

## VISA KHAPATNAM STEEL PLANT - RASHTRIYA ISPAT NIGAM LIMITED Visakhapatnam (Andhra Pradesh)

### Unit Profile

Rashtriya Ispat Nigam Limited is the corporate entity of Visakhapatnam Steel Plant. The steel plant is located 26 km south of Visakhapatnam city. The company also has a blast furnace grade limestone captive mine at Jaggayapeta, a captive mine for dolomite at Madharam, a manganese ore captive mine at Cheepurupalli. All the captive mines are located in the state of Andhra Pradesh. It has also got a mining lease for river sand in river Champavathi.

The foundation stone of the steel plant was laid by the then prime minister on 20th January 1971 and the plant was dedicated to the nation on 1st August 1992 by the then prime minister. The main facilities of the plant are detailed at Fig 1. The plant has a capacity to produce 2.656 Mt of saleable steel of which 2.410 Mt is finished steel.

Besides receiving raw materials from the captive sources, the steel plant meets its iron ore requirements from Bailadilla mines of National Mineral Development Corporation, coking coal requirements through imports and coal washeries of Coal India Limited, SMS grade limestone through imports, quartzite requirements through purchase and boiler coal from the coal mines of Mahanadi Coal Limited.

The product profile of the plant comprises of wire rods, rounds, reinforcement bars (rebars), angles, channels, beams, squares, billets and blooms. The product profile also includes basic grade pig iron, granulated slag, coal chemicals and other by-products. The plant also exports power to AP Transco from its captive power plant.

The steel plant has many technological features, which are unique amongst the steel plants in the country. The company is a pioneer in introducing

Sl. No.	Department	Unit	Capacity
1	Coke oven	3 coke oven batteries of 67 ovens each, of height 7 m, with 100% dry quenching.	2.261 Mt of blast furnace coke
2	Sinter plant	2 sinter machines with 312 sq.m grate area	5.256 Mt gross sinter
3	Blast furnace	2 nos. 3200 cum blast furnaces with bell less top equipment and cast house slag granulation	3.4 Mt hot metal
4	Steel melting shop	3 nos. 133 cum LD converter with 6 nos. 4 strands bloom casters	3.0 Mt liquid steel 2.82 Mt cast bloom
5	Light and medium merchant mill	7 stands continuous billet mill and 26 stands 2 strands continuous bar mill with tempcore facility for rebar rolling	1.857 Mt billets 0.710 Mt bar products
6	Wire rod mill	4 strands 61 stands continuous mill with stelmor cooling	0.850 Mt wire rods
7	Medium merchant and structural mill	20 stands continuous mill	0.850 Mt medium structural products

**Fig 1 : Main facilities of the plant**





many new technologies in the country. The production of TMT rebars by tempcore process is a shining example in this respect. Because of high level of technology existing throughout the plant, the company has a very good manufacturing capability to meet the needs of various customers.

Human resource initiatives at RINL are closely linked to the corporate strategy of the organisation. It has exemplary industrial relations where the entire work force (both executives and non-executives) works as a well-knit team for the progress of the company. Participative management, by involving cross-section of the employees, in development of the policy and strategy is actively implemented in the company. The productive wholesome environment provides

an atmosphere of growth, both for the employees as well as for the company. The welfare measures provided for the employees of the company are the best in the industry.

With the availability of the positive growth environment, the company is registering a steady and consistent up trend in the performance. It is achieving both incremental improvements as well as breakthrough improvements in its various performance measures. The theory of "success begets success" is very much visible here.

Exceeding of up rated capacities, which once seemed to be impossible, is a reality today. Records are being created only to be broken again. The company's rating amongst the largest steel producing companies in the world, as published by IISI is continuously improving (72 in CY 2000, 68 in CY 2001 and 67 in CY 2002).

### Energy Consumption

Steel making is energy intensive in nature and hence uses various types of energies for reduction of oxides and process heating. The main energy inputs are boiler coal (for power generation), furnace oil (in re-heating furnaces and boilers) and diesel. The electricity requirements were met from captive generation as well as imported from Grid. Surplus electricity is exported to grid. 96% of by product gases (Coke oven gas, Blast Furnace gas, LD gas)

