Bhilai Steel Plant, a unit of Steel Authority of India Ltd. is a public sector undertaking and was conceived under Indo-USSR Treaty in the 2nd Five year plan. This was in accordance with erstwhile government policy for strengthening economy and self reliance through development of core sector.

The plant is located at the central position of India, which is one of the major iron belt of India, and it is about 40 kilometer from Raipur, capital of Chattisgarh. The captive mines of the plant located at Dalli-Rajahara supplies iron ore and lime stone used to be available from Nandini captive mines. At present lime stone is procured from outside. The other major raw material, coal is purchased from outside either through import or from indigenous market.

Bhilai Steel Plant, an integrated steel works, was commissioned in 1959 with production capacity of 1.0 million tonne of steel. In successive phases, capacity was enhanced to 2.5 and 4.0 million tonne in the year 1962 and 1984 respectively. Figure depicts facilities available with Bhilai Steel Plant for 4.0 mt production. As of now this is the largest steel plant in India with present capacity utilisation more than 100% for three consecutive years.

Bhilai Steel Plant produces wide range of products. This includes Rails, Wire Rods, Plates and Merchant products. Commitment to quality and customer satisfaction has resulted in consistent R & D efforts culminating in development and commercialisation of distinctive new grades like SAILMA, UTS-90 etc. Bhilai Steel Plant could dream and implement the project of long rail (230 meter long) in consistence with it's reputation. This was a basic demand from Indian Railways for enhancement of country's economy.

Bhilai steel plant is planning to expand its production to 7.0 Mt by the year 2011-12. During its expansion plan all energy efficient technology will be installed, after this the energy consumption may come down to 5.6 gcal/tcs.

Human resource management is exemplary in Bhilai Steel Plant. It is worthwhile to note that Bhilai Steel Plant registered maximum profit for 2007-08 also among all public sector steel plants.

Facilities Available in Bhilai Steel Plant

Sl.No.	Department	Unit	Capacity
1	Coke Oven	8 Batteries of 65 ovens and 4.3 M high 2 Batteries of 67 ovens and 7.0 M high	3.3 million ton of BF Coke
2	Sinter Plants	1) 4 Machine of 50 Sq M hearth area 2) 3 machine of 75 Sq M and 1 Machine and 1 Machine of 80 Sq M hearth area 3) 1 Machine of 320 Sq M hearth area	8.3 mt of sinter
3	Blast Furnace	3 Furnaces of 1033 Cum 3 Furnaces of 1719 Cum 1 Furnace of 2000 Cum	4.71 mt of hot metal
4	SMS – 1	4 Twin Hearth Furnaces	2.5 mt of steel
5	SMS – 2	3 BOF of 100/130 T capacity	1.425 mt of steel
6	Concast	3 Single strand & 1 Combi caster	1.425 mt of steel
7	Blooming & Billet Mill	1150 mm Blooming Mill 1000/700/500 mm Cont. Billet Mill	2.15 mt of bloom
8	Rail & Structural Mill	950/800 2 high reverseing Mill	.75 mt of product
9	Merch. Mill	350 mm Cross Country Mill	.5 mt of product
10	Wire Rod Mill	4 strand continious Mill	.4 mt of product

11	Plate Mill	3600 mm 4 high reverseing mill	0.95 mt of product

The production indices of Bhilai Steel Plant for the year 2007-08 is 5.267670 million tonne of hot metal, 5.054645 million tonne of crude steel and 4.428861 million tonne of saleable steel.

The annual turn over of the company for the year 2007-08 is **Rs. 16518** crores with net profit margin of Rs. **5366** crores.

Bhilai Steel Plant symbolises Indian Industrial Growth. Many laurels were bestowed upon Bhilai Steel Plant. It has been honoured seven times with coveted **"Prime Minister's Trophy"** as best Integrated Steel Plant of the country.

ii) Energy Management Plan and Monitoring

Effective planning for current year is done based on the report of various committees who recommends the specific consumption of all utilities. These recommendations takes into account past performance, present production plan, implementation status of energy conservation programmes and future change in processes for both short and long term. These figures are then put into model to work out the projected of Specific energy consumption / tcs and expected requirement of purchase energy. Energy considerations are infect guide lines for election of appropriate technology under unit perspective plan 2012.

iii) Energy Consumption

Steel production in Bhilai Steel Plant, like any other integrated steel works, is highly energy intensive. The gross energy consumption in the plant for the year 2007-2008 is 4394 GCal/Hr. which is approximately equivalent of 3.9 million TOE (ton of oil equivalent) per year.

The primary energy input for the year 2007-2008 constitute 5.05 million tonne of Coking Coal, 0.222 million tonne of Boiler Coal, purchased electrical power of 221 MW and 22268 kilo litres of petro-fuel.

Energy distribution during 2007-08

	Gcal	%
Coking coal	31769633	82.68
Boiler coal	820378	2.13
Pur Power	4903517	12.53
Pur.Steam	800004	2.08
Petrofuel	203916	0.53
Lox Purchase	20207	0.05

The demand of other energy items, viz, steam, compressed air, oxygen etc. are completely met by in-house auxiliary units. 40 % of the total power demand of the plant is met by captive power plants including power from joint venture. Specific energy consumption, specific power consumption and specific petro-fuel consumption are given in figures attached herewith.

