

JINDAL STEEL AND POWER LIMITED Raigarh (Chhattisgarh)

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. Present manufacturing facilities are:

- Coal based Sponge Iron production from six kilns with annual production capacity of 6,50,000 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 2,50,000 tonne. Hot metal produced to fill the requirement of Steel Melting Shop and Pig Iron to fulfil the market demand.
- Steel Melting Shop has an annual capacity of 4,00,000 tonne of cast steel production. Two Steel melting shops have following equipments; One EAF, Two LRF, Two Vacuum Degassing and three Continuous Caster. Caster has facility to cast following section: Slab, Bloom, Round & Beam Blank, which caters to the requirements of our Rail & Universal Beam Mill and Customers.
- Submerged Arc Furnace producing Ferro Chrome from 24MVA furnace, which cater the need of SMS department and Group Company.
- Captive Power Plant with generating more than 205MW, 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 5,50,000 tonnes 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.

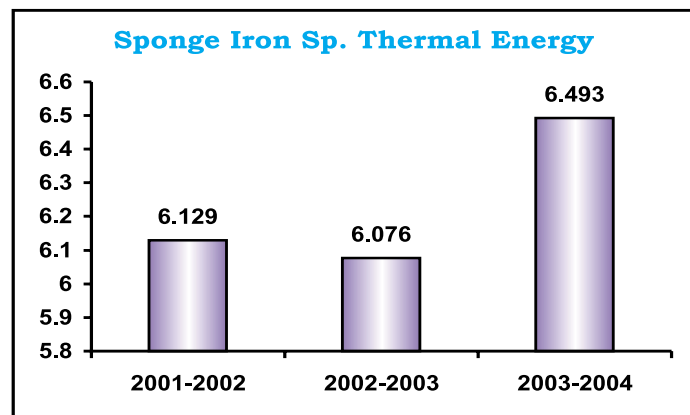
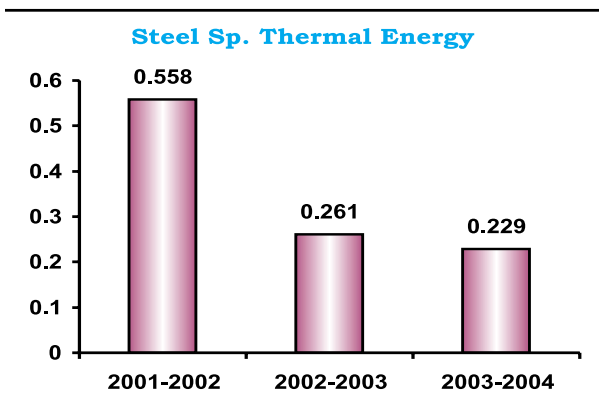
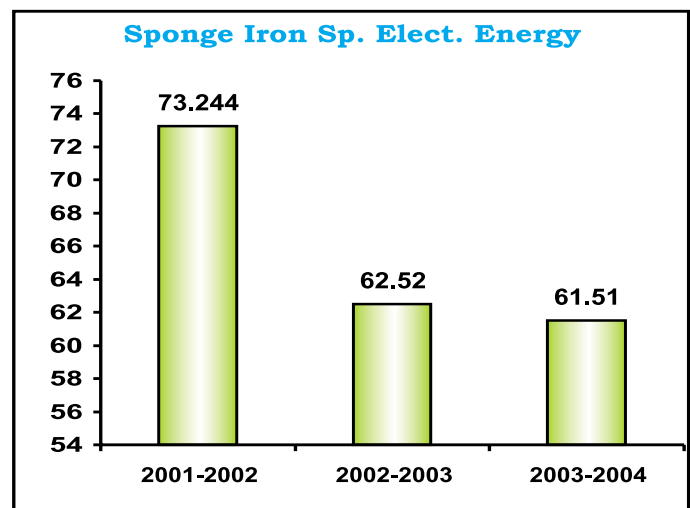
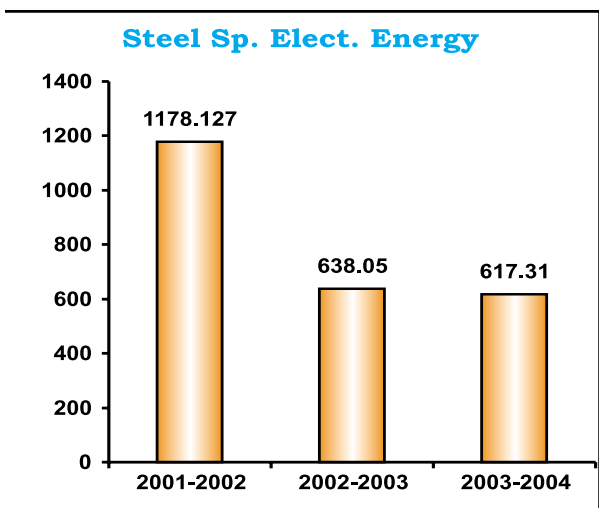
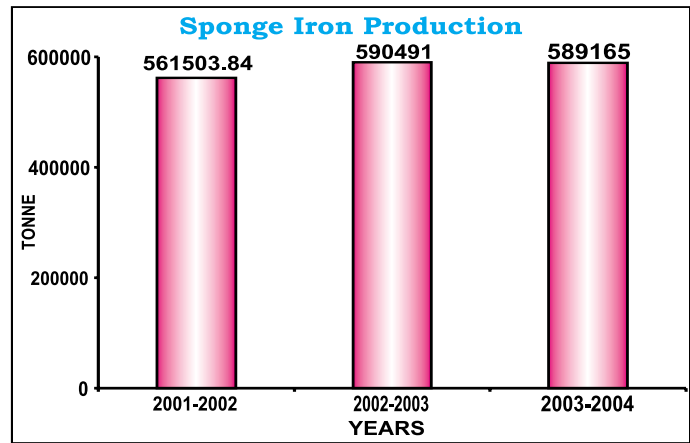
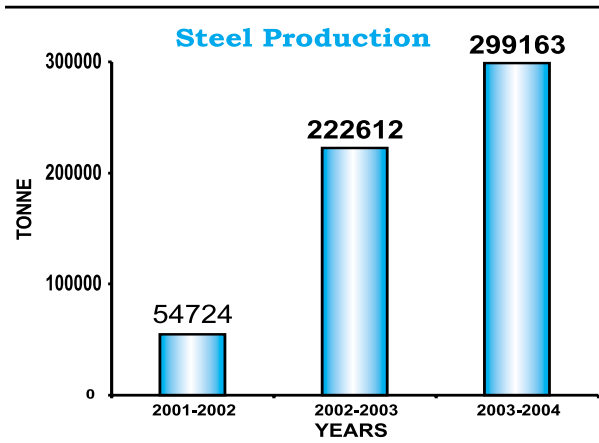
The plant is currently under large expansion programme:

