



Environmental Performance

WSA Sustainability Indicators for 2008-09

No.	Indicator	Units	Indicator value (World Avg.)	BSP's Value
1	Green House Gas emission	Tonnes of CO ₂ /Tonnes of Crude Steel Produced	1.6	2.71
2	Material Efficiency	%	96.8	96.6
3	Energy Intensity	GJ/Tonne Crude Steel Produced	19.0	27.17
4	Environment Management System	% of total employees working in registered production facilities	85	84.8

BSP, as a responsible corporate citizen is fully committed to safeguard, maintain and improve the quality of the environment and protecting human health. BSP has 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's Environment Management Department is equipped with modern Environmental Laboratory, ISO: 14001 certified, for monitoring and assessing the environmental quality in and around the plant for complying with the statutory requirements and improving the environmental performance. Pollution control systems are monitored on a regular basis and the environmental issues are reviewed by ED (Works) on weekly basis. Corrective and preventive actions are initiated based on the inspection reports. Regular meetings are also conducted at shop's HOD level, ED (W) & MD. BSP is also implementing 'Action Points' on Corporate Responsibility for Environmental Protection for Iron and Steel Industries issued by the CPCB.

Environment Management has been an integral part of overall management system of Bhilai Steel Plant. All new projects require environmental scrutiny from Environment Management Department. Environmental issues are also discussed during the business strategy formulation. The key current and future environmental issues are particulate emission, effluent discharge, solid waste management, water conservation, raw material conservation, energy consumption and carbon dioxide emissions. Benchmarking has been done for these key areas.

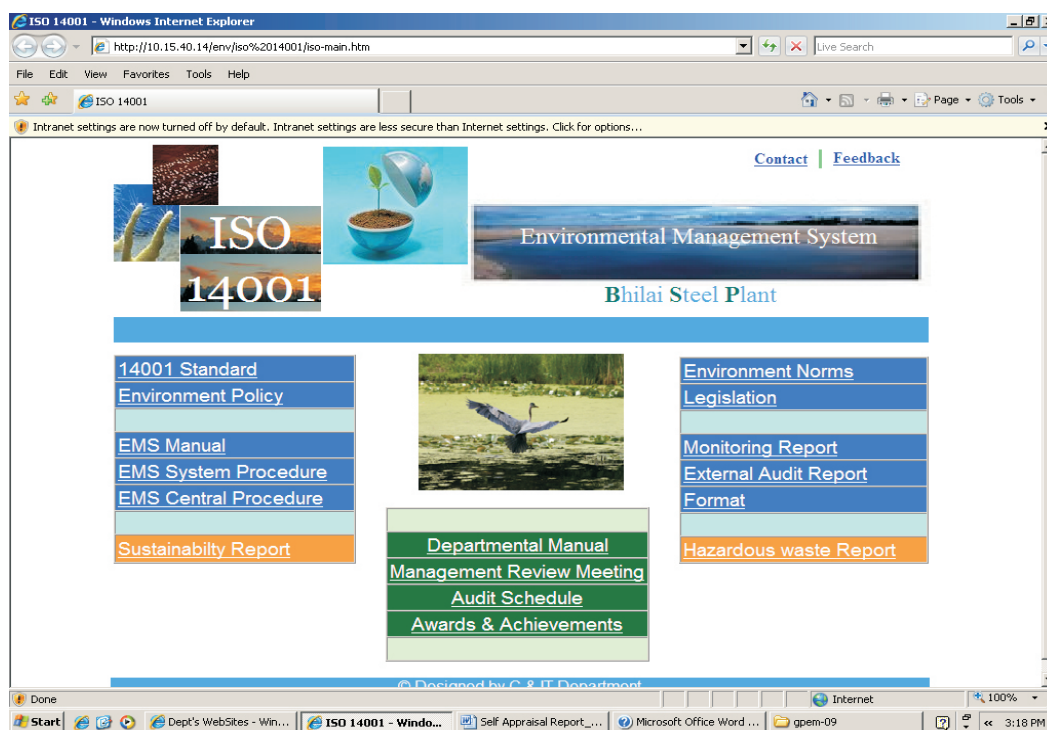
Benchmarking of Environmental parameters

