker machine up to a maximum capacity of 60000 MT. Once the pile known quantity & quality is achieved than reclaimer is used to reclaim stockpile material. By using stacker and Reclaimer machines, pre-blending takes place to minimize fluctuation in crusher limestone quality. Reclaimed pile LS stack is continuously reclaimed, when raw mill in operation and store in hopper (250 MT X 2) at raw mill section. Magnet separators are installed over the belt conveyors to remove any foreign materials if reported.

Additive materials like china- clay, purchased high-grade limestone and iron dust is also used as a corrective material. The additives materials are stored in separate identified yard and fed to feeding hopper through pay loader and then materials are transported in hoppers via a series of belt conveyors. All additives are stored in separate hoppers.

The proportionate ratio of LS and other additive materials after electronically weighing are conveyed to a vertical raw mill (capacity 340 TPH), where 70-100mm size LS materials are ground to very fine powder and residue of 90 µ & 212 µ is maintain at 20% and 4% respectively with the help of high efficient dynamic separator. Pre-conditioned hot gases from kiln-Preheater are utilized to dry up the material and swept the material to next conveying system. Cyclones, airslide and bucket elevators are deployed to transport the powder into CF silo. Around 4% water of total feed rate to mill is being sprayed on feed table to maintain require material bed layer.

Controlled Flow silo can store 20,000 MT fine powders, which is also known as kiln feed. In CF silo feeding, blending and extraction process took place simultaneously. Due to good halogenations in CF silo, fluctuations in inputs are minimized. The required feed to kiln for burning is being measured by an electronic weighing system (Solid Flow Meter) and fed to kiln PH cyclones. Half of the kiln feed is fed in one string and remaining in other string. Each sting is having 6 nos. of cyclones thus made total 12 nos. of cyclones in pre-heater. Materials that are fed from top cyclone (cyclone # 1) finally entered in cyclone # 5 and then from both string cyclone # 5 it entered in inline- calciner and after achieving degree of calcinations (de-association of CaO from CaCO3) it again fed to cyclone # 6, from where it entered in kiln for next process.

Hot gases when leaving cyclone # 1 are having around 340 ^{0}C. Hot gases are re-conditioned (reduction in temperature) for further utilization in raw mill & coal mill section. Re-conditioning of gases is being done through Waste Heat Recovery system (WHR), where proportionate heat is utilized by condensate water heat up, flowing from power plant. All gases after heat utilisation enter in baghouse, where fine dust particles are collected and again fed back into system.

Indigenous coal is ground in a vertical mill and being used in kiln & pre-calciner as a fuel. Around 60% pulverized fine coal is being fired at calciner, where material is 90% calcined before entering into rotary kiln. 40% pulverized fine coal is fired in kiln (4.55 m diameter & 68 m length) through multi channel swilax burner. Typically 1400 ^{0}C temperature is maintained in the kiln-burning zone to burnt limestone powder completely so that necessary chemical reactions can be performed ideally. The burnt powder is converted into black pieces known as clinker.
When clinker leave the kiln it fall on the grate cooler, where calculated fresh air is pumped with the help of 13 nos. fans and clinker temperature brought down from 1400 ^{0}C to 180 ^{0}C. Hot gases from cooler are used in kiln and calciner for coal combustion and remaining excess air after filtration through ESP, passes through WHR, where heat is recovered by water and clean air emit to the atmosphere. The cold clinker is then transported to clinker storage silo through DBC.

From clinker silo, clinker is extracted and transported to clinker hopper through apron & belt conveyors and stored in clinker hopper at cement mill section. In cement mill for OPC manufacturing around 94% of clinker and 6% gypsum are ground together in a ball mill. The fineness of cement is being controlled with a high efficiency sepax separator. Cement stored in different silo and packed through electronic packing machines. Dry fly ash is used during PPC manufacturing.

The whole process of control and operation is centralized from a single place called CCR. The process control and instrumentation are taken care by modern DC system. At every stage of process, on-line quality parameters are checked and analyzed through XRF & XRD machines for necessary corrective measures if any during in process stage. The company follows ISO 9001:2000 documentation procedure and guidelines at every stage of operation to ensure consistent quality of product.

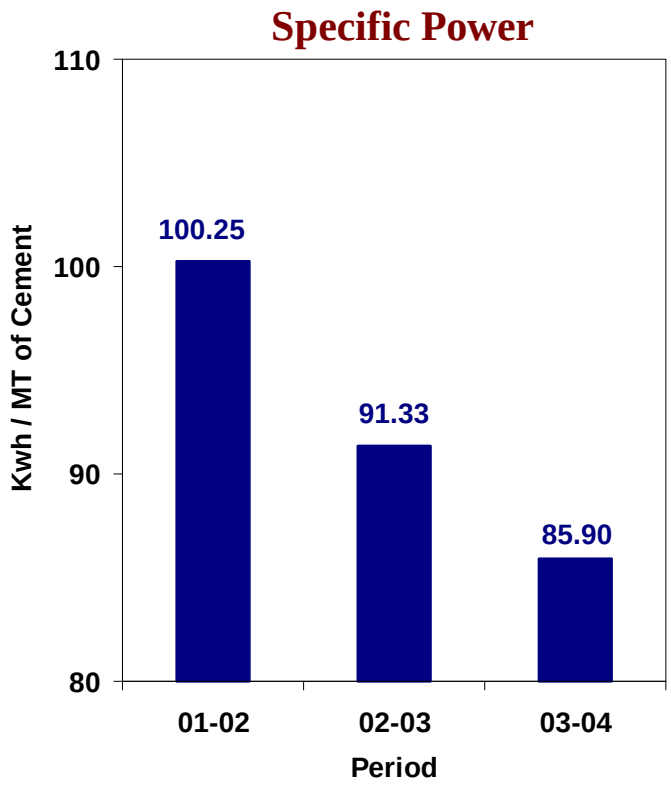
Energy Consumption:

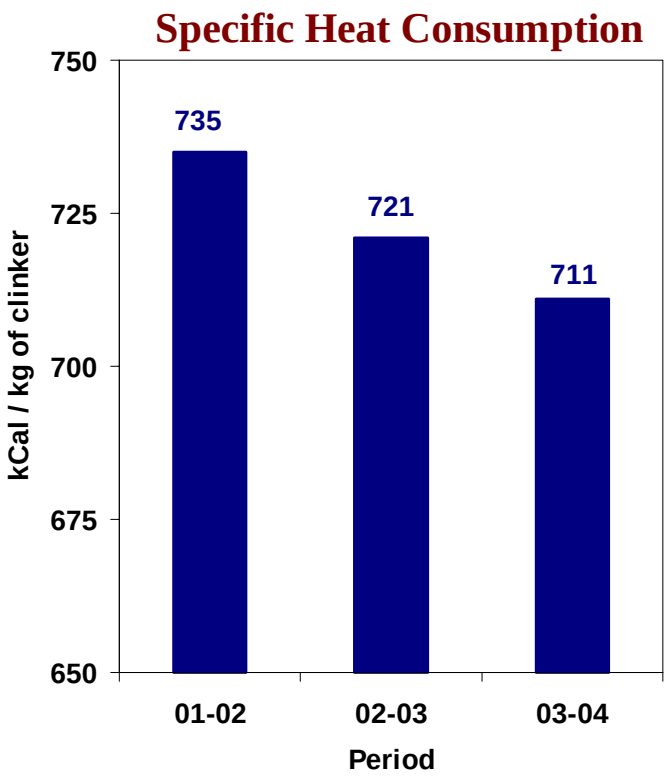
There has been a steady decreased in the Electrical & Thermal Energy consumption for equivalent cement due to the implementation of various energy conservation measures.

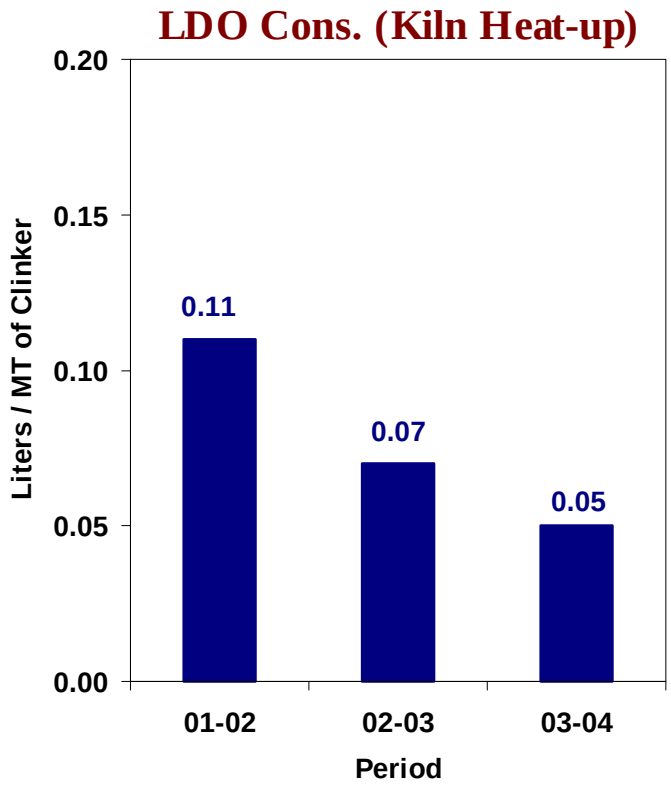
Description	UOM	01-02	02-03	03-04
Clinker Production	Lac MT	13.43	13.53	15.74
Cement Production	Lac MT	12.73	14.51	15.89
Specific Power Cons.	kWh/TC	100.25	91.33	85.90
Specific Heat Cons.	kCal/kg cl	735	721	711

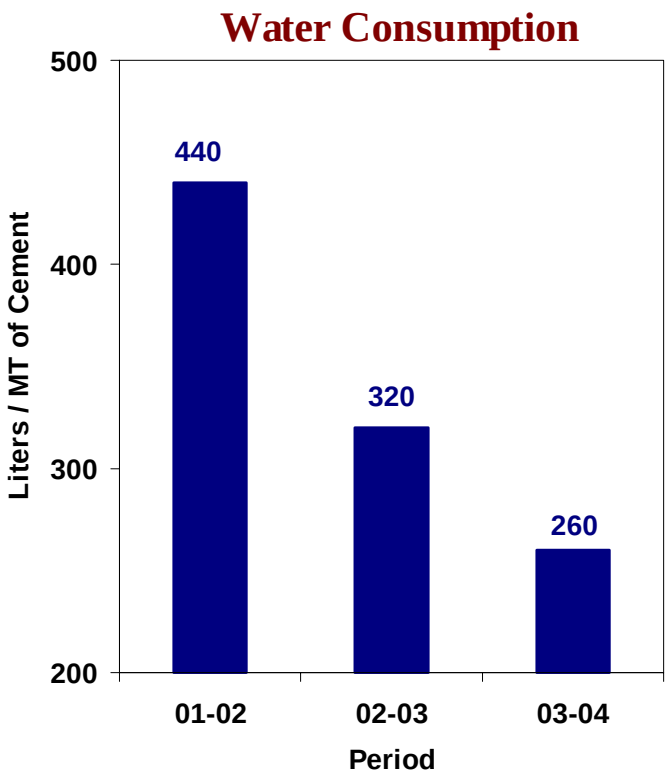
Year	Electricity		Thermal	
	Consumption (kWh/TC)	% Reduction over 01-02	Consumption (kCal/kgcl)	% Reduction over 01-02
01-02	100.25	-	735	-
02-03	91.33	9	721	2
03-04	85.90	14	711	3

