

## Bokaro Steel Plant, Jharkhand

### Company Profile

Bokaro Steel Plant (BSL), is the symbol of country's efforts towards augmentation of steel production & indigenisation. It has made definite contribution to the economy of our country. Agreement was signed with USSR on 25<sup>th</sup> Jan. 1965 for establishing a 1.7 MT capacity steel plant at Bokaro to be expanded later to 4.0 MT capacity. Over the years, BSL has grown in strength reaching increased levels of production and quality.

Bokaro Steel Plant is an integrated Steel Plant which incorporates all the classical features of Iron & Steel making from Coke Ovens to Cold rolling Mills.

With a saleable steel production capacity of 3.78 million tones, the plant has been recently modernized with continuous casting facilities and a state-of-the-art Hot strip mill for producing quality steels of international standards. A range of special steel products like DMR 249A, E-460/500/550, IS-8500 Fe540B, SAILCOR, SAILPROP, SAILMEDSi, SAILRIM, API grade steel, HRNO, SAILMA, WTCR, BSL-46 for auto sector etc. have been introduced after modernization. All the units of the plant from steel making to the finished product are accredited to ISO:9002 QMS standard.

### **ENERGY CONSUMPTION**

In the present scenario of global cost competitiveness in steel industry the challenge can be met by finding solutions to reduce energy consumption, which is one of the major cost factor. Energy consumption has reduced to an appreciable level of 7.2 Gcal/tcs in 2004-05 mainly through optimization and improvement in existing processes & equipment as well as introduction of new technologies. To achieve the international levels of energy consumption ie 4.5 to 5.5 Gcal/tcs attained by developed countries continuous efforts are made in this direction.

The basic energy input (purchased) to the steel plant are

- ✧ Coking coal (both low ash imported coal and indigenous coal) for producing coke in Coke Oven.
- ✧ Blast Furnace grade coke purchased to supplement shortage of BF coke generated in Coke Oven.
- ✧ Imported low ash non coking coal for injection in Blast furnace
- ✧ Power purchased from DVC and BPSCL.
- ✧ Steam purchased from BPSCL (both HP & LP) to meet requirement at various process.
- ✧ Diesel for mobile equipments, locos etc.

The basic energy input (purchased) to the steel plant and their contribution to energy bill with respect to cost of production is given in following table.

| SN  | Parameters                          | Unit                 | 02-03  | 03-04   | 04-05   |
|-----|-------------------------------------|----------------------|--------|---------|---------|
| 1.0 | Consumption of basic energy         |                      |        |         |         |
| 1.1 | Metallurgical coal.                 | Kg/T of crude steel  | 1051.6 | 1043.4  | 962.6   |
| 1.2 | Coal for injection in Blast furnace | Kg/T of hot metal    | 11     | 14      | 42      |
| 1.4 | Purchase Power                      | Kwh/T of crude steel | 462.2  | 445.5   | 435.4   |
| 1.6 | Total Energy Bill.                  | Rs. in crores        | 1896.0 | 1948.02 | 2425.81 |

|     |   |        |             |             |             |
|-----|---|--------|-------------|-------------|-------------|
| 2.0 | Total Manufacturing cost                                  | - do - | 5039.4      | 5381.43     | 5469.71     |
| 3.0 | <b>Contribution of Energy bill over production cost .</b> | %      | <b>37.6</b> | <b>36.2</b> | <b>44.3</b> |

There has been an astronomical rise in the price of inputs . To circumvent this adverse situation, technologies need to be adopted like fuel injections & other energy reducing measures like waste heat utilization systems etc.

**ENERGY CONSERVATION COMMITMENT , POLICY & SET UP**

Energy Conservation is continuous and on-going process. It has been a top management priority since last two decades.

