

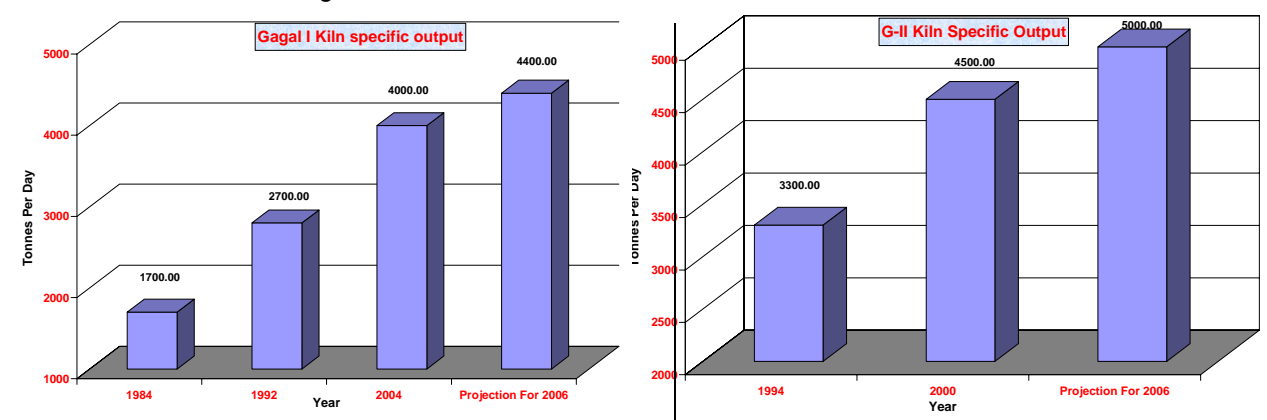
## ACC Gagal Cement Works (GCW)

### Unit Profile

Gagal Cement Works implemented & certified for **ISO 14001 Environment Management Systems, ISO 9001:2000 Quality Management System & OHSAS 18001 Occupational Health and Safety Management System certification.**

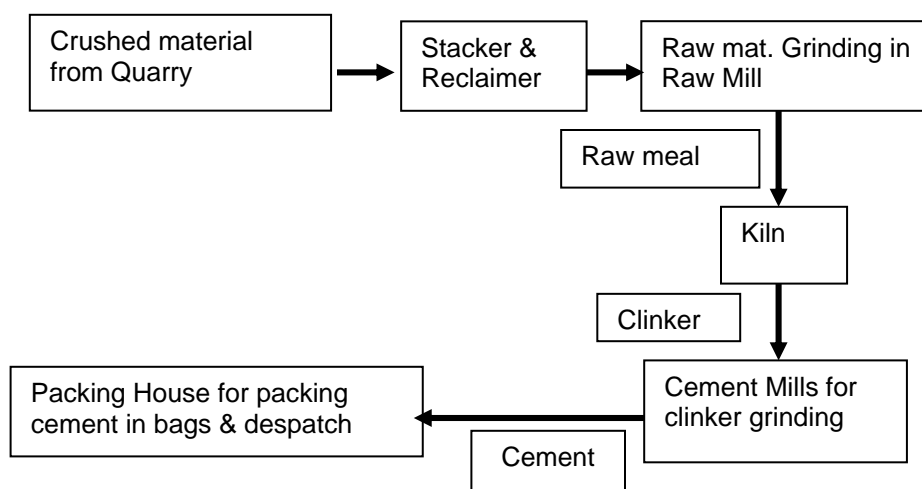
The Gagal Cement Works was set up in the year 1984 with the aim to serve the market of Himachal Pradesh, Punjab, Haryana, Uttaranchal +UP and Jammu & Kashmir. ACC was the first to put up a large-scale industrial house in a backward area of Himachal Pradesh. **Gagal-I unit** started with an annual capacity of 0.56 Million Tons (with one kiln of 1700 TPD).. **Gagal-II Unit** of 1 million capacity (with one kiln of 3300 TPD) was installed in 1994-95. Today Gagal works capacity has risen to **produce 3.8 Million Tons of blended cement** and is likely to increase to 4.6 Million tonnes by next financial year (2006-07)

GCW is market leader in northern region and maintains its market share in all strategic markets. GCW is the largest cement unit in this zone.



