



The Indian Iron & Steel Company Limited Burnpur Works

HISTORICAL BACKGROUND

The Indian Iron & steel Company Limited (IISCO) had its origin as Bengal Iron Works, which was founded way back in 1870 at Kulti (West Bengal). Iron production started in Kulti in 1875. The Indian Iron & steel Company was incorporated in 1918 and a new factory was set up at the area which is presently known as Burnpur. Iron production started in Burnpur in 1922 and steel making commenced in 1939 with the setting up of a new steel factory in Burnpur. IISCO became an integrated steel plant with captive ore mines, collieries, washeries and a foundry at Kulti.

The steel making capacity of Burnpur Works was expanded to 1.0 Million Tonnes in 1955-58. IISCO reached the pinnacle of its performance during 1962-63 & 1963-64 and produced more than 1.0 Million tonnes of Ingot Steel. IISCO was a blue-chip company during that period and its shares were also listed in the London Stock Exchange.

Being one of the major producer of iron & steel in the country from the early part of the century, IISCO has played a vital role in the country's economy till public sector steel plants under the then HSL started production. The plant performance subsequently declined since late 1960s due to various reasons and on 14th July 1972, the Government of India took over the management of IISCO. In 1979 IISCO became a wholly owned subsidiary of Steel Authority of India Limited (SAIL).

COMPANY PROFILE

IISCO, Burnpur Works is an integrated steel plant having Blast Furnace-Twin Hearth Furnace route of steel making and consisting of the following major operating facilities.

- (a) 2 Coke Oven Batteries of 78 ovens each
- (b) 2 nos.of Blast Furnaces of 1170 m³ volume each and 1 no. Blast Furnace of 500 m³ volume
- (c) Steel Melting Shop complex with one no.2 x 110 Tonnes Twin Hearth Furnace, ingot casting, ingot mould casting, ingot stripper shed, 1 no. rotary dolomite kiln facilities
- (d) Rolling Mills complex consisting of 40" Blooming Mill, 34" Heavy Structural Mill, Billet Mill, 18" Light Structural Mill and Merchant & Rod Mill
- (e) Captive Boiler House equipped with 2 nos.of big boilers (steam raising capacity of 90 tonnes/hour each), 5 nos.of medium boilers (steam raising capacity of 54 tonnes/hour each), 3 nos.of small boilers (steam raising capacity of 27 tonnes/hour each) to meet process steam requirements besides supplying steam for captive power generation.
- (f) Captive Power Plant with 3 nos.of Turbo Alternators (of available capacity = 40 MW = 1 x 20 MW + 2 x 10 MW machines)
- (g) Captive Oxygen plant (capacity 50 Tonnes/day)

Other facilities include Coal Handling Plant, Coke Oven By Product Plant, Tar Dehydration Plant, Benzol Treatment Plant, Coal Handling Plant, Raw Material Handling Plant, Pig casting machines, Slag Granulation Plant, Stock yards for semi-finished & finished products, Electrical & Mechanical Shops. The products departments are ably supported by departments like Safety, Fire Services, Civil Maintenance & Water Supply, Refractory Department, Laboratory & Quality Management, Energy Management, Environment Management, Production Planning & Control, Project Engineering & Development Division, Finance Department, Garage, Stores & Yards.

Besides major operating facilities, as indicated above, the following facilities have been taken out of operation either to optimise operating cost & process efficiency, or as preparatory actions of modernisation schemes proposed earlier, or have been phased out.

- (a) 2 nos.of Coke Oven Batteries
- (b) 1 no. small Blast Furnace of 500 m³ volume
- (c) Bessemer Converters
- (d) Sheet Mill
- (e) 4 nos.of small boilers (capacity 27 tonnes/hour each)



(f) 1 no. Turbo Alternator (20 MW capacity)

Production Summary	Unit	2001-02	2002-03	2003-04
Hot Metal Production	Tons/year	0.688	0.672	0.641
Steel Production	Tons/year	0.346	0.327	0.301
Finished Steel Production	Tons/year	0.302	0.288	0.258
Pig Iron Production	Tons/year	0.288	0.280	0.222

As on 31.03.2004 the crude steel production capacity had dropped down to 0.3 Million tonnes per annum after phasing out Bessemer Converters in

1988 and 6 nos.of Open Hearth Furnaces during 1999-2002.

