

GUJARAT AMBUJA CEMENTS LIMITED

Unit : Rabriyawas, Dist. Pali (Rajasthan)

Unit Profile

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
- Highest productivity
- Lowest power and coal consumption
- Best environment management
- Pioneering transportation of bulk cement by sea
- Excellent 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
Maharashtra	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.

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.

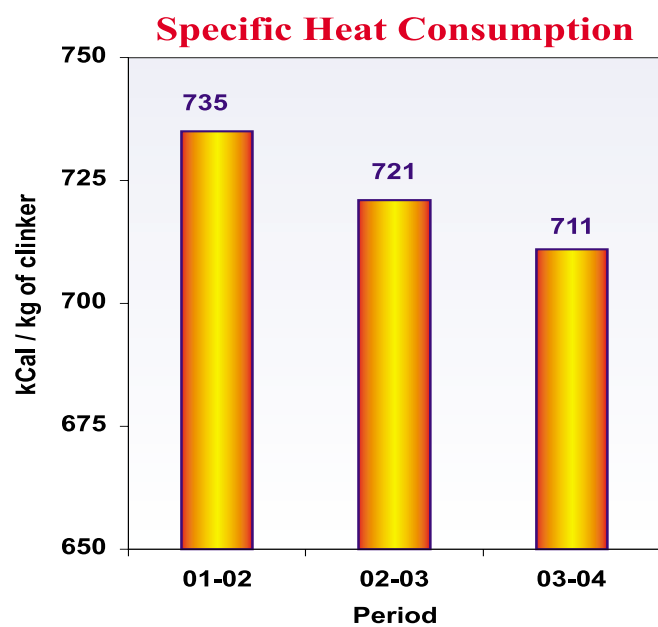
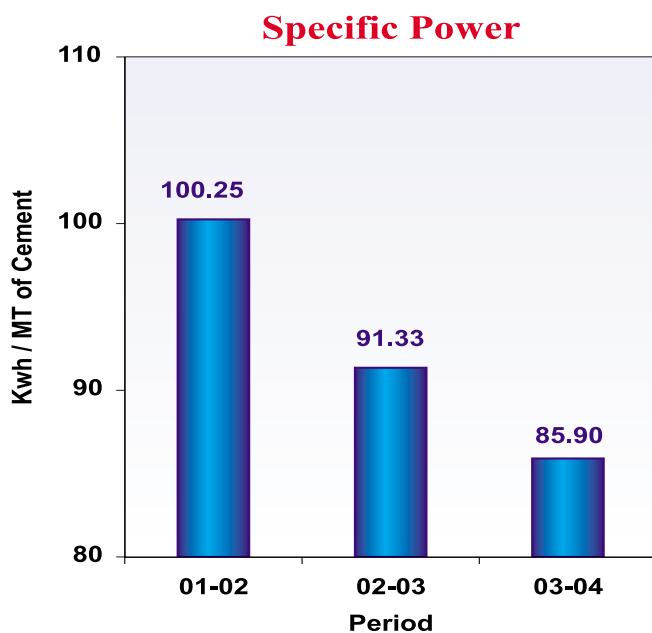
Energy Consumption