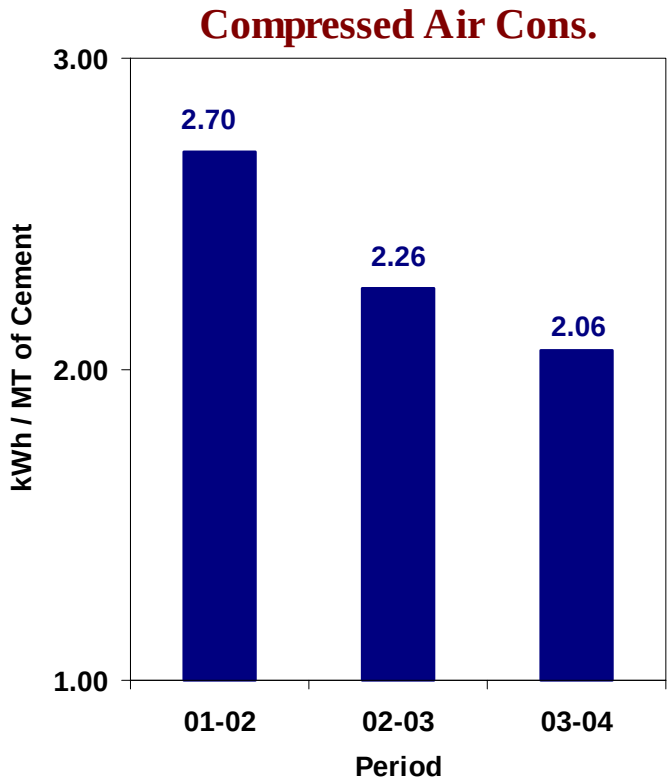
Energy Consumption Trend:

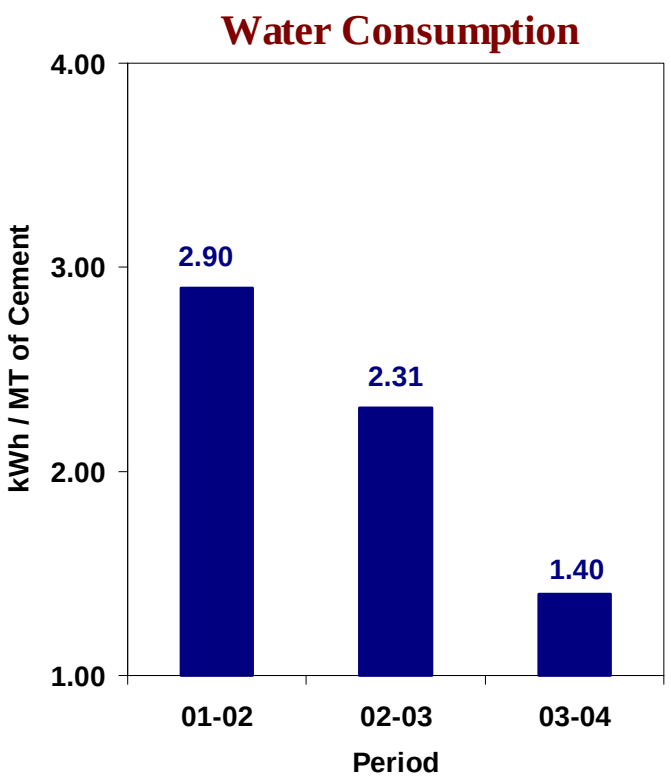












Energy Conservation Implemented for the Period 2001-04:

During the period 2001-2004 GACL, Rabriyawas unit has implemented various energy saving proposals through in-house by involving engineers & workmen. This has resulted in reduction of 14% in specific electrical consumption and 3% in specific thermal energy consumption without investing much capital expenditure. In water conservation also the unit has reduced the consumption by 41%.

Major projects implemented for the period 2001-04 are listed below:

- Removed raw mill fan inlet venturi and installed a straight duct to reduce DP. Saving achieved: 0.19 kWh/TM.
- Raw mill separator discharge cone extended by 550 mm to reduce DP in mill by 65 mmWG. Saving achieved: 0.14 kWh/TM
- Removed coal mill fan inlet venturi and installed a straight duct to reduce DP. Saving achieved: 0.90 kWh/TM.
- Removed coal mill fan damper. Saving achieved: 0.5 kWh/TM
- Reduced coal mill fan & coal mill booster fan impeller diameters. Saving achieved: 0.23 kWh/TM
- Modified coal mill hot air cyclone dust transport system. Saving achieved: 0.36 kWh/TM
- Removed PH WHR fresh air fans suction boxes (4 nos.) to increase fan flow by 3%. Saving achieved: 0.09 kWh/TCl.
- Removed insulation from PH down comer ducts. Saving achieved: 0.18 kWh/TCl
- Optimized coal transport air volume to kiln & PC coal firing by reducing blowers rpm by changing of pulley size. Saving achieved: 0.34 kWh/TCl.
- Installed membrane bags in six out of ten modules to reduce DP from 280 to 150 mmWG. Saving achieved: 0.68 kWh/TCl.

- Cooler fans' intake cones (13 nos.) modified and reduced RFT fans' speed (5 nos.) by changing motor pulley size. Saving achieved: 0.41 kWh/TCl
- Reoriented cooler water spray nozzles. Saving achieved: 0.48 kWh/TCl
- Reduced cooler ESP fan impeller dia from 2240 to 2170 mm. Saving achieved: 0.06 kWh/TCl
- Installed lower rpm motors on ESP fans of both the cement mills. Saving achieved: 0.17 kWh/TC.
- Shortened cement mill – 1 first chamber length by 0.75 m. Saving achieved: 2.04 kWh/TC
- Removed sepax fan dampers, reorientated JPF ducts, removed feed belt gravity take up & 2 nos. product transport blowers in cement mills. Saving achieved: 0.52 kWh/TC.
- Discontinued running of CP-7 compressor for cement silos extraction. Blowers started in place of compressor. Saving achieved: 0.66 kWh/TC
- Many minor modifications carried out in packing plant. Saving achieved: 0.25 kWh/TC
- Continuously optimised air & water system. Saving achieved in air & water: 0.64 & 0.80 kWh/TC respectively.
- Energy audit carried out through CII.

Energy Conservation Commitment, Policy & Setup:

Gujarat Ambuja Cements Limited is a multi-locational company where regular interaction on energy conservation is being carried out. The company appointed one General Manager (Energy) at corporate level. On annual basis each plant present energy performance data during Energy Meet held at various plant locations on rotation basis. Managing Director, Board of Directors, All plant Heads, Energy Managers & others are attending meet. The company's energy profile consists of electricity, LDO (kiln heat-up), HFO (DG set), HSD (vehicles), coal, lignite & water also. Budget provisions are made exclusively for energy projects. Energy conservation action plans & progress are reviewed periodically. The importance of energy conservation emphasized through various forums.

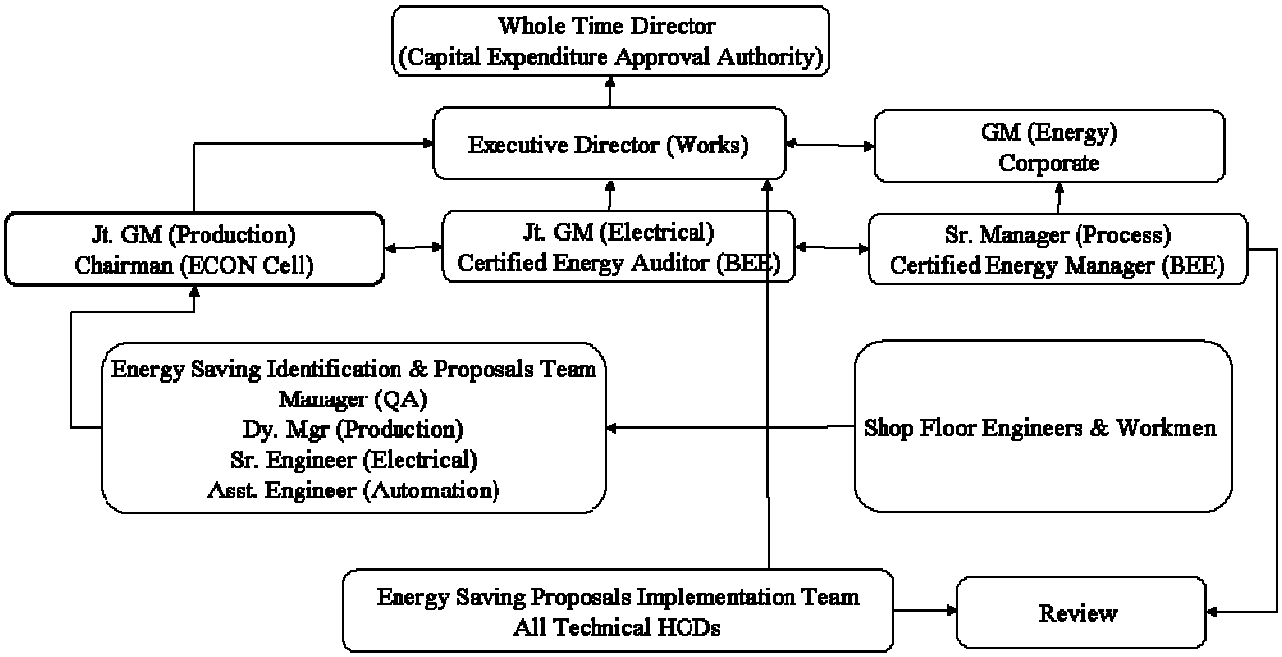
- **Energy Management Policy:**

  We are committed to conserve energy in cement manufacturing, power generation and related activities by optimization and efficient use of resources in a cost effective manner.

  We are committed to reduce our energy consumption by 2% every year.

  To accomplish this we shall:
  - Create awareness and impart training to employees for energy conservation.
  - Monitor energy consumption regularly in various departments, analyze the information and take necessary steps for continuous improvement through an effective energy management information system.
  - Conduct Energy Audit to further identify potential areas and equipments for energy conservation.
  - Implement innovative ideas / modifications for improvement and up-gradation of the equipments.
  - Carry out on-going process optimization and diagnostic studies to maintain high productivity and capacity utilization to minimize specific energy consumption.

ECON Cell Structure:



Measures Taken to Reduce Energy Consumption during 03-04:

1.0 Electrical:

1.1 Crusher:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Operation optimization resulted in improvement in crusher throughput	1.32	1.22	0.10	0.20	4.96
Monitoring of auxiliary consumption & avoiding of idle equipments running hours after providing energy meter					

1.2 Raw Mill:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Reduction in mill feed size resulted in improvement in mill throughput	14.27	13.82	0.45	1.12	23.73
Effect of venturi removal from raw mill fan after April '03 onward					
Synchronization between mill feed rate and layer thickness to improve mill operation					

1.3 Coal Mill:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Effect of venturi removal from coal mill fan after april '03 onward	27.53	26.08	1.45	0.60	6.44
Overhauling of bag filters (dp reduction by 20 mmWG)					
Arresting of false air across bag filter					
Reduction in coal mill fan impeller dia from 2600 to 2552 mm					
Reduction in coal mill booster fan impeller dia from 1600 to 1552 mm					
Modification of coal mill hot air cyclone dust transport system					

1.4 Kiln:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
DP reduction after refurbishing of PH WHR & installation of sonic horns from April '03 onward.	32.04	30.57	1.47	211.26	51.33
Suction box modification of PH WHR fresh air fans (4 Nos.)					
Reduction in DP after installation of membrane bags (4 modules) in bag house from April '03 onward.					
Reduction in cooler ID fan impeller dia from 2240 to 2170 mm					
Removal of PH down comer duct insulation					
Resizing of PC fine coal pipe line					

1.5 Water Pumps:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	fore	After	Saving		
Water optimization measures resulting in reduction of water consumption	2.48	1.67	0.81	4.56	28.28
Separation of process water and circulating water pipelines.					
Modification in water pipe line for PH & Sepax fan LRC.					
Optimization of operation & monitoring of pumps					
Re-routing of pipelines					
Discontinuation of 2 nos. cooling tower fans by utilizing drop in ambient temperature					
Better yield from borewell pumps					
Optimization of DG4 booster pump operation					

