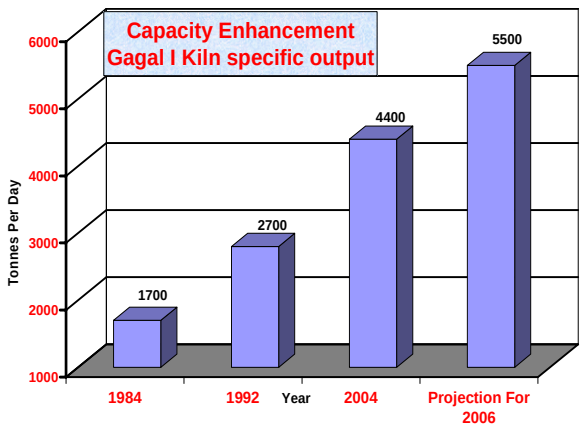
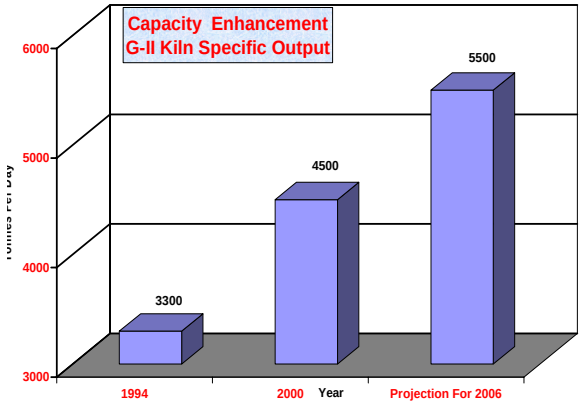
Unit Profile - ACC Gagal Cement Works (GCW)

Gagal Cement Works implemented & obtained 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 3.2 Million Tons of blended cement** and is likely to increase to 4.0 Million tonnes by next financial year (2005-06)

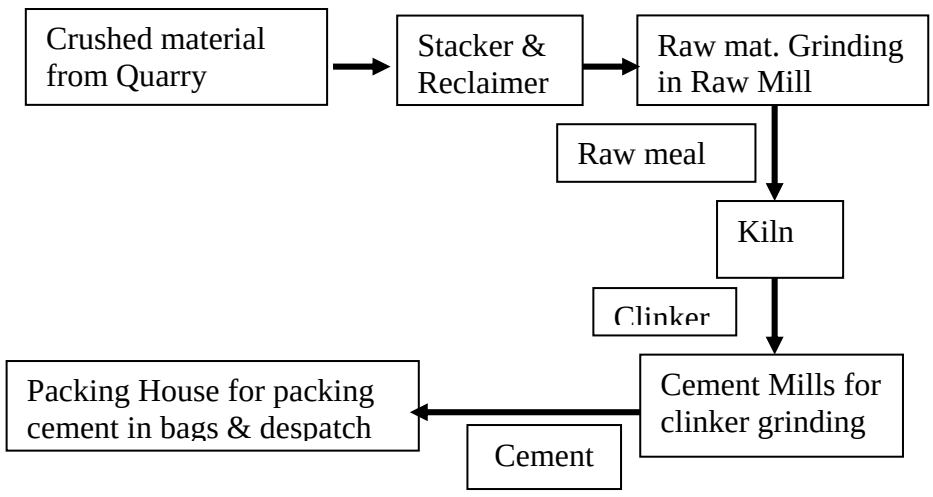




GCW is market leader in northern region and maintains its market share in all strategic markets. GCW is the largest cement unit in this zone. There are four other major cement manufacturers from HP, Punjab and Rajasthan who are our competitors.

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	2001-02	2002-03	2003-04
Clinker Production	Lacs Tons	7.35	8.08	7.93
Cement Grinding	Lacs Tons	10.39	11.29	11.19
Thermal Energy Consumption	Kcal/Kg Clinker	825	831	786
Electrical Energy Consumption	KWH/ Ton Clinker	70.03	70.72	69.95
Cement Packing	KWH/Ton Cement	1.47	1.50	1.28
Fly ash Absorption	%	19.70	19.70	19.97

Gagal-II

Description	Units	2001-02	2002-03	2003-04
Clinker Production	Lacs Tons	12.77	13.85	13.31
Cement Grinding	Lacs Tons	17.49	16.36	16.83
Thermal Energy Consumption	Kcal/Kg Clinker	719	721	718
Electrical Energy Consumption	KWH/ Ton Clinker	63.23	63.11	63.89
Cement Packing	KWH/Ton Cement	1.46	1.47	1.13
Fly ash Absorption	%	20.86	20.70	21.04

