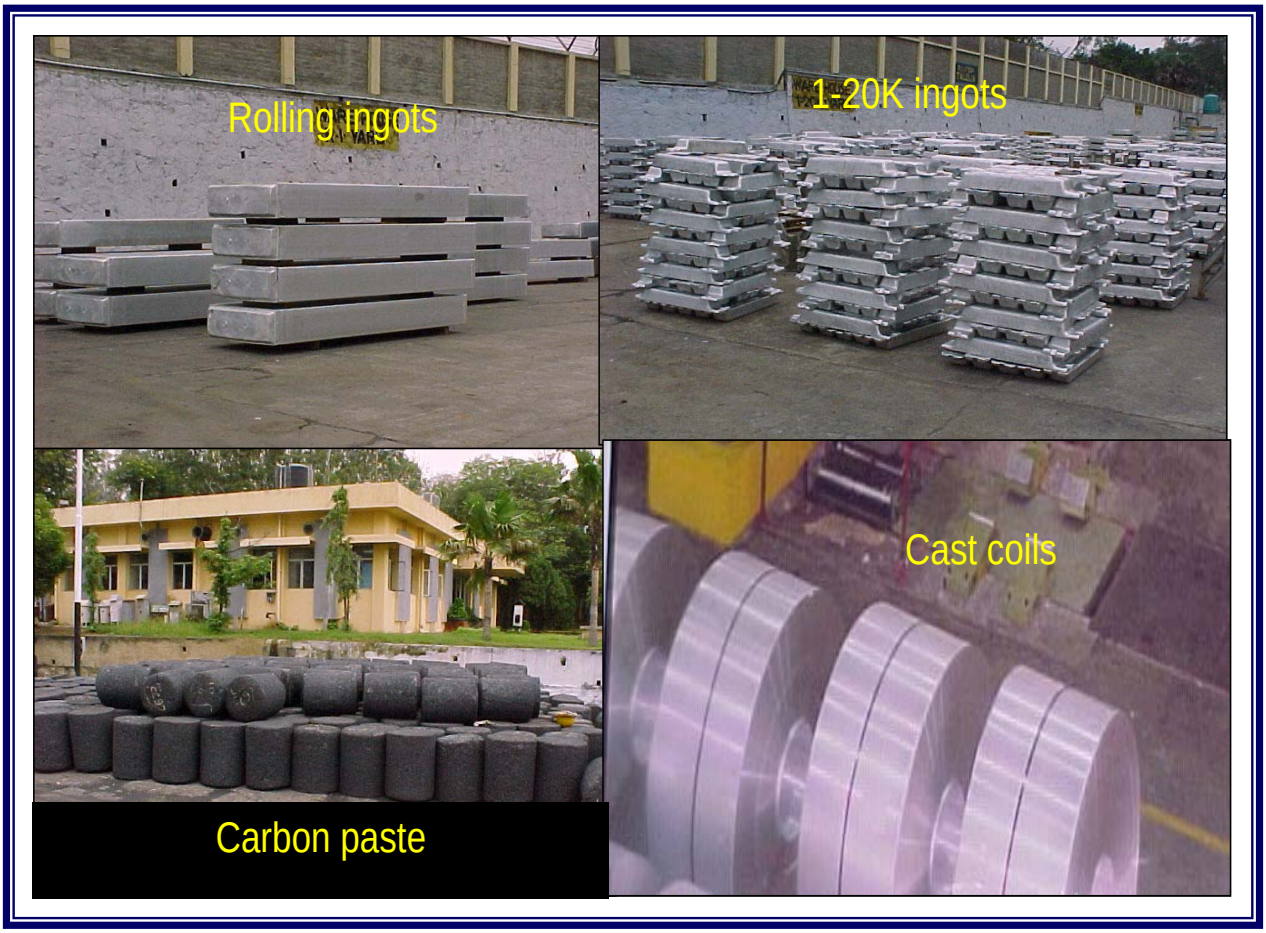
Hindalco Industries Limited
Hirakud Smelter (Orissa)

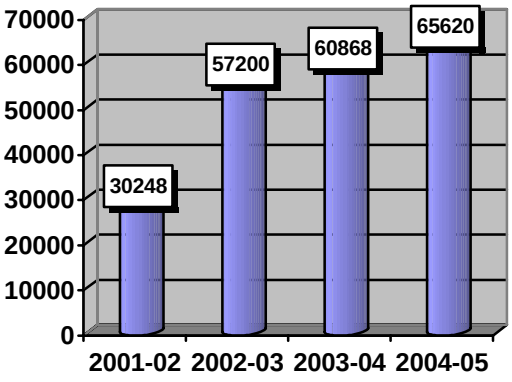
Unit profile

Hindalco, Hirakud smelter produces primary aluminium (99.6% purity) and is presently having a capacity of 65000 MT per annum. The technology for production of aluminium is being done by HSS (**horizontal stud soderberg**). The HSS technology has become obsolete now a day, but the unit maintains high standard of performance and presently operating at its peak efficiency. The lining life of pots and paste consumption factor are some of the performance parameters where the unit has its own benchmark. Smelting of aluminium is being done by reduction method by the well-known process known as Hall Heroult process. The main raw material for production of primary aluminium is alumina and electricity. The smelter unit gets alumina from its sister plant **Muri** Works and electricity is being produced by its captive power plant, presently having capacity of 167.5 MW. Also the unit is connected to state grid for meeting power requirement during emergency situation. The main products of the units are aluminium rolling ingots, cast coil and carbon paste. The unit has the state of art continuous caster plant for producing cast coils. The products from the unit are preferred for all the down stream specialty products because of its purity and quality.