Energy Parameters	2005-06(base year)	2006-07	2007-08	% + or -
Sp-Power kwh/tcs	393.8	402.1	402.3	+2.16
Sp.process Steam kg/tcs	405.3	418.5	393.6	-2.89
Water consumption M3/tcs	3.78	3.17	3.05	-19.31
Boiler coal cons. Tons	114067	149430	213147	+86.86
Petrofuel consumption KL	12338	13078	14950	+2.45
Coke Rate Kg/thm	497	508.9	509.2	+7.12
Power Gen. in PBS MW	35.1	39	37.6	+7.12

The Boiler coal consumption is 86.9 % high due to increased steam load after re commissioning of BF-7, and seven furnace operation. Petrofuel consumption is high due increased demand of calcined dolomite and lime by SMS-2. Coke Rate is high due to higher alumina content in iron ore and more slag rate in blast furnace.
It may also be noted that Bhilai Steel Plant is the **only steel plant in India continuing with "Ingot Casting & Soaking Pit with Blooming Mill" route for steel making.** About 50-55% of the total steel is made through this route. This route is energy inefficient and consumes about 0.35 – 0.4 Gcal of energy per ton of crude steel. Even after this handicap specific energy consumption per ton of crude steel is best among SAIL plants and Tisco shows the grit and commitment of Bhilai collective towards energy conservation.

The annual energy bill for the company is around Rs. 4075 Crores which comprises around 40 % of the total production cost.

iii) Energy Conservation Commitment, Policy and Set up

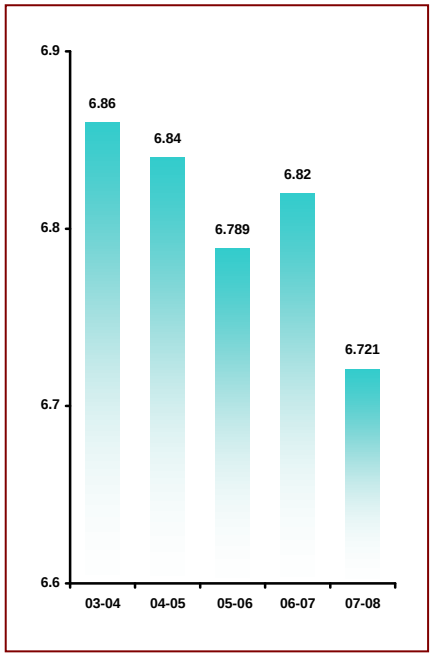
Energy intensive nature of integrated steel works and global energy crisis influenced policy makers of the company to accord high degree of priority for energy conservation as one of the major thrust areas for cost reduction along with restructuring of the plant. Bhilai Steel Plant being 50 years old, it's technology is not in pace with the modern one. Only the vision of the top management coupled with the grit of the Bhilai collective, keep the flag of energy conservation high and made Bhilai Steel Plant major player in the field of energy conservation.

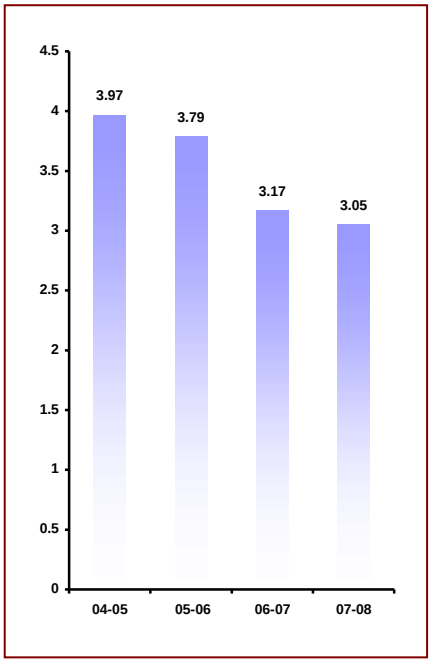
Energy Performance Indicators

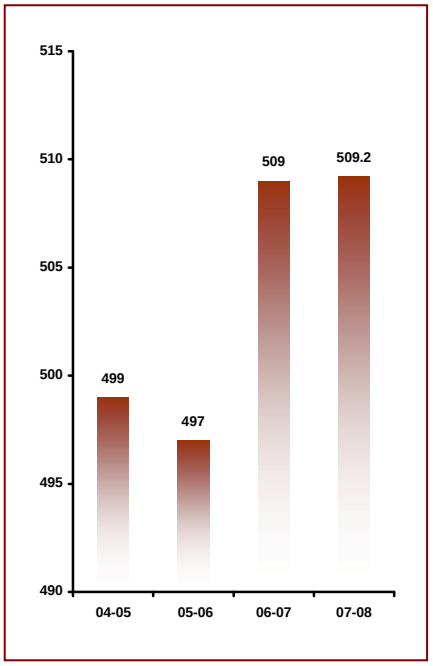
Specific Energy Consumption (GCal/tcs)

Specific Water Consumption (m^3/tcs)