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

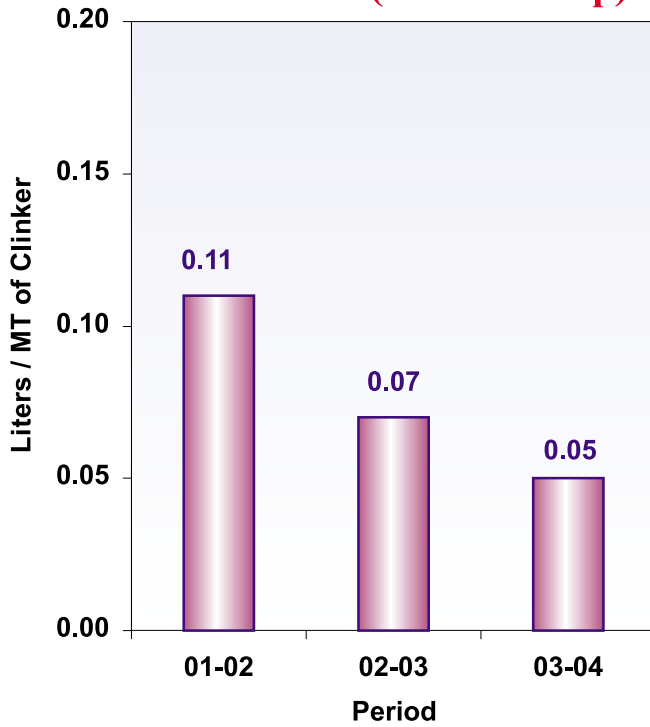
Description	UOM	01-02	02-03	03-04
Clinker Production	Lac MT	13.43	13.53	15.74
Cement Production	Lac MT	12.73	14.51	15.89
Specific Power Cons.	kWh/TC	100.25	91.33	85.90
Specific Heat Cons.	kCal/kg cl	735	721	711

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

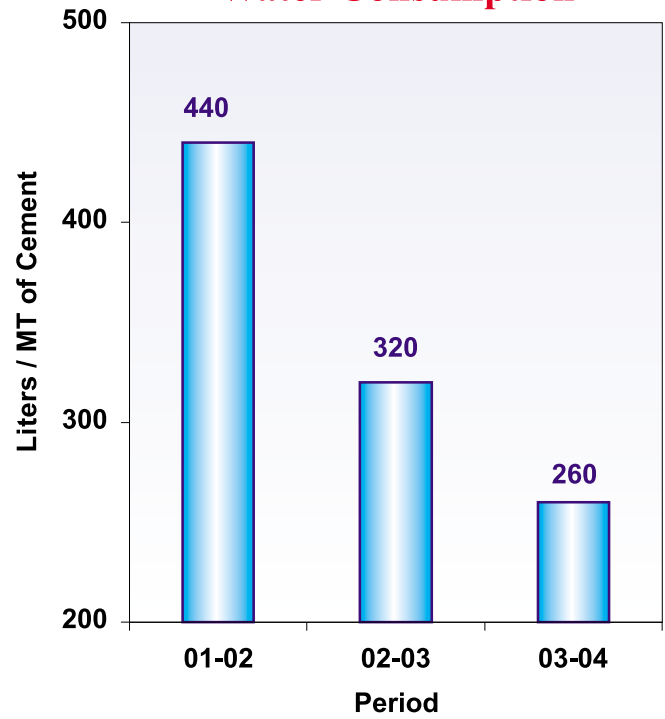
Energy Consumption Trend



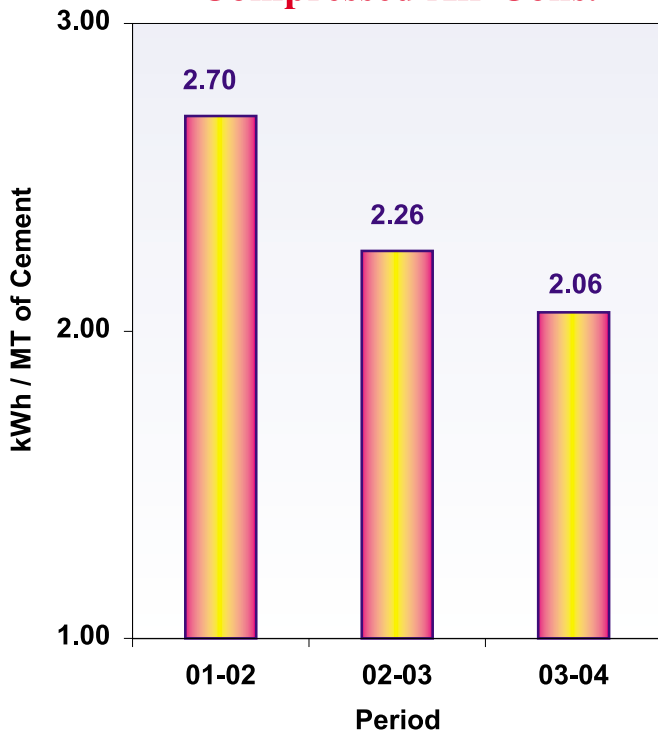
LDO Cons. (Kiln Heat-up)