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:

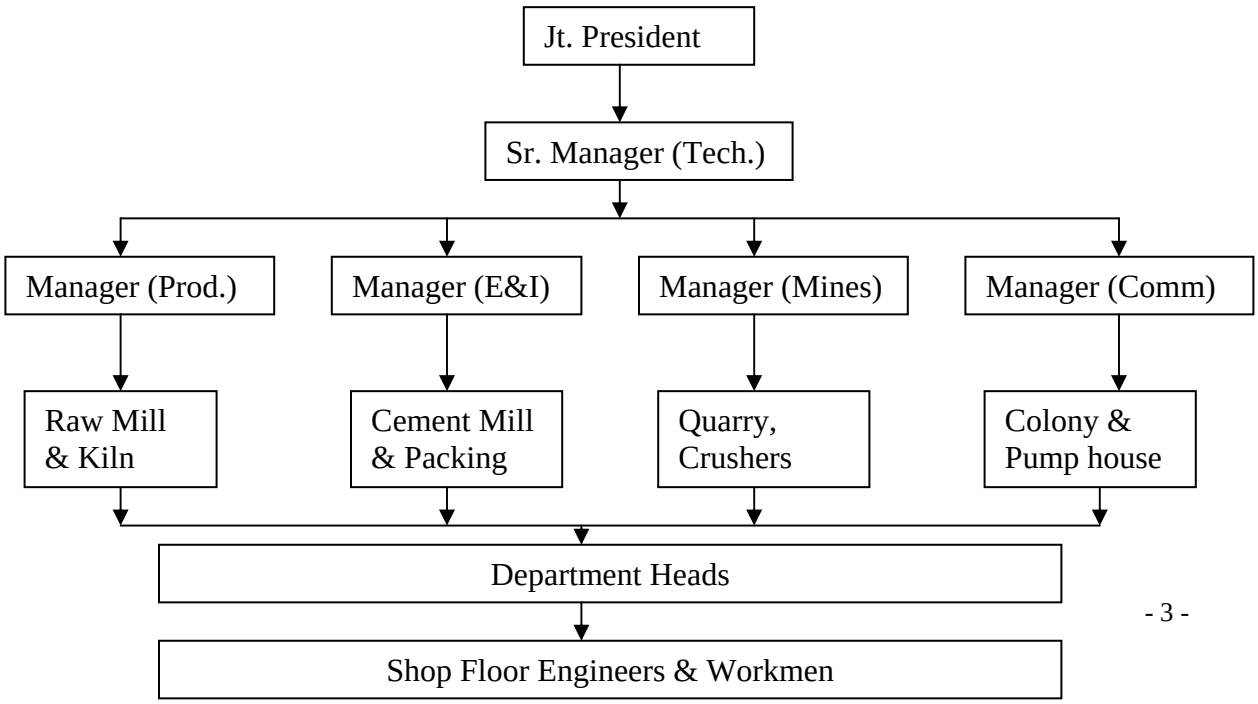
- Daily review in production meeting where weak areas are identified and attended with a view to improving energy performance and implementing remedial measures quickly.
- Weekly review by Jt.President at apex level meeting.
- Quarterly review for setting up energy targets for the year.
- Review by energy 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. In view of creating increased awareness about energy saving among the employees at various levels, we celebrate energy conservation week & conduct the various competitions. 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:-

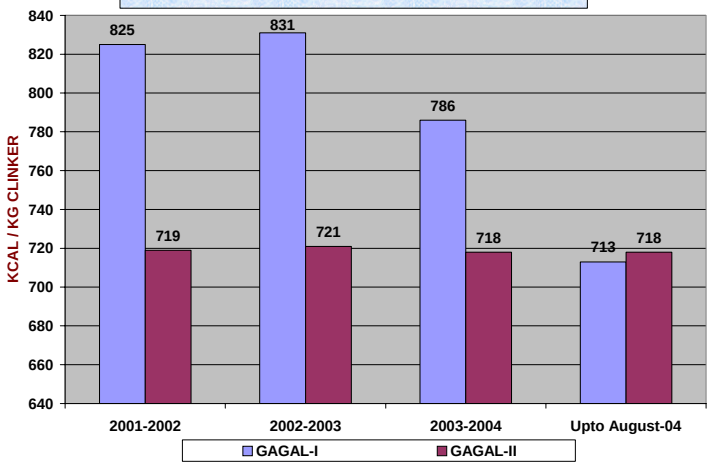
- To conserve energy & mineral resources
- To comply with all applicable & regulatory requirements
- To minimise waste generation at source & reutilize the waste of other industries.
- To create awareness among all employees for innovative ideas towards conservation of energy.
- To make an effort to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

Energy Saved is Energy Produced.