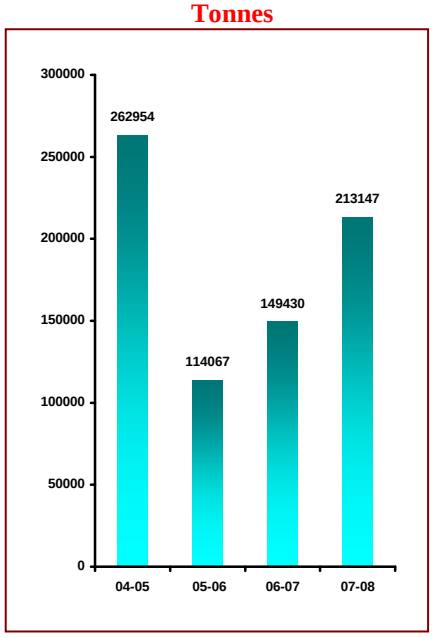
Coke Rate (kg/thm)



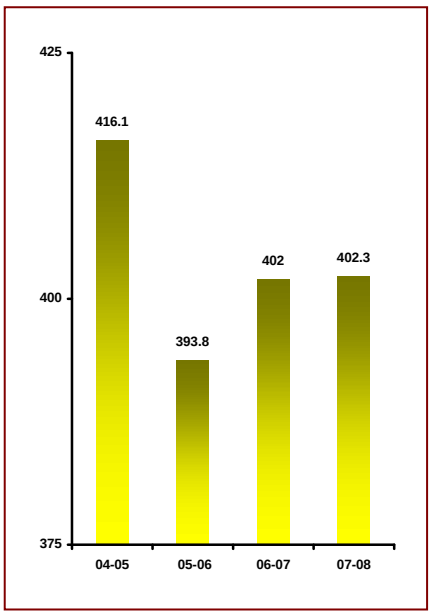




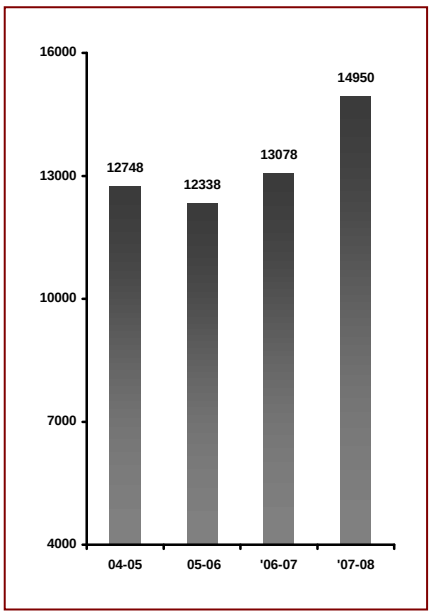
Boiler Coal Consumption Tonnes



Sp. Power Consumption Norm – 402 Kwh/tcs



Petrofuel consumption(KL)



Bhilai steel plant has formulated a well-defined Energy Management Policy. This reflects the commitment of leader ship towards sustainable development through energy conservation and resource management.

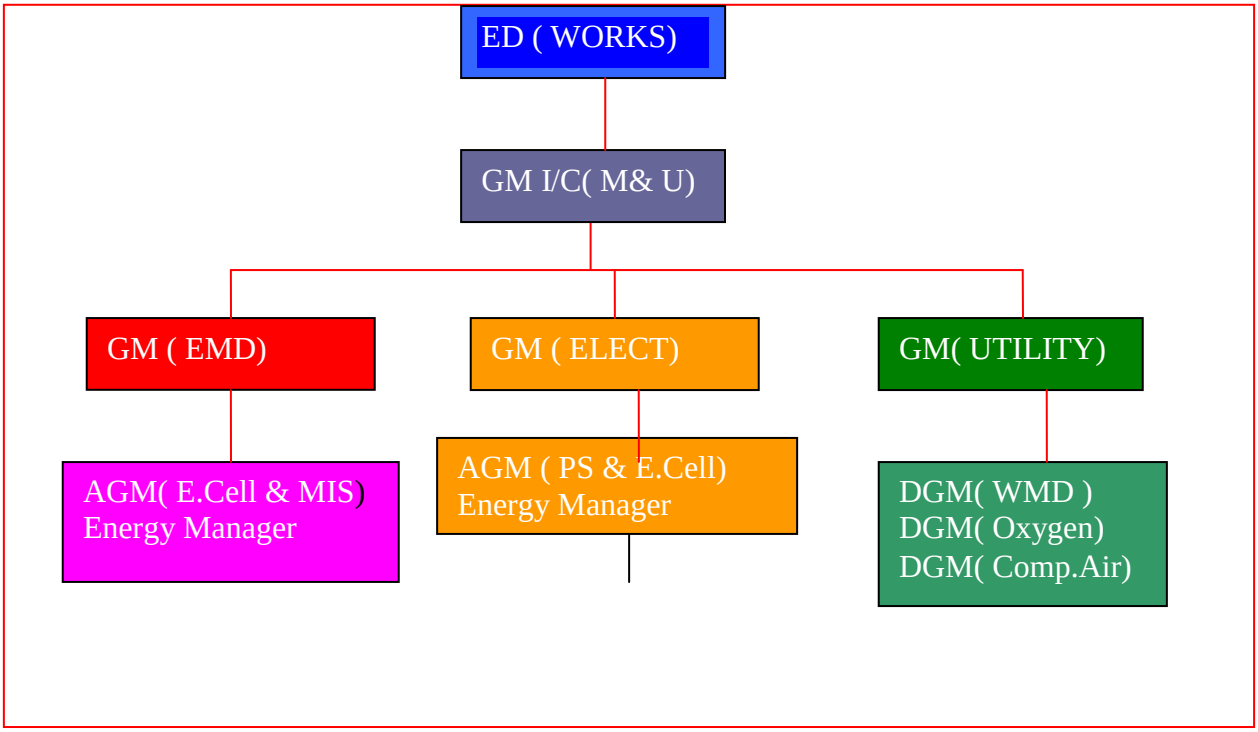
Energy Management Policy

- 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.
- Promote culture of awareness towards energy conservation In the organization.
- Communicate Energy policy to all the employees.