Environment Performance Indicators	2008-09	Target 2012	Int'l Benchmark
Particulate emission load (kg/TCS)	0.77	0.4	0.4 (CORUS)
Specific Effluent discharge(kg/TCS)	0.127	Zero Discharge	Zero Discharge
Solid waste utilization (%)	91.8	98	99.9%(CORUS)
Water consumption (m ³ /TCS)	3.04	2.8	2.97 CORUS
Sp. Raw material consumption (t/TCS)	3.09	2.90	2.7 t/tcs (CORUS)
GHG emission (T/TCS)	2.71	2.4	1.8 (Rautraukki)
Energy consumption (Gcal/TCS)	6.5	5.92	4.5 (POSCO)

The environmental issues are being addressed through series of action plans, considering the national and international benchmarks. These action plans are integrated into the Corporate Plan 2012 of Bhilai Steel Plant. Annual business plans are also prepared to achieve the environmental goal of the organization.

ISO 14001

Setting pace as a leader of Indian Steel Industry, Bhilai has obtained ISO: 14001 certification for its Environmental Management Systems as per revised ISO 14001:2004 standard covering 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. EMS as per ISO 14001:2004 has also been implemented at BSP Township. With this BSP township has become **second township in the country** to receive ISO 14001 certificate.



Legal Compliance

BSP's Environment Management Department receives information from the corporate Environment Management Division at Kolkata and 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. Regular monitoring and assessment of the environment quality with effective operation and maintenance of pollution control systems has resulted in ensuring 100% legal compliance. The plant has successfully obtained environmental clearance for its 7.0 MT expansion cum modernization during this year.

Environmental Legislations and Evidence of Compliance

S.N.	Name of Law / Regulation / Legislation / Authorisation / Consent Conditions	Year	Status of Compliance Prevailing
1	The Water (Prevention and Control of Pollution) Act & Rules	1974 (Amended upto1988) & Rules 1975	Measurement and analysis of effluent water, Operation & maintenance of ETP, Water Consent
2	The Water (Prevention and Control of Pollution) Cess Act & Rules	1977 (Amendment Act 2003) & Rules 1978	Payment to statutory authorities
3	The Air (Pollution Prevention and Control) Act & Rules	1981 (Amended in 1987) & Rules 1982	Stack emission monitoring Work area environment & Ambient air quality , Operation & maintenance of PC equipment, Air Consent
4	The Environmental (Protection) Act	1986 (Amended in 1991) & Rules -1986 (amended upto 2003).	Recycling / reuse of waste, Solid waste disposal Reduction of specific raw material consumption. Water consumption. Energy consumption
5	The Hazardous waste (Management and Handling) Rules	2008	Compliance as per HW rules 2008
6	Manufacture, Storage & Import of Hazardous Chemicals Rules	1989 and Amendment Rules 1994 & 2000	Safety Audits, MSDS, Disaster management plan & mock drills
7	The Public Liability Insurance Act & Rules	1991(Amendment-1992) & Rules, 1992 (Amendment-1993)	Composite Insurance by SAIL
8	The Noise Pollution (Regulation and control) Rules-	2000 (& Amendment Rules 2002)	Noise Monitoring & control of noise pollution
11	Ozone Depleting Substances Rules	2000	Complied. Filing of returns
12	The Battery (Management & Handling) Rules	2001	Complied. Filing of returns
13	Notification of Flyash utilization;	amendment upto 2003	Complied. Submission of annual report
14	Bio-medical wastes (Management & Handling) Rules	1998	Complied
15	Gas Cylinder rules	Amendment upto 1993	Complied
16	Environment Impact Assessment Notification	2006	Complied.

