
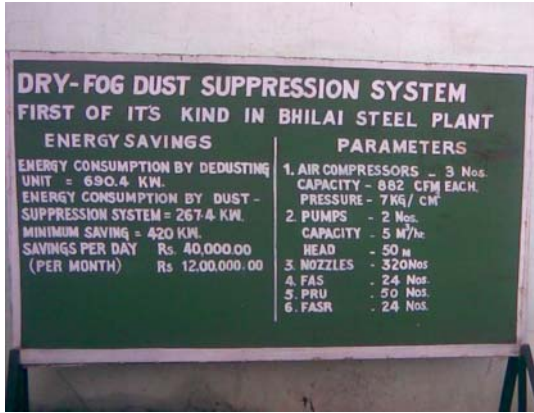


Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure Introduction of burners in preheat- zone in furnace 1 & 2 in Rail and Structural Mill with in-house know-how.	Sector ...Integrated steel			
Year to be filled by BEE		Technology ...Reheating Furnace			
<p>Description of the energy conservation measure: With the help of RDCIS, Ranchi the side burners were introduced in the Fce. 1 & 2 of Rail and Structural Mill. This has improved heat distribution in side the furnace and there by Furnace productivity was improved. The Sp. Heat consumption was reduced by 10 Mcal/T (6000 Gcal/Year).</p>					
Picture/ sketch/ drawing before modification (if available)			Picture/ sketch/ drawing after modification		
					
Agency that executed the project (with complete address and email): RDCIS, Ranchi					
Total investment, Rs.: In-house			Year of implementation: 2006		
First year energy cost savings, Rs.: 27 lakhs					
First year other savings, Rs.: increase in productivity					
On annual basis	Kwh 000'	Coal (Tons)	Gas Nm ³	Oil (kL)	Other
Energy consumption before			195x10 ⁶		
Energy consumption after			192x10 ⁶		
Energy tariff, Rs/ kWh/ Ton/ Nm ³ / kL ...			0.9		
Company complete address: Bhilai Steel Plant – SAIL Chattisgarh, 490001 L D Das Dy. Gen. Manager I/C Energy Management Deptt. Contact person who could be contacted for more information:				We authorise Bureau to use this information for dissemination Signature Date	

ID to be filled by BEE	Title of the measure Installation of a new Energy efficient Dry Fog dust suppression system for BF-4 stock house.		Sector ... Integrated steel		
Year to be filled by BEE			Technology ... Dust Extraction		
Description of the energy conservation measure: Substantial fugitive dust is emitted during screening, conveyor transfer and loading the charge in Skip of Blast furnaces. This dust is conventionally controlled by dust Extraction system with jet bag filters.					
Picture/ sketch/ drawing before modification (if available)			Picture/ sketch/ drawing after modification		
					
Agency that executed the project (with complete address and email: TPS Manufacturing and construction company Ltd, New Delhi)					
Total investment, Rs.: 189 lakhs			Year of implementation: 2006		
First year energy cost savings, Rs.: 140 lakhs					
First year other savings, Rs.: nil					
On annual basis	kwh 000'	Coal (Tons)	Gas Nm ³	Oil (kL)	Other
Energy consumption before	84096				
Energy consumption after	49056				
Energy tariff, Rs/ kWh/ Ton/ Nm ³ / kL ...	4.0				
Company complete address: Bhilai Steel Plant – SAIL Chattisgarh, 490001 L D Das Dy. Gen. Manager I/C Energy Management Deptt. Contact person who could be contacted for more information:				We authorise Bureau to use this information for dissemination Signature Date	

Process Description

Bhilai steel plant is an integrated steel plant with following four major units-

- a) Coke Ovens- for production of Coke.
- b) Blast Furnace- for production of Hot metal
- c) Steel Melting Shop- for conversion of Hot metal to Steel.
- d) Rolling Mills- for making, shaping and treating of steel in desired shape and size.

Metallurgical coal are charged in to Coke Oven and heated to about 1100°C in absence of air to produce metallurgical coke. Gases are evolved during coke making process due to volatile matter content in coal. These gases are further treated to separate chemicals like Benzene, Toluene, Tar etc. and clean gas is obtained. This gas is known as Coke Oven gas and has high calorific value (4300 kcal/Nm^3). The coke thus produced is the main fuel as well as raw material for Blast Furnaces.

The coke produced is charged in the Blast Furnaces along with iron ore, sinter and fluxes to produce pig iron. In Blast Furnaces, air blast is given which takes part in reaction for production of iron ore to molten iron along with coke and other iron bearing material like lump ore, sinter and flux material. Gas are also evolved during the process that is subsequently cleaned in gas cleaning plant. The gas from blast furnace is called Blast furnace gas and has calorific value of 800 kcal/Nm^3 .

The cleaned Coke oven gases and Blast furnace gas are main fuel for Bhilai Steel plant and used in various shops where heating is required.