Bhilai Steel Plant has a full-fledged Energy Management Department (EMD) which functions as a nodal agency for coordinating and executing various thermal energy related activities throughout the Plant. The other activity for the group is optimal distribution of in- plant generated by-product fuel that is a prime factor for energy conservation in an integrated steel plant.
Central Electrical department is nodal agency for any power releated projects. They also monitor optimal distribution of power and manage peak demand within stipulated norm in addition to the project on power.
Major role of utility is to minimize consumption of oxygen, steam, compressed air and water. These energy bearing component play very important role in specific energy consumption per ton of crude steel.

Constitution of Energy Cell

Gen. Managers head these cells and supervise with executives and trained technicians for Energy Conservation activities throughout the Plant that is a corollary to monitoring of norm. For monitoring and advisory control of various energy parameters, the plant has been divided into four zones namely - Iron Zone, Steel Zone, Mill Zone and Auxiliary Zone. In addition to this, the overall energy planning, on monthly and yearly basis are carried out by them for various energy-related MIS functions.



The competent group carries out cost analysis on the monthly basis. Their prime task is to translate the deviation in energy performance indices in the term of cost and its impact on the profitability of the plant.

The respective departments of the plant initiate modification and retrofitting of energy efficient equipments in the existing technology. A committee designated by management clears these projects purely on priority basis.

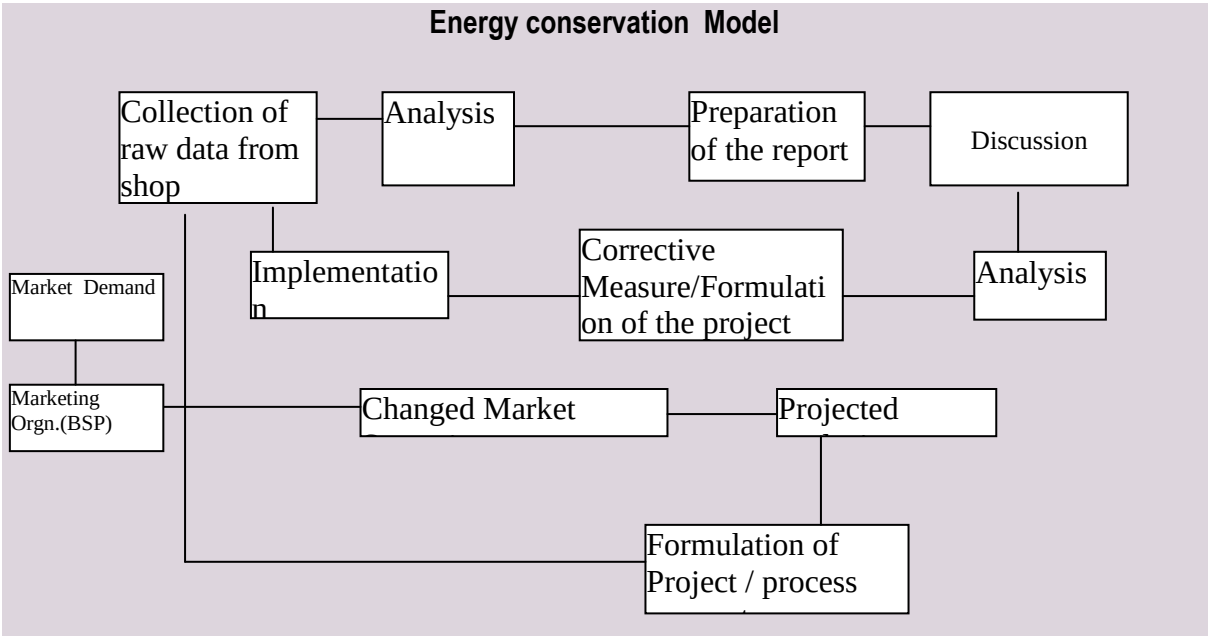
MIS group of Energy Conservation Cell prepares energy performance of the plant daily, weekly and monthly basis. These reports are reviewed on regular basis by respective Head of Department in plant level meeting chaired by Executive Director, Works to enhance Plant performance.

Monitoring of energy performance is given very high importance and energy reports are prepared on daily, weekly and monthly basis. Daily reports also includes the loss/gain on energy front based on the sensitivity of the parameters.
Training needs are identified at shop floor level, and training to the employees are imparted by experts as per module on regular basis.
BSP is also actively participating in the energy efficiency projects for steel rerolling mills initiated by MoEF in association with UNDP. Special training & skill enhancement module for the employees & management of these rerolling mills has been prepared by BSP and the training is imparted at location near rerolling mills.

Energy Conservation is an aggregate of total working of the plant and it has to be achieved by every one. For achieving target of energy consumption, energy bearing indices are identified for all major shops and norms are set at the beginning of the year. These norms have the approval of the Executive Director (Works) and all shops are asked to adhere to these norms. The impact of these norms are also explained to them for their awareness. The table below gives the impact of deviation of these norms on energy consumption per ton of crude steel.