- Four Sponge Iron Kilns with total capacity of 6.60 lac tonnes per annum.
- Power Plant with 50 MW capacities, to utilise the heat of Sponge Iron kiln exhaust gasses.
- Steel Melting Shop with 10 Lac Tonne capacity.
- Eight lac TPA Clean type non-recovery mechanized Coke Ovens.
- Blast Furnace (1670M3) with optimized energy utilization.
- 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.

Energy Consumption

DESCRIPTION	UNIT	2001-2002	2002-2003	2003-2004
PRODUCTION:				
- Sponge Iron	Tonnes	561503.84	590491.00	589165
- Steel	Tonnes	54724.00	222612.00	299163
- Ferro-Chrome	Tonnes	19743.00	25639.00	23373
- Power	Lakh Kwh	7195.37	10439.10	11796.0
- Hot metal/ Pig Iron	Tonnes	-	208797.00	221852
- Rolled Product	Tonnes	-	-	100129
Total Elect. Energy Consumption	Lakh Kwh	2656.04	4910.69	5917.117
Sp. Elect. Energy Consumption:				
- Sponge Iron	Kwh / Tonne	73.244	62.52	61.51
- Steel	Kwh / Tonne	1178.127	638.05	617.31
- Ferro-Chrome	Kwh / Tonne	3830.56	3914.59	3917.73
- Power	%	10.13%	10.89%	11.27%
- Hot metal/ Pig Iron	Kwh / Tonne	-	196.0	180.63
- Rolled Product	Kwh / Tonne	-	-	335
Total Thermal Energy Consumption	G Cal	3404133.46	4513140.15	4981187.57
Sp. Thermal Energy Consumption:				
- Sponge Iron	G Cal / Tonne	6.129	6.076	6.493
- Steel	G Cal / Tonne	0.558	0.261	0.229
- Ferro-Chrome	G Cal / Tonne	2.148	4.32	4.125
- Hot metal/ Pig Iron	G Cal / Tonne	-	4.45	4.72
- Rolled Product	G Cal / Tonne	-	-	1.09
Total Manufacturing Cost	Lakh Rs.	31,486.48	55,612.88	79,778.43
Total Energy Cost	Lakh Rs.	6125.17	15,955.17	23,299.89
Energy Cost / Total Manuf. Cost	%	19.45 %	28.69 %	29.20 %

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



Energy Conservation Commitment, Policy and Set up

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. 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 structure monthly meeting on energy conservation.

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

ENERGY POLICY

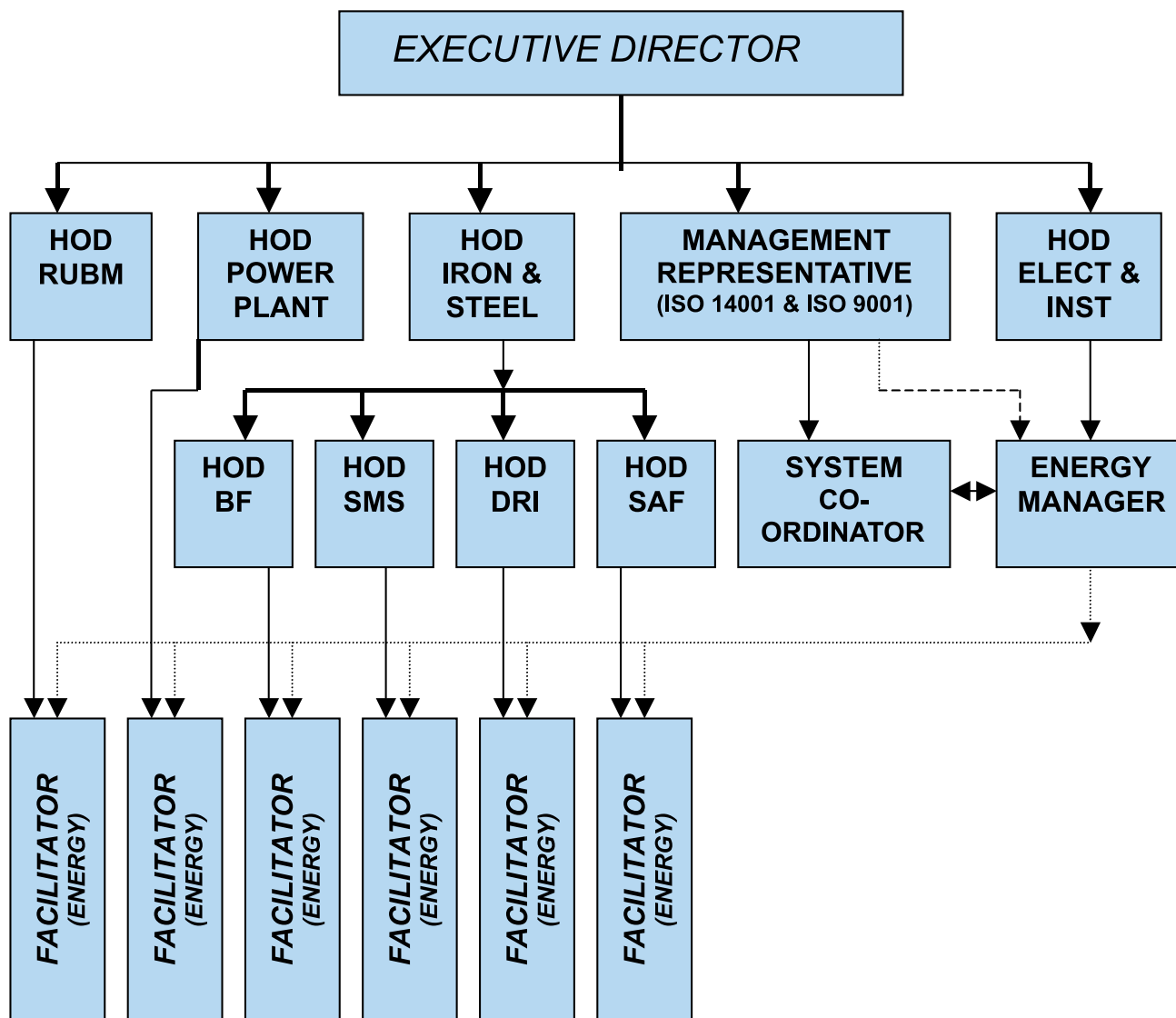
- Jindal Steel & Power Ltd., Raigarh, is committed to work for effective utilization of all types of energy. This is achieved by:
- taking specific objective of energy conservation through process / equipment modification.
- monitoring of energy consumption.
- creating innovativeness in employees through 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. Since it was decided to commission one Blast Furnace at Raigarh it was the challenge to utilize the excess of BF Gas of Blast furnace most profitably.