The pig iron produced from the Blast furnaces is fed to the Twin hearth furnaces of

Steel Melting Shop-1 and to the LD converters of SMS-2 for steel making. The steel produced from the SMS-1 is teemed into ingots, which are fed to Blooming Mill to make blooms. Small quantity of blooms is rolled to heavy structural in Rail & Structure Mill. Main quantity of the blooms is rolled into billets in the billet Mill. The billets of the suitable dimensions are further rolled into Merchant products in Merchant Mill and Wire Rods in Wire Rod Mill. The liquid steel produced from the LD converters is cast into Blooms/Slabs through continuous casting route, which is fed to the Plate Mill to make flat products and Rail mill to make rails. These blooms meet the stringent quality requirements of Indian Railways.

The other units like Refractory Material Plant, machine Shops, Foundry shops, Forge shop etc are the supporting units for main units.

One captive Power Plant, two Oxygen Plants and one Acetylene plant are there as Auxiliary units. The Blast Furnace slag is granulated in the Cast House slag granulation plants and sold to near by Cement Plants. The slag from the SMS-1 is dumped in slag yard & from SMS-2 is being recycled to Sinter Plants, Transport & Diesel and BF departments. All the solid waste materials of metallurgical value are recycled. Fines of iron ore, fluxes, mill scale etc. are fed to Sintering Plants to produce sinter. The process technology of plant is briefly illustrated in the Flow Chart given in Figure .