Type of fuel	Unit	2002-03	2003-04	2004-05
Coking coal	t	3162259	3205791	3085241
Coke	t	100422	281769	451945
Boiler coal	t	1367060	1381524	1383452
Furnace oil	KL	396	997.22	659
Diesel	KL	2842.9	2804	2846
Electricity purchased	Lakhs KWH	848.58	905.28	792.9
Electricity exported	Lakhs KWH	1647.1	1180.2	786.5
Electricity consumption	Lakhs KWH	18836.1	19546.1	19539.3
Monetary value of energy consumed				
Coking coal	Rs.lakhs	99395	101255	118965
Coke	Rs.lakhs	6205	22667	69883
Boiler coal	Rs.lakhs	13023	13539	14429
Furnace oil	Rs.lakhs	39	122	78
Diesel	Rs.lakhs	545	590	716
Electricity purchased	Rs.lakhs	5347	6520	4987
Electricity exported	Rs.lakhs	3261.3	2382.8	1643.0
Energy cost	Rs.lakhs	121293	142310	207416
Manufacturing cost	Rs.lakhs	308544	344017	413281
% energy consumption in manufacturing cost		39	41	50

Fig.2: Energy Consumption

generated during the process of steel making at various stages are used for process heating. By-product liquid fuel (coal tar fuel) is used in kilns. The total energy consumption of main inputs and their monetary value during the last three years is given at Fig 2. The percentage of energy consumption in terms of manufacturing cost, for which coking coal and coke is considered in the energy bill, though these are mainly used as raw materials, is also detailed in Fig.2. The specific energy consumption and petrol-fuel consumption for the last three years is detailed at Fig 3 and Fig .4

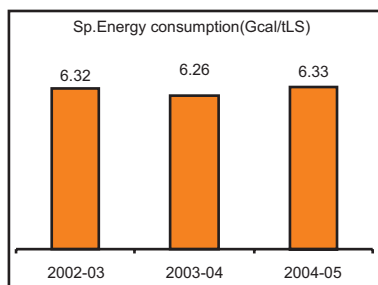


Fig. 3

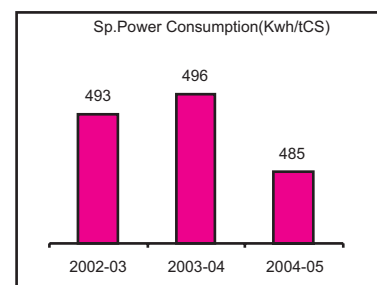


Fig. 4

### Energy conservation commitment, policy and set-up

RINL has focussed on energy conservation in the design stage itself by adopting various types of waste energy recovery facilities like coke dry quenching, back pressure turbine station, gas expansion turbine station, LD gas recovery system, Supervisory control and data acquisition system, evaporative cooling systems etc. These facilities are contributing significantly in reducing the wastage of energy.

The commitment to energy conservation has reflected in the energy policy of RINL where in it is committed to reduce specific energy consumption by 1% per year up to 2010AD. The Energy policy is given below

The energy conservation activities are reviewed at Apex level on regular basis through various review meetings (Co-ordination meetings, cost control meetings). To monitor energy conservation activities, RINL has Energy

Management Department headed by Deputy General Manager. He reports to General Manager (Energy & Environment) who is also the Designated Energy Manager of the company. The Energy Management Department monitors the levels of specific energy consumption on daily basis and provides base line information to top management for initiating appropriate action. RINL follows a cost effective energy conservation policy. Improving process management and increasing waste energy recovery from the



**RASHTRIYA ISPAT NIGAM LIMITED**  
**VISAKHAPATANAM STEEL PLANT**  
 VISAKHAPATANAM-53001

## ENERGY POLICY

We, at Visakhapatnam Steel Plant, are committed to optimally utilise the various forms of energy in a cost-effective manner to effect conservation of energy resources, To accomplish this we will:

- Document, implement, maintain and continuously review the energy management system
- Comply with the energy conservation Act-2001 and any other statutory requirements
- Make Energy Conservation a way of life by involving all employees
- Reduce energy cost by
  - Recovery of waste energy and Recycling os waste
  - Adoption of energy efficient operation, energy efficient maintenance, energy oriented incentive policy, procurement of energy efficient equipment, appropriate energy efficient technologies and use of cheaper forms of energy
- Reduce Specific Energy Consumption by 1% per year up to 2010

Date  
22/10/2004

(Y. Siva Sagar Rao)  
Chairman-cum-Managing Director

existing facilities ( CDCP,BPTS,GETS,ECS etc) by actively involving people is the strategy adopted for conservation of Energy. Involvement of people at working level in large numbers is achieved by formation of Departmental Energy Teams (DET).The team consists of people from all functional disciplines(Mechanical, Operation, Electrical & Instrumentation etc). QIP's are formed for energy conservation as a part of ISO-9000 and management objectives are taken on energy conservation as a part of ISO-14001.Awareness on conservation of energy at various levels is brought through month long energy conservation celebrations. Employees are empowered by encouraging suggestions and quality circles. RINL has successfully implemented strategy of minimizing petrofuel consumption by augmenting by product gases generation as well as usage.