1.6 Compressors:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Better monitoring practices on sustainable basis.	2.43	2.08	0.35	0.25	12.22
Reduction in leakage points					
Reduction in air pilferage					
Reduction in usage for cleaning					
D31-CP1dedicated exclusively to Process dept. for PH-cyclone air lancing					
Upgradation of CP6 compressor from existing 24 to 30 m3/min by increasing motor pulley size from 300 to 375 mm w.e.f. 11.12.03					
Installation of garage compressor for Packing Plant					

1.7 Factory Lighting:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Usage of day light concept in Site Office & MCC rooms	0.62	0.60	0.02	Nil	0.70

1.8 Colony Lighting:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Regulation of voltage & awareness in colony resident	0.53	0.53	0.00	Nil	Nil

1.9 CM-1:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Reduction in idle running hours of auxiliaries by incorporated belt conveyor tripping with minimum load (KW).	37.14	37.10	0.04	Nil	0.86

1.10 CM-2:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Usage of dry fly ash at mill outlet in-place of wet fly ash at mill inlet during PPC grinding after commissioning of dry fly ash system.	34.29	31.03	3.26	587.86	64.80
Higher production of PPC					

1.11 Packing Plant:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Replacement of all antenna switches with proximity switch arrangement.	0.95	0.84	0.11	2.30	4.58
Improvement in operation					

1.12 Line, transformer & transmission losses:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Improvement in power factor	0.65	0.59	0.06	Nil	2.49
Optimization of power transformers operation					

2.0 Thermal:

- Resizing of pre-calciner coal firing pipe line to optimise velocity profile resulted reduction in PC CO from 0.5% to 0.3%. Coal fluctuation also reduced.
- Provided 2 nos. blasters to avoid chocking of kiln inlet analyzer probe.
- Thin thermocouple (previous OD: 22 mm, New OD: 12 mm) provided for fast response of thermocouple for cyclone 6th gas temperature to control PC coal firing rate.
- Installation of air blaster in cyclone 4th spreader box.
- Monitoring of quartz size on 45 μ.
- Regular inspection of dispersion plate.
- Rescheduling of spreader box air blaster operation in cyclone 5th.

Energy Conservation Plan & Targets for 04-05:

1.0 Target

1.1 Electrical:

Section	Sp. Power Cons. (kWh/MT of Cement)
Crusher	1.34
Raw mill	16.46
Kiln	25.92
Factory light	0.55
Cement mills	33.01
Packing Plant	0.83
Colony light	0.40
line losses	0.60
Total	79.11

1.2 Thermal:

Section	Sp. Heat Cons. (kCal/kg cl)
Sp. Heat consumption	708

2.0 Energy Conservation Plans (04-05):

2.1 Cement Plant:

Sr. #	Type of Investment				Capital Cost Involved (In Lacs)	Remarks
	Modification	New Installation	Replacement	Major Spares		
A. Kiln						
1.			Replacement of cooler fan 471 FNA with new impeller & casing to improve efficiency.		1.75	Recommendations as per M/s. Sumit India. Saving : Rs.4.44 lac / annum
2.	Cooler ID fan - installation of VVVF controlled motor of 200 KW, 1450 rpm and use this for running the fan through a V belt drive having a ratio of 1450/850 rpm.				29.08	Recommendations as per Mr. E H Larsen. Saving: Rs. 26.87 lac/annum

Sr. #	Type of Investment				Capital Cost Involved (In Lacs)	Remarks
	Modification	New Installation	Replacement	Major Spares		
3.	WHR fresh air fan - installation of VVVF with new 150 KW motor & removal of inlet damper (2 nos.)				15.86	Recommendations as per Mr. E H Larsen Saving: Rs. 16.35 lac/annum
B. Cement Mills						
1.	Retrofiting of modified impellers of ESP fan for both mills as per M/s. Sumit India recommendations				3.25	Power saving & wear protection measuures. Saving: Rs.2.53 lac/annum
2.		Installation of Fuzzy Logic for mill optimization (CM-1)			7.00	Improvement in throughput by around 3% resulting power saving by 1 kWh/TC = Rs.37.5 lac/annum
C. Utility						
1.			Replacement of existing regenerative type air drier to refrigerant type (1 no.) 24m3/min		17.92	Saving : 9.75 lac/annum as per M/s PACE Equipments
D. Electrical						
1.		Energy Meters for Transformer No 7 & MCC12			0.50	To segregate the energy cons. data for transformer no. 7 & MCC12
2.		Power Factor Control Relay 5 nos			1.00	For energy saving & incentive from JVVNL. Total Saving: Rs. 7.00 lac/annum (by doing 1, 2, 3 jobs)
3.		Capacitor Banks 6.6 KV, 1500 KVAR			10.00	
E. Energy Cell						
1.		Energy Management system			10.00	For power consumption monitoring & recording at single place.
Total Capex Cost:					**Rs.96.34 Lacs**	

Expected Savings:	**Rs.104.44 Lacs**

2.2 Power Plant:

Sr. #	Modification	Capital Cost Involved (In Lacs)	Remarks
1.	VVVF drive for FD fan (2 nos.)	26.00	As per CII report. Saving: Rs. 16.39 lac/annum
2.	A.C.C Fan blades replacement with F.R.P blades(For 6 Fans)	13.50	As per ENCON report Saving: Rs. 30.04 lac/annum for 6 fans To be carried out initially for one fan.
3.	Installation of VVVF for operation of condensate extraction pump.	2.16	As per CII report Saving: Rs. 4.0 lac/annum
4.	Installation of VVVF for ID fan.	8.50	As per CII report Saving: Rs. 7.18 lac/annum
Total Capex Cost:		**Rs.50.16 Lacs**	
Expected Savings:		**Rs.57.61 Lacs**	

Safety Health & Environment:

Ambuja Cement has a well-established Environmental Management Division (EMD) with qualified professionals from diverse fields. Full fledged environmental lab and monitoring van have been created at all locations which are self sufficient for monitoring meteorological parameters, ambient air quality, stack emissions and water analysis. Opacity meter are installed at major stacks to monitor online emissions. EMD personnel also make efforts towards the spread of environmental awareness amongst the employees, their families and the people living nearby the plants, through non-formal environmental education, celebration of World Environment Day, Mines Environment & Mineral Conservation Week, Mines Safety Week etc.

We have **Received** National Award for Prevention and Control of Pollution from the Ministry of Environment and Forests, Government of India for the year 1990-91 and first prize for excellence in Environmental Management from the Gujarat Pollution Control Board in 1991. We have health & safety policy at all of our locations. We are also the proud recipients of various other awards from IBM, NPCM, BIS, NCBM and other esteemed organizations.

Recently Ministry of Environment & Forests also awarded the National Award for Prevention of Pollution, 2002-03 to our Cement Grinding Unit, Ropar, in recognition to our contribution to cleaner production as well as commitment towards environmental pollution control and resource conservation. This unit has been recognized as the best example of cleaner production in the industry to utilize waster material of thermal power plant. The adoption of cleaner technology for the fly ash utilization not only prevents pollution during the disposal of fly ash from thermal power plant, but also conserves the resources and reduces carbon-di-oxide generation.

SHE-RABRIYAWAS UNIT

1. Safety:

Health & Safety Policy:
The management is committed to impart health and safety education and inculcate health and safety consciousness among the employees, thereby ensuring healthy and safe working conditions, increasing productivity and developing a sense of self confidence among officers and workers which will ultimately help in achieving safety of men, machines, materials and protect them from health hazards and occupational diseases.

At our Rabriyawas unit in Rajasthan we have carried out various actions for Safety & Health in 2003-04 and brief is mentioned as below:

- Accident frequency rate reported 7.90 accident/mil.Man-hours worked against previous 6.19 accident/mil.Man-hours worked.
- Accident severity rate reported 55.36 Man days lost/mil. Man-hours worked against previous 5231.67 Man days lost/mil. Man-hours worked.
- Total 306 manhours in-house training conducted for safety.
- Successfully celebrated safety week – organised slogan, essay & drama competition on this occasion.
- 23 Staff members attended training on safety conducted by Regional Labour Institute, Kanpur.
- 13 Employees sent for outside safety training programmes.
- Illumination provided on clinker / additive feeding conveyors to cement mill hoppers.
- Providing maintenance platforms, coupling guards, toe guards & hand railings of 4800 m length.

2. Health:

- Annual health checkup of all workers
- 54 employees trained in “first-aid” by St. Johns Ambulance, Jaipur.
- Cardio pulmonary resuscitation training programme attended by 85 employees & their family members.

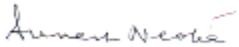
- Audiometery test conducted for workers, working in high noise area.
- Lung functions - spirometery test carried out for all staff & workers – results are satisfactory
- Eye testing for HEM operators conducted
- With government collaboration, Polio drops given to children aged below 5 years.
- Regular mobile dispensary services by qualified doctor to six villages.
- Vitamin ‘A’ solution given to Ambuja Public School Children aged below 5 years

POLICY ON HIV/AIDS

We, at Ambuja Parivar, shall strive to inculcate the awareness of HIV/AIDS at the deepest level amongst our employees, contractual workers, their families, truckers and the community around us to prevent its occurrence. Necessary health care assistance shall be extended to those afflicted with assured confidentiality. We will not discriminate against any employee because of this disease and we will provide them treatment with Anti-Retroviral drugs, as and when necessary.

A rehabilitation programme for the epidemic with a strong message to eliminate the misconception of social stigma and discrimination would also be launched. A Core committee will be set up to develop and implement HIV/AIDS programme of GACL and suggest policy and programmatic changes as and when necessary.

Ambuja will collaborate with International Labour Organization (ILO), State AIDS Control Society and other concerned Organizations to get guidance/technical support in its HIV/AIDS workplace programme.



Suresh Neotia
Chairman

Place: New Delhi
Date: 17.05.2004

Environment:

Environment Policy:

Gujarat Ambuja Cements Limited, Unit-Rabriyawas is an Environmentally conscious company, which commits for continual improvement towards sustainable development and create safe and healthy environment with active participation among employees and neighbouring community.

Objectives:

- Adopt eco-friendly practices for utilization of resources.
- Ceaselessly comply with all applicable Environmental regulation & legislations.
- Create Environmental awareness amongst the employees & neighbouring community
- Endeavor for continual improvement towards sustainable development.
- Accelerate aforestation & Water harvesting in and around our premises.

At our Rabriyawas unit in Rajasthan we have carried out various actions for Environment in 2003-04 and brief is mentioned as below:

- Applied for consent to establish for dry fly ash handling system
- Obtained consent to establish for crushing and screening plant for limestone.
- Applied for consent to establish for increasing cement capacity from 1.4 Ml.TPA to 1.8 Ml.TPA through process optimization.
- Mines workshop effluent oil skimming pit constructed.
- Hazardous waste storage site constructed to comply with Hazardous Waste Management Handling Rules as per RPCB.
- Coal mill reject handling system successfully commissioned to reduce fugitive dust emissions.
- Reduced dust emission from cooler 110 – 167 to 16 – 33 mg/Nm3 by retrofitting of cooler ESP first chamber & inlet gas distribution screen.
- Installed 3 nos. modified JPF for clinker extraction & transport. Clinker hopper JPF also modified.
- Installed clinker bulk loading system to ensure emission free loading of clinker.
- Installed total emission free dry fly ash unloading & feeding system.
- Improved boiler ESP performance - emission level reduced from 400 mg/Nm3 to < 150 mg/Nm3 (initially by liquid ammonia dosage and now by usage of lignite).
- Constructed 3.5 kms cement concrete roads in plant to reduce fugitive emission.
- Installed mechanised water spraying system & planted more than 400 trees at Merta railway siding to reduce coal dust emission.
- Successfully celebrated environment week – organised slogan, essay & quiz competition on this occasion.
- Improved SWRP performance by reducing COD to < 50 mg/l & BOD 10-12 mg/l.
- 2 nos. water harvesting systems constructed at township (Bachelor Hostel & New Type V).
- Complete ban on usage of plastic bags in colony.
- 7270 nos. saplings planted @ 83% survival rate covering 7.3 hectares in plant & colony.
- 10858 nos. saplings planted @ 80% survival rate covering 5.45 hectares in mines area.