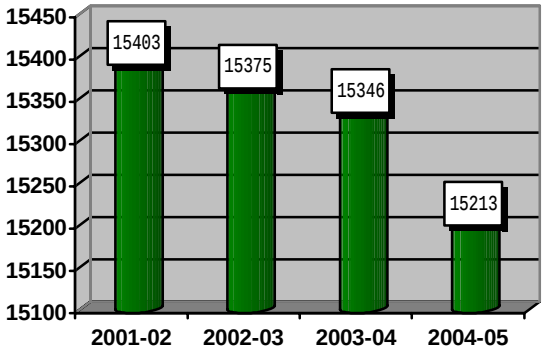
Energy Consumption



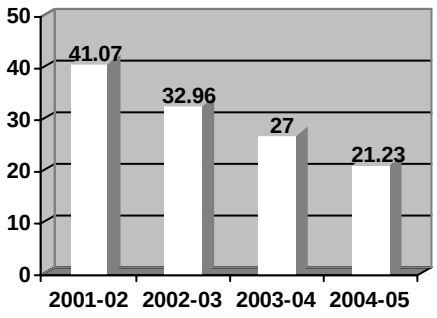
DESCRIPTION	UNIT	2002-03	2003-04	2004-05
Annual production	MT	57200	60868	**65620**
Total electrical energy consumption/annum	Lakhs Kwh	6494	10333	**10930**
Specific energy consumption (electrical)	Kwh/tonne	15375	15346	**15213**
Total thermal energy consumption	Mkcal	11152	14987	**14340**
Specific energy consumption (fuel)	Litres/Tonne	32.96	27.00	**21.23**



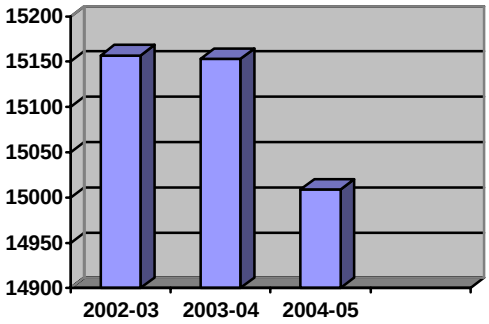
HOT METAL PRODUCTION



SPECIFIC ELECTRICAL ENERGY



SPECIFIC ENERGY (FUEL)



TOTAL DC ENERGY POT

Energy conservation commitment and policy set up

HINDALCO's Hirakud Smelter management believes that energy and resource conservation are the two building blocks for Hirakud Smelter's sustainable development. The Plant has an **Environment and Resource Conservation (E&RC) cell** which primarily focuses on energy conservation in addition to environmental issues. The activities of E&RC cell are reviewed once a month. Measurement, monitoring, managing and implementing new small group activities / in-house projects/new technologies for energy conservation are the functions of this cell. The new proposals for energy conservation projects are discussed in the E&RC cell. Key issues like conducting energy audit through external agencies and financial approval for identified energy conservation projects also constitutes the agenda of the meeting.

In an unending endeavor to improve the energy efficiency and capacity utilisation, we have constituted an apex body namely **World Class Manufacturing (WCM) Steering Committee** which is headed by the Chief Executive. The World Class Manufacturing is a holistic approach which incorporates the key features of contemporary initiatives and guides to excel in the field of energy conservation, waste reduction and optimisation of resource consumption. Under this concept, excellence and competitiveness go hand in hand which facilitates and encourages all the employees to maintain abnormality free environment and operating conditions. WCM Steering Committee constitutes of 12 WCM sub committees under which there are 48 operating teams across the entire cross section of the plant.

As a continued effort towards achieving excellence in the field of energy conservation, a **Specific Energy Policy** has been formulated for Hirakud Complex, which reflects the commitments of the top management towards conservation of energy, resources and environment. We are in fact the first Indian Company in the aluminium sector to have formulated the energy policy. **The said policy was also made public by publishing it in one of the national newspaper "The Times of India" on 23 August 2002.**

Having formulated the Energy Policy & involving people through SGA approach, the next priority for the Plant is the consolidation of the fundamentals of the Small Group Activities (SGA) at the grass root level which is a challenge being faced by the Hirakud Smelter's management. For reaping the advantages and the benefits of a concept or a practice in order to add on to the bottomline of the company, the concepts and the practices adopted need to be streamlined in the form of a well adopted system. Having established and maintained three effective and internationally recognised systems viz Quality Management System ISO 9001, Environment Management System ISO 14001 and Occupational Health and Safety Assessment Series (OHSAS) 18001 at our Hirakud Smelter, we are in process of amalgamating the best practices of all the three systems and thereby evolving a new common system which will cater to the needs of all the three established systems besides the **Energy Conservation and Management** at Hindalco Hirakud Smelter.