In 2004-05,the global steel industry had faced raw material shortages resulting in throttling of production. The quality of coke deteriorated resulting in high energy consumption. RINL initiated steps to control energy consumption by initiating Energy Audit and intensification of activities of Departmental Energy Teams. RINL has formed Departmental Energy Audit Teams in 2004-05 in all DET departments by imparting training in Energy Audit techniques by M/S NPC. 35 Executives were trained in Energy Audit techniques. Using this expertise, these teams are working continuously for conservation of Energy .

To increase awareness among VSP collective, energy conservation programmes were conducted at departmental level. About 3000 employees were covered in this programme. Various Training programmes like Waste management, Energy Management & Audit were conducted to employees. About 250 employees were covered. Energy Conservation Month Celebrations were conducted from 14th December to 13th January 2005 by conducting various competitions among employees of VSP. An Exclusive Suggestion campaign on Energy Conservation was conducted during the above period. A Diary consisting of Information on Energy Conservation pertaining to Steel Plant was given as prima facie gift. About 1200 Suggestions were generated. The Best 12 suggestions as well as Energy Performance of the various departments were recognised during Energy Awards valedictory functions by giving shields. As part of National Campaign on Energy Conservation initiated by Bureau of Energy Efficiency ,RINL has undertaken various training programmes to increase Energy conservation awareness. In addition to these, RINL has undertaken Energy Conservation Awareness Campaign to School children of Ukkunargam Schools. 135 School children were covered .

### ***Energy Conservation Achievements***

During the last three years, RINL implemented 130 energy saving ideas generated from various sources. There was marginal increase in Specific energy consumption over based period by 0.01 Gcal/tLS. The departmental energy teams have taken many initiatives in electrical energy and thermal energy consumption and contributed significantly in reducing energy conservation . Some of the energy conservation projects implemented during the year are:

- Reduction of Contracted Maximum Demand from 150 MVA to 100 MVA.



- Increasing the yield of crude Benzol as well as reducing solar oil usage in Benzol scrubbers by installing muck drying bed in Coke ovens.
- Increasing coke yield by reducing burning losses of coke inside the cooling chamber by optimization of air entry by PLC modification.
- Reduction of specific heat consumption at CO battery -2 by reducing reversal pause duration from 50 seconds to 40 seconds
- Replacement of motor at CO-57 Conveyor
- Reducing electricity consumption in Blast furnaces by reducing impeller diameter of centrifugal pump in Blast Furnace-1, Stopping of KA1 and KP1 Conveyor , Optimising flow in BHS and CHS fans.
- Reduction in Air-conditioning load in QATD/Steel lab, CCD computer center
- Reducing electricity energy consumption in water pumping system by reducing the number of pumps running in Final Gas Cooler circuit in CCP and running two pumps only instead of three pumps at Pump House-09 Heat Exchanger system.
- Enhancing the efficiency of Cooling Tower-4 by cleaning of the fills
- Reducing electricity consumption at Pump House-11 by Automation tunnel lighting to avoid continuous glowing
- Electrical Energy conservation by pulley modification in slurry pumps at Treatment Plant -1 & 2.
- Reducing electrical energy consumption at by locating and plugging the false air leakages in to kiln system, PLC modification for KF1, 3, 4 & 5 Main drives
- Replacing diesel oil by waste reclaimed oil in ore drying plant
- Reducing electrical energy at MMSM by replacing frequency converters and stopping of Mill drives of during SQ 90 rolling.
- Reduction of electrical energy consumption at Billet Mill reheating furnace by stopping HP Descaling System pumps and Hydraulic cellars pumps during shutdown period.
- Improving thermal regime in Blast furnace by installing PLC for simultaneous charging of battery coke and purchased coke in to Blast Furnaces.
- Installation of lighting saver in Forge Shop
- Improved usage of blast furnace gas in thermal power plant by increasing impeller diameter of ID fan of Boiler-1
- Improving performance of Boiler 1 by Replacement of Air heater baskets and Replacement of Tubular air heater.
- Improving feed water temperature by 8oc by replacement of HP heater-3 in Turbo generator 2 in Boiler Feed Water Circuit
- Reducing oxygen consumption by reduction of full return heats and partial heats during Converter blowing



### **Energy Conservation Plans and Targets**

The following projects are planned for implementation during the next 3 years, as given at Fig 5.