Safety Health & Environment (04-05):

- Safety audit by National Safety Council to be conducted – Work order released.
- Fire hydrant system to be modified & one fire tender to be purchased – Proposal approved.
- 5000 nos. saplings to be planted in plant & colony, seed spray in colony and area to be covered 22.5 hectares.
- 8500 nos. saplings to be planted in mines and area to be covered 3.5 hectares

A Brief Profile of the Company

- The Cement industry is one of the few industries in India which have achieved global competitiveness. India is the second largest cement producer in the world. The cement industry matches world standards, on all parameters. The quality of Indian cement compares with the internationally accepted British and American standards. Also, the industry's productivity, energy efficiency and environment standards are among the best in the world.

- This excellent performance is the reflection of the responsible and mature attitude of its major players. Their individual performance set an example for others to follow. Among those who played a major role in taking the cement industry to the present high position, one name shines bright.

"Ambuja Cement"

- Gujarat Ambuja Cements is a relatively young company in the industry. It began operations in 1986. But, in a short span of 18 years, it has set new benchmarks in every aspects of the cement business. From cement quality to power consumption and from marketing to environment management. Some of the main achievements are listed below:

  - Fastest project commissioning
  - Fastest stabilization of production
  - Excellent productivity
  - Lowest power and coal consumption
  - Best environment management
  - Pioneering transportation of bulk cement by sea
  - Highest product quality
  - Covering a strong brand

- Gujarat Ambuja Cements Limited better known as Ambuja Cement establish first modern cement plant of 0.7 MTPA capacity in 1986 at Ambujanagar, Dist. Junagarh, Gujarat. Within 18 years period, company increased its installed capacity upto 14.86 MTPA. Presently, Ambuja Cements Plants are located at following places:

Location	Installed Capacity (MTPA)	Type
Gujarat	4.5	Cement Plant
Himachal Prades	1.16	Cement Plant
Punjab (Ropar)	2.5	Cement Grinding
Punjab (Bhatinda)	0.5	Cement Grinding
Rajasthan	1.8	Cement Plant
Maharashatra	2.4	Cement Plant
Chhattisgarh	1.0	Cement Plant
West Bengal	1.0	Cement Grinding
Total	**14.86**	

- Gujarat Ambuja Cements Limited is in the business of manufacturing & marketing of Ordinary Portland Cement (OPC) & Pozzolana Portland Cement (PPC) with total sales turnover of around 3152 crores is the leader in high strength cement production, and fourth largest cement producer in India.

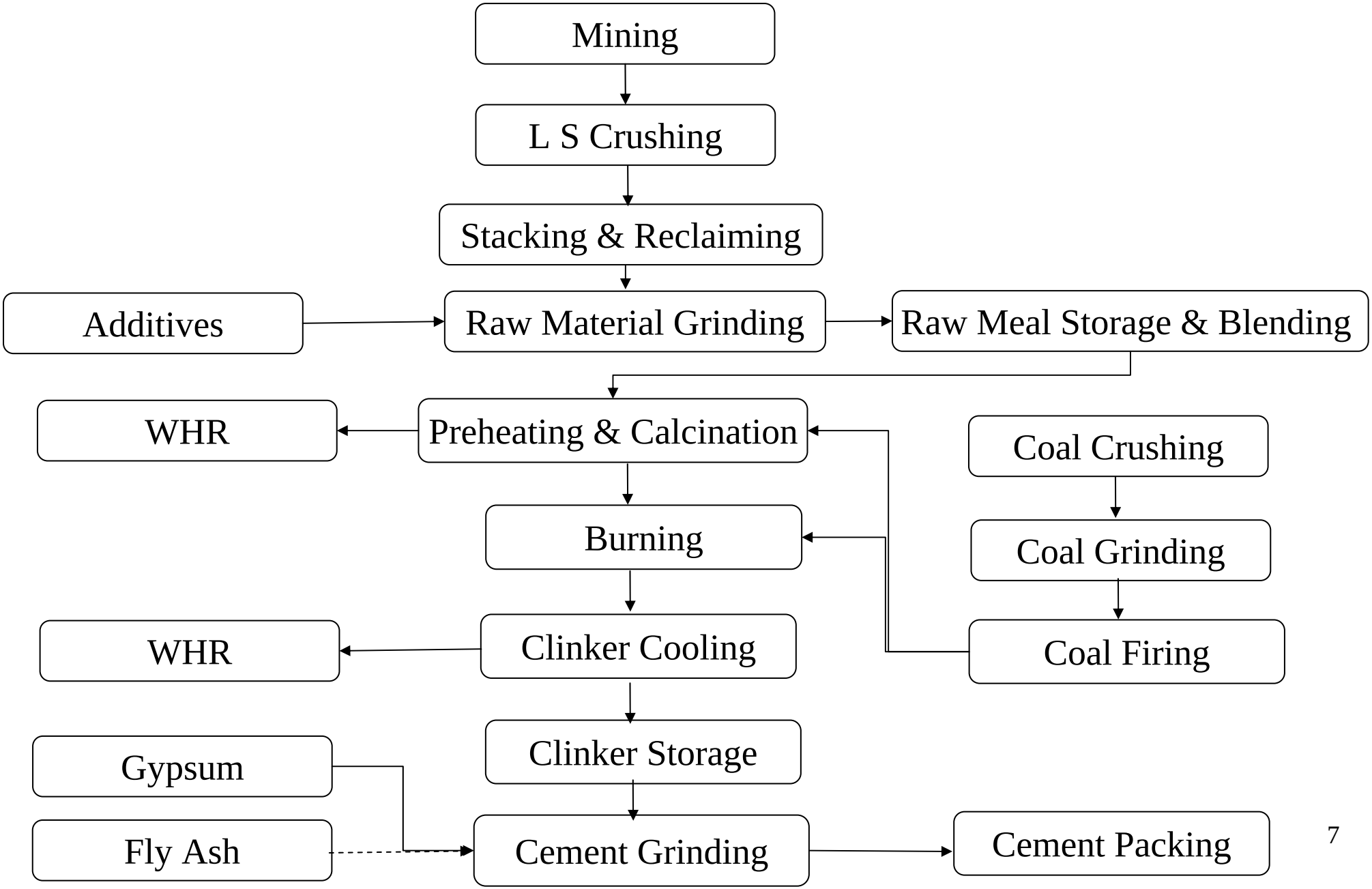
- In 1993, GACL setup a whole new way of transporting cement – bulk cement transportation by sea. It includes a dedicated port at the Gujarat plants and unloading terminals in Mumbai and Surat. All of them are fitted with mechanized conveying system. It also includes special bulk cement ships. GACL is also the largest exporter of Cement in India.

- GACL acquired 1.80 MTPA cement plant from the management of M/s DLF Cement Ltd. Rabriyawas, Rajasthan in the year 2000. Three waste heat recovery systems are installed in cement plant right from beginning to utilize waste gas heat temperature for heat-up of feed water for boiler.

- GACL, Rabriyawas unit **Received** “Second Best Improvement in Electrical Energy Performance” award for the year 02-03 from NCBM and “Excellence Award for Productivity” for the year 02-03 from Rajasthan State Productivity Council.

- GACL, Rabriyawas unit has also successfully obtained certification of ISO 9001:2000 by BVQi.

Process Flow Chart



Brief Cement Manufacturing Process

Identified captive lime stones after assessing the required quality are drilled, blasted and transported to single impact crusher hopper, where 1m3 LS boulder is crushed by 700 TPH impact crusher and converted to 70-100 mm sizes. The crushed limestones are transported to lime stone yard (capacity 2 x 60000 MT) through a series of belt conveyors and store in a pile through an automatic stacker machine up to a maximum capacity of 60000 MT. Once the pile known quantity & quality is achieved than reclaimer is used to reclaim stockpile material. By using stacker and Reclaimer machines, pre-blending takes place to minimize fluctuation in crusher limestone quality. Reclaimed pile LS stack is continuously reclaimed, when raw mill in operation and store in hopper (250 MT X 2) at raw mill section. Magnet separators are installed over the belt conveyors to remove any foreign materials if reported.

Additive materials like china- clay, purchased high-grade limestone and iron dust is also used as a corrective material. The additives materials are stored in separate identified yard

and fed to feeding hopper through pay loader and then materials are transported in hoppers via a series of belt conveyors. All additives are stored in separate hoppers.

The proportionate ratio of LS and other additive materials after electronically weighing are conveyed to a vertical raw mill (capacity 340 TPH), where 70-100mm size LS materials are ground to very fine powder and residue of 90 µ & 212 µ is maintain at 20% and 4% respectively with the help of high efficient dynamic separator. Pre-conditioned hot gases from kiln-Preheater are utilized to dry up the material and swept the material to next conveying system. Cyclones, airslide and bucket elevators are deployed to transport the powder into CF silo. Around 4% water of total feed rate to mill is being sprayed on feed table to maintain require material bed layer.

Controlled Flow silo can store 20,000 MT fine powders, which is also known as kiln feed. In CF silo feeding, blending and extraction process took place simultaneously. Due to good halogenations in CF silo, fluctuations in inputs

are minimized. The required feed to kiln for burning is being measured by an electronic weighing system (Solid Flow Meter) and fed to kiln PH cyclones. Half of the kiln feed is fed in one string and remaining in other string. Each sting is having 6 nos. of cyclones thus made total 12 nos. of cyclones in pre-heater. Materials that are fed from top cyclone (cyclone # 1) finally entered in cyclone # 5 and then from both string cyclone # 5 it entered in inline-calciner and after achieving degree of calcinations (de-association of CaO from CaCO3) it again fed to cyclone # 6, from where it entered in kiln for next process.

Hot gases when leaving cyclone # 1 are having around 3400C. Hot gases are re-conditioned (reduction in temperature) for further utilization in raw mill & coal mill section. Re-conditioning of gases is being done through Waste Heat Recovery system (WHR), where proportionate heat is utilized by condensate water heat up, flowing from power plant. All gases after heat utilisation enter in baghouse, where fine dust particles are collected and again fed back into system.

Indigenous coal is ground in a vertical mill and being used in kiln & pre-calciner as a fuel. Around 60% pulverized fine coal is being fired at calciner, where material is 90% calcined before entering into rotary kiln. 40% pulverized fine coal is fired in kiln (4.55 m diameter & 68 m length) through multi channel swilax burner. Typically 14000 C temperature is maintained in the kiln-burning zone to burnt limestone powder completely so that necessary chemical reactions can be performed ideally. The burnt powder is converted into black pieces known as clinker.

When clinker leave the kiln it fall on the grate cooler, where calculated fresh air is pumped with the help of 13 nos. fans and clinker temperature brought down from 14000 C to 1800 C. Hot gases from cooler are used in kiln and calciner for coal combustion and remaining excess air after filtration through ESP, passes through WHR, where heat is recovered by water and clean air emit to the atmosphere. The cold clinker is then transported to clinker storage silo through DBC.

From clinker silo, clinker is extracted and transported to clinker hopper through apron & belt conveyors and stored in clinker hopper at cement mill section. In cement mill for OPC manufacturing around 94% of clinker and 6% gypsum are ground together in a ball mill. The fineness of cement is being controlled with a high efficiency sepax separator. Cement stored in different silo and packed through electronic packing machines. Dry fly ash is used during PPC manufacturing.