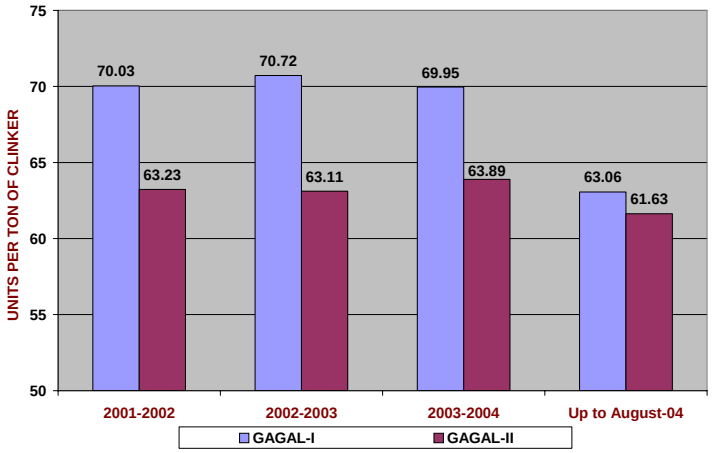
Energy Conservation Cell Structure



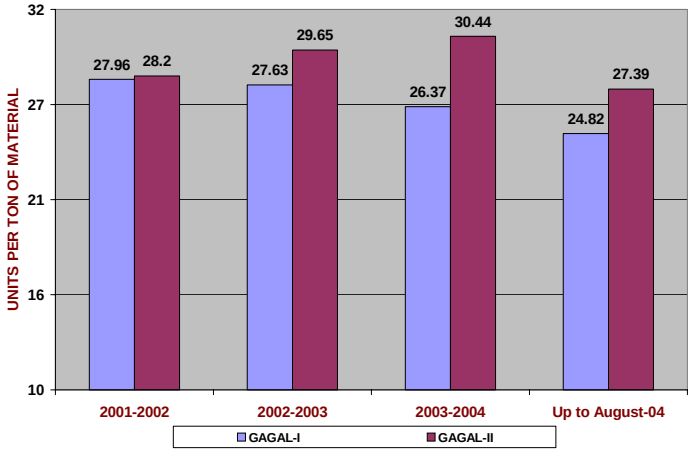
THERMAL POWER CONSUMPTION IN G-I AND G-II