S.No.	Parameter	Variation	Impact on Energy
I	Coke Rate	+ 10 Kg/THM	0.085 Gcal/tcs
II	Hot Metal Rate	+ 10 Kg/T CS	0.052 Gcal/tcs
III	Power Cons	+ 10 Kwh/TCS	0.03 Gcal/tcs
IV	Steam Cons	+ 10 Kg/TCS	0.007 Gcal/tcs
V	Boiler Coal	+ 10 Kg/TCS	0.042 Gcal/tcs
VI	Oxygen	+ 1 M3/TCS	0.0025 Gcal/tcs
VII	Steam loss through lakages	¼ inch hole /1/2 inch hole	0.4 Tons/hr

The figure below gives the basic model that are being followed for energy conservation.



iv) Energy Conservation Achievement

The specific energy consumption in last few years registered steady decline. Specific energy consumption of the plant per tonne of cast steel was 6.72 Gcal in 2007-2008 which is the lowest for any SAIL steel plant and speaks of the achievement of Bhilai collective for energy conservation. This was achieved by capacity utilization and judicious use of energy. Judicious selection of cheaper fuel over costly fuel, optimum utilisation of available facilities and constant vigil over plant performance indices are few key parameters that are prime reason for reduction of specific energy consumption.

In Bhilai steel plant energy conservation activities are also started in use of renewable energy resources like Bio- Diesel, Solar energy. The few specific energy

conservation measures in the area of renewable energy and in operation during the year 2007-08 are given below:

Initiatives taken in the area of use of Renewable Energy

- From the existing Karanj trees in plant and township, seed were collected and 100 liters of bio-diesel produced and used in plant vehicles.
- 18000 Jatropha saplings planted & Plantation of 30,000 Jatropha saplings planned
- Replacement of HPMV/HPSV by energy efficient FTL for street lights, works building.
- 7 solar lamps of 100W are installed for street lighting on trial basis. The entire forest avenue to be covered in future.
- Replacement of 472 Nos. old ACs replaced by energy efficient ACs.
- Rainwater harvesting has been implemented in Plate Mill covering 37000 sqm roof top area. It has also been implemented in 3 schools. It is under implementation in Machine Shop-2.
- One storage tank of 25000 m^3 capacity has been constructed for recycling of effluent of outlet A for achieving zero discharge.
- A tank of capacity 1,98,000 M^3 has been planned in township for harvesting rain water in 08-09.

Re-use of packaging materials:

- Wooden blocks for packaging are recycled
- Scrap and winding strips are recycled.
- Drums and containers are reused/sold.

Energy Conservation measures implemented during 2007-2008

1. **VVVF drive installed in ID fan 1&2 of converter shop.**

   The ID fans for Convertor 1 &2 were running at full speed and drawing current throughout the day. The provision of VVVF drive the speed is regulated during non blowing period.
   Investment - Rs – 419 Lakhs Saving - Rs. – 180 Lakhs/year

2. **VVVF drive installed in booster fan 1,2 &3 of converter shop.**

   Similar to ID fan LD Gas booster fans are provided for recovery of LD gas, these booster were running at constant speed during non blowing time. After installing VVVF drives the speed is reduced, thereby saving of power.
   Investment - Rs – 463 Lakhs Saving - Rs. – 102 Lakhs/year

3. **Installation of a new Energy efficient Dry Fog dust suppression system for BF-5 stock house.**

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

Investment - Rs – 189 Lakhs Saving - Rs. – 140 Lakhs/year

4. **Curtain flame burner introduced in sinter plant M/c-1&2 of SP-II.**

It was decided jointly by BSP and RDCIS to install the multi Curtain Flame Ignition System in machine #1& 2 of SP-2. The Curtain Flame Ignition System was lighted up on 14th August 2007 first with pilot burners. The average specific gas consumption before the modification period was 0.056 Gcal/tgs and after modification it came down to 0.040 Gcal/tgs.

Investment - Rs – 48 Lakhs Saving - Rs. – 272 Lakhs/year

5. **Improvement in power factor from 96% to 98% in power systems department resulting in considerable reduction in distribution losses.**

Investment - Rs – in-house Saving - Rs. – 438 Lakhs/year

6. **VVVF drive installed in Sinter Cooler & drum feeder of Sinter M/C No - 4 of SP-1.**

DC drives for speed control of sinter cooler & drum feeder were replaced with VVVF drive control. The motors requirement for MG set etc were eliminated, and overall system efficieny was imprived.

Investment - Rs – 0.7 Lakhs Saving - Rs. – 1.44 Lakhs/year

7. **70 Watts WHPSV lamps were installed in place of 300 W/500W bulbs in feeder area machine in SP-1.(120 Nos)**

Investment - Rs – 0.5 Lakhs Saving - Rs. – 0.21 Lakhs/year

8. **Rectification of steam, compressed air, oxygen and nitrozen leakages.**

Rectification of steam, compressed air, oxygen leakages in IPPL network were carried out on regular basis. Total no's of points for steam -150, Service oxygen-40, Compressed air – 400, Nitrogen – 10 were attended during the year.