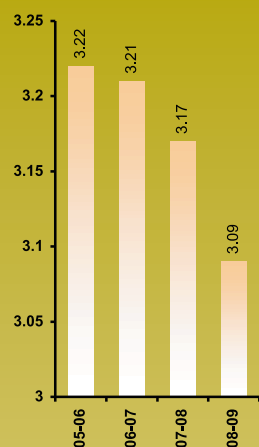
BSP has no cases of Environmental non compliance registered by any legal authority till date. No fines/penalties were imposed during the year

Raw Materials

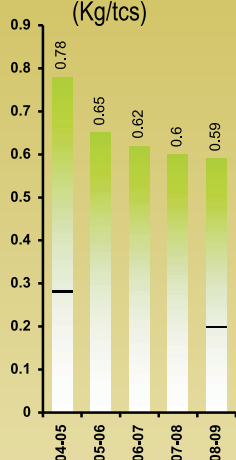
Special attention is being taken to optimally utilise the raw materials. Internal scrap is recycled. Associated process materials (i.e., materials that are needed for the manufacturing process but are not part of the final product) are Refractories, Oxygen, Nitrogen, Argon, Acetylene, Compressed air, Propane, Sodium Hydroxide, Sulfuric Acid, Petroleum Coke, Aluminum, Bentonite, Fire clay, Kyanite, Casting powder, electrodes, molasses, synthetic slag, Graphite powder. Lubricants, Petro-fuels, wooden sleepers, metal strips, wire ropes etc.



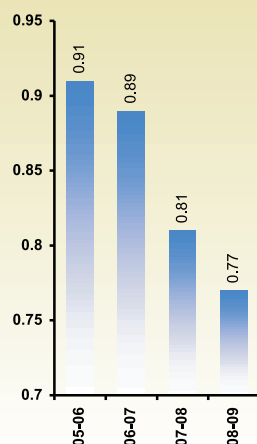
Specific Raw Material Consumption (t/tcs)



Lubricant consumption (Kg/tcs)



Particulate Emission Load (kg/tcs)



Major Raw Material Consumption

Raw materials consumed (Tonnes)	2006-07	2007-08	2008-09
Iron Ore	8077288	8373326	8545571
Boiler Coal	168053	220147	272761
Coking coal	4606482	4744672	4770354
Other Coal	82263	154890	196900
Limestone	1402832	1459055	1071619
Dolomite	909911	912734	1035613
Mn Ore	38238	7890	4066
Ferro Manganese	27749	39512	46066
Ferro Silicon	7128	6288	6451
Silico Manganese	43614	49289	50084
Sulphur	13490	12781	1433
Quartz/Si-Sand	39555	38585	40597
Others	3500	5424	2414
Total	15420103	16024593	16043929
Crude steel production (MT)	4.80	5.054	5.184
Sp. Raw mat. Consumption (t/tcs)	3.21	3.17	3.09

Significant reduction in mn ore consumption is achieved by its optimal utilization in BFs. Lime stone consumption is brought down by recycling LD-slag to SPs & BFs

Materials used that are recycled input materials

Scrap	2006-07	2007-08	2008-09
Scrap use at SMS-1(t)	461464	416079	393899
Scrap recycling at SMS-2 (t)	273814	277615	255659
Total scrap recycled (t)	735278	693694	649558
Other materials recycled	414172	618966	927013
Total input Materials (t)	15395010	16024593	16043929
% of recycled materials used	7.4	8.2	9.8

Air Quality

Over the years BSP has been systematically maintaining and ensuring effective functioning of pollution control systems for improving its environmental performance and for complying with statutory norms. The pollution control systems comprise of electrostatic precipitators, gas cleaning plants, bag filters. The levels of SPM, SO₂ and NO_x are much below the Ambient Air Quality Norms. The emissions of particulate mater (PM), SO₂ and NO_x from process stacks are 0.77, 1.04 and 1.05 Kg/TCS in the year 2008-09.

Earlier, process stacks were designed to 100 mg/Nm³. However, to achieve the international benchmark in stack emission load, BSP has designed process stacks for 50 mg/Nm³ as against the statutory norm of 150 mg/Nm³, in all expansion projects.