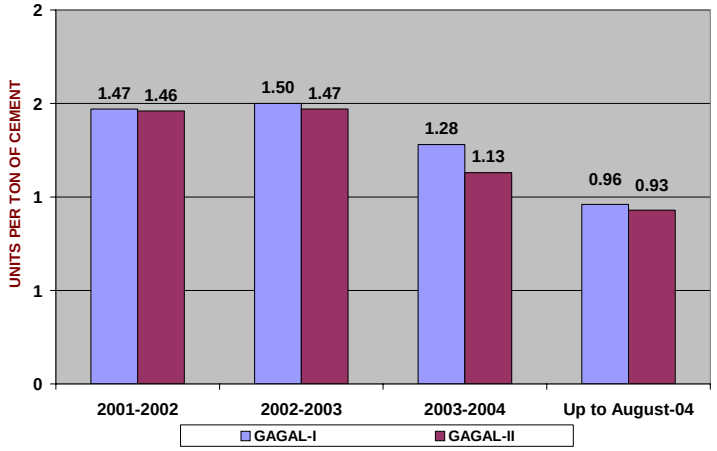
POWER CONSUMPTION FOR CLINKERING



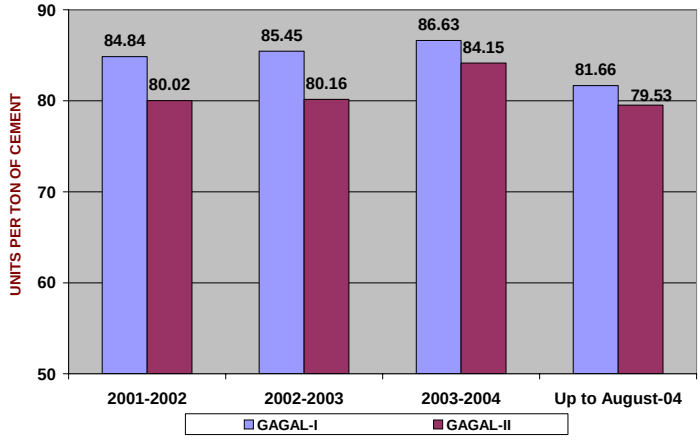
KILN POWER CONSUMPTION



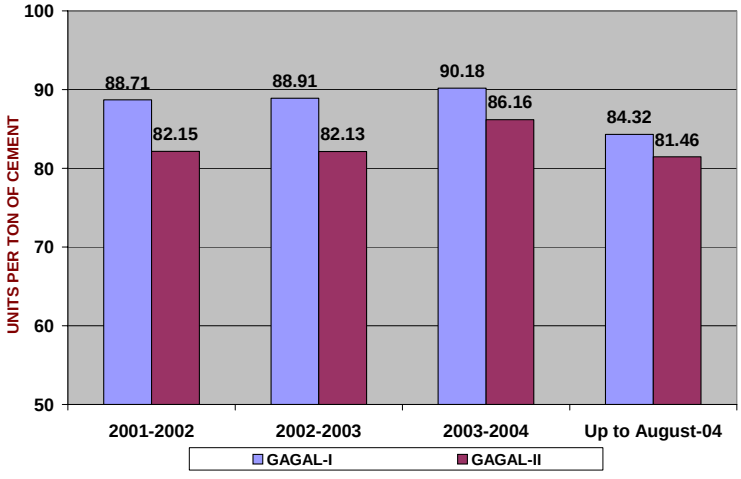
POWER CONSUMPTION FOR CEMENT PACKING



PROCESS POWER CONSUMPTION



NET POWER CONSUMPTION



Energy Conservation Achievements

The Gagal Cement Works has taken various initiatives during the year 2003-04 & implemented for energy conservation. Major energy conservation projects are listed below.

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

After this modification the Thermal Energy consumption has reduced from 827 kcal/Kg clinker to 720 kcal/kg clinker in the year 2003-04 (Four months) which has resulted in saving of Rs 192.79 lacs in four months & subsequently thermal energy has further reduced to 710 kcal/kg clinker in the current year. This reduction corresponds to estimated saving of Rs 602 lacs in the current year.

Installation of Six stages preheater, Clinker Cooler & Multichannel Burner in Unit-1					
Heat Consumption before modification				827	Kcal/Kg Clinker
Heat Consumption After Modification				720	Kcal/Kg Clinker
Savings				107	Kcal/Kg Clinker
Clinker production from dec'03 to Mar'04				314665	Tons
Savings				33669155000	Kcal
Coal CV				4890	Kcal /Kg Coal
Coal Savings				6885	Tons
Coal Cost				2800	Rs/Ton
Savings in Rs				192.79	Rs Lacs

4) Installation of secondary crusher for limestone crushing in Raw mills

Secondary Crusher					
Raw Mill Production levels before modification				128	TPH
Raw Mill Production levels after modification				135	TPH
Production gain				7	TPH
Savings on power basis					
Specific power consumption of Raw Mill				23.3	kW/tn
Annual savings per mill on power basis				28	Lacs
Total Power savings for both the mills				**56**	**Lacs**

5) Replacement of LLP with BB Elevator in Raw Mills

Replacement of LLP with BB Elevator in Raw Mills					
Power consumption in LLP				272	kW
Power consumption in Belt Bucket elevator				125	kW
Power saving per hour				147	kW
Annual savings				**21**	**lacs**

6) Raw Mills separator modification

Raw Mill Separator Modification					
Raw Mill Production levels before modification				135	TPH
Raw Mill Production levels after modification				145	TPH
Production gain				10	TPH
Savings on power basis					
Specific power consumption of Raw Mill				24	kW/tn
Annual savings per mill on power basis				41.5	Lacs
Total Power savings for both the mills				**83**	**Lacs**

The energy conservation measures taken for Gagal-2 are given below.

1) K-2 cooler fan 15FN03 optimisation

K-2 cooler fan 15FN03 optimisation					
Power Consumption of fan before optimisation				155	kw
Power Consumption of fan after calibration and optimisation				105	kw
Power saving per hr				50	kw
annual saving				**10**	**lacs**

2) KII VRM bag house Fan detipping for improved efficiency

KII VRM bag house Fan detipping for improved efficiency					
Present power consumptio of BH Fan				800	Kwh
Present effeciency of Fan				70	%
Efficiency after detipping				74	%
Estimated power saving				43	Kwh
Estimated savings per annum				**8.6**	**Lacs/annum**

3) Conversion of pneumatic conveying system to mechanical conveying system for cement mills product to cement silos of G-II

Cement Mill No 3 & 4 common elevator					
Power consumption in LLP				280	kW
Power consumption in Belt Bucket elevator				46	kW
Power saving per hour				234	kW
Annual savings				**40**	**lacs**
Savings till date				**47**	**lacs**

Environment & Safety

Environment

Gagal Cement Works (GCW) being located in picturesque Himalayan ranges and Tourism State of India, environment conservation and pollution control has always topped the list of priorities. To maintain the ecological balance, afforestation cannot be neglected with plantation of more than 10.50 Lac trees over a period of 12 years in and around factory premises with a survival rate of 75 %. **ACC has also sponsored an exclusive training programme for environmental engineers at IIT, Mumbai in environment management** and application in cement industry. Further in order to have close monitoring on the activities in the field of environment protection being carried out at different plants of ACC, a centralized environment management centre is set up at corporate office Mumbai.