The whole process of control and operation is centralized from a single place called CCR. The process control and instrumentation are taken care by modern DC system. At every stage of process, on-line quality parameters are checked and analyzed through XRF & XRD machines for necessary corrective measures if any during in process stage. The company follows ISO 9001:2000 documentation procedure and guidelines at every stage of operation to ensure consistent quality of product.

Energy Consumption

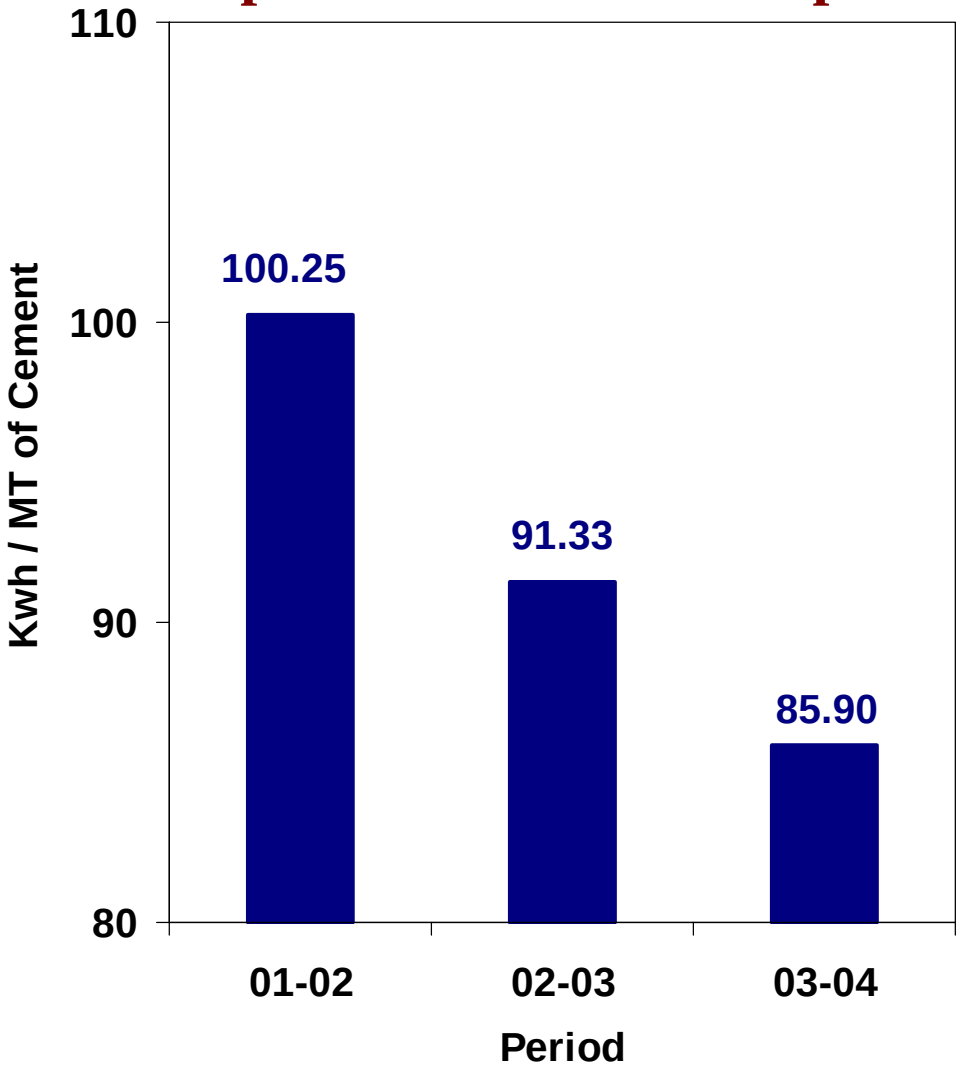
- There has been a steady decreased in the Electrical & Thermal Energy consumption for equivalent cement due to the implementation of various energy conservation measures.

Description	UOM	01-02	02-03	03-04
Clinker Production	Lac MT	13.43	13.53	15.74
Cement Production	Lac MT	12.73	14.51	15.89
Specific Power Cons.	kWh/TC	100.25	91.33	85.90
Specific Heat Cons.	kCal/kg cl	735	721	711

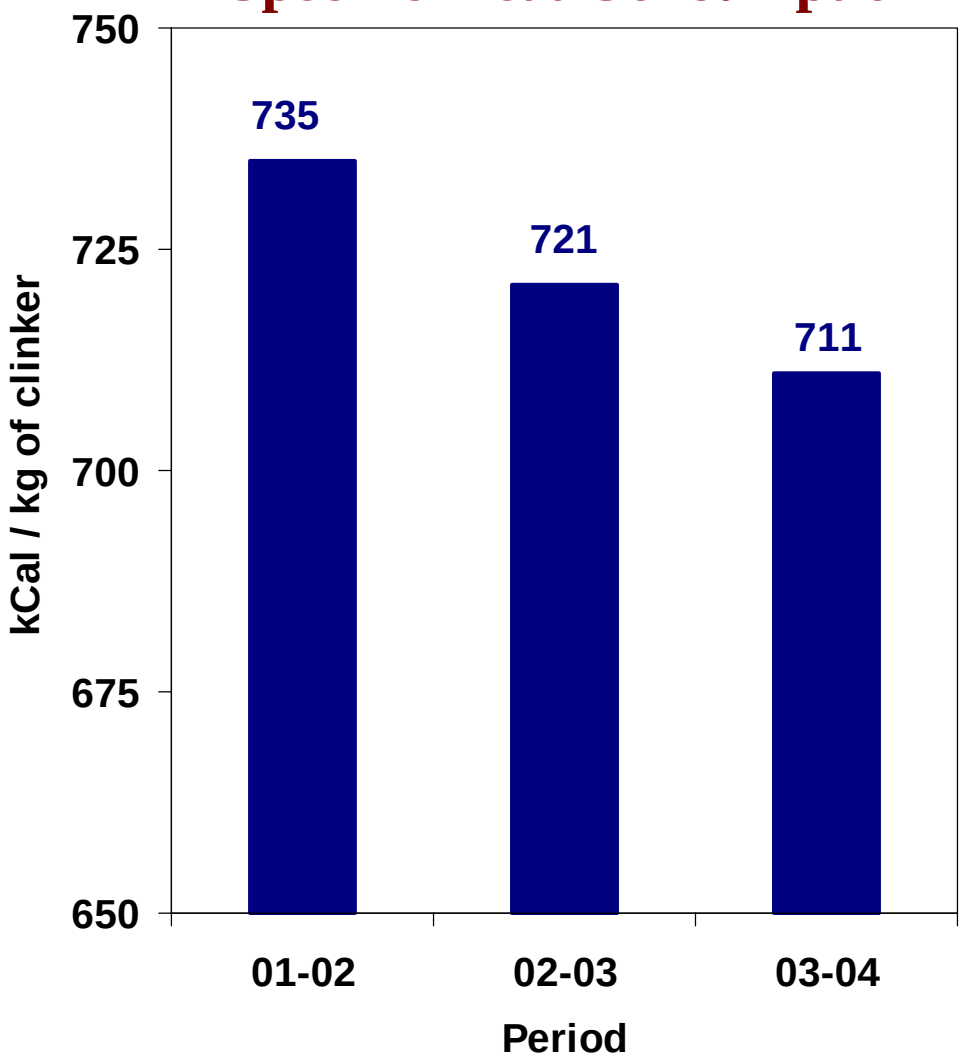
Year	Electricity		Thermal	
	Consumption (kWh/TC)	% Reduction over 01-02	Consumption (kCal/kgcl)	% Reduction over 01-02
01-02	100.25	-	735	-
02-03	91.33	9	721	2
03-04	85.90	14	711	3