Investment - Rs – 5.0 Lakhs Saving - Rs. – 200 Lakhs/year

9. **Commissioning of VVVF drives at roller table section-106m 107, 201,202, 301, & 302 in M Mill.**

MG set NO 6 DAP was replaced with VVVF drive. The total power loading was reduced from 150 kw to 90 kw. This has saved about 40 kw
Investment - Rs – 12.0 Lakhs
Saving - Rs. – 11.9 Lakhs/year

10. Installation of field economy mode at 5D & 6D in M Mill.

MG Set 6 DAP

Modification in Panel

During mill stoppage the stand field of drives are kept charged. The charge current used to be 23 Amp at 180 V, this has been changed to 10 Amp at 150 V, therby saving of power at the rate of 13 AMP at 180 V.
Investment - Rs – in-house Lakhs Saving - Rs. – 0.79 Lakhs/year

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 of SP-1.
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.
4. Use of Waste lubrication oil on regular basis.

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.

Short Term Energy Project (2007-2009)

Area	Project	Impact gcal/tcs	Year of imple-mentation
Coke Making	Rebuilding Coke oven Batt # 5,6 UP-gradation of Benzol Rec. plant	0.003 0.0001	2009 2009
Iron Making (Bfce productivity and Coke Rate will be improved)	I. Coke Rate reduction a. Modernisation of BF# 6 b. Modernisation of BF# 5 d. Screening and washing plant at Rajhara Mines e. Modernisation of SP-2 with slit burner ignition furnace. f. Sale of slag to Cement Plant.	 0.100 0.01 0.3	 April'08 May'09 2008 2008 2007-08
	Total Savings	0.413	

Target for 2008 6.82-0.413 = 6.41 gcal/tcs

Long Term Project s(2009-2012)

Area	Project	Impact gcal/tcs	Year of imple-mentation
Steel Making	Introduction of SMS-3 & phasing out SMS-1 & BBM	0.3	2010
Iron Making	I. Installation of TRT in BF-7 II. Coke Rate Reduction a. Modernisation of BF# 4 III Installation of Blast Furnace -8	0.02 0.056	2010 2010 2012
Coke Making	I. Installation of Batt # 11 with CDQ II. Rebuilding Coke oven Batt # 6	0.18 0.003	2012 2009
Mills	Installation of Walking beam Fces in MM, WRM, PM & RSM	0.05	2012
Boilers Aux.	1.Up-gradation of TG's 2.Improved technology for Oxygen making and utilization of BY-product fuels.	0.03 0.08	2010
	Total savings	0.719	

Target for 2012 6.41-0.719 = 5.71 gcal

vi) Environment and Safety

Environment Management at BSP

Bhilai Steel Plant's top management gives prime importance to environment management. BSP, as a responsible corporate citizen is fully committed to safeguard, maintain and improve the quality of the environment and protecting human health. BSP's Environment Management Department receives information from the corporate Environment Management Division at Kolkata, Delhi and also from CPCB, MOEF and SPCB on a regular basis, and based on the information, legal requirements of BSP are assessed. Actions are initiated for complying with the various legal requirements promptly. Legal compliance has been integrated as part of ISO 14001 at plant and township. The Air& Water consent conditions are regularly reviewed, action plans implemented and compliance status is sent to SPCB.

BSP's Environment Management Department is equipped with modern Environmental Laboratory and a strong team of 30 personnels for monitoring and assessing the environmental quality in and around the plant for complying with the statutory requirements and improving the environmental performance. Management ensures allocation of resources for installation, maintenance, operation of various equipments. Specific budget is allotted for Environment Deptt and other departments also. Pollution control systems alongwith other environment management activities are monitored on a regular basis and the environmental issues are reviewed by ED (Works) on weekly basis. For addressing non-conformances, Corrective and preventive actions are initiated based on the inspection reports. Weekly meetings are also conducted at shop's HOD level. Quarterly review meetings are conducted by corporate EMD, Kolkata and status reported to Director(Opr). Policy level decisions on specific environmental issues and projects are also taken at the Board level meetings. BSP is also implementing 'Action Points' on Corporate Responsibility for Environmental Protection for Iron and Steel Industries issued by the CPCB.

BSP has also adopted various environmental protection measures through natural resources conservation, pollution control systems implementation and waste minimization, recycling and reuse strategies. These efforts have resulted in minimizing the adverse impacts on the environment and health of employees and people inhabiting the surroundings.

BSP has obtained ISO: 14001 certification for its all the major production units and service departments. The complete EMS documentation of BSP has been maintained in electronic format through web-enabled system on BSP intranet**. ISO 14001 has also been implemented at BSP township**. **With this BSP township is second township in the country to receive ISO 14001 certificate**.

BSP has conducted Life Cycle Assessment study project under the aegis of MOEF and National Metallurgical Laboratory (NML). 26 recommendations by the NML, on Improvement Analysis based on LCA Study relevant to BSP, have been implemented. **BSP is participating in the LCA update organized by International Iron & Steel Institute (IISI), Brussels. BSP has also procured the latest LCA software GaBi 4 for conducting LCA study of various products of BSP and evaluating the environmental impacts of the proposed expansion plan.**

Bhilai Steel Plant has prepared its 5th Sustainability Report as per Global Reporting Initiatives (GRI) G3 latest guidelines, for 2006-07, depicting the three core areas - Economic, Environmental and Social sustainability. **BSP is the first public sector company in India to have published this report and second steel plant in world to publish sustainability report as per GRI G3 guidelines**. 25 nos of internal sustainability assessors have been developed by CII. Internal assessment of sustainability practices was carried out by assessors for 2006-07. BSP has

participated in the assessment of Sustainability indicators by International Iron & Steel Institute (IISI)

BSP has effectively adopted waste minimization strategies including conservation at source, recovery and recycling. Some of the initiatives that were undertaken, for increasing the recycling of solid wastes are sale of 1.62 million tonnes of granulated slag and air cooled slag and recycling of flue dust , LD slag, lime and dolo dust, Mill scales and sludges etc.