Energy conservation achievements:

Year	No of SGA	Investment (Rs lakhs)	Savings (Rs lakhs)	Crude pay Back period
1999-2000	21	227	169	**16**
2000-2001	29	152	179	**10**
2001-2002	31	240	212	**13.5**
2002-2003	35	89	197	**5.5**
2003-2004	36	806	712	**13.5**
2004-2005	35	476	496	**11.5**
Total	187	1990	1965	**12.1**

Innovative projects implemented during the year 2004-05:

Project Title: Air supply control system for fine bins at carbon plant

(I) Background of the project:

In carbon plant for the production of paste coke is mixed with pitch with different ratio. Nearly 50% of the coke is in powder form and stored in fine bins. During production and conveying of fine coke to the weighing feeder, due to dense nature of powder coke flow interruption was a common problem. In order to avoid flow interruption compressed air supply was given to the bins in a regular basis

(II) Observation made:

Providing regular air supply to the bins causes unnecessary wastage of electricity in the form of compressed air. A modification done with air solenoid valves and switches are provided at control room to apply compressed air when required.

(III) Technical & Financial analysis:

Saving of electrical energy in the form of compressed air = Rs 4,20,000/- per annum with an investment of Rs 50,000/-

(ii) Implementation:

This project has been implemented and is working successfully

Project Title: Modification of air slide blower pulley to reduce the pressure required in FTP

i. **Background of the project:**

The FTP having 4 numbers air slide blower out of which two are in operation and the other two are running.

ii. Observation made:

It was found that if that the actual pressure required across the air slide is much lesser than the pressure out put from the blower. Hence the pulley of the blower was modified to reduce the RPM and hence the electrical energy. The total saving in each compressor was found to be 30-40%

iii. Technical & Financial analysis:

Saving in each compressor = 25 Kw
Total electrical energy saved = 50*24*365=4.38 lakhs
Monetary saving due to the project = 8.76 lakhs

iv. Investment:-

Cost of material and labour:-20,000/-

v. Implementation:

This project has been implemented and is working successfully

Project Title: Auto firing system of Furnace A and B of old casting plant

(i) **Background of the project:**

Furnace A and B of old casting plant are stationary furnaces. Firing in both the furnaces are done manually by the operator by opening the damper for air after running the blower motor and also the valve for controlling the furnace oil.

(ii) Observation made:

Due to the manual operation of both the furnaces, the furnace oil consumption was also very high and the running hours of the blower was also high. Hence a in house control system was designed with help of PLC to control the oil flow and blower based on the required temperature.

(iii) Technical & Financial analysis:

Oil consumption in casting plant was reduced 1 lits/ ton and running hours of blower was reduced 4 hours/day/furnace.
Total oil saving was 55726 lits=55.726 KL=7.8 lakhs/annum
Electrical energy saving=4*2*365*7.5=21900Kwh =Rs 43,800/-

(iv) Implementation:

This project has been implemented with an investment of Rs 1.5 lakhs and is working successfully

Project Title: Optimization of carbon plant through put and there by reducing the furnace oil and electrical energy consumption

(i) **Background of the project:**

Carbon plant produces anode paste for pot room, which is used as anode for electrolysis process. In the year 2003-04, the heat tracer project was implemented and the operation of boiler was completely eliminated.

(ii) Observation made:

In the year 2003-04, carbon plant produces 25,000 Tons of anode paste consuming approximately 16 Lits of F.O and 34.5 Kwh of electrical energy for Ton of production. In the year 2004-05, carbon plant produces 42,000 Tons of anode paste consuming only 10 Lits/Ton of F.O and 29.75 Kwh of electrical energy by monitoring and proper process control

(iii) Technical & Financial analysis:

Saving in terms of F.O consumption=16*(42000-25000)+6*42000=524KL of F.O
Considering average F.O cost per Lits, Total saving =73.36 lakhs
Saving in electrical energy=42000*4.75=199500Kwh=4.0 lakhs

(iv) Investment:-
Nil

(v) Implementation:

This project has been implemented and is working successfully

Project Title: VFD in Rectifier Station Cooling Tower Cold well pump motor

(i) Background of the project:
Rectifier station cooling tower recirculates the cooling water required for the old rectifier station equipments. The cooling tower has hot well, cold well and draft fan motors. The cold well pump motor was operating in throttled condition (nearly 30%) opening for meeting the required pressure and flow at rectifier station equipment.

(ii) Observation made:
Earlier a VVFD was installed in the hot well pump motor. This time a VVFD was installed in the cold well pump motor. In order to adjust the pressure and flow, the speed of the motor was controlled. A potentiometer was provided at the operator cabin with pressure and flow meter. Operators adjust the speed of the motor as per the requirement. The frequency in the VVFD was set at 20Hz (low) and 40Hz (High)

(iii) Technical & Financial analysis:
It was found that the 125 Kw motor operates at an average load of 45 Kw and there by a saving of 80Kw.
Total electrical energy saved in annum=24*80*365= 700800 kWh
Total monetary saving per annum= 14 lakhs

(iv) *Investment: -*
Cost of material and labour: -2.5 lakhs

(v) Implementation:
This project has been implemented and is working successfully

Project Title: VFD for Cross Travel and Long Travel of EOT crane No 1, 2 and 3 in pot room

(i) Background of the project:

EOT (electrical operated traction crane) in our plant operates with standard contactor and timer circuit for speed and torque adjustment.

