

HINDALCO INDUSTRIES LIMITED

HIRAKUD SMELTER, SAMBALPUR (ORISSA)

Unit profile

HINDALCO industries limited (Hindustan Aluminium Company limited) is the largest manufactures of primary aluminium in India and also one of the largest manufactures in the world. Earlier the company was known as Indian Aluminium Company Limited, popularly known, as 'INDAL' is one of the largest private sector companies of India. As a subsidiary of 'ALCAN' Canada, INDAL was incorporated on 17th December 1938 under the name of Aluminium Production Company of India Limited. In 1944, the name changed to Indian Aluminium Company Limited. INDAL has pioneered in the production and marketing of alumina, aluminium metal and semi-fabricated products. INDAL has 14 plants and 10 offices spread across the country. INDAL is vertically integrated through every stage of the industry including bauxite mining, alumina refining, alumina smelting, semi-fabricating (sheets and foils), product development and captive power generation.

INDAL joined the Aditya Birla Group in June 2000 when Alcan. INDAL is a dominant player in alumina and has significant strengths in the downstream product segment. These strengths coupled with Aditya Birla Group's dominance in metal and competitive cost structure makes the INDAL- Aditya Birla Group combine a major force in the Aluminum Industry. In April 2005 INDAL merged with HINDALCO and also operates with the name HINDALCO industries limited.

One of the smelter plants of HINDALCO is located at Hirakud in Orissa. Hirakud smelter plant pursues production of primary metal, which is based on electrolytic reduction process through the primitive horizontal stud soderberg (HSS) technology. The major raw materials used for the primary aluminium production are alumina, cryolite, aluminium fluoride and electrical power. The smelter that was started in January 1959 with 10 KTPA capacity has undergone expansion in stages to reach the present level of capacity of 65 KTPA. Expansion and modernization project for increasing the smelting capacity to 146 KTPA is in the completion stage. For meeting the extra power requirement the captive power plant at Hirakud is also expanding from 67.5 MW to 367.5 MW. Presently the CPP capacity has already reached at 267.5 MW and another 100 MW unit is expected to be commissioned by the end of 2007. HINDALCO Hirakud smelter has also taken a coal mine known as Talabira mines near Jharsuguda district of Orissa for meeting the coal demand of its power plant.

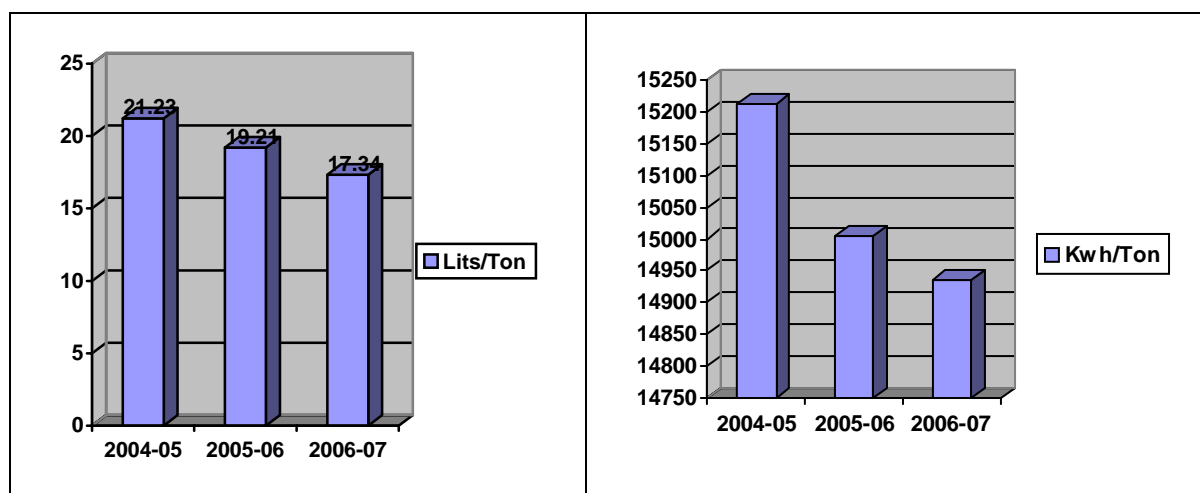


The smelter plant has already converted 296 HSS pots to Pre-baked pots out of 468 pots and has added 164 new pre baked pots for better energy efficiency and running with lesser DC energy.