During the current financial year several initiatives like additional spray nozzles in chimneys of steel melting shops, installation of pilot burners in Boilers of captive power plant for proper combustion control, modification of flue Gas cleaning plant at RMP I have had significant impact in further reducing the particulate emission load from the stacks to 0.77 kg/tcs in 08-09 from 0.81 kg/tcs in 07-08. Several schemes to reduce fugitive emissions during the year like installation of Air cooled self-sealing doors in Battery #3 of Coke ovens, commissioning of dry-fog dust suppression systems in stack houses of BF-4 & 5, Revamping/retrofitting of dust extraction systems in RMP-1 have also had significant impact in improving the work zone air quality.

Case study

Process innovation by redesign/modification in Refractory Material Plant

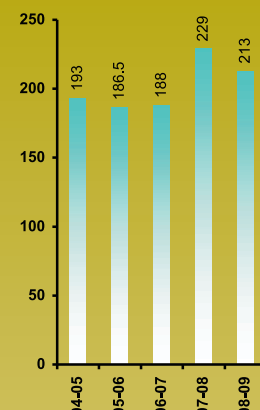
The innovation involves redesign/modifications in the GCPs of Refractory Material Plant-1 (RMP-1) of Bhilai Steel Plant. The innovation led to “Zero-breakdown” of GCP and corresponding benefits in the form of

- ❖ Power savings & corresponding reduction in CO₂ emissions
- ❖ Reduced fuel consumption & corresponding reduction in CO₂ emissions
- ❖ Improvement in the productivity of Refractory material Plant-1
- ❖ Reduced refractory consumption

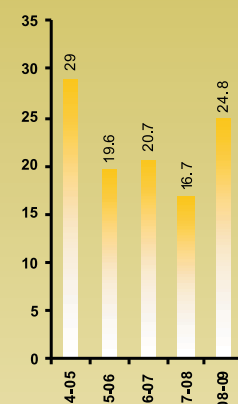
The reduction in CO₂ emissions is to the tune of 20360 T per year. The benefits in monetary terms worked out due to above listed savings was 11.77 Cr



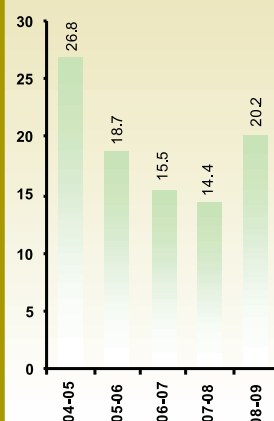
Ambient Air Quality- SPM Norm – 500 ug/Nm³



Ambient Air Quality – NO_x (ug/m³) Norm (ug/m³)



Ambient Air Quality – SO₂ (ug/m³) Norm – 120 ug/m³



Water Quality :

The water quality through the plant outlets has been maintained well within the statutory norms. The thrust was on conservation of water through implementation of recycling schemes at various stages of water use. The implementation of various water conservation & recycling schemes has resulted in bringing down the specific water consumption to 3.04 m³/TCS in 08-09 from 3.06 m³/TCS in 07-08. The level achieved by BSP in water consumption is amongst the best in the steel industry.

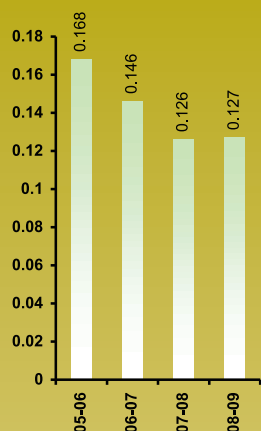
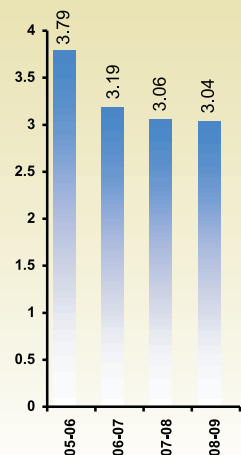
Water Consumption at Bhilai Steel Plant (Mm³)

S.No.	Source	06-07	07-08	08-09
1	Make-up water from canal/River to plant	25.519	25.736	25.994
2	Drinking water Supply to Plant	16.68	16.71	16.81
3	Drinking water Supply to Township	34.24	33.73	34.85
	Total water drawn from Canal	80.16	85.04	85.189
4	Rain water collected	6.88	12.36	6.201