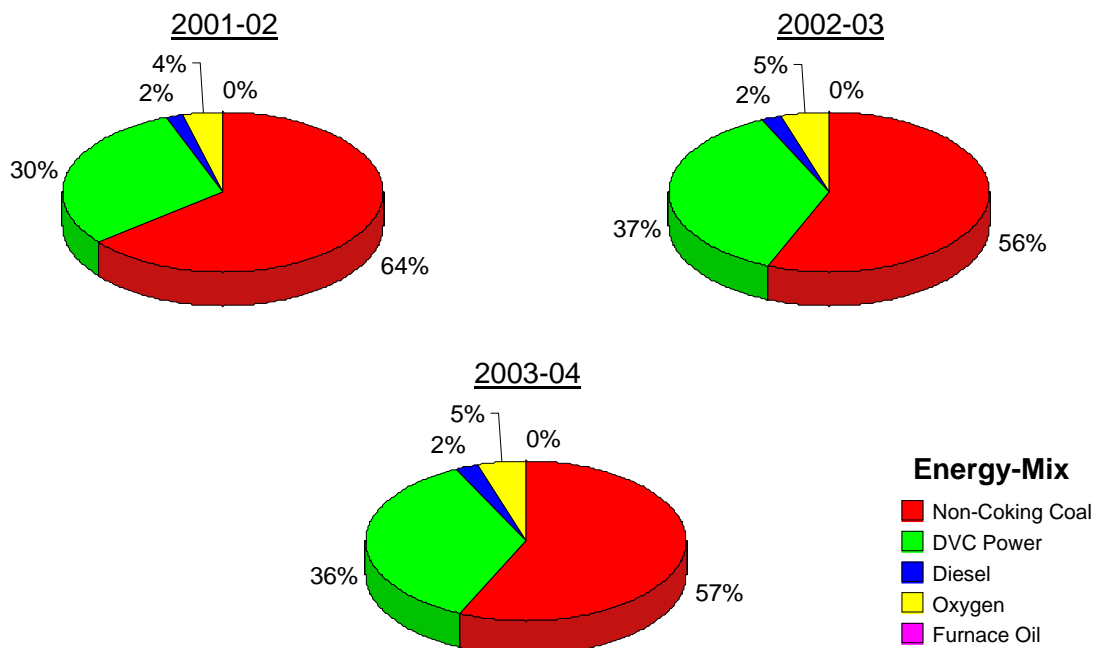
IISCO has a countrywide marketing network with its headquarter at Kolkata and regional offices at Delhi, Mumbai & Chennai and branch offices at Ludhiana, Chandigarh, Bangalore, Hyderabad, Burnpur and Kolkata.

ENERGY CONSUMPTION

	Unit	2001-02	2002-03	2003-04
Specific Energy Consumption	Gcal/tcs	9.339	9.220	9.295
Unit Energy Cost	Rs/Gcal	419	466	385
Specific Energy Cost	Rs/tcs	3,918	4,298	3,581

Present level of specific energy consumption is 8.5-9.0 Gcal/tcs (or Million Kcal/tonne of crude steel) compared to 14.0-16.0 Gcal/tcs in 1990s. The specific energy consumption in IISCO,

Burnpur Works is high compared to other integrated steel plants of SAIL & TISCO due to aging equipment and outdated technology. The energy mix is given below.



ENERGY CONSERVATION COMMITMENT, POLICY AND ORGANIZATIONAL SETUP

Energy consumption attributes to about 38% of the production cost in IISCO, Burnpur Works. Therefore, energy conservation and reduction of energy cost is of immense importance for sustaining the competitive edge in present open market economy. There is also substantial potential in IISCO for improvement.

Regular review meetings at various levels are convened to monitor the status of energy management and progress of energy conservation projects. Daily meeting at the level of Deputy General Manager, Energy Management, weekly meeting at the level of Executive Director (Works) are part of series of meeting that are held in this respect.



Energy generation and consumption are pollution intensive. Therefore in view of ecological balance, energy conservation schemes are required to be environment friendly. Technology upgradation and adaptation are carefully executed with an air to reduce emission of CO, NO_x, SO_x etc. The company is also concerned of the forthcoming thrust of reducing CO₂ emission from fossil fuel combustion in near future. It also understands that the future lies in adapting new environment friendly as well as energy efficient processes.

ENERGY CONSERVATION ACHIEVEMENT

The major achievement during the last decade that contributed significantly in reducing specific energy consumption to a level below 9 Gcal/tcs for the first time in the company's history are listed below.