(ii) Observation made:

VVFD drives were installed in EOT crane 1, 2 and 3 after observing the successful performance in the crane 4. The purpose of the drive was mainly for reduction of maintenance cost, breakdown. But energy conservation was also a part of the project as the drive adjust the power factor and also speed can be achieved at lesser frequency.

(iii) Technical & Financial analysis:

Saving after installation of VVFD in both LT and CT motor of three cranes =3* 3*10*365+1*3*365*10=43800 Kwh
Monetary saving on installing VVFD=Rs 0.876 lakhs

(iv) Implementation:

the project was implemented w.r.t Feb-05 with an investment of Rs 4,60,000/- only.

Project Title: Lighting transformer for main and riverside colony street lights

(i) Background of the project:

The total lighting load in main and riverside colony of our plant was roughly 120Kw. The light fitting mainly consists of 70W, 125W, 250W and 400W S.V and also M.V lamps. Mainly most of the light fittings are S.V lamps.

(ii) Observation made:

The colony draws power from the state grid at 440V supply and accordingly distributes power to the various locations. As the Substation is situated at the end of the colony in-order to take into account the voltage at the farthest point the transformer tap is unchanged. Hence the light fittings also get a supply voltage of 250V, which is high. Hence two numbers lighting transformer are installed at suitable location to give a supply voltage of 210V to the lights

(iii) Technical & Financial analysis:

After putting lighting transformer

Total load for lighting circuit = 65 Kw

Monetary saving = 10 lakhs*

*** colony power is being calculated at Rs 3.50/- per unit**

(iv) Implementation:

This project has been implemented effective from Dec-04 with an investment of Rs 80,000/-

Project Title: Replacement of Fuses by MCCB

(i) Background of the project:

Fuses not only adds to the maintenance cost when being blown, also consumes large amount of power. When ever any electrical distribution board is being replaced in our plant, instead of going for SFU or FSU, the general preference is MCCB or MCB.

(ii) **Observation made:**

In the year 2004-05 the DB of pot room switch room and nearly 12 lighting distribution board has been changed, replacing nearly 1000-120 numbers FSU, TPN and SPN.

(iii) **Technical & Financial analysis:**

Considering average of 7 W/ fuses as the energy loss
Annual saving = 22075 kWh
Annual money saving = Rs 44,150/- (Rs 2/- per kwh)

(iv) **Implementation:**

The project was implemented w.r.t feb-05 with an investment of Rs 15,00,000/- only.

Project Title: Common Cooling tower for compressor house 2 & 3

i. Background of the project:

Compressor house 2 and 3 having 10 numbers of 500cfm compressor employees two numbers cooling tower

ii. Observation made:

The two numbers cooling tower are replaced with a bigger size cooling tower. The rating of the cold well pump motor of single cooling tower was 30 Kw and rating of the draft fan was 11 Kw. The common cooling tower employees a cold well pump motor of 45 Kw and 18.5 Kw draft fan motor.

iii. Technical & Financial analysis:

Saving in cold well and draft fan motor = 22.5 kW
Electrical energy saved = 1.971 lakhs Kwh
Monetary saving per annum= 3.942 lakhs

iv. Implementation:

The project was implemented w.r.t Mar-05 with an investment of Rs 10,00,000/- only.

Project Title: VVFD application in old 1-20 K ingot casting machine

i. Background of the project:

The old ingot casting machine was employing a 5 Kw D.C shunt motor for controlling the speed. Speed control with DC shunt motor was being done by resistance in the shunt field.

ii. Observation made:

From maintenance point of view the complete DC shunt motor along with the controller was replaced with a 5 Kw VVFD and 3.7 Kw squirrel cage induction motor. Apart from providing a smooth control for operation, the project has also tremendous impact on the energy saving aspects.

iii. Technical & Financial analysis:

Saving lowering the size of the motor = 1.3 kW
Electrical energy saved = 1.3*12*365=5694 Kwh
Monetary saving per annum= Rs 11,388/-

iv. Implementation:

The project was implemented w.r.t Oct-04 with an investment of Rs 50,000/- only.

Project Title: Separate pump motor for 1-20 K ingot casting machine

i. Background of the project:

Cooling water is required for both 1-20K ingot casting and DC casting in casting plant. The old casting plant consists of two numbers of ingot casting machine and one number DC casting facility. All the casting facility uses the required water from the single casting plant cooling tower having a 45 Kw hot well pump motor, 60 kW cold well pumps motor and 11 Kw draft fan motor

ii. Observation made:

The 60 kW cold well pump motor is put only for the purpose of DC, but the same pump motor being utilized for the purpose of 1-20 K ingot casting machine. The diversion of water from the DC casting to 1-20K casting is being done by a valve. But for 1-20K ingot casting the flow of water and pressure required is very less, hence throttling of valve is being done. Now a separate 18.5 Kw pump motor is put for 1-20K ingots casting only. The process not only saves huge amount of electrical energy, but independence in operation also

iii. Technical & Financial analysis:

Saving in cold well pump motor = 41.5 Kw
Electrical energy saved = 41.5*16*365=2.43 lakhs Kwh
Monetary saving per annum= Rs 4.85 lakhs

iv. Implementation:

The project was implemented w.r.t Mar-05 with an investment of Rs 1,00,000/- only

Project Title: Auto switch off of casting plant emergency water pump motor

i. Background of the project:

The casting plant emergency water tank is an emergency reservoir to supply water to DC pit during casting in case of power failure. The water tank is situated out side the plant premises.

ii. Observation made:

The operator usually starts the pump motor before casting to fill up the tank. After the tank is full, the excess water falls inside the cold well pit of the casting plant.