ACC Cement has very strong brand image, trusted by generation for consistent and durable cement quality, fair business practices and long association with dealers and customers are the principal factors which provide us competitive advantage over the other brands. Our unique R&D support and business policies, differentiate us from our competitors.

### Process Flow chart



### **Energy Consumption:-**

There has been continual improvement in production & decrease in Thermal & Electrical Energy Consumption.

#### **Gagal-I**

Description	Units	2002-03	2003-04	2004-05
Clinker Production	Lacs Tons	8.08	7.93	10.69
Cement Grinding	Lacs Tons	11.29	11.19	11.65
Thermal Energy Consumption	Kcal/Kg Clinker	831	786	710
Electrical Energy Consumption	KWH/ Ton Clinker	70.72	69.95	63.3
Cement Packing	KWH/Ton Cement	1.50	1.28	0.97
Fly ash Absorption	%	19.65	19.97	22.1

#### **Gagal-II**

Description	Units	2002-03	2003-04	2004-05
Clinker Production	Lacs Tons	13.85	13.31	12.73
Cement Grinding	Lacs Tons	16.36	16.83	18.11
Thermal Energy Consumption	Kcal/Kg Clinker	721	718	718
Electrical Energy Consumption	KWH/ Ton Clinker	63.11	63.89	62.43
Cement Packing	KWH/Ton Cement	1.47	1.13	0.94
Fly ash Absorption	%	20.70	21.04	22.9

### **Energy Conservation Commitment Policy & Set-up**

The cement industry is highly energy intensive industry therefore we give top most priority to energy conservation. In view of increasing green house gas emission, fast depletion of natural resources of energy and galloping prices of energy the commitment of the company towards energy saving programme is pretty high. Consistent efforts are invested to identify the potential of energy conservation and implementing remedial measures for reducing energy consumption in the plant. Full-fledged Energy Conservation Cell has been created in the plant, which is headed by Sr. Manager (Technical). The activities of E. Cell are as follows:

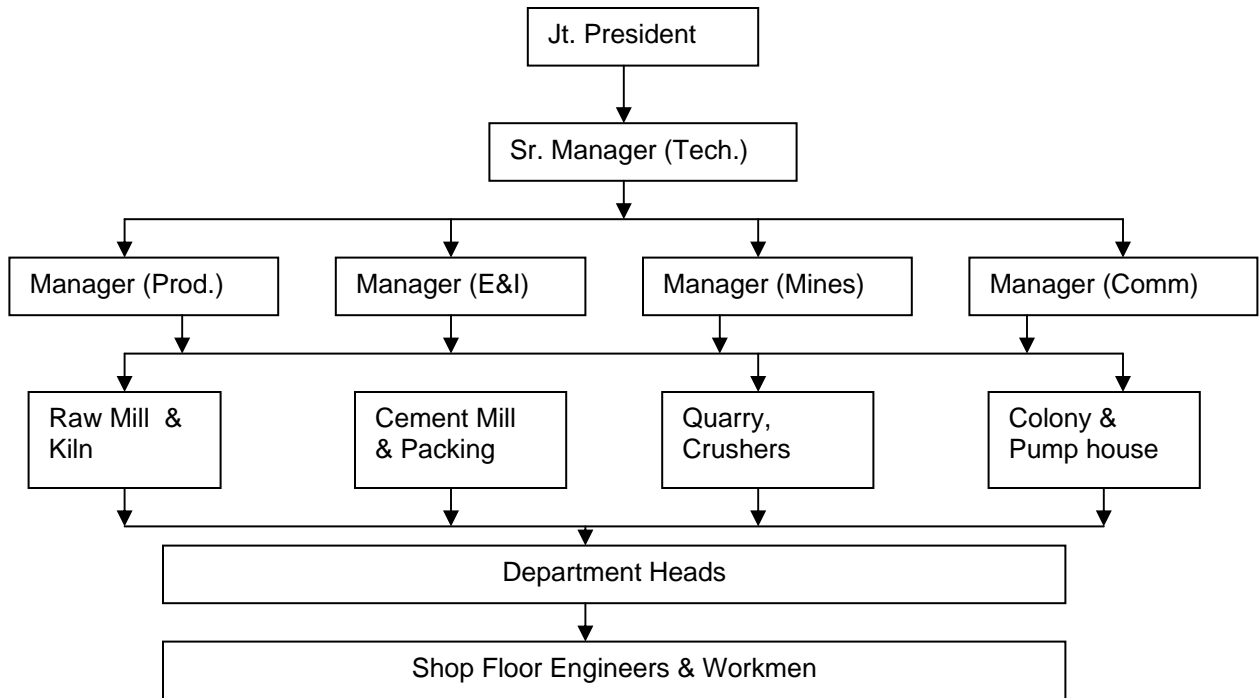
- Daily review in production meeting where weak areas are identified and attended with a view to improving energy performance and implementing remedial measures quickly.
- Weekly review by Jt.President at apex level meeting.
- Monthly and quarterly review by top management against the target .
- Review by energy conservation cell on regular basis.