During the year 2007-08 through increased recycling and improved management, **Bhilai Steel Plant has been able to reduce its specific water consumption to 3.05 m^3/tonne of crude steel reduction of 4.4% over the previous year, .**This conforms to the best global averages. This is also a major step in conserving a natural resource, which is becoming increasingly scarce.

BSP has been conducting carbon accounting since 5 years and accordingly GHG reduction strategy is integrated in the corporate plan 2010. BSP has aimed to reduce energy consumption and achieving specific energy consumption benchmark of 5.7 Gcal/tcs, and achieve CO2 emissions of 2.2 t/tonne of crude steel from the present level of 2.90 t/tcs.

Earlier, process stacks were designed to 100 mg/Nm^3 .However, to achieve the international bench mark in stack emission load , BSP has decided to design process stacks for 50 mg/Nm^3 in all expansion projects.

As a part of conservation of non renewable resources for reduction of Green House Gases (GHGs) mainly carbon dioxide emissions, energy conservation projects, both for heat & electricity conservation, are taken-up every year.

Under Montreal Protocol, as a part of phasing out ozone depleting substances, BSP has eliminated use of CFC-11 by replacing it Li- Br based chiller unit, way before the target date of 1.1.2010. Procurement of Carbon Tetra Chloride (CTC) has been stopped and use of Trichloroethylene (TCE) has been started. To control the TCE chemical losses, vapour phase degreasing systems are under installation, which is being implemented under the UNDP aid. 50 % of Halon based fire extinguishers have been replaced by FM 200 based units. All industrial package air conditioners using CFC-12 will be replaced in phased manner by year 2010 by units using CFC free refrigerant.

Clean Development Mechanism

Under Clean Development Mechanism, BSP has obtained host country approval for two project design documents from MOEF i) Coal dust Injection to Blast Furnaces ii) BF gas firing system in Boiler # 6 of Power Plant-1.

BSP will be implementing another 10 potential CDM projects for reducing green house gas emission.

Projects implemented:

- Blast Furnace Gas Waste Heat utilization at boiler # 6 of Power Plant-1.
- Heat recovery at Sinter Plant-3.
- Coal Dust Injection in Blast Furnaces 1,5 ,6 & 7
- Additional LD gas evacuation scheme to increase LD gas recovery.
- Modification in the furnace of RSM.
- Microprocessor control system at at Plate Mill furnace.
- Upgradation of Blast Furnace # 7.
- Recycling of LD slag in SMS-1 and Blast Furnace.
- Replacement of CFC-11 by Li-Br based chilled water plant.
- Independent exhaust system for slab casters 2, 3 & 4.(other 2 slab casters had independent exhaust system).
- Resizing and improvement in design of impeller of GCP-4 in SMS-1.
- Thyristorisation of BF – 3 & 4 Skip Hoist Electrical supply for better operation efficiency and energy conservation.
- Commissioning of VVVF drive ID fan motor of SMS-2.
- Replacement of 175 Nos. Old ACs by energy efficient ACs.

Project under expansion plan

- Coke Dry Quenching.
- Top Pressure Recovery Turbines
- Installation of walking beam furnaces one each at plate mill, wire rod mill, merchant mill and Rails & structural mill
- Installation of 4000 m3 BF.
- Installation of gas fired boilers
- Replacement of old compressors of OP-2 with energy efficient compressors
- Waste heat recovery in new sinter machine

These projects have potential to reduce 1 million tonnes of CO2 per year. Implementation of CDM is being monitored by various levels of management and Ministry of Steel. Any new projects of BSP are evaluated by Design organizations and Consultants for potential CDM applicability. Top management gives utmost priority to reduce energy consumption and reduction of GHG emissions.

The potential revenues realized from CDM will be utilized in the development of sustainable livelihood in the periphery, implementation of state of art pollution control technologies.

Solid waste management

- Slag granulation plants installed for granulation of Blast Furnace slag.
- Granulated BF slag is sold through Marketing Deptt to cement manufacturers.
- A full fledged Material Recovery Department is responsible for handling and disposal of scrap.
- Enhancement of LD slag utilization through state of the art LD-Slag crushing/processing unit
- Transportation of solid waste is ensured through vehicles of Plant Garage Deptt.
- Sludges handling recovery, reuse and disposal is ensured by Water Management Deptt.
- Housekeeping has been ensured by contracts awarded by Civil Engg Deptt.
- Other solid wastes are also collected, internally recycled/disposed through respective shops.

Toxicity and environmental impacts reduction initiatives

The initiatives undertaken by BSP for reducing use of Hazardous and toxic substances as well as generation of Hazardous solid wastes, emissions and effluent are:

- Coke oven effluent are Treated in ETP and completely recycled for quenching.
- Use of degreasing agent Carbon Tetra Chloride is eliminated by replacing it byTrichloroethylene.
- Use of asbestos as sealing material is being replaced by Ceramic material
- Use of LD slag in sill making at SMS-1 replacing Dolomite
- Use of waste oil mixed with LSHS in Kiln
- Non-ferrous metal waste recycled in Steel Melting Shop for replacement of copper.
- Tar sludge is mixed with coal and charged to coke ovens
- Process dust and sludges are recycled back in the system
- Acetylene is replaced by Propane gas in SMS-2
- Recovery of refractory materials..