- Phase out 4 nos. of uneconomic boilers (steam raising capacity @ 27 tonnes/hour/boiler) and one small 600 tonnes/day Blast Furnace.
- Improvement in B.F. Gas quality (by minimising dust & moisture content) through exercising control over re-circulating water temperature by operating optimum no. of cooling fans in cooling towers, daily monitoring of dust content in gas and continuous monitoring of high pressure water flow to Static Washer Towers.
- Reduction of top gas loss from Blast Furnace No.3 and optimising B.F. Gas utilisation in Boilers
- Reduction of specific heat consumption in steel making from 1.6 Gcal/tcs to 0.16 Gcal/tcs due to phasing out of inefficient open hearth furnaces, installation & commissioning of 1 no. 2x110 Tonne Twin Hearth Furnace.
- Reduction of specific heat consumption in Soaking Pits from 0.8-1.0 Gcal/tcs to 0.5-0.6 Gcal/tcs through optimising pit operation and their health.
- Constant monitoring & control and by ensuring optimum operation of gas pressure controllers to improve C.O. Gas yield from below 290 m³/tonne of dry coal charged to 298-300 m³/tonne of dry coal charged.

ENERGY CONSERVATION PLANS AND TARGETS

In Director's workshop it was decided to bring down the specific energy consumption in all SAIL plants to 7.0 Gcal/tcs and power consumption to a level of 550 kwh/tonne of saleable steel. Accordingly action plan to achieve the target has been drawn up during Corporate Level Task Force meeting on Energy.

IISCO, Burnpur Works is the oldest integrated steel plant in SAIL fraternity. The technological obsolescence is a major bottleneck in achieving competitive specific energy consumption level. Considering all these the APP target for the plant during 2004-05 has been set at 8.65 Gcal/tcs (including electrical energy and based on IISI energy accounting methodology). The collective of the unit is striving hard to reduce the specific energy consumption levels to the levels of other integrated steel plants under SAIL through upgradation / addition / modification / optimisation of processes. The second 2 x 110 Tonnes Twin Hearth Furnace has been commissioned and Blast Furnace No.4 has been partially relined in 2004-05 and shortly a number of steps are going to be implemented as part of revival / modernisation package which is expected to bring down the specific energy consumption level to below 8.0 Gcal/tcs.

ENVIRONMENT MANAGEMENT

Environment Management is a thrust area in the company. Pollution Control Department is responsible for environment management in IISCO, Burnpur Works. The department is equipped with full-fledged laboratory facility to aid monitoring & control on a regular basis. The department keeps a constant vigil on the pollution parameters through regular observation, test, implementation of corrective measures and feedback to top management. The plant is equipped with a B.O.D. Plant in Coke Oven for effluent control; Gas Cleaning plant at Dolomite Plant to abate stack pollution, Multi-Clone System at Boiler Plant and Gas Cleaning Plant at Steel Melting Shop for prevention of air pollution through minimised stack emissions. All parameters with respect to effluent and stack emission are within norms as per the requirements of both West Bengal Pollution Control Board (state-level) and Central Pollution Control Board. IISCO has always been complying with the standards of Pollution Control Boards with regard to work environment and ambient air quality.