- Auxiliary fuel injection in Blast Furnaces.
- Additional stream for LD gas recovery
- Upgradation of SCADA
- Usage of Coke oven gas in place of CTF in CRMP
- Multislit burners in Sinter Plant

**Fig 5: Energy conservation projects**

## Environment and Safety

Environment protection measures have been incorporated in the design stage itself with an investment of Rs 488 cores. The major environment protection facilities are detailed at Fig 6.

The commitment towards Environment is enunciated through the company's Environment Policy. A copy of the same is enclosed. RINL obtained ISO 14001:1996 for Environmental Management System.

Solid waste recycling has been given prime importance in RINL. Some of the fresh initiatives taken during the year at RINL are given at Fig 7.

As a commitment towards Safety and occupational health, RINL is following occupational health and Safety Management Systems (OHSAS: 18001:1999). Towards, this, RINL has formulated Occupational health and safety policy. The Occupational health Service and Research Centre is carrying out many activities as part of Occupational health and safety policy. RINL has been awarded OHSAS: 18001, 1999 certificate in the month of April 2002.

The efforts of RINL are being recognised by various forums. In addition to National Energy Conservation Award(Special Prize) in Integrated Steel Sector, RINL has been bestowed with Prestigious "Prime Ministers Trophy-2003" for Steel Industry for overall improvement. Some of the major awards received by RINL are given at Fig.8

Today RINL is moving forward with an aura of confidence and with pride amongst its employees, who are determined to give their best for the company, so that it can scale higher and higher heights.

- Elaborate dust extraction systems at all production units
- Mechanical, Biological and Chemical Treatment Plant for treating toxic effluents.
- Sewage treatment plants for effluent treatment

**Fig6: Environmental protection facilities**

- Recycling of Anthracene oil
- Recycling of Medium hard pitch
- Recycling of BF gas sludge into Sinter plant
- Recycling of GCM sludge
- Usage of LD slag in Sinter plant, Blast Furnaces, Steel Melt Shop.
- Recycling of Benzol muck and tar sludge

**Fig7: Solid waste recycling**

- ◆ Energy conservation awards (continuous) by Ministry of Power.
- ◆ PM Trophy for Best Steel Plant
- ◆ MOU award
- ◆ SCOPE Award
- ◆ CII Water Conservation Award
- ◆ CII SHE Award
- ◆ Environmental awards
- ◆ Safety awards
- ◆ Quality awards
- ◆ Quality circle awards
- ◆ Raj bhasha awards
- ◆ Best tax payer award
- ◆ Best management award

**Fig 8. Major Awards**

**JINDAL STEEL AND POWER LIMITED**  
**Raigarh (Chattisgarh)**

**Unit Profile**

Jindal Steel & Power Limited (JSPL) is the youngest fleet under the flagship of JINDAL Organisation. With the vision to cater the needs of nation and meeting the challenges of global markets, JSPL management embarked on the ambitious mission to establish an Integrated steel plant with perfect blend of in-house and state of art technology. Today JSPL has the largest coal-based sponge iron manufacturing capability in the world, Rails of 120-meter length, the longest produced anywhere in the world and Parallel flange universal beams in larger sizes, manufactured for the first time in India.

Company has a obsession for excellence. Shaping its business in synchronized with the market dynamics. Boldly venturing into new territories and the future. Present manufacturing facilities are:

- ❖ Coal based Sponge Iron production from 10 Rotary Kilns ( 6 no. in DRI –I shop and 4 no. in DRI-II shop) with annual production capacity of 1.32 Million tonne, which is the world’s largest coal-based sponge iron production capability. One of the lowest cost producer of Sponge Iron, with in-house availability of the three Key raw materials, coal, iron ore and power.
- ❖ Blast furnace with the volumetric capacity of 351 m3 and annual production capacity of 0.25 Million Tonne, which supplies hot metal for steel making.
- ❖ Two Steel Melting Shops, no. I & II, having capacity of 1.15 Million tonne of continuously cast steel products. Shop I has one EAF of 50/60 tonne capacity, one Ladle Refining Furnace, one Tank Degasser and two casters (one round-cum-bloom and one slab). Shop II has one 100 T EAF, one LRF, one Tank Degasser and one 4-strand Beam blank-cum-Round-cum Bloom caster. The products, Beam blanks for larger parallel flange beams, rail bloom for rail rolling and other products, rounds for seamless pipe application and slabs.
- ❖ Submerged Arc Furnace producing Ferro Chrome from 24MVA furnace, which cater the need of SMS department and Group Company.
- ❖ Captive Power Plant with generating 265MW, which include power generation from exhaust gases of Sponge Iron Kilns & Blast Furnace and middling from coal washery.
- ❖ Rail & Universal Beam Mill with state of art technology, having a capacity of producing 120meter long rail and large size parallel flange Beams. Mill has annual capacity to produce 0.75 Million tonne of rolled product.
- ❖ Machinery Division at Raipur with a manufacturing capacity of 11,500 TPA, along with an annual capacity of 30,000 MT of Steel Ingots & Castings that compares with the best in the region. The

Machinery Division plant also has a machine manufacturing facility. This division caters to the in-house maintenance needs of the Raigarh Plant and special maintenance orders from other Group Companies.

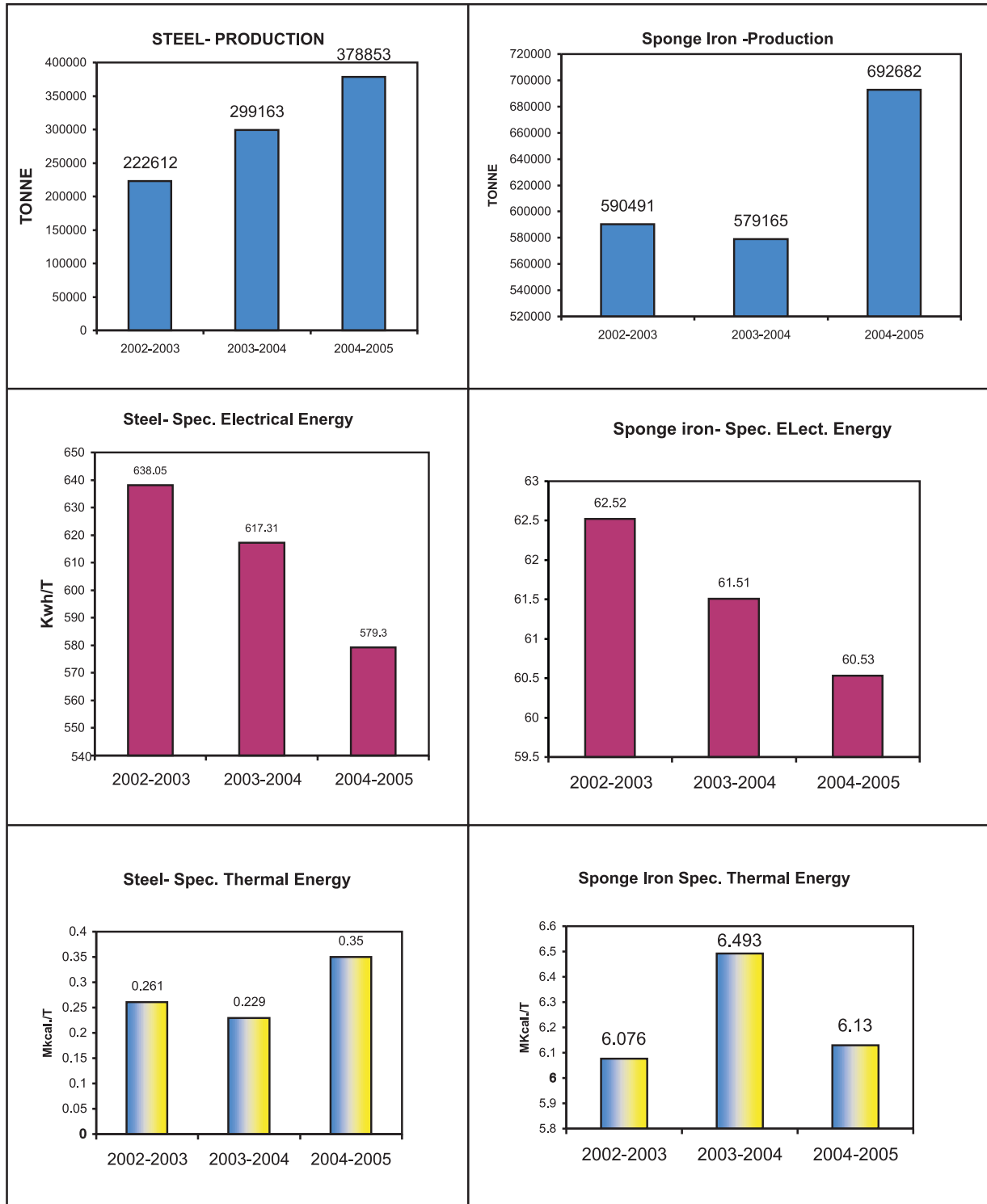
- ❖ Captive Coal Mines at Tamnar, Raigarh with crushing and washing facility at mines head. Meeting total wash coal requirement of existing Sponge Iron unit.
- ❖ Captive Iron Ore Mines at Tensa Orissa. Meeting partly requirement of existing Sponge Iron unit.
- ❖ The plant is currently under large expansion programme:
- ❖ Steel Melting Shop II with second 100 tonne EAF and two more LRFs to increase the steel making capacity to 2.5 Million tonne. .
- ❖ 0.8 Million TPA Clean type non-recovery mechanized Coke Ovens.
- ❖ Blast Furnace with optimized energy utilization with annual capacity of 1.25 Million tonne.
- ❖ Sinter Plant (2.4 MTPA) with modern pollution control ESP with high capacity.
- ❖ Lime and Dolomite Plant (600 & 300 TPD respectively) with latest global technology and features.