On observing the water falling in the casting pit the operator switch off the motor. It is observed that many times the operator forgets to switch off the motor and there is a huge loss of water as well as electricity. A float system was provided at the overflow line of the tank to automatically switch off the motor after filling the tank.

iii. Technical & Financial analysis:

Electrical energy saved = 18.5*4*365=27010 Kwh
Monetary saving per annum= Rs 54,020/-

iv. Implementation:

The project was implemented w.r.t Mar-05 with an investment of Rs 2,000/- only

Project Title: Optimization of DC power for electrolysis process in pot room.

i. Background of the project:

DC energy for electrolysis process in pot room accounts for 90% of our total electricity. Our pot lines operate with 55 KA current with 4.5 V across each pot.

ii. Observation made:

In the year 2003-04 the power required for 1 Ton of production was 15153 Kwh and for the year 2004-05 the DC energy was 14957*. this was only possible with the proper use and monitoring of EPC system in pot room.
* DC energy being calculated considering months where power has not been affected by external factors

iii. Technical & Financial analysis:

Electrical energy saved = 65620*196=128.6 Lakhs Kwh
Monetary saving per annum= 257.2 lakhs

iv. Implementation:

The project was implemented w.r.t Mar-05. With moderate investment of Rs 5, 00,000/- for software alteration and other miscellaneous expenditure.

Project Title: Reduction of Bus-Stud drop in pot room

i. Background of the project:

Our pot lines operate with a voltage of 4.5 V in each pot with a current of 55 KA.

ii. Observation made:

From the operation of the pot room it is quite obvious that single mV reduction in pot line voltage the electrical energy saving is very high. In the year 2003-04 the

average Bus-stud drop in pots was 16 mV and in the year the average Bus-stud drop in pot was 10 mV. Hence there is a reduction of 6 mV in each pot.

iii. Technical & Financial analysis:

Electrical energy saved = 6mV*55 KA*468(nos of pots)*24*365
= 13.53 lakhs Kwh
Monetary saving per annum= 27 Lakhs/annum

iv. Implementation:

The project was implemented w.r.t Mar-05. with no investment.

Project Title: Digital pressure transmitter for main air compressor 2 and 3 with auto control system

i. Background of the project:

Main air compressor 2 and 3 employees pressure switches for the load and unload of compressors. The operator is also responsible to run the required numbers of compressors depending upon the peak and off peak hours.

ii. Observation made:

In case of pressure switches the compressor was never un-loaded at the desire pressure set. Hence pressure transmitter was used instead of pressure switches to solve the purpose. Also a PLC was used to stop the compressor as per the preset peak and off peak hours. It was observed that it was not required to run nearly 1.5 compressors of 110 Kw motor rating

iii. Technical & Financial analysis:

Electrical energy saved = 1.5*110*24*365=14.45 lakhs unit
Monetary saving per annum= 28.9 lakhs

iv. Implementation:

The project was implemented w.r.t Jan-05. with Rs 3.0 lakhs investment

Project Title: Optimization of cooling fans of rectiformers in new rectifier station

v. Background of the project:

Rectiformers are the devices used for converting AC to DC. Rectiformers are combination of rectifier transformers and diode units. The cooling unit for rectiformers consists of 9 numbers of fans out of which 6 numbers are for cooling the transformers and 3 numbers fan are for cooling the diode units.

vi. Observation made:

The transformer is cooled by 6 numbers 4 H.P motor and diode units are cooled by 3 4 H.P motors. All the fans run continuously for cooling. It was found that the rates of temperature rise for transformer is not high and bellow the allowable temperature. Hence a temperature controller with two independent setting was installed. Out of the 6 fans two fans run continuously and the starting of the other fans depend on the temperature. It was seen that running of two and half fans was reduced.

vii. Technical & Financial analysis:

Electrical energy saved = 3*4*2.5*24*365=2.63 lakhs Kwh
Monetary saving per annum= 5.25 lakhs

viii. Implementation:

The project was implemented w.r.t Mar-05. With Rs 25,000/- investment

Project Title: Use of 18 W and 36 W energy saver lamps instead of 40 W fluorescent lamps in offices of pot room, engineering and rectifiers

i. Background of the project:

All our offices in pot room, engineering and rectifiers are having 40 W fluorescent lamps. During the renovation of offices (offices are converted to work stations), all these 40 W lamps are changed to energy saved lamps.

ii. Observation made:

In offices where single tube lights are fitted it was replaced by 18 W energy saver lamps and double tube lights were replaced by 36 W energy saver lamps. Approximately 150 numbers 40 W fluorescent lamps were replaced by energy saver lamps in offices.

iii. Technical & Financial analysis:

Consumption in tube lights including choke loss = 60 W
Consumption in energy saver lamps (18W) = 22 W
Electrical energy saved = 38*150*10*365/1000=20805 Kwh
Monetary saving per annum= Rs 41,610/-

iv. Implementation:

The project was implemented w.r.t Mar-05. With an investment of 1.5 lakhs (including cost of lamps and fittings)

Project Title: Replacement of fluorescent lamps in HINDALCO club with 11W energy efficient lamps

i. **Background of the project:**

There are 25 numbers fluorescent lamps (40W) in the HINDALCO club in the auditorium area and other area.

ii. **Observation made:**

All the 40W lamps are being replaced with 11 W energy saver lamps

iii. **Technical & Financial analysis:**

Consumption in tube lights including choke loss = 60 W
Consumption in energy saver lamps (11W) = 15 W
Electrical energy saved = 45*25*6*365/1000=2464 Kwh
Monetary saving per annum= Rs 4927/-

iv. **Implementation:**

The project was implemented w.r.t Mar-05. With an investment of Rs 25,000/- (including cost of lamps and fittings)

Project Title: Replacement of low efficiency induction motor with energy efficient low kW rating induction motor for fire hydrant system

i. **Background of the project:**

The fire hydrant system earlier having a low efficient, induction motor (1960 make motor of 150 Kw).

ii. **Observation made:**

The motor along with the pump being replaced with an energy efficient motor of 90 Kw (pump and motor set being a vertical set). Even though the motor runs on few occasions for lesser time (on every Thursday the motor runs approximately 5-6 hours for testing the hydrant system and other times when the pressure in hydrant line is low i.e. during emergency and fire)

iii. **Technical & Financial analysis:**

Assuming average 1 hours running of fire hydrant system.
Total Kw saving on account of efficiency and low capacity= 40 Kw
Annual electrical energy saving = 1*40*365=14,600 Kwh
Annual monetary saving = Rs 29,200/-

iv. **Implementation:**

The project was implemented w.r.t Oct-04. With an investment of Rs 2, 75,000/- (including cost of panel)

Project Title: Replacement of 18.5 Kw jockey pump motor with a 7.5 Kw jockey pump motor in new fire hydrant system

i. **Background of the project:**

The fire hydrant system earlier having an 18.5 Kw jockey pump motor to maintain the normal pressure of 7 kg/cm^2, which was operating nearly 12 hours a day.

ii. **Observation made:**

With the replacement of new fire hydrant lines in the plant, the required size of the pump motor was also minimized and instead of 12 hours a day the new pump motor operates only 4 hours a day to maintain the pressure. (switch on and off of the pump motor is being done by pressure transmitter)

iii. **Technical & Financial analysis:**

Energy consumed by earlier pump motor = 81030 Kwh
Energy consumed by the present pump motor=10950 Kwh
Energy saved =70080 Kwh
Monetary saving =1.4 lakhs

iv. **Implementation:**

The project was implemented w.r.t July -04. With an investment of Rs 1, 00,000/- (including cost of panel)

Project Title: Replacement of 2 nos 400Sqmm, cable to 630 sqmm cable from plant auxiliary SS 1 to old compressor house

i. **Background of the project:**

The main air compressor (old) was situated nearly 300 mtrs away from the plant auxiliary substation #1. Earlier two Nos. 400 sqmm cable was being laid for running the entire compressor. The compressor house is having two numbers distribution board.

ii. **Observation made:**

Earlier it was observed that there was a voltage drop of nearly 12 V in the cables. Also the power factor was low. Now the 400 Sqmm cable being replaced with 630 sqmm cable keeping in mind the voltage drop and addition of one number compressor. Now the voltage drop being observed at the compressor end found to be 4 volts.

iii. **Technical & Financial analysis:**

Energy saved = 1.732*8*750*0.85*24*365=77,380 Kwh
Monetary saving =1.55 lakhs

iv. **Implementation:**

The project was implemented w.r.t Jun -04. With an investment of Rs 6, 00,000/-

Project Title: Arrangement of bypassing the Coldwell pump motor operation of rectifier cooling tower during winter

i. **Background of the project:**

The cooling tower consists of hot well, cold well and draft fan motor. The purpose of the cooling tower is to supply water at a temperature of 30 deg. Cent to rectifier equipments

ii. **Observation made:**

It was observed that during winter the temperature of the water remains well bellow 30 deg. Cent., at the same time the capacity of the hot well pump motor is sufficient to circulate the water to the equipments. Hence arrangement has been made to connect the out let of hot well pump motor with outlet of cold well pump motor with necessary valve arrangement. At winter the whole cooling tower operates with a single hot well pump motor of 75 Kw capacity bypassing the 125 Kw cold well motor and 44 Kw draft fan motor

iii. **Technical & Financial analysis:**

Energy saved = 169*24*90*=365040 Kwh
Monetary saving =7.3 lakhs

iv. **Implementation:**

The project was implemented w.r.t Dec -04. With an investment of Rs 20,000/-

Project Title: Installation of one number 630 KVA transformer replacing the two 500 KVA transformer

i. **Background of the project:**

There are two numbers 500 KVA transformers at auxiliary substation 4, which caters the requirement of R/S cooling tower, Fire hydrant system and other miscellaneous load.

ii. **Observation made:**

The two 500 KVA transformer are very old and also the losses in the transformer are also very high. The two transformers are replaced with a 630 KVA transformer.