Make up water drawn from reservoir for plant was 85.189 Mm³ (Inclusive of supply to NSPCL storage & evaporation Losses) during the year 2008-09, which is around 4.8% of the capacity of reservoirs supplying water to the industry. No water source is affected by the withdrawals by the company

Water consumption (industrial & domestic) at Mines (Mm³)

Name of Mine	2006-07	2007-08	2008-09
Rajahara Dalli etc.	11.76	11.59	10.74
Nandini	0.90	0.98	0.934
Hirri	0.39	0.48	0.501

Specific Effluent Load
(kg/tcs)Specific Water
Consumption (m³/tcs)

water recycling and reuse

Year	Maroda-I to Plant for industrial make up (Mm ³)	Industrial Water Recycled to Maroda-I (Mm ³)	Total Industrial Makeup water (2 + 3)	Makeup water % of total (2/4)*100	Recycled water % of total (3/4)*100
06-07	25.519	51.48	76.999	33.14	66.86
07-08	25.736	53.89	79.626	32.32	67.68
08-09	25.994	47.00	72.994	35.6	64.4

Effluents :

BSP has three outlets. Outlet-A consist effluent from BF, Foundry, OP-I, RMP-I, & storm water, Outlet-B consists effluents from MSDS-I, RTS, Diesel shed R&SM & storm water and Outlet-C consists effluent from COBPP, SP-I, SP-II & storm water. Only treated water is discharged through these outlets and the effluent quality is meeting the norms. The water is discharged to the surface drains. There is no impact on water sources and related ecosystems/habitats by discharges of water and runoff. No significant spills were observed during the year.

Effluent Load

Year	Sp. Effluent load (kg/tcs)
2006-07	0.146
2007-08	0.1262
2008-09	0.127

Water conservation & water pollution prevention schemes completed in 2008-09

- Cleaning & distillation of underground pipelines by Trench-less “NO DIG” Technology to conserve the overflowing water due to choking of the drain lines & also saving energy due to stoppage of pumps.
- Construction of water recycling system in Merchant Mill has resulted in saving of fresh industrial water @ 660 NM³ per hour
- Oil skimmer (1 No.) procured and installed in secondary settling tank of Plate Mill. 160 Barrel of oil recovered.
- A tank of 120000 m³ capacity has been completed in the township for rainwater harvesting for the year 2008-09.

New Schemes:

- 30 MLD sewage recycling project work started.
- Study to harvest rain water & improve the recharging capacity at different location of Township has been completed. - Implementation under progress.



Case Study:

Flooding of colonies under Durg municipality by the flood waters of Shankar nala has been an annual feature. Residents adjacent to Shankar nala used to face lot of hardships during every Monsoon. To address the problem, a tank of capacity 1,20,000 m³ has been built in the year 2008-09 through BSP funding. The flood waters of Shankar Nala have been successfully diverted into the tank through construction of check dam. This has not only solved the problem of flooding of residential areas, but also serving as recharging source for recharging of the ground water in the area.



Solid Waste

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 granulated slag, air cooled slag and recycling of flue dust, LD slag, lime and dolomite dust, mill scales and sludges. 80% of solid waste at BSP is contributed by BF slag and Steel slag, 4 % by sludge and other wastes contribute to 16%.

During the year 2008-09, 100% of BF & LD-slag, apart from mill scale, lime fines and , lime sludge were recycled.

The plant has achieved a remarkable 91.8% solid waste recycling rate, bettering the previous year's performance of 75.6%

Looking into future, BSP has entered into agreement with M/s.JP Cement for setting-up of 2.0 MTPA JV Cement Plant, which will utilize 1.0 MTPA of granulated slag generated there by achieving 100% BF-slag utilization after 7.0 MT expansion.