The structured approach to achieve Excellence in Energy Conservation and management is based on

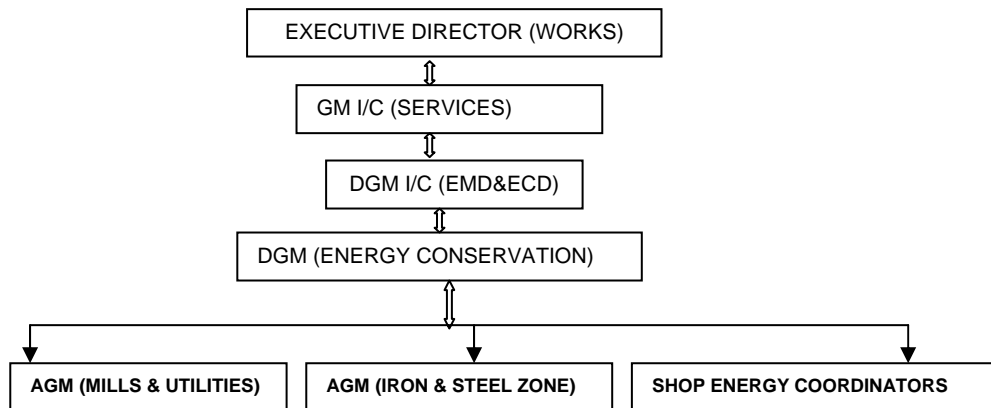
- Technological change to to adopt energy efficient process
- Retrofitting and modification of existing process to make it more efficient.
- Minimise noise level through improved house keeping.
- Monitoring shop wise energy parameters at micro and macro level.

Bokaro Steel has established a well organized Energy Management Department since inception for sustained and systematic approach towards efficient utilization of energy.

A separate energy conservation cell comprising 6 executives, 26 skilled and 11 semi skilled workers is operating under Energy Management department for monitoring and controlling all energy parameters in close association with all units of the plant.

The energy cell is headed by Assist. General Manager exclusively for monitoring energy consumption of the plant.

The structure of the energy cell is given below.



**ENERGY SCHEMES COMPLETED IN 2004-05**

1. COKE OVEN

- ☛ DRY GUNNITING IN 204 OVENS TO PLUG CROSS LEAKAGES AND INCREASE CO GAS YIELD.
- ☛ HYDROJET CLEANING OF OVEN DOORS @ 200 NOS OVENS /DAY
- ☛ USE OF STEAM IN PLACE OF POWER DRIVEN EXHAUSTER.

## 2. SINTERING PLANT

- ☛ COMMISSIONING OF MULTISLIT BURNERS IN BAND II & III AN APRIL'04 AND SEPT'04.
- ☛ RUNNING OF 5 COOLER BLOWERS IN STEAD OF 6

## 3. BLAST FURNACES

- ☛ INJECTION OF COAL TAR IN BLAST FURNACE NO. 1.
- ☛ OXYGEN ENRICHMENT IN BLAST FURNACE I & 4.
- ☛ USE OF MIXED GAS IN STOVE HEATING AND INCREASE OF BLAST TEMPERATURE UPTO 1000 C.
- ☛ INCREASE OF SURFACE AREA OF STOVE CHECKER WORK BY HOOGOVEN TYPE DESIGN IN STOVE IV OF BLAST FURNACE NO 3.
- ☛ INSTALLATION OF STAINLESS STEEL SHEET IN COMBUSTION CHAMBER WALL OF STOVE IV OF BLAST FURNACE 3 TO ELIMINATE CROSS LEAKAGES.

## 4. SLABBING MILL

- ☛ REPLACEMENT OF 120 NOS. 1000 W HPMN HIGH BAY LIGHT WITH 400 W HPSV IN SLABBING MILL.
- ☛ COMPLETE REPAIR OF 2 NOS. SOAKING PITS ( PIT NO. 22 & 30) AND 2 NOS. OF RECUPERATOR.
- ☛ ADJUSTMENT OF SETTING OF OPTIMUM AIR/GAS RATIO IN ALL RUNNING PITS ROUND THE CLOCK.

## 5. COLD ROLLOING MILL

- ☛ MODIFICATION OF 3 NOS. BATCH ANNEALING FURNACESWITH FLAT ROOF TOP AND CERAMIC FIBER LINING.