During study it was highlighted that Blast Furnace gas required at various points but at higher pressure. So it was decided to install the one booster station to pump the gas in various location of the plant with required pressure. It was decided to utilize at;

- a. Ladle pre-heating of Blast furnace, (Implemented in 2002-2003)
 - b. RUBM reheating furnace. (Implemented in 2002-2003)
 - c. AFBC Boiler,
 - d. Coal dryer hot air generator,
 - e. In the place of injection coal at Kilns.
- c. One AFBC Boiler (65 ton/hr capacity) with dual fuel type burner that utilizes the Blast Furnace gas along with washery rejects (Boiler will run on total waste) has been installed. Steam is used to generate 25 MW power. On annual basis 1751 lakh kwh extra power is generated of worth Rs. 4027 lakh rupees.
 - d. Coal (Coal for DRI rotary kiln) Dryer for enhancing the capacity, productivity and efficiency and use of Blast Furnace gas led to reduction in Furnace Oil consumption from 2.5 ltr. to 1.2 ltr. per tonne of coal per percent of moisture removal. In terms of money savings are 16.8 rupees per tonne of coal per percent of moisture removal. On annual basis 318 KL of Furnace Oil has been saved of worth Rs.41.26 lakhs rupees.
 - e. Blast furnace gas charging in rotary furnace (DRI KILN) to utilize the CO of Blast Furnace Gas has provided the advantage of increase in campaign life of KILN, stability in kilns with low temperature profile at discharge section and reduction in specific coal consumption by 20 kg per tone of sponge Iron production. On annual basis saving of 11783 tonne of coal of worth Rs. 117.8 lakhs.



2. In DRI Kilns transfer chute jamming was creating teething problem. Every time the transfer chute was cleaned after jamming and approx including 5 tonne of product was wasted. After modifying the upper and lower rings, opening of the transfer chute increased. It resulted in drastic reduction in transfer chute jamming from 585 times in a year to 85 times in a year.

Total saving :

Reduction in opening frequency :- 585-85	=	500 nos
Reduction in wastage of product @ 5 mt/jamming	=	2500 ton
Coal saving @ 1.4 mt /sponge iron	=	3500 ton
Saving in term of money @ 1000/tonne of coal	=	Rs 3500000

3. The performance data of TG#5 of Power plant has been analyzed and it was found that TG#5 has high backpressure i.e low vacuum. After doing the in-depth analysis it was found that causes of low vacuum is due to the deterioration of condenser performance and cooling tower performance. To improve the performance of Condenser online ball cleaning was done and some condenser tubes were replaced. Further, to improve the performance of Cooling tower #2, low pH water was circulated in the cooling water circuit. Both the actions resulted in

- Increase in condenser vacuum from 0.76 to 0.80 kg/cm²
- Reduction in cold-water temperature from 38.5°C to 33°C.