Safety

Commitment to safety is another prime aspect for Bhilai Steel Plant, Safety Engineering Department under the guidance of General Manager (Safety) regularly inspect, monitor and ensure implementation of safe working practices in all units of the plant. Structured internal safety audits are conducted twice a year with a view to ensure healthy and safe working environment for employees. Necessary preventive actions are initiated based on the audit findings and yearly mock drill results. The safety points are reviewed through various levels at regular interval which include departmental safety meeting, joint safety committee meeting, zonal safety committee meeting and coordination meeting chaired by ED (Works). In addition to centralised Safety Engineering Department, each department has one nominated Safety Officer for better co-ordination with Safety Engineering Department and to ensure safe working on daily basis.

Energy Conservation Measure implemented in 2007-2008

ID to be filled by BEE	Title of the measure **Curtain flame burner introduced in sinter plant M/c-1&2 of SP-II.**	Sector …Integrated steel
Year to be filled by BEE		Technology …Reheating Furnace

Description of the energy conservation measure:

It was decided jointly by BSP and RDCIS to install the multi Curtain Flame Ignition System in machine #1& 2 of SP-2. The Curtain Flame Ignition System was lighted up on 14th August 2007 first with pilot burners. The average specific gas consumption before the modification period was 0.056 Gcal/tgs and after modification it came down to 0.040 Gcal/tgs.

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.: 48 lakhs	Year of implementation: 2007

First year energy cost savings, Rs.: 272 lakhs

First year other savings, Rs.: increase in productivity

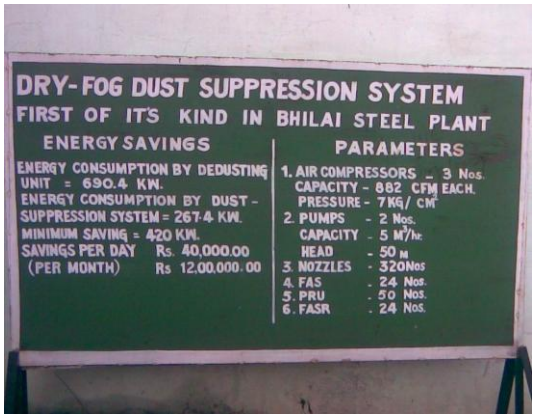
On annual basis	Kwh 000'	Coal (Tons)	Gas Nm^3	Oil (kL)	Other
Energy consumption before			25.46×10^6		
Energy consumption after			17.86×10^6		
Energy tariff, Rs/ kWh/ Ton/ Nm^3/ kL …			3.5		

Company complete address: Bhilai Steel Plant – SAIL Chattisgarh, 490001 L D Das General. Manager 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-5 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: 2007
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 General. Manager Energy Management Deptt. Contact person who could be contacted for more information:	We authorise Bureau to use this information for dissemination Signature Date

Annexure 'C'

Evaluation Criteria – Large & Medium Scale Industries	
S. No	**Evaluation Criteria**
1	**Implementation of energy conservation measures**
	Energy savings in lakh Rs for 2007-08
	Savings as % of energy cost over previous year (2006-07)
2	**ENERGY SAVINGS- Electrical and Thermal**
I	Electrical energy savings in lakh kWh (2007-08)
	% savings in EE over the previous year (2006-07)
ii	Thermal energy savings in million KCal (2007-08)
	% savings in Thermal Energy over the previous year (2006-07)
3	**SPECIFIC ENERGY CONSUMPTION REDUCTION**
	Electrical SEC 2006-07)
	Electrical SEC 2007-08
I	% Elect. SEC reduction during 2006-07 over 2006-07
	Thermal SEC 2006-07
	Thermal SEC 2007-08
ii	% Thermal SEC reducing during 2007-08over 2006-07
	Electrical SEC 2005-06
	Electrical SEC 2006-07
iii	% Elec. SEC reduction during 2006-07 over 2005-06
	Thermal SEC 2005-06
	Thermal SEC 2006-07
iv	% Thermal SEC reduction during 2006-07 over 2005-06
4	**Annual energy savings in 2007-08/ Annual Sales turnover in 2007-08 (%)**
5	**Latest technology employed in 2007-08 and savings achieved**
6	**Use of Renewable energy technology and savings achieved**
7	**Specific Energy Consumption Comparisons with the best reported values among the participating units**
8	**SEC TARGETS PLANNED/ACHIEVED**
9	**Organizational set up for energy conservation**
	a) EC Cell formation
	b) Appointment of Energy Manager
	c) EC Cell Structure
	d) Energy Auditing & Monitoring
	e) Top Management commitment
10	**Commitment to Environment & Safety**
	a) Issue of consent order on Air Pollution
	b) Issue of consent order on Water Pollution
	c) Extra effort put in by Plant to safety
	d) Top Management commitment to safety
	e) Level of safety activities
11	**Presentation of Data as per the Award Questionnaire format**
	a) Presentation
	b) Completeness of data
	c) Attachment of Annual Reports
	d) Attachment of photographs of the projects implemented
	e) Write up about the company