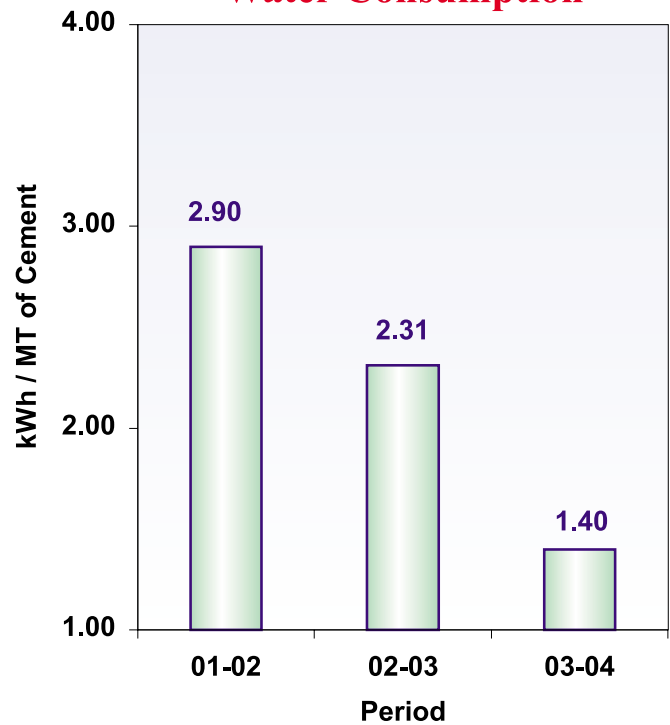
Water Consumption



Compressed Air Cons.



Water Consumption



Energy Conservation Projects implemented in 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 in 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/TCI.
- Removed insulation from PH down comer ducts. Saving achieved: 0.18 kWh/TCI
- Optimized coal transport air volume to kiln & PC coal firing by reducing blowers rpm by changing of pulley size. Saving achieved: 0.34 kWh/TCI.
- Installed membrane bags in six out of ten modules to reduce DP from 280 to 150 mmWG. Saving achieved: 0.68 kWh/TCI.
- Cooler fans' intake cones (13 nos.) modified and reduced RFT fans' speed (5 nos.) by changing motor pulley size. Saving achieved: 0.41 kWh/TCI
- Reoriented cooler water spray nozzles. Saving achieved: 0.48 kWh/TCI
- Reduced cooler ESP fan impeller dia from 2240 to 2170 mm. Saving achieved: 0.06 kWh/TCI
- 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 and Set up

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.



Measures Taken to Reduce Energy Consumption during 03-04:

1.0 Electrical:

1.1 Crusher:



Description	Sp. Power Cons. (kWh/TM)			Invest. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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					

1.6 Compressors:



Description	Sp. Power Cons. (kWh/TM)			Invest. (Lakhs)	Saving (Lakhs/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-CP1 dedicated exclusively to Process dept. for PH-cyclone air lancing					
Upgradation of CP6 compressor from existing 24 to 30 m ³ /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. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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. (Lakhs)	Saving (Lakhs/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 m.
- Regular inspection of dispersion plate.
- Rescheduling of spreader box air blaster operation in cyclone 5th.

Energy Conservation Plan and 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. Power Cons. (kWh/MT of Cement)
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		
<i>A. Kiln</i>						
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 Lakhs)	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.	Retrofitting of modified impellers of ESP fan for both mills as per M/s. Sumit India recommendations				3.25	Power saving & wear protection measures. 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/T C = Rs.37.5 lac/annum
C. Utility						
1.			Replacement of existing regenerative type air drier to refrigerant type (1 no.) 24m ³ /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 Lakhs	
Expected Savings:					Rs.104.44 Lakhs	

2.2 Power Plant

Sr. #	Modification	Capital Cost Involved (In Lakhs)	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 Lakhs	
Expected Savings:		Rs. 57.61 Lakhs	

Safety, Health and 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.