Energy Consumption

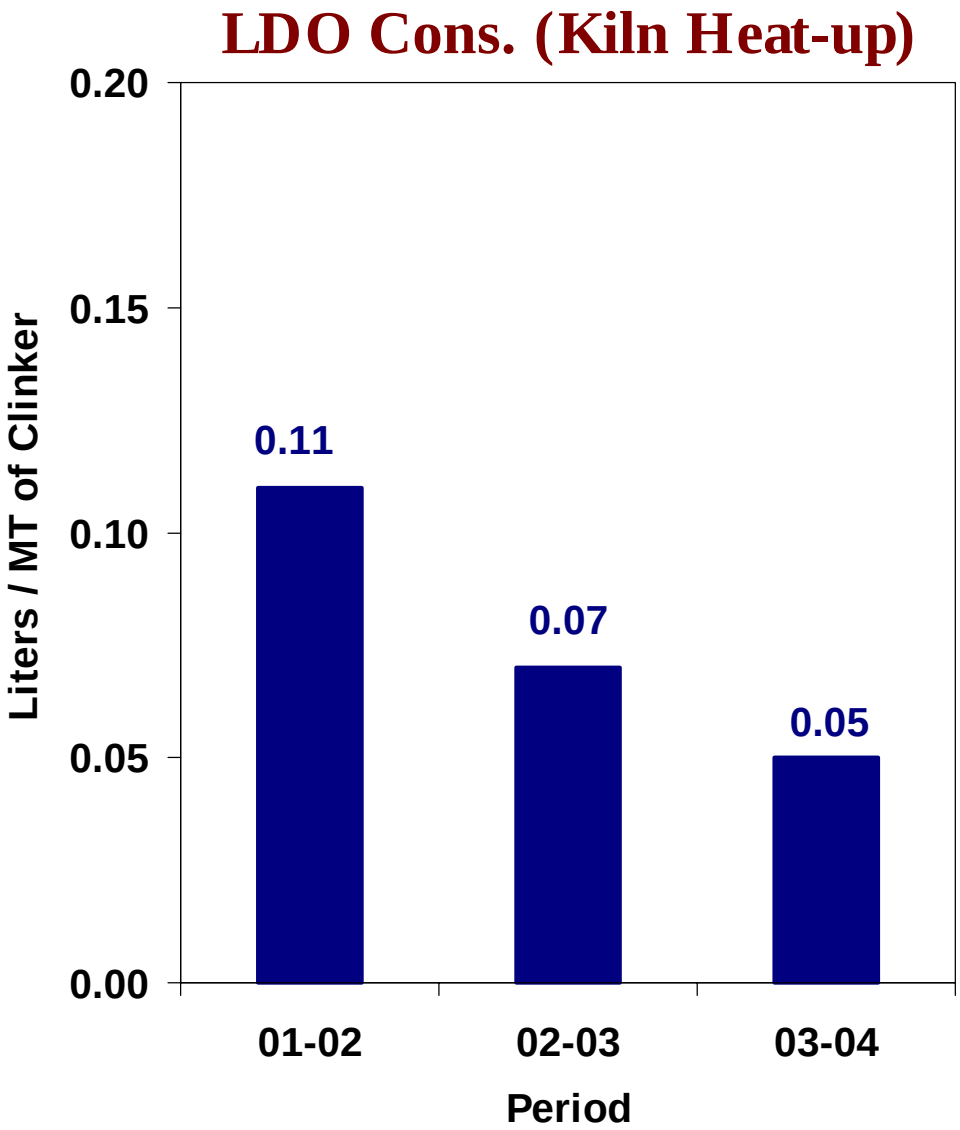
Specific Power Consumption

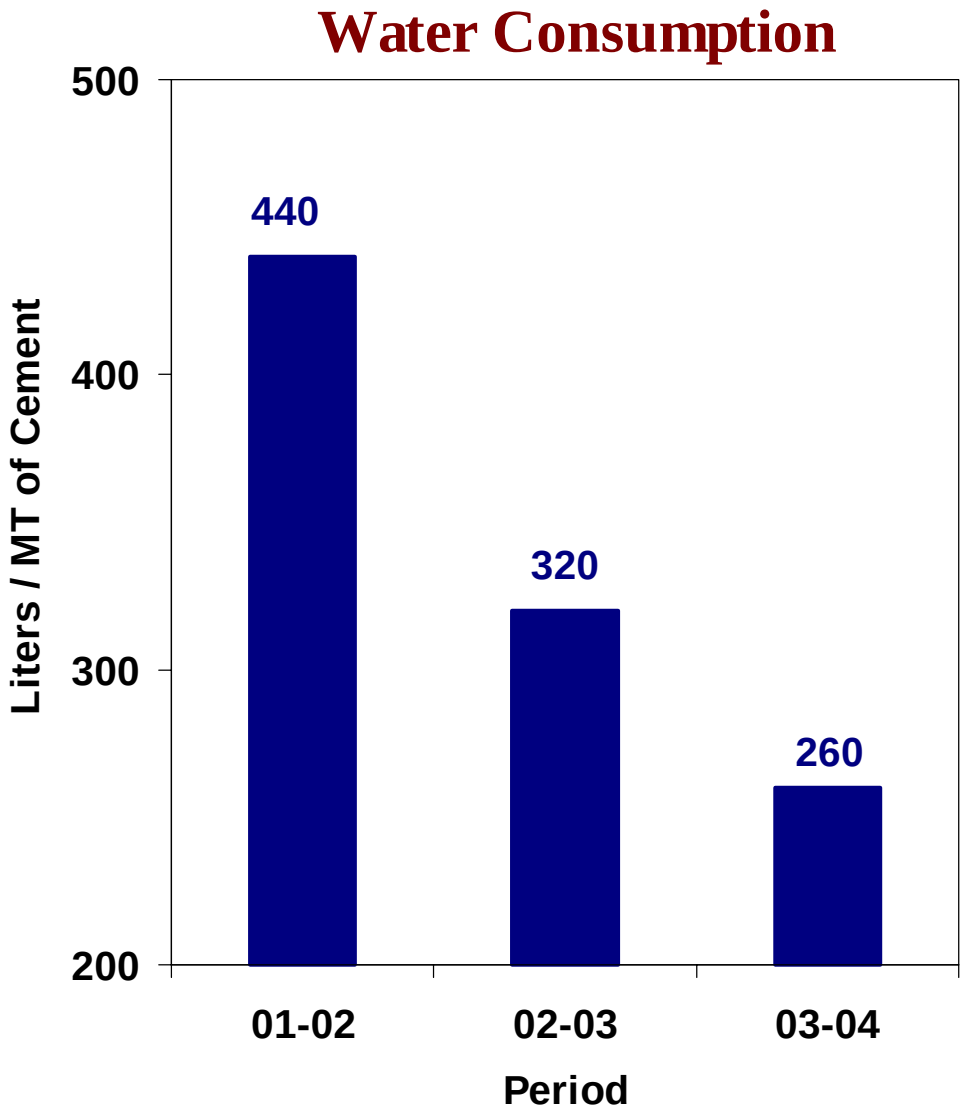


Specific Heat Consumption



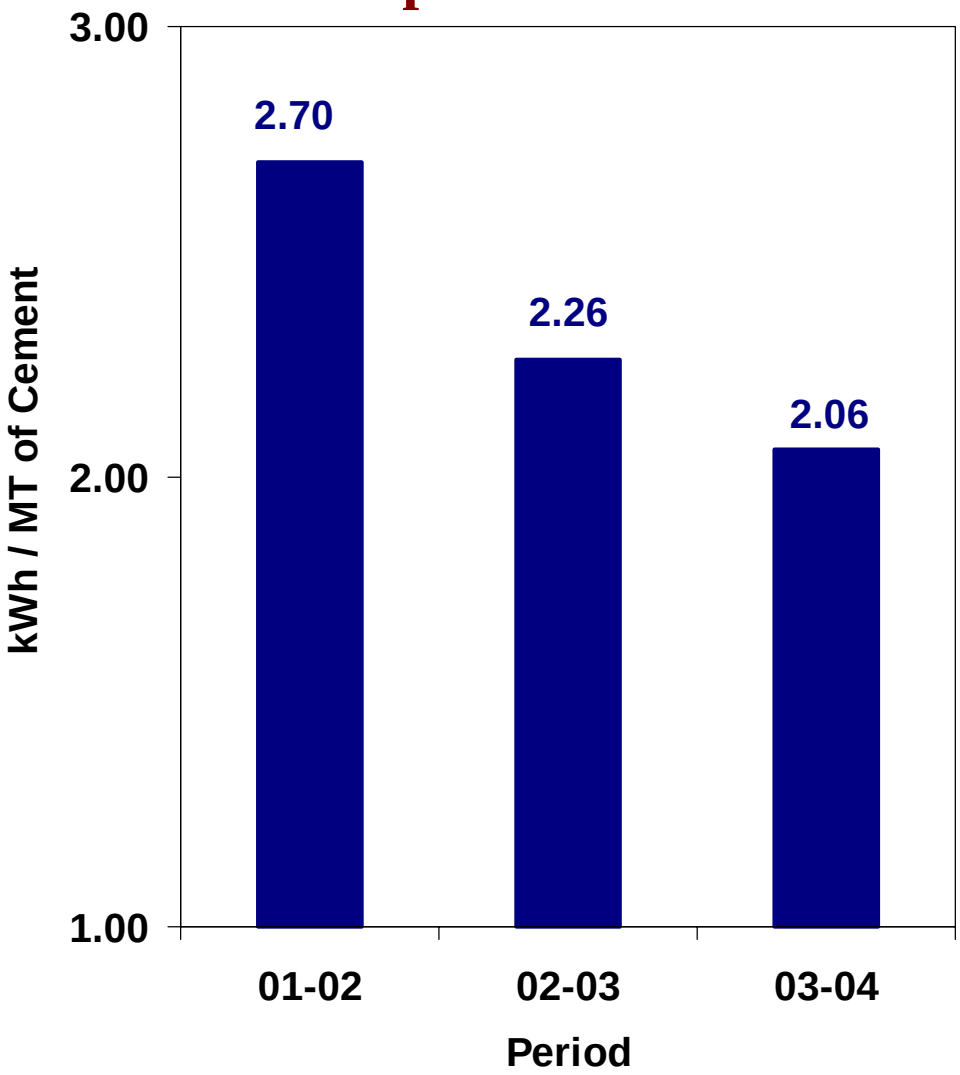
Energy Consumption



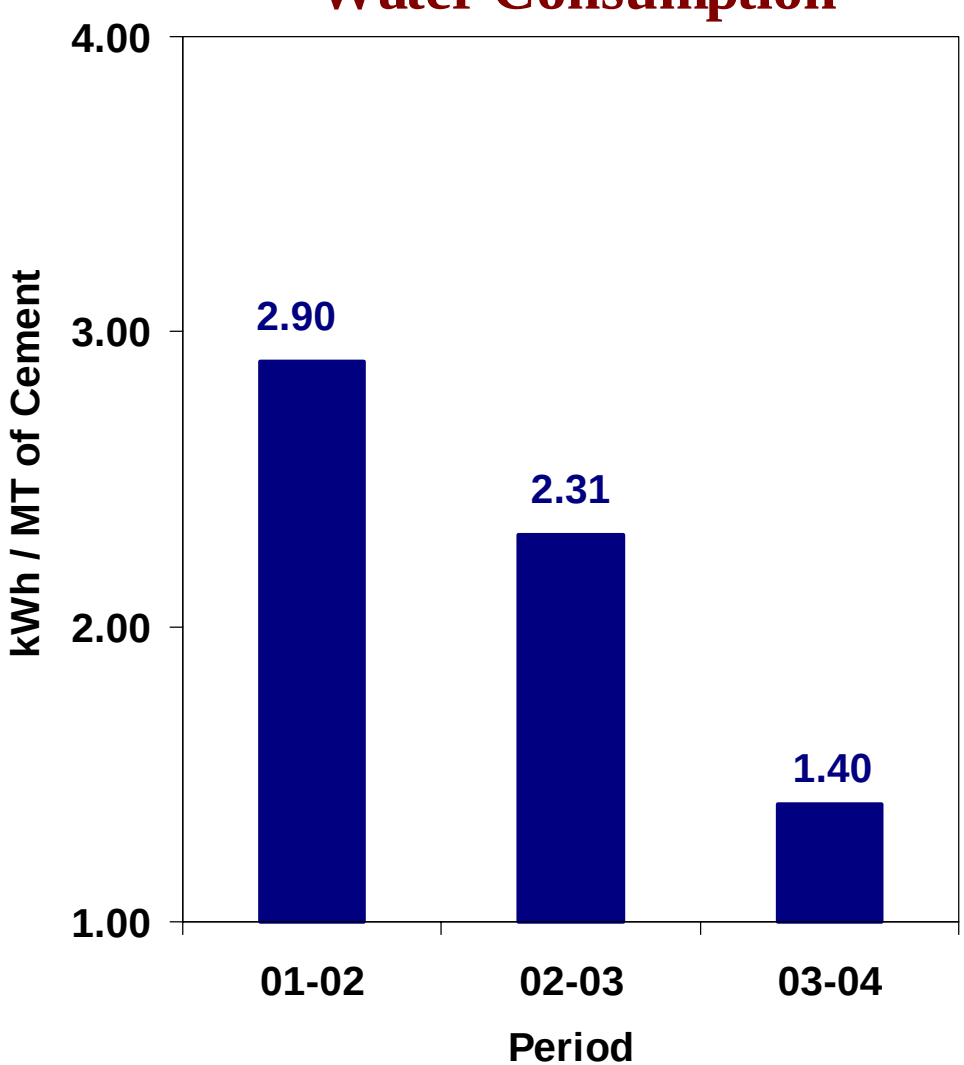


Energy Consumption

Compressed Air Cons.



Water Consumption



Energy Conservation Implemented for the Period 2001-04

During the period 2001-2004 GACL, Rabriyawas unit has implemented various energy saving proposals through in-house by involving engineers & workmen. This has resulted in reduction of 14% in specific electrical consumption and 3% in specific thermal energy consumption without investing much capital expenditure. In water conservation also the unit has reduced the consumption by 41%.

Major projects implemented for the period 2001-04 are listed below:

- Removed raw mill fan inlet venturi and installed a straight duct to reduce DP. Saving achieved: 0.19 kWh/TM.

- Raw mill separator discharge cone extended by 550 mm to reduce DP in mill by 65 mmWG. Saving achieved: 0.14 kWh/TM

- Removed coal mill fan inlet venturi and installed a straight duct to reduce DP. Saving achieved: 0.90 kWh/TM.

- Removed coal mill fan damper. Saving achieved: 0.5 kWh/TM

- Reduced coal mill fan & coal mill booster fan impeller diameters. Saving achieved: 0.23 kWh/TM

- Modified coal mill hot air cyclone dust transport system. Saving achieved: 0.36 kWh/TM

- Removed PH WHR fresh air fans suction boxes (4 nos.) to increase fan flow by 3%. Saving achieved: 0.09 kWh/TCl.

- Removed insulation from PH down comer ducts. Saving achieved: 0.18 kWh/TCl

- Optimized coal transport air volume to kiln & PC coal firing by reducing blowers rpm by changing of pulley size. Saving achieved: 0.34 kWh/TCl.

- Installed membrane bags in six out of ten modules to reduce DP from 280 to 150 mmWG. Saving achieved: 0.68 kWh/TCl.

- Cooler fans' intake cones (13 nos.) modified and reduced RFT fans' speed (5 nos.) by changing motor pulley size. Saving achieved: 0.41 kWh/TCl

- Reoriented cooler water spray nozzles. Saving achieved: 0.48 kWh/TCl

- Reduced cooler ESP fan impeller dia from 2240 to 2170 mm. Saving achieved: 0.06 kWh/TCl

- Installed lower rpm motors on ESP fans of both the cement mills. Saving achieved: 0.17 kWh/TC.