Energy Consumption

With the implementation of various energy conservation projects and the conversion of HSS pot lines to Pre-Baked pots has resulted in substantial energy reduction. There is steady decline of specific energy consumption in the last three years. Bellow table and graphs shows the reduction of specific energy of various products. With the conversion process the DC energy has shown significant reduction and presently we are operating with DC energy less than 14000 Kwh per Ton of aluminium production. During the last two years the organization has invested nearly Rupees 625 crores for the conversion process in smelter and nearly 550 crores for setting up new coal based power plant to meet extra electrical energy required for the smelting operation. The use of imported baked anode has resulted in reduction of F.O consumption. Also the use of new machinery for casting operation is resulting in reduction of energy in cast house. More over the operation of pre-baked pots are yet to be stabilized, hence in coming years the specific energy consumption is likely to come down further.

<i>DESCRIPTION</i>	<i>UNIT</i>	<i>2004-05</i>	<i>2005-06</i>	<i>2006-07</i>
<i>Annual production</i>	MT	65620	66347	73008
<i>Total electrical energy consumption/annum</i>	Lakhs Kwh	10930	11020	12480.77
<i>Specific energy consumption (electrical)</i>	Kwh/tonne	15213	15006	14935
<i>Total thermal energy consumption</i>	Mkcal	14340	19108	19040.7
<i>Specific energy consumption (fuel)</i>	Litres/Tonne	21.23	19.21	17.34



(Total Specific energy- Thermal)

(Total Specific energy-Electrical)

Energy conservation commitment and policy set up

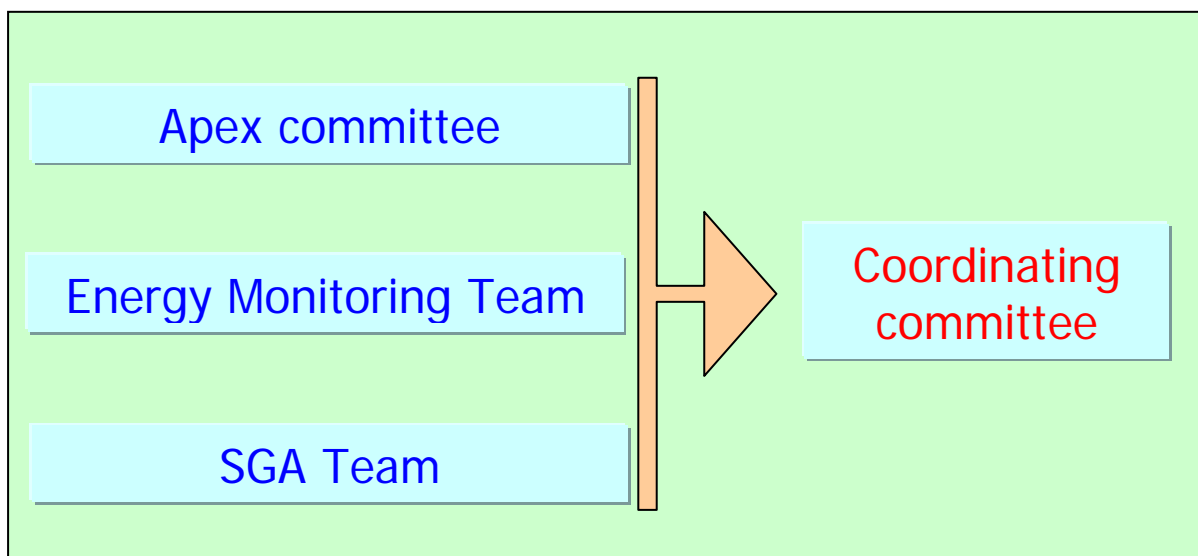
HINDALCO's HIRAKUD Smelter management believes that energy and resource conservation are the two building blocks for HIRAKUD Smelter's sustainable development. The Plant has an **Environment and Resource Management (E&RM) cell**, which primarily focuses on energy conservation. The activities of E&RM 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&RM 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 Vice President. 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.