Waste Generation & Utilization

2008-09

Solid Wastes	Generation	Recycling	Sold	% Utilisation
BF Slag Total	2092931	371850	1768867	102.3
BF Flue Dust	52231	21845	17043	74.5
LD Slag	304413	309028	0	101.5
LD Sludge	26470	9238	0	34.9
Other Sludges (SP,BF&THF)	85508	10093	0	11.8
Lime fines	57136	55123	2013	100
Mill Scale	109262	108589	673	100
Cinder	4920	0	4813	97.8
Used/Rejected Refractory Bricks	32524	13047	13966	83.1
Lime Sludge	418	10	1864	448.3
THF Slag	154724	0	0	0
Fly Ash	60592	28190	602	47.5
TOTAL	2981129	927013	1809841	91.8

Hazardous & Biomedical Waste

As per Hazardous Waste (Amendment) Rules, 2003, BSP has got the authorization from Chhattisgarh Environment Conservation Board for the disposal of Hazardous Wastes. Apart from this the guidelines of MOEF are followed while handling, storage, transportation of Hazardous Wastes. Hazardous Wastes Material is sold to only customers authorized by MOEF/CPCB. Use of Manifest, TREM Cards, Proper Labeling and provision of protective appliances for workers handling hazardous waste are being ensured. The handling and disposal of Bio-medical wastes has been outsourced to an approved agency.





Hazardous waste generation & disposal at BSP in 2008.

Sl. No	Hazardous waste & Category	Quantity/ Annum	Method of Disposal, Transportation and any other information sought by Pollution Control Board
1.	Cat. 13.4 Tarry Waste	1880 T	Sold
2.	Cat. 13.5 Tar storage tank residue	978 T	Sold
3.	Cat. 13.3 Acid Tar sludge	1594 T	Neutralization and solidification
4.	Cat. 34.4 ETP sludge	918 T	Recycled
5.	Cat. 20.2 Skimmed oil	74 T	Sold
5.	Cat. 20.2 Spent solvent oil Type-I, II	54.7 T	Sold
6.	Cat. 17.1 Filter cake	290.5 T	Recycled
7.	Cat. 33.3 Discarded containers of hazardous chemical	160 Nos.	Recycled (Used as flower pot)
8.	Cat. B-21 Asbestos waste	5.4 T	Stored
9.	Cat A -6 Mercury arc Rectifier Tanks	Nil	-
10.	Non Ferrous Waste	394 T	Recycled
11.	Cat 5.1 used Oil	367 KL	Recycled/ used as fuel

During the year, no hazardous waste was received at BSP. 2987 tonnes of hazardous wastes were transported from BSP to external sources by truck and container to the agencies authorized by SPCB/MOEF/CPCB. Strict adherence to Hazardous Waste Rules - 2008 has been ensured.

Case study

Innovation for eco-friendly disposal of used oil filters.

The innovation involves development of “tailor made press” for eco-friendly disposal of used oil filters, wherein oil is pressed out and scrap recycled to steel melting furnaces.
(The above innovative System is useful in all industries where a fleet of heavy vehicles, diesel engines etc are used)



Noise Environment

To reduce the impact of noise, measures taken at BSP are given below:

- Bellow-type tuyers at and Snort Valve Silencers at all Blast Furnaces
- Sound-proof Acoustic Cabins at Power Plants, Oxygen Plants, and Pump Houses, etc.
- Blast by-pass silencers at Power Plant-I
- Acoustic paneling at Shipping Office, R&SM
- Acoustic Silencers of Exhausters / ID Fans
- Replacement of conventional GCP at BF 7 with low noise GCP

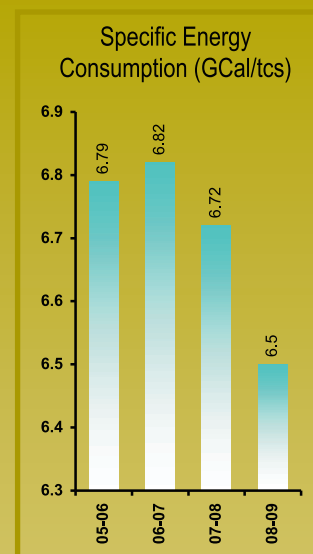
During the year state of the art acoustic enclosure in pulpit of Wire Rod Mill & 6 nos of blow off silencers in compressor plant III have been commissioned