- Shortened cement mill – 1 first chamber length by 0.75 m. Saving achieved: 2.04 kWh/TC

- Removed sepax fan dampers, reorientated JPF ducts, removed feed belt gravity take up & 2 nos. product transport blowers in cement mills. Saving achieved: 0.52 kWh/TC.

- Discontinued running of CP-7 compressor for cement silos extraction. Blowers started in place of compressor. Saving achieved: 0.66 kWh/TC

- Many minor modifications carried out in packing plant. Saving achieved: 0.25 kWh/TC

- Continuously optimised air & water system. Saving achieved in air & water: 0.64 & 0.80 kWh/TC respectively.

- Energy audit carried out through CII.

Energy Conservation Commitment, Policy & Setup

- Gujarat Ambuja Cements Limited is a multi-locational company where regular interaction on energy conservation is being carried out. The company appointed one General Manager (Energy) at corporate level. On annual basis each plant present energy performance data during Energy Meet held at various plant locations on rotation basis. Managing Director, Board of Directors, All plant Heads, Energy Managers & others are attending meet. The company's energy profile consists of electricity, LDO (kiln heat-up), HFO (DG set), HSD (vehicles), coal, lignite & water also. Budget provisions are made exclusively for energy projects. Energy conservation action plans & progress are reviewed periodically. The importance of energy conservation emphasized through various forums.

- **Energy Management Policy:**

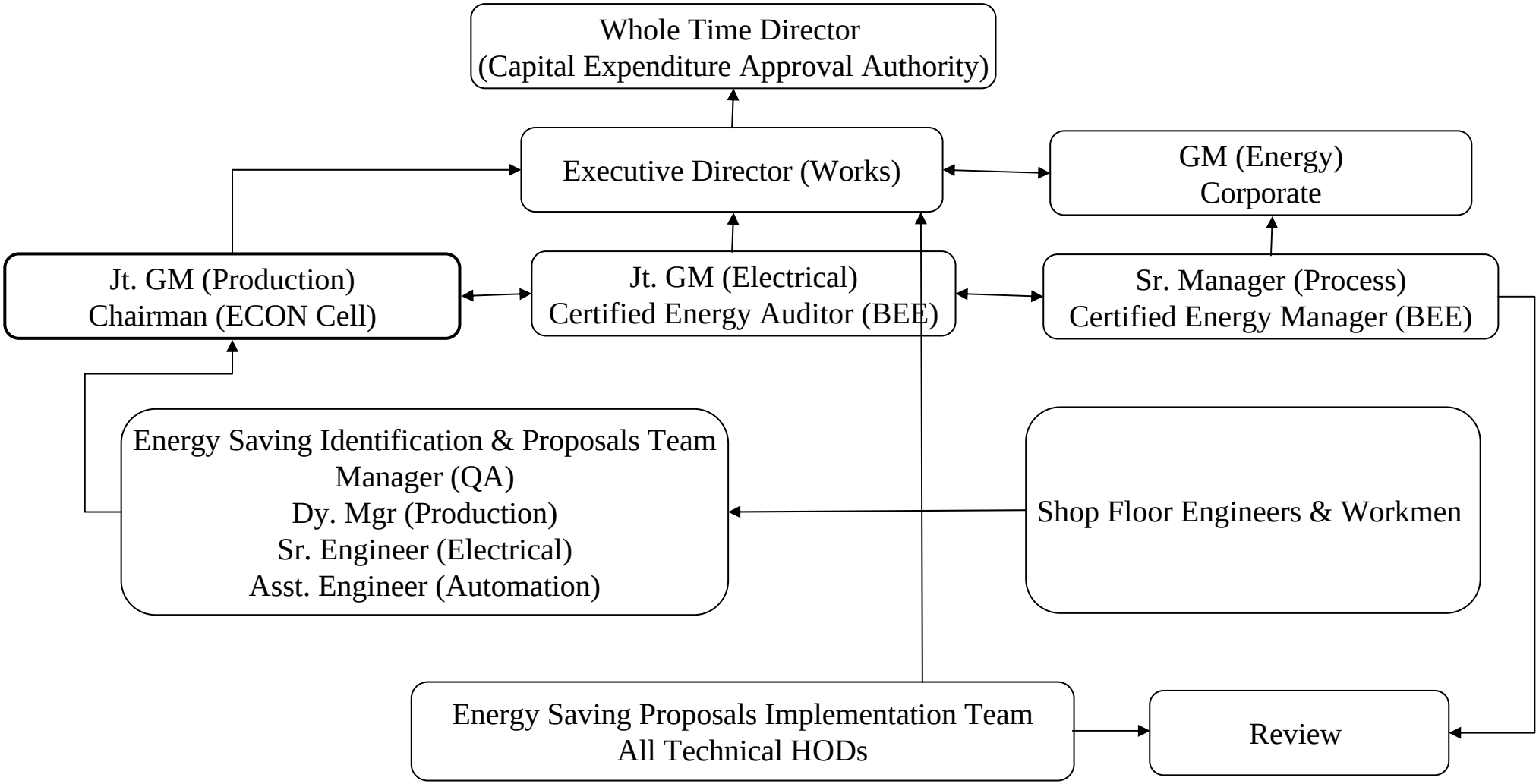
  We are committed to conserve energy in cement manufacturing, power generation and related activities by optimization and efficient use of resources in a cost effective manner.

  We are committed to reduce our energy consumption by 2% every year.

  To accomplish this we shall:

  - Create awareness and impart training to employees for energy conservation.
  - Monitor energy consumption regularly in various departments, analyze the information and take necessary steps for continuous improvement through an effective energy management information system.
  - Conduct Energy Audit to further identify potential areas and equipments for energy conservation.
  - Implement innovative ideas / modifications for improvement and up-gradation of the equipments.
  - Carry out on-going process optimization and diagnostic studies to maintain high productivity and capacity utilization to minimize specific energy consumption.

ECON Cell Structure



Measures Taken to Reduce Energy Consumption during 03-04

1.0 Electrical:

1.1 Crusher:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Operation optimization resulted in improvement in crusher throughput	1.32	1.22	0.10	0.20	4.96
Monitoring of auxiliary consumption & avoiding of idle equipments running hours after providing energy meter					

1.2 Raw Mill:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Reduction in mill feed size resulted in improvement in mill throughput	14.27	13.82	0.45	1.12	23.73
Effect of venturi removal from raw mill fan after april '03 onward					
Synchronization between mill feed rate and layer thickness to improve mill operation					

1.3 Coal Mill:

Description	Sp. Power Cons. (kWh/TM)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Effect of venturi removal from coal mill fan after april '03 onward	27.53	26.08	1.45	0.60	6.44
Overhauling of bag filters (dp reduction by 20 mmWG)					
Arresting of false air across bag filter					
Reduction in coal mill fan impeller dia from 2600 to 2552 mm					
Reduction in coal mill booster fan impeller dia from 1600 to 1552 mm					
Modification of coal mill hot air cyclone dust transport system					

1.4 Kiln:

Description	Sp. Power Cons. (kWh/TCl)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
DP reduction after refurbishing of PH WHR & installation of sonic horns from April '03 onward.	32.04	30.57	1.47	211.26	51.33
Suction box modification of PH WHR fresh air fans (4 Nos.)					
Reduction in DP after installation of membrane bags (4 modules) in bag house from April '03 onward.					
Reduction in cooler ID fan impeller dia from 2240 to 2170 mm					
Removal of PH down comer duct insulation					
Resizing of PC fine coal pipe line					

1.5 Water Pumps:

Description	Sp. Power Cons. (kWh/TCl)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Water optimization measures resulting in reduction of water consumption	2.48	1.67	0.81	4.56	28.28
Separation of process water and circulating water pipelines.					
Modification in water pipe line for PH & Sepax fan LRC.					
Optimization of operation & monitoring of pumps					
Re-routing of pipelines					
Discontinuation of 2 nos. cooling tower fans by utilizing drop in ambient temperature					
Better yield from borewell pumps					
Optimization of DG4 booster pump operation					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8

1.6 Compressors:

Description	Sp. Power Cons. (kWh/TCl)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Better monitoring practices on sustainable basis.	2.43	2.08	0.35	0.25	12.22
Reduction in leakage points					
Reduction in air pilferage					
Reduction in usage for cleaning					
D31-CP1dedicated exclusively to Process dept. for PH-cyclone air lancing					
Upgradation of CP6 compressor from existing 24 to 30 m3/min by increasing motor pulley size from 300 to 375 mm w.e.f. 11.12.03					
Installation of garage compressor for Packing Plant					


Chicago Pneum

1.7 Factory Lighting:

Description	Sp. Power Cons. (kWh/TCl)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Usage of day light concept in Site Office & MCC rooms	0.62	0.60	0.02	Nil	0.70

1.8 Colony Lighting:

Description	Sp. Power Cons. (kWh/TCl)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Regulation of voltage & awareness in colony resident	0.53	0.53	0.00	Nil	Nil

1.9 CM-1:

Description	Sp. Power Cons. (kWh/TC)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Reduction in idle running hours of auxiliaries by incorporated belt conveyor tripping with minimum load (KW).	37.14	37.10	0.04	Nil	0.86

1.10 CM-2:

Description	Sp. Power Cons. (kWh/TC)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Usage of dry fly ash at mill outlet in-place of wet fly ash at mill inlet during PPC grinding after commissioning of dry fly ash system.	34.29	31.03	3.26	587.86	64.80
Higher production of PPC					

1.11 Packing Plant:

Description	Sp. Power Cons. (kWh/TC)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Replacement of all antenna switches with proximity switch arrangement.	0.95	0.84	0.11	2.30	4.58
Improvement in operation					

1.12 Line, transformer & transmission losses:

Description	Sp. Power Cons. (kWh/TC)			Invest. (Lacs)	Saving (Lacs/annum)
	Before	After	Saving		
Improvement in power factor	0.65	0.59	0.06	Nil	2.49
Optimization of power transformers operation					

2.0 Thermal:

- Resizing of pre-calciner coal firing pipe line to optimise velocity profile resulted reduction in PC CO from 0.5% to 0.3%. Coal fluctuation also reduced.

- Provided 2 nos. blasters to avoid chocking of kiln inlet analyzer probe.

- Thin thermocouple (previous OD: 22 mm, New OD: 12 mm) provided for fast response of thermocouple for cyclone 6th gas temperature to control PC coal firing rate.

- Installation of air blaster in cyclone 4th spreader box.

- Monitoring of quartz size on 45 μ.

- Regular inspection of dispersion plate.

- Rescheduling of spreader box air blaster operation in cyclone 5th.