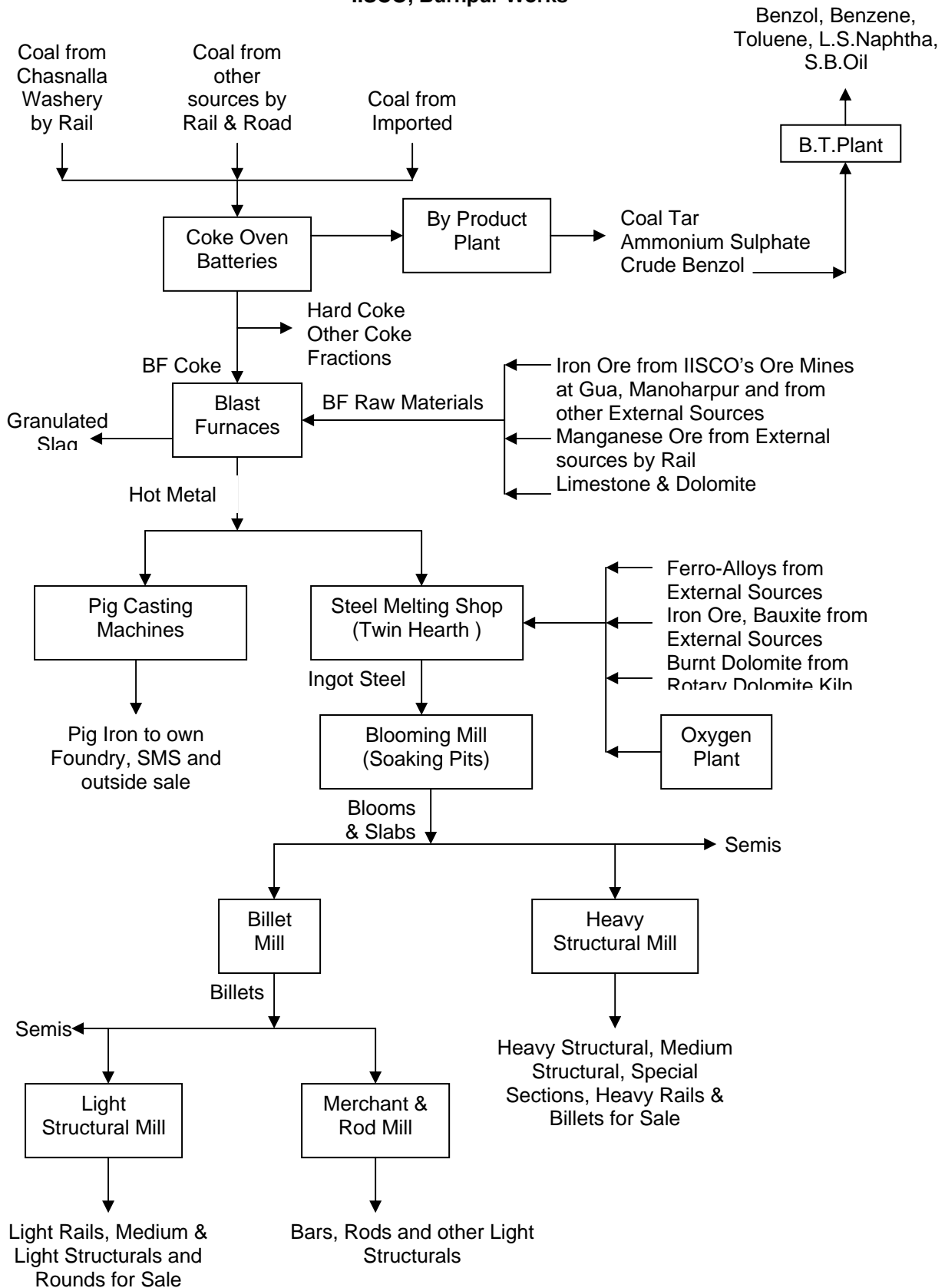


SAFETY

The company accords top priority to safety and is in constant pursuit of inculcating safety culture in day-to-day shop floor activities. Safety Inspectors & Managers ensures the observation of safety standard through site inspection, necessary coordination & cooperation with different departments, adherence to safety protocols, Standard Operating Practices and Standard Maintenance Practices. Safety day is observed every year through safety oath taking ceremony, awareness programmes such as quiz, essay-writing competition, slogan competition & poster making competition, displaying banners, slogans etc. The department also organizes job-specific as well as extensive training programs for workmen (both regular & contractor labourers) & officers round the year on safety. The company also awards prizes to deserving employees.



**Schematic diagram showing the Production Process
IISCO, Burnpur Works**





ENERGY CONSERVATION PROJECTS TAKEN UP DURING 2003-04 **IISCO, BURNPUR WORKS**

During the financial year 2003-04 four projects were planned to be taken up at an estimated investment of Rs.30.56 Lakhs. They are as listed below.

- Arresting steam leakages using on-line / conventional methods and by installation / replacement of steam traps and valves.
- Thermal insulation of steam pipelines & hot air ducts.
- Periodic cleaning (mechanical & chemical) of boiler heating surface.
- Installation of reactive compensation device at Ilgner House No.2.

However, only two projects could be completed by 2003-04. The projects involving thermal insulation and installation of reactive compensation device were delayed due to reasons beyond control. These projects are expected to be completed during 2004-05. Brief description of the two completed projects is given below.

Project No.1

A project was taken up to arresting increasing nos.of steam leakages on high pressure [22 Kg/cm²(g)] steam distribution header & branch lines and due to defective steam traps & valves. The steam leakages on high pressure lines are eliminated by on-line techniques, which is undertaken by external agencies through contract, by conventional methods, which is carried out by in-house maintenance group, and by replacement of defective steam traps & valves. The project involved a total expenditure of Rs.1,40,810/-. The estimated savings was 6,994 tonnes of steam (@ 0.8 tonnes/hr approx.) during 2003-04 with a financial savings of Rs.28.0 Lakhs.

Project No.2

Maintaining boiler tubes as clean as possible is important to operate boilers efficiently. A group consisting of Boiler operation personnel was entrusted with a special assignment to undertake periodic cleaning of boiler tubes and boiler heating surfaces and improve overall operating efficiency of Boilers. The estimated savings was 2,403 tonnes of boiler grade coal worth Rs.25.4 lakhs.