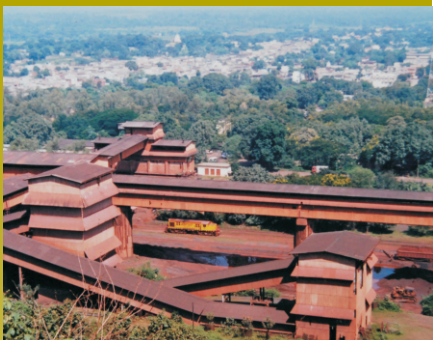
Energy

Energy conservation has been given prime importance in the organization. BSP has declared its energy policy and standard operating procedures are being followed to minimize the energy consumption.. As a part of conservation of non renewable resources for reduction of Green House Gases (GHGs) mainly carbon dioxide emissions, BSP has aimed to reduce energy consumption and achieving specific energy consumption benchmark of 5.92 Gcal/tcs, and achieve CO₂ emissions of 2.4 t/tonne of crude steel from the present level of 2.71 t/tcs.

Energy Purchased	Quantity(T)			Heat Content (TJ)		
	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Boiler Coal (Ton)dry	156289	204736	250940	2613	3614	4196
Coking coal (Ton)dry	4145834	4270204	4348809	123092	126785	128700
BF injection Coal/CDI Coal	74811	136072	178389	2221	4040	5279
LSHS (KL)	13078	14950	13841	494	564	522
Diesel (KL)	15068	15690	13749	593	618	519
Power Purchases(mwh)	1796838	1938149	1995446	17609	18994	19555
Total purchased				154243	162078	158771

Energy Sold	Quantity(T)			Heat Content (TJ)		
	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Tar products (t)	155707	73191	29771	4211	1979	805
Benzol Products (t)	52284	44920	27556	2499	1913.8	1009
	19221	13849	21687	567	768.1	886
Total energy sold				7277	4661	2700
Net Energy Consumption				146966	157417	156071





Electricity purchased by Bhilai Steel Plant (Mwh)

Source of electricity (mwh)	2006-07	2007-08	2008-09
NSPCL	523385	536860	497284
CSEB	1273453	1401289	1497493
Total	1796838	1938149	1994777

Other type of Energy	2006-07	2007-08	2008-09
Propane gas (t)	1029	1265	1286

Electricity purchased by Mines (Mwh)

Name of mines	2006-07	2007-08	2008-09
IOC	26675.590	26826.343	26286.686
Nandini	3791.385	3761.913	3011.813
Hirri	1424.016	1717.142	1662.490
Total	31890.991	32305.398	30960.989

Energy saved due to conservation and efficiency improvements:.

Energy Conservation Projects at BSP

Year	Project	Savings/Yr
2006-07	1. Modified burners, automatic gas/air ratio control and DAS system for auto control of Reheating furnaces of Rail & Structural Mill	10-15 mcal/t of rail produced
	2. Installation of energy efficient dry fog dust suppression system at BF 4 stock house	900 mwh
	3. Installation of VVVF drives at Rail & Structural Mill	1000 mwh
	4. Improvement in power factor 0.98 to 0.99	
	5. Replacement of 200 Nos of old room AC with energy efficient Air conditioners	110000 kwh
2007-08	1. VVVF drive installed in ID fan 1&2 of converter shop	4562 mwh
	2. VVVF drive installed in booster fan 1,2 &3 of converter shop	2555 mwh
	3. Curtain flame burner introduced in sinter plant M/c-1&2	1200 Kcal/hr
2008-09	1. Curtain flame burner introduced in sinter plant M/c-3 &4	1200 Kcal/hr
	2. Replacement of 1.5 KM Gas pipe line at plate mill resulting running of less number of booster pumps and corresponding energy saving.	-
	3. VVVF drives installed at 23 locations of RSM	3000 mwh
	4. 'Trench-Less Technology' to restore water flow through underground pipe lines at Bfs	1275 mwh

Other Initiatives

- 18000 Jatropha saplings planted in 07-08 & 50,000 in 08-09
- Replacement of 472 Nos. old ACs replaced by energy efficient ACs.
- Inside the factory premises, 400 W mercury lamps have been replaced by 250 W sodium vapor lamps.
- To increase natural lighting during day time, 16.5% of the roof sheeting has been made of transparent sheets at SP-III.
- Installation of CFLs is promoted in all the new units. Phasing out of old lighting facilities by CFLs is in progress.
- Popularizing the concept of Video conferencing for communication with corporate office and other SAIL plants there by reducing the frequency of travel of top executives of the company.