iii. **Technical & Financial analysis:**

Energy saved (as per reading) = 5.25 lakhs Kwh
Monetary saving =10.5 lakhs

iv. **Implementation:**

The project was implemented w.r.t Dec -04. With an investment of Rs 4 lakhs

Project Title: Energy saving due to reduction in rejection of paste production from 1.42 % to 1.23 %

i. **Background of the project:**

Rejection affects the energy, as the rejected quantity needs to be again recycled in the same production process.

ii. **Observation made:**

In the year 2003-04 the rejection percentage of paste production in carbon plant was 1.42 % and in the year the rejection brought down to a level of 1.23%. this could be possible with the help of many of the engineering control and modification of the semi auto adjustment of pitch to be mixed with coke.

iii. **Technical & Financial analysis:**

Total production of paste in the year 2004-05 = 36115 T
Production based on decrease in rejection = 68.62
Saving of oil = 686.2 Lits =Rs 9,606.8/-
Saving on electricity = 29.75 * 68.62 = 2042 kWh
Monetary saving (Electricity) = Rs 4,084/-

iv. **Implementation:**

The project was implemented w.r.t Jan-05. With an investment of Rs 1,50,000/-

Project Title: Energy saving due to reduction in rejection of cast coil production from 0.703 % to 0.503 %

i. **Background of the project:**

Rejection affects the energy, as the rejected quantity needs to be again recycled in the same production process.

ii. **Observation made:**

In the year 2003-04 the rejection percentage of cast coil production in continuos caster plant was 0.703 % and in the year the rejection brought down to a level of 0.503%. This could be possible with the help strong focus on start up procedure, equipment maintenance and better environment at caster

iii. **Technical & Financial analysis:**

Total production of cast coil in the year 2004-05 = 10388 T
Production based on decrease in rejection = 20.8 T
Saving of oil = 20.8*53.84 Lits=1120 lits =Rs 15,680/-
Saving on electricity = 142.7 * 20.8 = 2968kWh
Monetary saving (Electricity) = Rs 5936/-

iv. **Implementation:**

The project was implemented w.r.t mar-05. With zero investment

Project Title: Energy saving due to reduction in rejection of RI and other casting product from 1.29 % to 1.05 %

i. **Background of the project:**

Rejection affects the energy, as the rejected quantity needs to be again recycled in the same production process.

ii. Observation made:

In the year 2003-04 the rejection percentage of RI, 1-20 K ingot casting machine production in casting plant was 1.29 % and in the year the rejection brought down to a level of 1.05%. This could be possible with the help of many of the engineering control and modification of the done in casting machine, RI mould and automatic stacker.

iii. Technical & Financial analysis:

Total production of paste in the year 2004-05 = 55726 T
Production based on decrease in rejection = 133.8
Saving of oil = 133.8*10.51 Lits=1406 lits =Rs 19,690/-
Saving on electricity = 32.0 * 133.8 = 4281.6 kWh
Monetary saving (Electricity) = Rs 8,563/-

iv. Implementation:

The project was implemented w.r.t Jan-05. With an investment of Rs 2,50,000/-

Project Title: Installation of MRS (multi receiving station) for stability of power

v. Background of the project:

Aluminium production is high power intensive process and requires stable and uninterrupted power. Our smelter plant is connected with two numbers 132 KV line from our own power plant and another two number line from near by Burla power house (WESCO).

vi. Observation made:

Due to the unstable nature of Burla powerhouse, there was frequent tripping of main feeder and the plant has to remain without power for many hours. The MRS connects another feeder (BURIPADHA feeder) along with the existing feeders, hence in case of any problem power can be taken from the stand by feeder and avoiding the outages.

vii. Technical & Financial analysis:

It is seen that the DC energy jumps to a figure of 16500 instead of normal figure of 15000 Kwh/T of production and remain nearly 72 hours. Assuming 12 outages a year before MRS
Total DC energy saved = 1500*12*72=13 lakhs Kwh
Other auxiliary energy saved = 2 lakhs Kwh
Total monetary saving = 15 lakhs

viii. Implementation:

The project was implemented w.r.t Jan-05. With an investment of Rs 4 cores.

Project Title: Switching of bag filter chamber lights when not required.

i. Background of the project:

The bag filters in FTP 1 and 2 consist of nearly 27, 150 W light fittings (12 in FTP 1 and 15 in FTP 2)

ii. Observation made:

The bag filter lights are always switched on. Even if the bag filter area are completely dark, but the requirement of switching on the light fittings come at the time of inspection or replacement of any bags in a particular chamber. Hence separate switches are provided for each lights to switch on when required.

iii. Technical & Financial analysis:

Earlier consumption of energy = 150*27*24*365=35480 Kwh
Present consumption = 150*5*4*365=1095 Kwh
Electrical energy saved = 34385 Kwh
Monetary saving =Rs 68,770/-

iv. Implementation:

The project was implemented w.r.t Jan-05. With an investment of Rs 25,000/-

Project Title: Installation of power and energy monitoring system in all auxiliary substation

i. Background of the project:

Earlier all our auxiliary sub station are having only energy meter for monitoring of energy consumed

ii. Observation made:

Presently all the incoming of auxiliary sub station are having a digital meter known as power and energy monitoring system. The power and energy monitoring system displays all the data e.g. active, reactive, apparent, p.f, f, V, I values (instantaneous and integrated)

iii. Technical & Financial analysis:

It is not possible to calculate the saving from the above project. But suitable actions are being taken after the meter readings and the feed backs are given to respective dept.

iv. Implementation:

The project was implemented w.r.t Mar-05. With an investment of Rs 1,20,000/-

Project Title: Feeder wise monitoring of colony power

i. **Background of the project:**

The colony power of both main colony and riverside colony do not have any energy monitoring system. Only monitoring system has been available in the HT side for monthly calculation of energy by the WESCO representative at the end of the month.

ii. **Observation made:**

Separate energy meters are provided for monitoring the energy in different feeders by the colony maintenance crew. Energy monitoring is done in the peak hours to minimize the maximum demand. Also during peak hours the unnecessary lights are being switched off.

iii. **Technical & Financial analysis:**

From the monthly energy bills it was found that there is reduction of nearly Rs 1,50,000/-.

iv. **Implementation:**

The project was implemented w.r.t Feb-05. With an investment of Rs 75,000/- for the procurement of energy meters

Project Title: Upgrading insulation of complete thermic fluid line in carbon plant

i. **Background of the project:**

Thermic fluid line is carbon plant is used to melt the cold pitch and also in the mixer and preheater for raising the temperature of the output product.

ii. **Observation made:**

The total length of the thermic fluid line in the carbon plant is roughly 20000 Mtrs. And the temperature of thermic fluid is maintained at 200 deg. Cent. The insulation over the thermic fluid line is roughly 30 years old. From the temperature study it was found that the surface temperature over the thermic fluid line is nearly 30 deg above the atm. Temperature (normally it should be less than 15 deg cent). Hence new insulation is done for the complete thermic fluid line.

iii. **Technical & Financial analysis:**

Reduction of F.O after insulation = 15,000/- lits=2.1 laks

iv. **Implementation:**

The project was implemented w.r.t July-04. With an investment of Rs 2,00,000/-

Project Title: Installation of moisture separator for recovery of lubricant oil from new compressor

i. **Background of the project:**

Huge amount of lubricant is being lost from the moisture trap of all compressor in new line.

ii. **Observation made:**

Earlier the moisture separator for compressor has been implemented in the old compressor house, which has given good saving. This time it has been installed in the new compressors, to recover the lubricants. The recovered lubricants are then used for crust breakers and other equipments.

iii. **Technical & Financial analysis:**

Average lubricant saving per month = 300 lits
Annual saving = 3600 lits per month
Monetary saving = 2,16,000/-

iv. **Implementation:**

The project was implemented w.r.t mar-05. With an investment of Rs 50,000/-

Project Title: To reduce electrical energy consumption by adopting counter flow type cooling tower instead of cross flow type cooling tower in line 1 compressor

i. **Background of the project:**

The cooling tower for line 1 compressor is having a cross flow type cooling tower for 5 numbers 500 cfm compressor

ii. **Observation made:**

As the delta T of the cooling tower was not very high and it was affecting the operation of the cooling tower, a new counter flow type cooling tower was installed, in the same cold well pit. And the cross flow type cooling tower was made as stand by unit. As a result the draft fan motor rating could be reduced to 3.7 Kw instead of 7.5 Kw

iii. **Technical & Financial analysis:**

Electrical energy saved/annum = 3.8*24*365=33,288
Monetary saving made = Rs 66,576/-

iv. **Implementation:**

The project was implemented w.r.t Feb-05. With an investment of Rs 60,000/-

Project Title: Replacement of 4 Nos. old battery charger with electronics type battery charger

ix. Background of the project:

Most of the equipment in pot room runs with lead acid traction battery. Different vehicles employees different voltage of battery e.g. 12 V, 30 V, 36V and 80 V. all these batteries are charged with battery charger every day.

x. Observation made:

We are having many old battery chargers, for charging these batteries. These battery chargers are manual battery charger and to be switched off by the electrician after certain charging hours. For the last 4-5 years we are replacing these battery chargers. In the year 2004-05 four number battery chargers are replaced by microprocessor based battery charger.

xi. Technical & Financial analysis:

Energy saved/battery charger/day = 2 Kwh (approx)
Total energy saved = 2*4*365 =2920 Kwh
Monetary saving = Rs 5,840/-

xii. Implementation:

The project was implemented w.r.t Jan-05. With an investment of Rs 1,75,000/-

PROJECT: IMPLEMENTATION OF ENCON CULTURE IN NEAR BY SCHOOLS

i. Background of the project:

The culture of ENCON needs to be spread to the near by areas to create awareness among the general people. ENCON activity needs to be spread to various organizations like schools, hospitals and other places to create more impact and generate saving for the nation.

ii. Observation made:

Based on the above novel thoughts and ideas, first the ENCON activities are started in our colony involving colony ladies and children. In the year 2004-05 a near by school was audited by our representative and the SGA (small group activities) culture was taught to the school children. A small project was launched by the school children involving their teachers. The project was started with monitoring of the total electrical energy consumed by the school and prepares an action plan to reduce the same.

iii. Technical & Financial analysis:

The project has a potential of saving nearly Rs 1500/- on account of electricity bill.

iv. Implementation:

The project was started from Mar-05