Company is certified to ISO 9001:2000 and ISO 14001: 1996. Company is recognized by DSIR, Govt. of India as “in-house R & D Centre” and by Central Boiler Board, Govt. of India as “ **well known steel maker**” for Boiler quality steels.

## Energy Consumption

DESCRIPTION	UNIT	2002-2003	2003-2004	2004-2005
<b>PRODUCTION:</b>				
- Sponge Iron	Tonnes	590491.00	579165	692682
- Steel	Tonnes	222612.00	299163	378853
- Ferro-Chrome	Tonnes	25639.00	23373	35656
- Power	Lac Kwh	10439.10	11796.0	18982.4
- Hot metal/ Pig Iron	Tonnes	208797.00	218118.3	220022
- Rolled Product	Tonnes	-	100129	215542
<u>Total Elect. Energy consumption</u>	Lac Kwh	4910.69	5917.117	7647.62
<b>Sp. Elect. Energy Consumption:</b>				
- Sponge Iron	Kwh / Tonne	62.52	61.51	60.53
- Steel	Kwh / Tonne	638.05	617.31	579.3
- Ferro-Chrome	Kwh / Tonne	3914.59	3917.73	4038
- Power	%	10.89%	11.27%	11.0
- Hot metal/ Pig Iron	Kwh / Tonne	196.0	180.63	180.77
- Rolled Product	Kwh / Tonne	-	335	250.6
<u>Total Thermal Energy Consumption</u>	G Cal	3404133.46	4513140.15	5660303.8
<b>Sp. Thermal Energy Consumption:</b>				
- Sponge Iron	G Cal / Tonne	6.076	6.493	6.13
- Steel	G Cal / Tonne	0.261	0.229	0.35
- Ferro-Chrome	G Cal / Tonne	4.32	4.125	3.97
- Hot metal/ Pig Iron	G Cal / Tonne	4.45	4.72	4.78
- Rolled Product	G Cal / Tonne	-	1.09	0.83
<b>Total Manufacturing Cost</b>	Lac Rs.	55,612.88	79,778.43	140509.77
<b>Total Energy Cost</b>	Lac Rs.	15,955.17	23,299.89	42907.04
<b>Energy Cost / Total Manuf. Cost</b>	%	28.69 %	29.20 %	30.5%

Specific Energy consumption figures over last three years show steady decline, due to continuously effort towards energy conservation.



### **Energy Conservation Commitment, Policy and Setup**

All the above figures clearly indicate the culture of energy conservation imbibed right from initiation of the company in 1991. When the plant started, to utilize the waste heat of rotary kilns, producing Sponge iron, waste heat recovery boilers (WHRB) were installed on-line and the steam used for generation of electrical power. Thus all the six kilns are fitted with WHRB. Continuing the commitment for Energy conservation, all new kilns ( 4 Nos.) are also fitted with WHRB. Boilers generating steam utilize the in-house waste of washery reject and rotary kiln char. In fact, commitment for energy conservation and waste utilization is so high in the plant that the Power Plant unit-II was planned for utilization of waste basically. Towards this end, energy policy has been formulated and Executive Director takes monthly meeting on energy conservation.