Some of the latest technologies adopted by GCW with the huge investment are as follows:

1. Installation of **Bag house with PTFE coated filter bags** to work at high gas temperatures
2. Adoption of **COHPAC technology** wherein bag filter is installed in series with the existing pollution control equipment like ESP to further reduces the stack emissions.
3. Installation of **root zone technology** for wastewater management.
4. **High magnesia limestone**, which is considered a waste rock, is used in cement manufacturing without sacrificing the quality of cement. **Software SURPAC 2000** is being used for long term planning.

Trained manpower for operation & Maintenance of the treatment / disposal facilities for :

(a) Effluents

(b) Emissions

(c) Hazardous / bio-medical / Solid Waste

Apart from corporate division of environment, GCW has a fully functional Environmental Management Cell having experienced environmental engineers, horticulturists, chemist's etc. A trained manpower of 32 person is engaged for operation, monitoring and maintenance of pollution control equipments.

CERTIFICATION & AWARDS

The unit has been certified with **"IS/ISO-9002: Quality Management System" & "IS/ISO - 14001: Environmental Management System"** by **"Bureau of Indian Standards"** in the Years 1997 & 1998 respectively. In addition to this Gagal Cement Works has been certified by KPMG for **"OHSAS - 18001 (Occupational Health & Safety Management System)**.

Our relentless efforts have made us in bagging the coveted **"Subh Karan Sarawagi Environment Award – 1998-99"** instituted by the Federation of Indian Mineral Industries for the measures taken for the protection of environment while mining; which includes Air, Water, Sound Pollution & Soil Degradation, we have also received the following prestigious awards as follows

- **"Indira Priyadarshini Vrikshamitra Award for 1996"** instituted by the National Afforestation & Eco-Development board under the ministry of Environment & Forest for the extraordinary work carried out in the area of afforestation.
- **FICCI** award for **"Corporate Initiative in Adapting Innovative Measures for Control of Pollution, Waste management & conservation of mineral resources in the mines & plant"** for the year: 1997-98.
- **"Drona Trophy "** for "**extra ordinary efforts for protection of environment & mineral conservation under large mechanized mines sector**" was presented to Gagal Cement Works by **Bureau of Indian Mines** in the year 1999.
- **Golden Peacock Environment Management special Award 2001** for the outstanding efforts put in for **Environmental Management in large manufacturing sector.**

- **Indo German Greentech Environment Excellence Award for** the year 2000 - 2001.

Safety

GCW, Barmana, a unit of The Associated Cement Companies Limited, Mumbai, recognize that good occupational health & safety performance is an integral part of efficient and profitable business management. This Plant has awarded with Prestigious "Sword of Honor" by "British Safety Council; England (U.K) " in 1993 for excellence in safety performance.

To achieve our goal of 'Zero' accident we have been carrying out the following activities.

1. Suitable safety training and educational activities related to and required for the prevention of personal injuries.

2. Organize various safety promotional / awareness activities to develop & sustain the interest of the workers in establishing & maintaining safe conditions of work.

3. Plant safety inspections in order to observe the physical conditions of work and the work practices and procedures followed by workers.

4. Advice on measures to be adopted for removing the unsafe physical condition and preventing unsafe actions by workers.

5. Monitor of work environment in respect of noise, illumination and render advice on measures to be adopted for improvement of the same.

New Six Stage Preheater

Clinker Cooler – CFG-CIS-MFR

Secondary Crusher

Belt Bucket Elevator In Raw Mill

K-2 Cooler Fan 15FN03

K-2 VRM Bag House Fan

Innovative project implemented at Gagal Cement Works in Unit-2

Installation of Flyash Dryer by utilisation of waste gases from clinker cooler.

The availability of dry fly ash from thermal power plant was limitation to enhance the fly ash absorption in PPC cement. Gagal works were forced to use wet fly ash which ultimately reduces the through put of cement mills & leads higher specific power consumption at grinding stage. In order to over come the wet fly problem we have installed the flyash dryer where waste gases from cooler exhaust is used to dry the wet flyash from 20% moisture to less than 1% moisture. The total project cost is 3.30 crores. Now there is no constraint for dry fly ash availability & we have increased flyash percentage from 20.5 % to 24 % in PPC cement. Resulted in substantial benefits to the organisation.