By improving the condenser and cooling tower performance, energy saving of 84 kcal/ kWh was achieved. On annual basis, 16800 Gcal energy saving was saved of worth Rs. 217.9 lakhs.



4. Installation of two supersonic oxygen blowing lance at EAF in place of single sub sonic oxygen lance. To reduce tap-to-tap time and use energy more efficiently, two supersonic oxygen blowing lance have been installed. This is used to inject more oxygen leading to faster reaction during heat making, which reduce electricity consumption and improve metallurgical consistency. EAF electricity consumption reduced from 370 to 350 kilowatt-hours (kWh) per ton. It consistently has reduced the EAF's power-on time from 50-55 minutes to 40-45 minutes.



Power Consumption with single sub sonic oxygen lance	370kWh / tcs
Power Consumption with two supersonic oxygen lance	350 kWh / tcs
Power consumption at LRF(kWh) before installation of super sonic oxygen lance	91 kWh / tcs
Power consumption at LRF(kWh) after installation of super sonic oxygen lance	88 kWh / tcs
Aux. Power consumption (kWh) before installation of super sonic oxygen lance	111 kWh / tcs
Aux. Power consumption (kWh) after installation of super sonic oxygen lance	105 kWh / tcs
No. of Heats/ day with single sub sonic oxygen lance	20-22 heats
No. of Heats/ day with two supersonic oxygen lance	25-26 heats
On annual basis 87 lakh units of power saving was achieved resulting in monetary savings of Rs. 200 lakhs.	

Energy Conservation Plans and Targets

	ENERGY CONSERVATION PLANS	Savings in Lakh Rs.	Approx. Investment in Lakh Rs.	Project commencement & completion yearn
1.	Installation of 5 nos of Producer Gas Plant to replace the Furnace Oil in plant.	250.38	1500	Nov. 2004
2.	Installation of 2x25 MW power generation unit to utilize the waste heat of upcoming DRI Kilns.	9660	13744	March 2005
3.	Installation of Air Pre- heater in WHRB#2.	175	30	Jan.2005
4.	Replacement of old ID fan at WHRB#2 with efficient ID fan.	12.97	15	Nov. 2004
5.	Installation of online oxygen analyzer in flew gases of reheating furnace.	7.8	5	Nov.2004
6.	Insulation of expansion bellows in hot air line of reheating furnace.	120	60	March 2005
7.	Installation of high efficiency screen in coal and iron ore circuit at day bins of Kilns.			

Environment and Safety

Environment

JSPL is Certified with Environmental Management System, ISO 14001, which is mark of excellence in environmental performance. Different types of pollution control equipments have been installed in various production units in the plant to control the air pollution. A state of art technology based Fume Extraction System (F.E.S.) has been installed in Steel Melting Shop. In the entire plant total 16 nos. of Bag filters have been installed in various locations like cooler discharge at the end of DRI unit, Product Hopper, Packing

Plant, raw material handling in Steel Melting Shop for dust control. To control flue gas emission from power plant, efficient Electrostatic Precipitators (ESPs) have been installed. Producer Gas Plant & Lime Kiln units are equipped with Ventury Scrubber and wet scrubber respectively for controlling the emission.

As far as water pollution management is concerned, a close water cycle network has been established in the plant, which ensures 100% water recycling and reuse after necessary treatment and settling. DRI, Power Plant etc close cycle system has been established and entire wastewater is reused in various purposes. Two nos. Sewage Treatment Plants has been installed for the treatment of domestic wastewater of Colonies and Offices. Treated water is reused for irrigation of tree plantation areas. Vermin-composite unit has been installed to utilize biodegradable waste of the company and colonies. Company has installed fly ash Brick making plant to utilize the fly ash waste generated from the Power Plant.

Safety

To generate safety awareness among the employees campaigns are being conducted. All departments are covered during the campaign. Employees of all levels including staff, workers & contract workers are covered. Awareness provides information about the type of Hazard, importance of safety appliances and preparedness for emergency situations related to the concerned departments.