The energy audit is being carried out by in-house & outside agency for helping out in identifying the energy saving potentials in different sections of the plant. We celebrate energy conservation week & conduct the various competitions in view to create and increase awareness about energy saving among the employees at various levels,. The importance of energy conservation is emphasized through various forums, TPM & Brain storming sessions conducted regularly. We have formulated our **Energy Management Policy** , which is as under:-

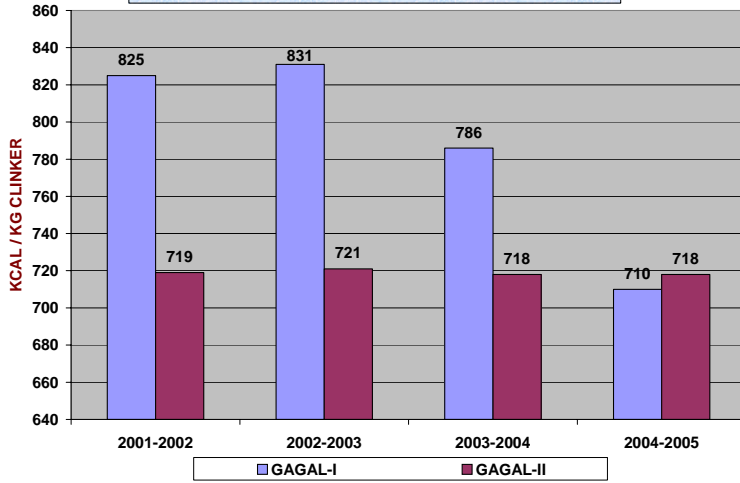
- To conserve energy & mineral resources
- To comply with all applicable & regulatory requirements
- To minimise waste generation at source & reutilize the waste of other industries.
- To create awareness among all employees for innovative ideas towards conservation of energy.
- To make an effort to reduce cost continuously by taking various measures for energy conservation.

Energy Saved is Energy Produced.