1. Proposal for Installation of VVVF Drive for Dilution Air Fan in Kiln I System

Background:
It is being observed that dilution air fan damper position range in between 16-30% with both raw mills in running condition. Therefore exercise was taken up to estimate the power losses and find remedial actions.

Observations Made:
Data was collected to estimate the pressure losses across the damper, which was observed around 288 mm of WC. The other observations are as follows:

- At kiln feed of 225 TPH and one raw mill running; damper position was only 16%.
- At the downstream of DAF damper, static pressure was around –63 mm wc and at upstream of damper it was around 225 mm wc. Based on the calculation, ***power losses across damper are 84 kw whereas process power of fan is only 64 kw***. This shows that ***system has potentials to draw air from its surrounding by virtue of negative draft*** inside the duct and mechanical work to be done by fan is minimum.
- With both raw mills running and at kiln feed of around 300 TPH; damper position is in the range of 30%, which is very less and signifying appreciable power losses.
- At the start up of the kiln, dilution air fan runs at its full capacity to control bag house inlet temperature.

Impact of Implementation:

On the basis of above data it is proposed to provide VVVF drive to control the speed of dilution air fan, thus ensuring power saving to the tune of RS 13 lacs per annum.

2. Optimization of PC Coal Mill FK pump and PD blower operation in Gagal –1.

Background:

There is additional running of ~6 hrs per day of FK pump & PD blower for kiln-1 PC coal due to handling of coal mill dust collector fines, which is taking the ventings from hoppers and Rotor scale.

Observations Made:

It is studied that the additional running of 6 hrs per day can be avoided by the use of FK pump hopper as a collecting bin for dust collector material at the time when PC coal is not transferred to the surge hopper in preheater, which will avoid the idle running of FK pump & PD blower & result in saving of 32.75 Kw.

Impact Of Implementation:

With this act, we can save around a whooping **786 KW per day** giving the gains of around **6. 5 Lacs per annum.**

3. Replacement of LLP with Belt Bucket Elevator in Raw Mill

Background:

Initially the raw mill product was conveyed to the blending silo top pneumatically with the help of Low lift pumps (LLP) by using compressed air.

Observations Made:

It was studied that the power consumption involved in lifting the raw meal to the silo top is around 272 KW due to the involvement of compressors. So, it was proposed that a belt bucket elevator to be installed in place of LLP which consumes less power as compared to LLP.

Impact of Implementation:

It was observed that with the installation of belt bucket elevator power consumption goes down to around 125 KW, thus resulting in a power saving of around **147 KW** per day with an annual savings of **21.6 Lacs.**

4. Replacement of CF Silo dust collector fan motor with low rating motor

Background:
For the venting of CF silo and VRM product poldos conveying air a high capacity dust collector was installed at the top of CF silo.

Observations Made:
After conversion of pneumatic conveying system to mechanical conveying system of VRM product the venting requirement from the silo has decreased. The motor installed in existing dust collector draws a power of around 30 KW. So, it was decided that to lower the capacity of the dust collector by reducing the rating of the motor of the fan.

Impact of Implementation:
It was later seen that with the installation of lower rating motor, the power consumption goes down to 22 KW, thus resulting the power savings of around **8 KW** per hour and thus making the gains of around **1.6 Lacs per annum.**

5. Spout Modification in Gagal-1 Packers

Background:
Initially, the output of the packers was around 85 tons/hr and with the specific power consumption of 1 KWH/ton.

Observations Made:
It was studied that flow of cement into the bags was through a bore dia. of 50mm. it was proposed to increase the size of the bore to 55mm dia which will result in the increase of the output.

Impact of Implementation:
It was seen later that the output of the packers are increased from 85 tons/hr to **95 tons/hr** and bringing down the specific power consumption to **0.9 KWH/ton.** This act results in the reduction of specific power consumption as well as increase in the despatch, thus resulting in the gains of around **3.16 Lacs per annum.**

6. Reverse Air Fan Damper Optimization

Background:

Preheater outlet gases are going into the Reverse Air Bag House (RABH) before vented out to atmosphere. In this, the requirement of the purging air is fulfilled by the RABH fan outlet gases with the help of reverse air fan.

Observations Made:
During off cycle of 18 hours per day, reverse air fan inlet damper was remained open resulting in the constant running of the fan. Due to this operation, the power consumed by the reverse air fan was around 104 KW. We have proposed to install a damper at the reverse air fan inlet such that during off cycle it will remain in closed position resulting in the fan running at no load condition.