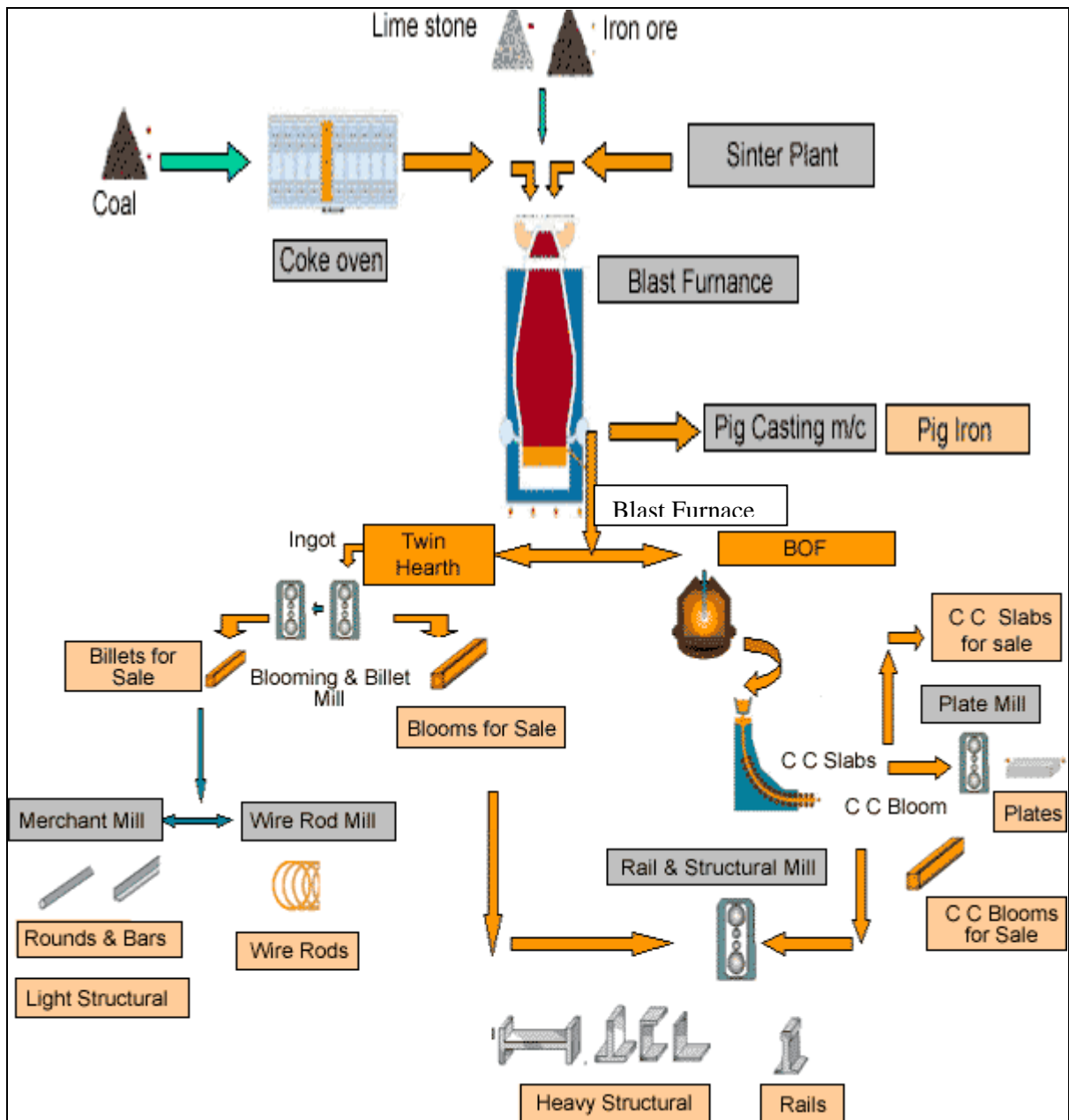


Figure 1. **PROCESS FLOW CHART: BHILAI STEEL PLANT**

Energy Management Policy

- Reduce specific energy consumption by identifying areas with the energy saving potential..
- Conserve and optimally utilize , petroleum fuels, steam, power, compressed air, water and other resources
- Set energy consumption target and monitor continuously.
- Benchmark with the global best in the country.

Energy Conservation measures implemented during 2006-2007 are given below :

1. Increase in productivity of Machines in sinter plant-2 by changing chute angle from 54° to 60°.

The feeding of raw material in Sinter Machines was improved by changing chute angle from 54° to 60°, this was done after detailed study by RDCIS, Ranchi. This has improved the permeability of bed and due better air distribution Machine productivity improved by 5 % i.e 2 T/Hr. The fuel saving achieved 8000 gcal/year.

2. Introduction of burners in preheat- zone in furnace 1 & 2 in Rail and Structural Mill with in-house know-how.



With the help of RDCIS, Ranchi the side burners were introduced in the Fce. 1 & 2 of Rail and Structural Mill. This has improved heat distribution in side the furnace and there by Furnace productivity was improved. The Sp. Heat consumption was reduced by 10 Mcal/T (6000 Gcal/Year).

3. Installation of a new Energy efficient Dry Fog dust suppression system for BF-4 stock house.

Substantial fugitive dust is emitted during screening, conveyor transfer and loading the charge in Skip of Blast furnaces. This dust is conventionally controlled by dust Extraction system with jet bag filters.



DRY-FOG DUST SUPPRESSION SYSTEM	
FIRST OF ITS KIND IN BHILAI STEEL PLANT	
ENERGY SAVINGS	PARAMETERS
ENERGY CONSUMPTION BY DEDUSTING UNIT = 690.4 KW.	1. AIR COMPRESSORS - 3 Nos.
ENERGY CONSUMPTION BY DUST SUPPRESSION SYSTEM = 267.4 KW.	CAPACITY - 882 CFM EACH.
MINIMUM SAVING = 420 KW.	PRESSURE - 7 KG/ CM ²
SAVINGS PER DAY (PER MONTH) = Rs. 40,000.00 (Rs. 12,00,000.00)	2. PUMPS - 2 Nos.
	CAPACITY - 5 M ³ /hr
	HEAD - 50 M
	3. NOZZLES - 320 Nos.
	4. FAS - 24 Nos.
	5. PRU - 20 Nos.
	6. FASR - 24 Nos.

4. Percentage leakage doors in Coke Ovens batteries brought down to <10 % from 12 %.



The doors of Coke Oven Batteries are subjected to leakage if proper technological discipline is not met. During the year as a special task with adhering to technological norms and close monitoring the PLD was reduced to less than 10 % compared to previous data of 12 %. This has resulted in an increase in CO Gas Yield.

5. Revamping of BF-7 with technological up gradation was done.



The Blast Furnace No-7 (2000 M³ Volume) was modernized during Capital Repair. It was commissioned in Feb.07. After the repair its productivity has improved from 3500 T/Day to 4500 T/day and its fuel rate has reduced by 10 Kg/thm.

6. Replacement of old insulation of steam pipe lines.



The old insulation of steam pipe lines was made of with Cement coating , due to aging effect it was broken at many places and its efficiency was reduced. This insulation was replaced with insulation and Aluminium sheet cover. This has resulted in heat loss saving.

7. Use of Granulated Blast Furnace slag for Cement making.

The slag generated in Blast furnace during Hot Metal production has the chemistry of cement and can be used in Cement plant. It will save other raw material like limestone and waste utilisation is also achieved. Use of granulated slag in Cement plant also saves energy required for calcination of raw material as done in Cement plant.

v) Energy Conservation Plans and Targets

The company has set up a challenging target of reducing specific energy consumption by 1% in every successive year and to reach International Norm. In line with that, Bhilai Steel Plant has undertaken a major programme for investment in capacity enhancement and introduction of energy efficient technologies. The following is the brief outline of envisaged projects :

The proposed short term future plans for energy conservation are as follows :

1. Introduction of energy efficient multi-slit burner in sintering machine.
2. Regular replacement of old insulation of steam pipelines.
3. Sale of Granulated slag to cement plant. Energy used for making cement will be saved.

It has been estimated that with introduction of modern technologies and energy conservation schemes, the specific energy consumption will come down to 5.7 Gcal/tcs by 2010 and that will be at par with international norm. The table below gives the impact of various project that are envisaged as a part of future program on energy conservation.