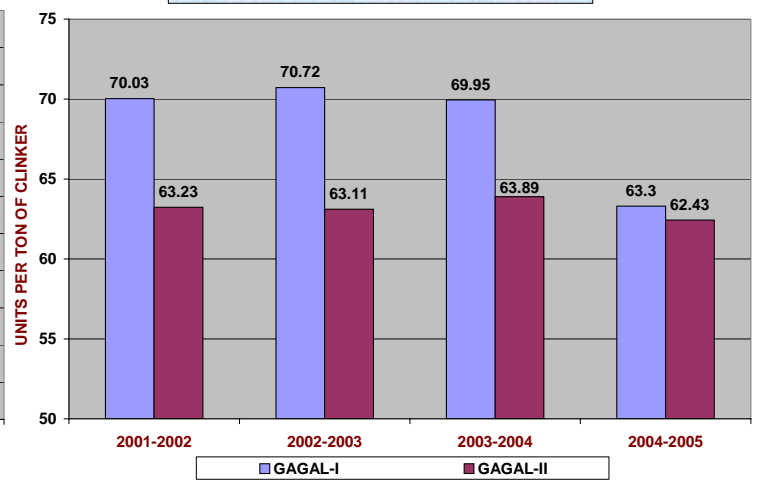
**Energy Conservation Cell Structure**



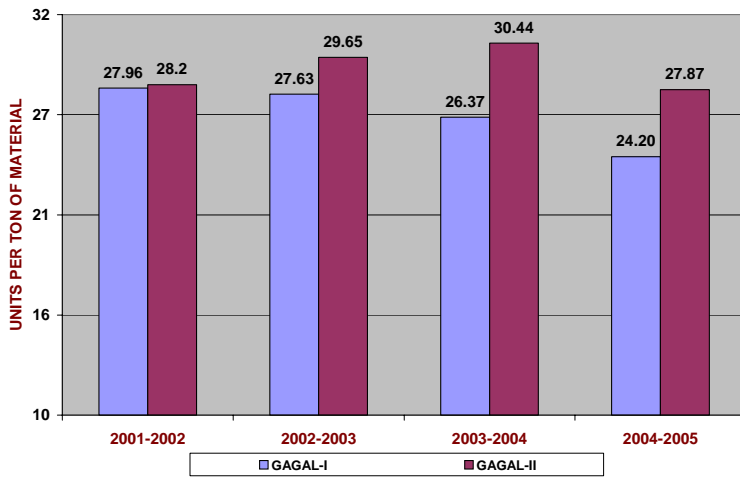
**THERMAL POWER CONSUMPTION IN G-I AND G-II**



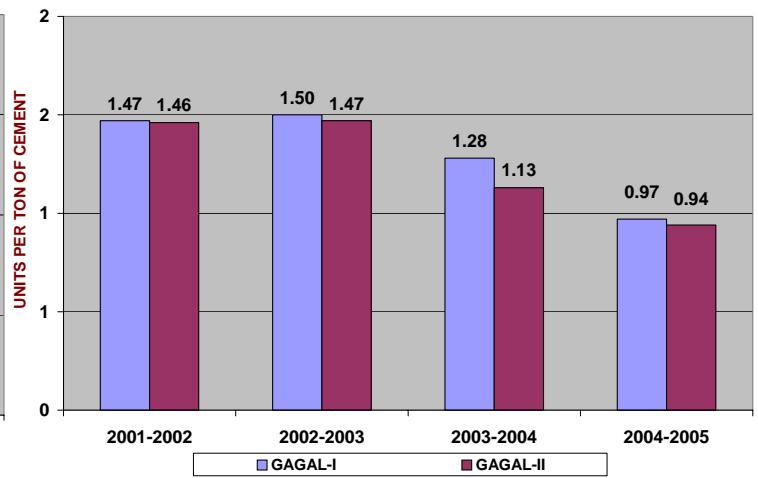
**POWER CONSUMPTION FOR CLINKERING**



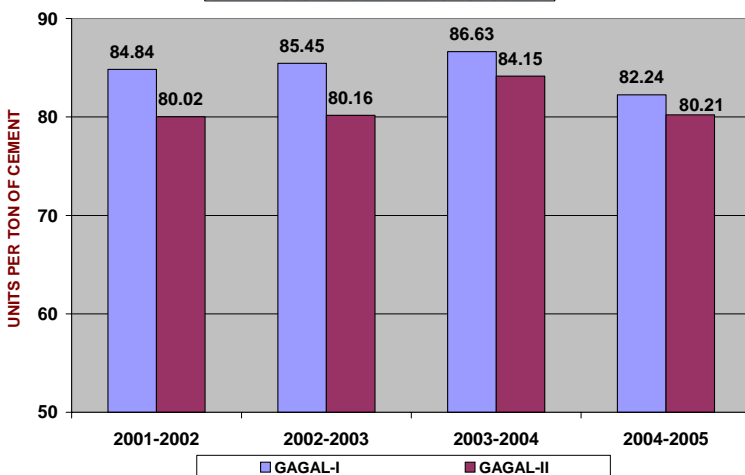
**KILN POWER CONSUMPTION**



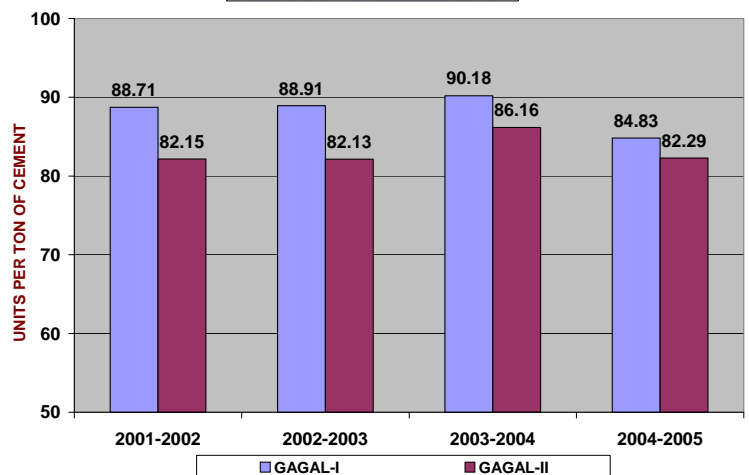
**POWER CONSUMPTION FOR CEMENT PACKING**



**PROCESS POWER CONSUMPTION**



**NET POWER CONSUMPTION**



## Energy Conservation Achievements

The Gagal Cement Works has taken various initiatives during the year 2004-05 & implemented various initiatives for energy conservation. Major energy conservation projects are listed below.