## 6. GENERAL & UTILITIES

- ☛ REPAIR OF SECTOR GATE VALVES, BURNERS OF POWER PLANT BOILERS TO MAXIMIZE BF GAS FLOW TO TPP.

- ☛ **COMMISSIONING OF VSAT EQUIPMENTS AT SLCC FOR BI-DIRECTIONAL DATA TRANSFER BETWEEN BSL, EREB, DVC FOR EFFECTIVE POWER DISTRIBUTION.**
- ☛ **2700 M2 DAMAGED INSULATION HAS BEEN CHANGED DURING THE YEAR.**
- ☛ **REPAIR AND INSTALLATION OF 25 NOS. DEFECTIVE STEAM TRAPS IN STEAM LINE.**

### **ENERGY CONSERVATION ACHIEVEMENTS**

As a result of the above energy conservation measures taken and optimization of the operating & maintenance practices, there was a marked improvement in all the major energy parameters. The % improvement of the major energy indices as against 02-03 is shown below :

#### **The status of energy parameters and % improvement over 02-03**

| Sl. No | Parameters                 | Unit                  | Year    |         |         | % improvement over 02-03 |
|--------|----------------------------|-----------------------|---------|---------|---------|--------------------------|
|        |                            |                       | 2002-03 | 2003-04 | 2004-05 |                          |
| 1.0    | Sp. Heat consumption       |                       |         |         |         |                          |
|        | - Coke Oven                | Gcal/T dry coal       | 0.595   | 0.594   | 0.591   | 0.67                     |
|        | - Sinter Plant             | Gcal/T gross sinter   | 0.044   | 0.033   | 0.024   | 45.5                     |
|        | - Blast Furnace            | Gcal/T hot metal      | 0.588   | 0.585   | 0.580   | 1.4                      |
|        | - Hot Strip Mill           | Gcal/T slab rolled    | 0.469   | 0.442   | 0.446   | 4.9                      |
|        | - Cold Rolling Mill        | Gcal/T annealed coil  | 0.350   | 0.336   | 0.332   | 5.1                      |
| 2.0    | Sp. Power Consumption      |                       |         |         |         |                          |
|        | - Coke Oven                | Kwh/t gross coke      | 27.6    | 27.3    | 26.9    | 2.5                      |
|        | - Sinter Plant             | Kwh/T gross sinter    | 49.0    | 46.7    | 48.5    | 1.0                      |
|        | - Steel Melting shop       | Kwh/T crude steel     | 36.0    | 29.5    | 23.1    | 35.8                     |
|        | - Hot Strip Mill           | Kwh/T coil + plate    | 92.7    | 87.7    | 82.7    | 10.8                     |
|        | - Cold Rolling Mill        | Kwh/T CR Product      | 164.7   | 154.1   | 153.2   | 7                        |
| 3.0    | Coke Rate                  | Kg/T hot metal        | 536     | 541     | 531     | 0.9                      |
| 4.0    | Coke Oven Gas yield        | Nm3/T dry coal        | 317.3   | 318.2   | 321.4   | 1.3                      |
| 5.0    | Crude Tar Yield            | Kg/T dry coal         | 30.4    | 30.6    | 30.6    | 0.7                      |
| 6.0    | Overall Energy Consumption | Gcal/T of crude steel | 7.360   | 7.338   | 7.233   | 1.7                      |

## **ENERGY CONSERVATION PLANS AND TARGETS**

### **FUTURE ENERGY CONSERVATION PLAN ARE :**

- Coal dust injection in Blast Furnace 2 & 3.
- Revamping & upgradation of Sinter Plant including ESP.
- Moderisation BF gas bleeder system with state of art control system and provision for operation of throttles at strategic position for efficient distribution of fuel gases and minimization of bleeding losses.
- Computerized energy management system for optimal use of various forms of energy.
- Installation of slab caster in SMS I
- Oxygen enrichment in Blast furnace # 5
- Cast house slag granulation plant in Blast furnaces.
- Installation of Sponge iron plant of capacity 500 tdp.

The target for Energy consumption for 2005-06 is 7.100 Gcal/Tcs and for 2006-07 is 6.9 Gcal/tcs.