Apart from the various internal energy conservation and awareness activities, the organization has gone to various other level of the society to impart awareness on energy and resource conservation. Regular programs are being conducted for **colony ladies** on the domestic energy conservation measures and awareness. Leaflets on domestic energy conservation are being given to all houses in the colony. More over the organization is also conducting awareness program for the **school children** and conducting regular audits for brining down the energy consumption. The organization has also conducted program like teachers meet, Awareness program for villagers on energy conservation.



Energy Policy

- Energy efficient power generation, aluminium smelting and casting
- Nurturing energy efficient designs and technology for all future acquisitions, where ever practicable
- Enhancing utilization of renewable energy resources, wherever feasible
- Recognizing efforts of our employees and their family members in energy conservation initiatives
- Going beyond standards, wherever economically viable
- Yardsticks, which drive us to monitor and improve energy performance through periodic reviews and skill up-gradation of our employees.

Energy conservation achievements

The table bellow illustrates year wise energy conservation projects implemented at Hirkud smelter and the savings achieved.

Year	No of SGA/Projects	Investment (Rs lakhs)	Savings (Rs lakhs)
2002-2003	35	89	197
2003-2004	36	806	712
2004-2005	35	476	496
2005-2006	30	15048	888.56
2006-2007	20	45859	2047

During the year 2006-07 total of 20 numbers major energy saving projects are executed at Hirkud smelter, which have resulted in a saving of 2047 Lakhs of rupees. Few of major energy saving projects are illustrated here.

1. Conversion Of HSS Pots to Pre-Baked Pots



HSS Pots are converted to pre-baked pots for energy efficiency, reducing environmental pollution. Implementation of the project resulted in reducing AC energy/Ton of metal from 15213 units to 14935 units.

Investment: 35000 Lakhs

Saving: 1000 Lakhs

2. Bypassing Of 65 MVA transformer



65 MVA regulating transformer earlier provided to maintain 11 KV voltage for pot line-1 was by passed after rearranging of pots in different lines

Investment: 0 Lakhs

Saving: 43.8 Lakhs

3. Harmonic Filter For OSS-3



Harmonic filter was installed in OSS- 3 to improve power factor and eliminate harmonics in the power system. The project has also helped in reducing the penalty paid to the state grid

Investment: 200 Lakhs

Saving: 50 Lakhs

4. 90 KA single Converter unit



For Pre-baked pots instead of installing multi units of smaller KA rating converters a single 90 KA single stage 132 Kv to 850 V DC converters was installed in line-IV to reduce conversion loss and other losses

Investment: 3500 Lakhs

Saving: 2.88 Lakhs

5. Bypassing of Compressors by Replacement of Pot Doors



Three numbers compressors were by passed after replacement of pneumatically operated pot doors to simple pot hoods.

Investment: 0 Lakhs

Saving: 31.5 Lakhs

6. Separate Pump motor set for ingot casting machine



A smaller capacity pump motor set was installed for ingot casting machine to avoid the running of 60 Kw motor.

Investment: 0.15 Lakhs

Saving: 5.25 Lakhs

Energy Conservation plans and Targets

The following energy conservation related projects have already been identified for implementation in the plan.

1. Installation of Harmonic filter and capacitor bank in pot line-I substation
2. Conversion of remaining 172 pots in line-I
3. Installation of new energy efficient cooling system for old rectifiers
4. Installation of VVFD in 5 numbers pump and blower motors at various places

The targeted DC consumption by end 2008 is 13500 kwh/T of aluminium from the present figure of 14200 kwh/T .

Safety and Environments

HINDALCO, HIRAKUD Smelter subscribes to eco-efficiency. In other words, it entails manufacturing products and providing services in a manner that conserves natural resources, minimizes wastes and ensures pollution control. Better environment management at HINDALCO, HIRAKUD Smelter has enabled us to contain our production cost. At HIRAKUD Smelter an unending quest for environment excellence is demonstrated through implementation of Environment Management System 14001. Unit has been certified for **ISO 14001 by DNV**. Yet another major landmark in the field of Occupational Health and Safety has been implementation of OHSAS 18001.

More over the conversion from HSS to Pre-baked technology has contributed significantly to our environmental performance by reducing the fluoride emission from 2.6 Kg/T to 0.8 Kg/T.