## **JINDAL STEEL & POWER LTD., RAIGARH (AN ISO 9001 & ISO 14001 CERTIFIED COMPANY)**

### **ENERGY POLICY**

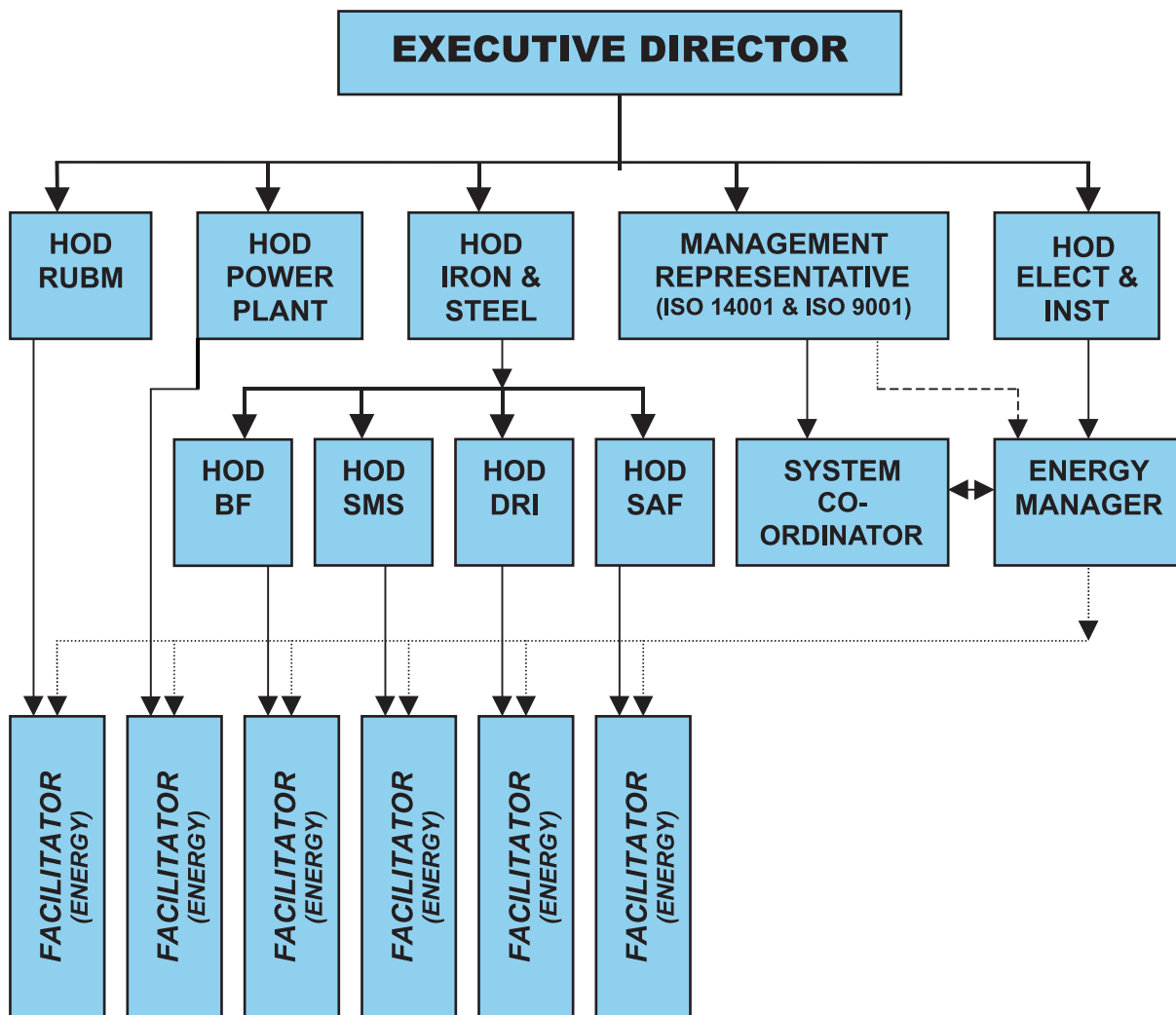
- Jindal Steel & taking specific objective of energy conservation through process / equipment modification.
- monitoring of energy consumption.
- creating innovativeness in employees through awareness.
- converting waste as resource.
- benchmarking the energy consumption norms.
- adherence to statutory requirements.