Impact of Implementation:
With the installation of damper at the inlet of the fan, resulted in the power saving of around **55KW** and hence the annual gains touches the mark of **8.2 Lacs.**

7. Reverse Air Fan Optimization with Damper Rectification

Background:
Previously, a damper installed at the inlet of the reverse air fan remains closed during the off cycle of 18 hours thus resulting in the power consumption of 48.9 KW per hour.

Observations Made:
Keeping in mind that the fan keeps on running on no load condition during off cycle, then it was suggested to stop the fan during the off cycle time.

Impact of Implementation:
By keeping the fan stopped during the off cycle time, power saving of around **880 KW** per day was reported and thus resulting in the savings of around **8.6 Lacs per annum.**

8. Kiln Shell Cooling Fan Operation to be Controlled by Kiln Shell Temperature

Background:
Initially, the kiln shell cooling fans keeps on operating whether the temp. of the shell is high or low.

Observations Made:
It was observed that all the kiln shell cooling fans kept on operating day and night keeping aside the temp. of the shell. Thus consuming unnecessary power during normal conditions also. So, it was proposed to have a shell

scanner, which senses the kiln shell temp. and regulates the operation of the shell cooling fans.

Impact of Implementation:
With the installation of the shell scanner, it was observed that the cooling fans doesn't remain in operation the whole day, thus resulting in the power savings and the hence giving the gains to around **3.1 Lacs per annum.**

9. Automatic Tripping of Flyash Unloading Compressors

Background:
Flyash from the bulkers are unloaded pneumatically round the clock depends on receipt of bulkers for which compressed air from compressors is needed. The unloading of the flyash takes place for around 12 hours in a day intermittently.

Observations Made:
It was observed that flyash unloading compressors kept on running idle even when the unloading of the flyash from the bulkers is not in operation. So, it was suggested that these compressors should automatically get tripped when the flyash unloading process is not going on.

Impact of Implementation:
The tripping of these compressors when not required results in the power savings of around **40 KW** per hour and hence results in the annual savings of **3.96 Lacs.**

10. Modification of Clinker Stock Pile Dust Collector I/L Duct

Background:
A dust collector is installed for the dedusting of the clinker stockpile. Initially, the I/L duct of the dust collector had the dia. of 0.8 m.

Observations Made:
It was observed that the pressure drop across the duct is found out to be 76 mmwc. So, it was proposed that to increase the duct dia. to 1.0 m so as to gain on pressure drop while maintaining the approx. same flow in the duct.

Impact of Implementation:
It was seen that by replacing the duct with a larger dia. results in the saving of 42 mmwc across the duct and results in the savings of about **8.5 kW** and giving the gains of around **1.9 Lacs per annum**.

11. LNV Separator Modification

Background:
In the cement mill, the separator installed for the separation of fines with the bottom dia. of 2.8 m and the flow of 275000 m3/hr was obtained.

Observations Made:
It was observed that a particular velocity is maintained at the bottom of the separator. So, it was proposed to reduce the bottom dia. to 2 m with a reduced flow of 225000 m3/hr thus maintaining the same velocity at the bottom of the separator.

Impact of Implementation:
With the modification done, we are getting the same velocity as the previous one at a lower flow rate, thus giving savings in power of fan of around **84 kW** and thus giving the annual savings of around **16.8 Lacs.**

12. K-2 Cooler Fan No.3 Optimization

Background:
K-2 cooler fan no.3 is one of the fan used for the cooling of the clinker. It was designed for the flow of 17.50 m3/sec at 700 mmwg static pressure.

Observations Made:
It was observed that the temp. of the outlet gases was dropping. So, the flow of the fan was measured that was coming out to be on the higher side i.e. 21.52 m3/sec at 375 mmwg static head as compared to the 14.33 m3/sec indicated in the Central Control Room (CCR). So, the calibration of the said fan is done.

Impact of Implementation:
It was seen that with the calibration of the fan No.3, we ended with the power saving by running the fan on lower rpm. The power goes down from 151 kW to 105 kW thus making the power saving of 46 kW and the gains amounting to around 9.2 Lacs per annum.

13. Installation of Common Elevator for Cement Mill No. 3 & 4

Background:
Initially, there was Low Lift Pump (LLP) available for transferring cement from the cement mills 3 & 4 to the cement silo.

Observations Made:

It was observed that for transferring cement to the top of the silo 4 compressors for LLP are used thus consuming 280 kW. Then, it was proposed that to replace the LLP system with a belt bucket elevator.