- 1) Optimisation of new six stages, double string preheater in Gagal-1 .
- 2) Optimisation of new clinker cooler (CIS-CFG-MFR) in Gagal-1
- 3) Optimisation of low primary air multi-channel Duoflex burner in Gagal-1.

After this modification and Optimisation the Thermal Energy consumption has reduced from 786 kcal/Kg clinker to 710 kcal/kg clinker in the year 2004-05. We have also taken various initiatives to reduce electrical energy consumption in both the units and few of the initiatives and achievements are given below.

### Initiatives taken for Thermal Energy Consumption

<b>Installation of Six stages preheater, Clinker Cooler &amp; Multi channel Burner in Unit-1</b>			
Heat Consumption in 2003-04		786	Kcal/Kg Clinker
Heat Consumption in 2004-05		710	Kcal/Kg Clinker
Savings		76	Kcal/Kg Clinker
Clinker production in 2004-05		1069450	Tons
Savings		81278200000	Kcal
Coal CV		4456	Kcal /Kg Coal
Coal Savings		18240	Tons
Coal Cost		2821	Rs/Ton
Savings in Rs		514 .56	Rs Lacs

<b>Savings due to use of high Combustable flyash in coal</b>			
		G-I	G-II
Cost of coal for 1000 kilo cal		0.60	0.60
Calorific value of coal kilocal/kg		4456	4453
Cost of Nangal flyash	Rs /Tn	266	266
Calorific value of Nangal flyash kilo cal /kg		550	550
Cost of Nangal flyash for 1000 kilocal		0.48	0.48
Quantity of Nagal Flyash used MT 2004-05		3058	4009
Total calorific contribution		<b>1681900000</b>	<b>2204950000</b>
Savings due to use of N flyash for 1000 kilo cal as for coal replacement		0.12	0.12
<b>Savings on annulised basis Rs/Lacs</b>		<b>1.96</b>	<b>2.57</b>

### Initiatives taken for electrical energy Conservation:

<b>Raw mill -1circuit mod for divert LE Cyclone product to final product</b>			
Mill feed rate before modification		118	TPH
Mill feed rate after modification		130	TPH
Gain in output		12	TPH
Power Savings		0.69	kWh/t mat.
Rawmeal grinding upto July'04-March'05		761217	MT

<b>Cost Savings (July'04 - Mar'05) @Rs3.13/kWh</b>		<b>16.44</b>	<b>Lacs</b>
Proposal implemented on 28 June 04			

<b>Raw mill -2circuit mod for divert LE Cyclone product to final product</b>			
Mill feed rate before modification		118	TPH
Mill feed rate after modification		130	TPH
Gain in output		12	TPH
Power Savings		0.69	kWh/t mat.
Rawmeal grinding upto Oct'04-March 05		400055	MT
<b>Cost Savings (Oct'04 - Mar'05) @Rs3.13/kWh</b>		<b>8.64</b>	<b>Lacs</b>
Proposal implemented on September 04			

<b>Replacement of LLP with Belt Bucket Elevator in Raw Mills</b>			
Power consumption in LLP		272	kW
Power consumption in Belt Bucket elevator		125	kW
Power saving per hour		147	kW
<b>Annual savings (2004-05)</b>		<b>29.12</b>	<b>lacs</b>
Running hrs of Raw mill		6329.25	hrs

<b>Reverse air Damper optimisation</b>			
Power consumption by during off cycle and damper in open position		104	kw
Power consumption by during off cycle and damper in close position		48.9	kw
Power saving on closing the damper of reverse air fan during off cycle		55	kw
Proposal implemented on 12 July 04			
<b>Total Savnigs (2004-05)</b>		<b>8.0</b>	<b>lacs.</b>

<b>Reverse Air Fan optimisation after damper rectification</b>			
Power consumed during off cycle and damper closed position		48.9	kw
Duration per day		18	hrs
Kiln running days		330	days
<b>Total Savnigs (2004-05)</b>		<b>5.71</b>	<b>lacs</b>