16 September 2002

Naveen Jindal  
(Executive Vice Chairman  
&  
Managing Director)

An Energy Management organization set up has been made for the philosophy of the management, energy management is part of the total management system, and that is why HODs are the key elements in the total structure, for planning and execution of the action plans, supported by Energy Coordinator.

## **ORGANISATION STRUCTURE OF ENERGY MANAGEMENT CELL**



## **Energy Conservation Achievements**

**Major achievements are:**

### **1. Producer Gas Plant :**

In Reheating furnace Plant was using dual fuel i.e. Blast furnace gas and furnace oil. As the plant wanted to increase the percentage of Blast furnace gas to replace furnace oil, we were finding difficulty as calorific value of Blast furnace gas is comparatively low. Therefore plant has gone for Producer gas and has installed 5 x 3000 Nm<sup>3</sup>/hr. capacity producer gas plant to enrich the blast furnace gas.

Average Gas generation in a year = 777.6 Lakh Nm<sup>3</sup>/hr.

Cost for generation in a year = Rs. 280 Lakh

Cost of furnace oil replaced = Rs. 1718.5 Lakh

**Amount saved in year = Rs. 1438.5 Lakh**

### **2. New WHRBs :**

Plant has 4 x 500 TPD capacity Sponge iron kiln. To utilize the waste heat of sponge iron kiln it installed 4 No of WHRB along with the kilns which generate steam to produce power i.e. 50 MW.

Total extra power generation in a year. = 3348.18 Lakh Kwh

**Amount saved in a year = Rs. 4419.6 Lakh**

### **3. Air Pre heater :**

In WHRB it was noticed that outlet flue gas temperature was on higher side i.e 180oC. It was studied and evaluated that Air Pre-heater can be installed.

In WHRB #2 & 3 APH was introduced which has resulted in reduction in flue gas temperature by 20oC, reduction in unburned carbon in ash came down to below 5% from more than 10% and Steam generation increased by 3-4 Tons/Hr / WHRB.

Total extra steam generation by WHRB # 2&3 = 48000 Ton/annum

**Total saving by using extra steam to generate power = Rs. 251 Lakh.**

4. In sponge Iron kiln, raw material quality & size makes lot of impact on productivity and size yield of kiln. Plant came to know from supplier that with new technology ( i.e. flip flop method) screen can reduced the minus fraction in raw material to 2 % from 5 % ( i.e. in conventional screen).

Management decided to install one screen on trial basis. By installing the new screen, drastic improvement was noticed in productivity and yield of kiln. So same type of screen was installed in all the kilns

Total increase in production compared to last year = 44835 Tonne

Total amount saved = Rs.2241.75 Lakh.

### **Energy Conservation Plans and Targets**

	ENERGY CONSERVATION PLANS	Savings in Lakh Rs.	Approx. Investment in Lakh Rs.	Project commencement & completion year
1,	60 MW power plant based on utilization of waste heat of coke oven.	9504	40000	Sept.06
2..	Installation of new oxygen plant with energy efficient technology. Specific energy consumption will be reducing by 0.38 kWh / Nm <sup>3</sup> . Capacity of plant is 350 liter per hr.	290	10500	August 05

### **Environment and Safety**

#### **Following steps have been taken for Environmental Management at JSPL :**

- ❖ Installation of Waste Heat Recovery Boilers (WHRB) to use waste heat of sponge iron unit for generating electrical energy.
- ❖ Installation of AFBC boilers to reuse solid wastes (middlings) of coal washery.
- ❖ Installation of ESPs and Bag Filters in all dust generating sources.
- ❖ Waste gas from blast furnace is used as fuel in our Rolling mill (reheating furnace) DRI (rotary kiln & Coal dryer) and 63 TPH boiler.
- ❖ Installation of two Nos. of Sewage Treatment Plants to treat the domestic waste generated from the colonies and offices. This treated wastewater is 100 % reused for plantation and garden development purpose.
- ❖ Waste Management for reduction of the waste generation and exploring the use of the waste.
- ❖ Construction of the pucca road inside the plant
- ❖ Implementation of the concept of Green Productivity.
- ❖ Waste water recycling and zero discharge.
- ❖ Rain Water Harvesting
- ❖ Bio-gas plant established
- ❖ Vermiculture composting plant has been established.
- ❖ Use of Fly Ash for Brick Manufacturing.
- ❖ Use of fly Ash for various construction works.