Impact of Implementation:
It was seen that with the installation of the belt elevator in place of LLP gives the gain in power to about of **234 kW**, and hence making the annual savings to about **40 Lacs.**

14. Installation of Secondary Crusher

Background:
Initially, the limestone, which was coming from quarry, is of larger size, due to this output of raw mills was not going beyond 128 TPH.

Observations Made:
It was studied that the size of the stone was large enough to hinder the increase in the output of the raw mill. So, it was proposed to have a pre-crusher before feeding the limestone into the raw mill.

Impact of Implementation:
After installation of secondary crusher the lime stone size has reduced from 75 mm to less than 20 mm & enhanced the raw mill out by 7 TPH, which has resulted in saving of specific power consumption by 1.3 kwh/t of material. This action has resulted in the savings of around **56 Lacs per annum** for both mills.

15. Using Refratherm Bricks in Kiln-1 in place of Conventional Bricks

Background:
Conventional bricks are used in Kiln-1 at 53-60 m.

Observations Made:
It was studied that the surface temp. of the kiln by the application of the conventional bricks are on the higher side i.e. 320oC. So, it was proposed that to replace the conventional bricks with the Refratherm bricks.

Impact of Implementation:
It was seen that by the application of Refratherm bricks, the surface temp. of the kiln comes around to be **230oC**, thus making an energy savings of around **217551 Kcal/hr** and thus resulting in the coal savings of **40 kg/hr** and thus making the annual savings of **7 Lacs.**

16. Replacement of Gagal-1 Packing House Elevators

Background:
Chain elevators are used to convey the spilled cement from the packer to the collecting bin over the packer.

Observations Made:
It was studied that the operation of these chain elevators consumes 20 kW. So, it was proposed that to replace these chain elevators with belt bucket elevators.

Impact of Implementation:
It was seen that with the replacement of the elevators, power consumed by the elevator goes down to **10 kW**. Thus making the savings for the three elevators to around **5.2 Lacs per annum.**

17. Raw Mill Separator Modification

Background:
Initially, the main fan installed in the raw mill separator is of lower capacity, just catering to the mill output of 135 TPH.

Observations Made:
It was studied that besides the margin in the mill, the feed cannot be increased due to the lower capacity of the separator. So, it was proposed to increase the capacity of the separator by installing a higher capacity separator main fan.

Impact of Implementation:
It was seen that by increasing the size of the main fan in the separator, the output of the raw mill increases by **10 TPH**. Resulted in saving in specific power consumption 1.6 kwh / ton material and thus making the annual savings of around **83 Lacs.**

18. K-2 VRM Bag House Fan Detipping for Improved Efficiency

Background:
Initially, the K-2 VRM bag house fan was giving us the required flow but at the cost lower efficiency.

Observations Made:

Readings were taken from the field and it was derived that the efficiency of the fan was on the lower side as recommended. So, calculations were made and was proposed that the Detipping of the fan has to be done.

Impact of Implementation:
It was studied that the efficiency of the fan increases by Detipping at the same flow but with the savings in power to about **43 kW**. Thus resulting in the gains of around **8.6 Lacs per annum.**

19. Replacement of Cement Mills No. 1 Discharge & Product Elevator

Background:
Initially, the mill outlet material is conveyed ahead by a chain elevator and final product is conveyed to the silo top also by chain elevator.

Observations Made:
It was studied that these chain elevators consume more power in transferring the material to the destination. So, it was proposed to replace both the elevators with the belt bucket elevators.

Impact of Implementation:
It was observed that after the installation of the belt bucket elevators in place chain elevators, the power consumption has come down from 29 to 16 kW in discharge elevator thus giving the savings of **13 kW** with an annual savings of **2.2 Lacs**. And in the product elevator, power consumption reduces from 29 to 15 kW, giving us the savings of **14 kW** with an annual saving of **2.4 Lacs.**

20. Replacement of Cement Mills No. 2 Discharge & Product Elevator

Background:
Initially, the mill outlet material is conveyed ahead by a chain elevator and final product is conveyed to the silo top also by chain elevator.

Observations Made:
It was studied that these chain elevators consume more power in transferring the material to the destination. So, it was proposed that to replace both the elevators with the belt bucket elevators.

Impact of Implementation:
It was observed that after the installation of the belt bucket elevators in place chain elevators, the power consumption goes down. From 29 to 16 kW in discharge elevator thus giving the savings of **13 kW** with an annual savings of **2.2 Lacs**. And in the product elevator, power consumption reduces from 29 to 15 kW, giving us the savings of **14 kW** with an annual saving of **2.4 Lacs.**