<b>KII VRM bag house Fan detipping for improved efficiency</b>			
Power consumption of BH Fan before modification		800	Kwh
Efficiency of Fan before modification		70.18	%
Efficiency after detipping		72.35	%
Power saving		17.36	Kwh
Running hrs after modification		4417.0	hrs
<b>Total Savings (2004-05)</b>		<b>2.4</b>	<b>Lacs/annum</b>

<b>CF Silo Dust Collector Fan Replacement</b>				
	Motor Rating	Actual Cons.	Fan Flow	
	KW	kW	m3/hr	
Before Replacement	37	34.9	30000	
After Replacement	22	18	18000	
<b>Power Savings</b>		<b>16.9</b>		
Running hrs Feb'05- Mar'05			1119.5	hrs
Implementation during Aug shutdown				
<b>Total Savings (2004-05)</b>			<b>2.34</b>	<b>Lacs</b>

<b>Coal Mill FK Pump &amp; PD Blower Optimization in Gagal-1</b>				
Amps by FK pump operation		22	A	
Power consumed by FK pump		14.23	KW	
Amps by PD blower operation		130	A	
Power consumed by PD blower		84.10	KW	
Time taken to fill PC coal surge hopper from 20T to 29T		1.58	hr	
Time taken by PC coal surge hopper to get emptied from 29T to 20T		1.67	hr	
Total power consumed by FK pump and PD blower		98.33	KW	
Earlier running hrs of FK pump and PD blower per shift		8.00	hrs	
Present actual operating hours of FK pump & PD blower per shift		4.74	hrs	
Saving in running hrs of FK pump & PD blower during bag filter in operation			3.26	hrs
Estimated savings for 3.26 hrs per shift		1003.3	Rs	
Estimated savings for 3 shifts or per day		3010	Rs	
Total power saved per shift			<b>320.6</b>	<b>KW</b>
Total power saved per day(3 shifts)			<b>961.7</b>	<b>KW</b>
Implementation in Nov.,04				
Rhrs from Dec'04-Mar'05		<b>2806.50</b>	<b>Hrs</b>	
<b>Total Savings (2004-05)</b>		<b>3.52</b>	<b>Lacs</b>	

<b>Optimisation of running of Cement Silo-7 extraction &amp; surge bin aeration blowers in Packing House</b>			
Power consumption by bin aeration blower		5	kw
After stopping the blower & tapping from extraction blower power saving		5	kw
Annual Power saving		39600	kw
<b>Annual Savings</b>		<b>1.24</b>	<b>Lacs</b>
Implemented on 1st Jan'05			
<b>Total Savings (2004-05)</b>		<b>0.31</b>	<b>Lacs</b>

<b>Automatic tripping of flyash unloading compressors during ideal state.</b>		
Power consumption at unload cond.	40	KW
R. Hrs. Of unloader	12	Hrs/day
Power savings per day	480	kW/day
Power savings per annum	158400	kW/Annum
Estimated Annual Savings in Rs	4.75	Lacs
Implementation Date 10/08/04		
<b>Total Savings (2004-05)</b>	<b>3.04</b>	<b>Lacs</b>

<b>Spout modification in Galgal I Packers</b>		
Average Power consumption in Galgal I packer (2003-04)	1.3	kwh/tn
Average output of packers before modification	85	Tn/hr
Average output of packers after modification	95	Tn/hr
Power consumption after modification	0.97	kwh/tn
Estimated power saving	0.31	kwh/tn
Average packign per month from Galgal I	100000	tn/hr
Implementation in AUG,04		
Packing from G-1 from Aug'04-Mar'05	<b>785727</b>	Tn
Savings2004-05	<b>7.62</b>	<b>Lacs</b>

<b>Savings due to overall reduction in power consumption</b>				
In The Year 2003-04		G-1	G-2	
Gross Power Cons.	kWh/T Cem	94.17	89.67	
2004-05	kWh/T Cem	88.2	85.74	
Difference	kWh/T Cem	5.97	3.93	
Cement Grinding 2004-05	MT	1165355	1810790	Total Savings
<b>Savings 2004-05 RS/Lacs</b>	<b>Rs in Lacs</b>	<b>217.76</b>	<b>202.96</b>	<b>420.72</b>