Energy Conservation Plan & Targets for 04-05

1.0 Target

1.1 Electrical:

Section	Sp. Power Cons. (kWh/MT of Cement)
Crusher	1.34
Raw mill	16.46
Kiln	25.92
Factory light	0.55
Cement mills	33.01
Packing Plant	0.83
Colony light	0.40
line losses	0.60
Total	79.11

1.2 Thermal:

Sp. Heat Cons. (kCal/kg cl)	708

2.0 Energy Conservation Plans

2.1 Cement Plant

Sr. #	Type of Investment				Capital Cost Involved (In Lacs)	Remarks
	Modification	New Installation	Replacement	Major Spares		
A. Kiln						
1.			Replacement of cooler fan 471 FNA with new impeller & casing to improve efficiency.		1.75	Recommendations as per M/s. Sumit India. Saving : Rs.4.44 lac / annum
2.	Cooler ID fan - installation of VVVF controlled motor of 200 KW, 1450 rpm and use this for running the fan through a V belt drive having a ratio of 1450/850 rpm.				29.08	Recommendations as per Mr. E H Larsen. Saving: Rs. 26.87 lac/annum

Sr. #	Type of Investment				Capital Cost Involved (In Lacs)	Remarks
	Modification	New Installation	Replacement	Major Spares		
3.	WHR fresh air fan - installation of VVVF with new 150 KW motor & removal of inlet damper (2 nos.)				15.86	Recommendations as per Mr. E H Larsen Saving: Rs. 16.35 lac/annum
B. Cement Mills						
1.	Retrofiting of modified impellers of ESP fan for both mills as per M/s. Sumit India recommendations				3.25	Power saving & wear protection measuures. Saving: Rs.2.53 lac/annum
2.		Installation of Fuzzy Logic for mill optimization (CM-1)			7.00	Improvement in throughput by around 3% resulting power saving by 1 kWh/TC. Saving: Rs.37.5 lac/annum

Sr. #	Type of Investment				Capital Cost Involved (In Lacs)	Remarks
	Modification	New Installation	Replacement	Major Spares		
C. Utility						
1.			Replacement of existing regenerative type air drier to refrigerant type (1 no.) 24m3/min		17.92	Saving : 9.75 lac/annum as per M/s PACE Equipments
D. Electrical						
1.		Energy Meters for Transformer No 7 & MCC12			0.50	To segregate the energy cons. data for transformer no. 7 & MCC12
2.		Power Factor Control Relay 5 nos			1.00	For energy saving & incentive from JVVNL.
3.		Capacitor Banks 6.6 KV, 1500 KVAR			10.00	Total Saving: Rs. 7.00 lac/annum (by doing 1, 2, 3 jobs)

Sr. #	Type of Investment				Capital Cost Involved (In Lacs)	Remarks
	Modification	New Installation	Replacement	Major Spares		
E. Energy Cell						
1.		Energy Management system			10.00	For power consumption monitoring & recording at single place.
Total Capex Cost:					**Rs.96.34 Lacs**	
Expected Savings:					**Rs.104.44 Lacs**	

2.2 Power Plant

Sr. #	Modification	Capital Cost Involved (In Lacs)	Remarks
1.	VVVF drive for FD fan (2 nos.)	26.00	As per CII report. Saving: Rs. 16.39 lac/annum
2.	A.C.C Fan blades replacement with F.R.P blades(For 6 Fans)	13.50	As per ENCON report Saving: Rs. 30.04 lac/annum for 6 fans To be carried out initially for one fan.
3.	Installation of VVVF for operation of condensate extraction pump.	2.16	As per CII report Saving: Rs. 4.0 lac/annum
4.	Installation of VVVF for ID fan.	8.50	As per CII report Saving: Rs. 7.18 lac/annum
Total Capex Cost:		**Rs.50.16 Lacs**	
Expected Savings:		**Rs.57.61 Lacs**	

Safety Health & Environment

Ambuja Cement has a well-established Environmental Management Division (EMD) with qualified professionals from diverse fields. Full fledged environmental lab and monitoring van have been created at all locations which are self sufficient for monitoring meteorological parameters, ambient air quality, stack emissions and water analysis. Opacity meter are installed at major stacks to monitor online emissions. EMD personnel also make efforts towards the spread of environmental awareness amongst the employees, their families and the people living nearby the plants, through non-formal environmental education, celebration of World Environment Day, Mines Environment & Mineral Conservation Week, Mines Safety Week etc.

We have **Received** National Award for Prevention and Control of Pollution from the Ministry of Environment and Forests, Government of India for the year 1990-91 and first prize for excellence in Environmental Management from the Gujarat Pollution Control Board in 1991. We have health & safety policy at all of our locations. We are also the proud recipients of various other awards from IBM, NPCM, BIS, NCBM and other esteemed organizations.

Recently Ministry of Environment & Forests also awarded the National Award for Prevention of Pollution, 2002-03 to our Cement Grinding Unit, Ropar, in recognition to our contribution to cleaner production as well as commitment towards environmental pollution control and resource conservation. This unit has been recognized as the best example of cleaner production in the industry to utilize waster material of thermal power plant. The adoption of cleaner technology for the fly ash utilization not only prevents pollution during the disposal of fly ash from thermal power plant, but also conserves the resources and reduces carbon-di-oxide generation.

At our Rabriyawas unit in Rajasthan we have carried out various actions in 2003-04 and brief is mentioned as below:

Safety:

Health & Safety Policy:

The management is committed to impart health and safety education and inculcate health and safety consciousness among the employees, thereby ensuring healthy and safe working conditions, increasing productivity and developing a sense of self confidence among officers and workers which will ultimately help in achieving safety of men, machines, materials and protect them from health hazards and occupational diseases.

- Accident frequency rate reported 7.90 accident/mil.Man-hours worked against previous 6.19 accident/mil.Man-hours worked.
- Accident severity rate reported 55.36 Man days lost/mil. Man-hours worked against previous 5231.67 Man days lost/mil. Man-hours worked.

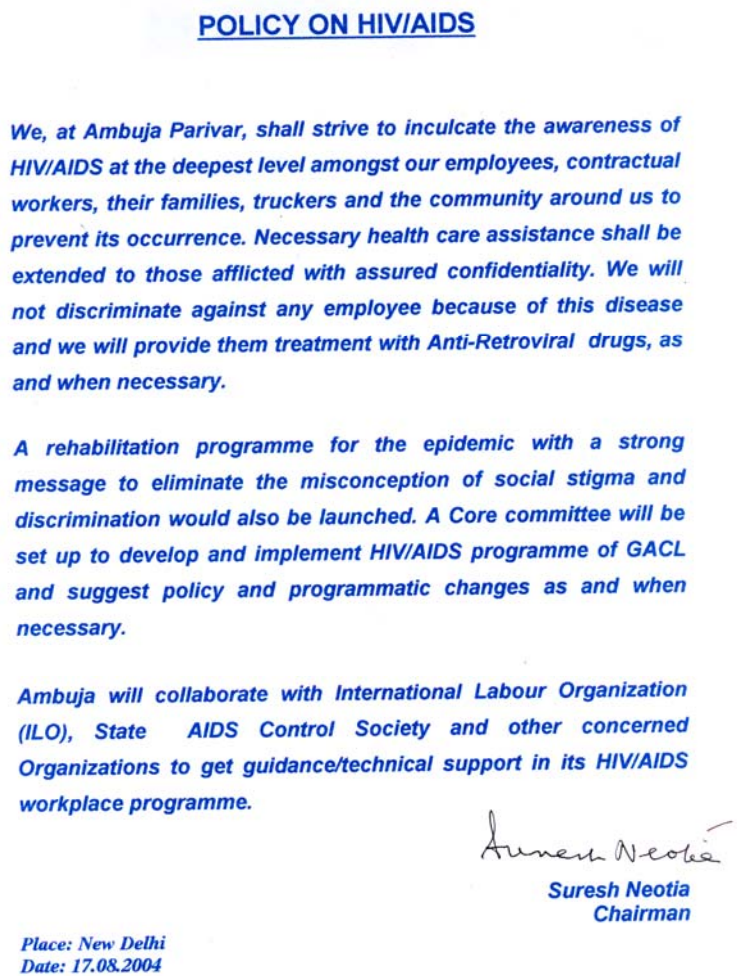
- Total 306 manhours in-house training conducted for safety.
- Successfully celebrated safety week – organised slogan, essay & drama competition on this occasion.
- 23 Staff members attended training on safety conducted by Regional Labour Institute, Kanpur.
- 13 Employees sent for outside safety training programmes.
- Illumination provided on clinker / additive feeding conveyors to cement mill hoppers.
- Providing maintenance platforms, coupling guards, toe guards & hand railings of 4800 m length.

Health:

- Annual health checkup of all workers
- 54 employees trained in “first-aid” by St. Johns Ambulance, Jaipur.
- Cardio pulmonary resuscitation training programme attended by 85 employees & their family members.
- Audiometery test conducted for workers, working in high noise area.
- Lung functions - spirometery test carried out for all staff & workers – results are satisfactory
- Eye testing for HEM operators conducted
- With government collaboration, Polio drops given to children aged below 5 years.

- Regular mobile dispensary services by qualified doctor to six villages.

- Vitamin ‘A’ solution given to Ambuja Public School Children aged below 5 years



POLICY ON HIV/AIDS

We, at Ambuja Parivar, shall strive to inculcate the awareness of HIV/AIDS at the deepest level amongst our employees, contractual workers, their families, truckers and the community around us to prevent its occurrence. Necessary health care assistance shall be extended to those afflicted with assured confidentiality. We will not discriminate against any employee because of this disease and we will provide them treatment with Anti-Retroviral drugs, as and when necessary.

A rehabilitation programme for the epidemic with a strong message to eliminate the misconception of social stigma and discrimination would also be launched. A Core committee will be set up to develop and implement HIV/AIDS programme of GACL and suggest policy and programmatic changes as and when necessary.

Ambuja will collaborate with International Labour Organization (ILO), State AIDS Control Society and other concerned Organizations to get guidance/technical support in its HIV/AIDS workplace programme.

Suresh Neotia
Chairman

Place: New Delhi
Date: 17.08.2004

- **Environment:**

Environment Policy:

Gujarat Ambuja Cements Limited, Unit-Rabriyawas is an Environmentally conscious company, which commits for continual improvement towards sustainable development and create safe and healthy environment with active participation among employees and neighbouring community.

Objectives:

- Adopt eco-friendly practices for utilization of resources.
- Ceaselessly comply with all applicable Environmental regulation & legislations.
- Create Environmental awareness amongst the employees & neighbouring community
- Endeavor for continual improvement towards sustainable development.
- Accelerate aforestation & Water harvesting in and around our premises.

- Applied for consent to establish for dry fly ash handling system
- Obtained consent to establish for crushing and screening plant for limestone.
- Applied for consent to establish for increasing cement capacity from 1.4 Ml.TPA to 1.8 Ml.TPA through process optimization.
- Mines workshop effluent oil skimming pit constructed.
- Hazardous waste storage site constructed to comply with Hazardous Waste Management Handling Rules as per RPCB.
- Coal mill reject handling system successfully commissioned to reduce fugitive dust emissions.
- Reduced dust emission from cooler 110 – 167 to 16 – 33 mg/Nm^3 by retrofitting of cooler ESP first chamber & inlet gas distribution screen.
- Installed 3 nos. modified JPF for clinker extraction & transport. Clinker hopper JPF also modified.

- Installed clinker bulk loading system to ensure emission free loading of clinker.

- Installed total emission free dry fly ash unloading & feeding system.

- Improved boiler ESP performance - emission level reduced from 400 mg/Nm^3 to < 150 mg/Nm^3 (initially by liquid ammonia dosage and now by usage of lignite).

- Constructed 3.5 kms cement concrete roads in plant to reduce fugitive emission.

- Installed mechanised water spraying system & planted more than 400 trees at Merta railway siding to reduce coal dust emission.

- Successfully celebrated environment week – organised slogan, essay & quiz competition on this occasion.

- Improved SWRP performance by reducing COD to < 50 mg/l & BOD 10-12 mg/l.
- 2 nos. water harvesting systems constructed at township (Bachelor Hostel & New Type V).
- Complete ban on usage of plastic bags in colony.
- 7270 nos. saplings planted @ 83% survival rate covering 7.3 hectares in plant & colony.
- 10858 nos. saplings planted @ 80% survival rate covering 5.45 hectares in mines area.

Safety Health & Environment (04-05)

- Safety audit by National Safety Council to be conducted – Work order released.

- Fire hydrant system to be modified & one fire tender to be purchased – Proposal approved.

- 5000 nos. saplings to be planted in plant & colony, seed spray in colony and area to be covered 22.5 hectares.

- 8500 nos. saplings to be planted in mines and area to be covered 3.5 hectares