GHG Emissions

The combustion of fossil fuels like Coal, Furnace oils and other petroleum and coal based products at various process shops results in emission of Green House Gases mainly CO₂. The shops contributing to the emission of CO₂ emissions are Coke ovens (Bat#1 to 10), Sinter Plants (No. 1, 2 & 3), Blast Furnaces (1to7), Steel Melting Shops (1 & II), Rolling Mills (Plate Mill, Billet & Blooming Mill, Merchant Mill, Rail & Structural shop), Captive Power Plant (PP-1), Other auxiliary Shops like Foundries, Acetylene Plant, Emissions due to movement of Vehicles like Locomotives, dumpers etc.

Total direct and indirect greenhouse gas emissions by weight.

CO ₂ emissions (t/tcs)	2006-07	2007-08	2008-09
Total emissions	2.99	2.82	2.71

The calculation is based on CO₂ emission tool developed by world steel association (WSA) formerly known as International Iron and Steel Institute (IISI)

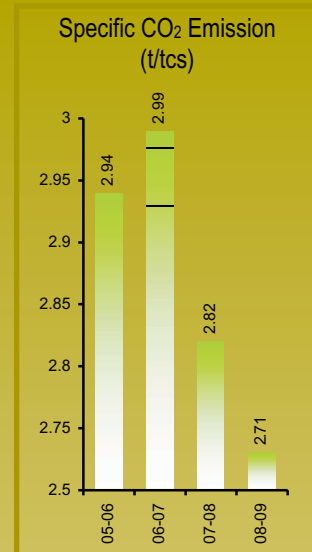
The other indirect relevant green house gas emissions are:

Fuel combustion for transport of raw materials and products also contribute to global warming. BSP has its own captive mines of Iron ore, Limestone mines and Dolomite Mine at a distance of 80 km, 20 km and 130km respectively. Due to close vicinity of mines, BSP has little impact of CO₂ emissions generated during transportation of raw materials. Transportation of 2.5 million tones of coking coal from Australia is major contributor of transport related CO₂ emissions. The various products are primarily sold in domestic market. Therefore, the transport related emissions for product distribution is also low. BSP endeavors to reduce environmental load through well-considered selection of transportation modes, reduction in distance, improvements in load efficiency, and introduction of information technology for **communication with suppliers and consumers to reduce travel of personnel and improve their satisfaction level.**

New Generation Products

The iron and steel industry can contribute to energy conservation and reduction of the carbon dioxide emission on the part of users by improving the quality, properties and application of steel products in addition to energy-saving in the manufacturing processes. LCA assessment of high-performance steel products will be carried out for estimation of reduction of CO₂ emissions during manufacturing and its use. We have identified some of the high functional steel products.

BSP eco-friendly products create value to customers and also help in reducing the GHG emissions during use stage by lower steel needs with high strength, high temperature resistant, fuel savings during light weight plates etc.



- Use of high-strength steels reduces the need for heavy load-bearing beams and there by save energy and greenhouse gas emissions at manufacturing stage.
- Compared to concrete, steel intensive buildings have less impact on the environment during on-site work.
- The double-hull large vessels made from a new generation high strength and lighter steel plates increases fuel efficiency.
- Steel is the main material used in wind turbines. 3.0 megawatt wind turbine generate 280,000 MWh in 20 yr resulting in saving of about 230,000 t of CO₂.

Clean Development Mechanism

Right since inception BSP has implemented several energy efficiency projects with an aim to bring down the green house gas emissions & cost of energy, which contributes to about 30 to 40% of the cost of steel making in an integrated steel plant. Bhilai Steel Plant has identified 25 clean development Projects(CDM) which have already been completed or will be taken-up under BSP, 7.0 MT expansion plan.



CDM projects of BSP

Completed Projects	Envisaged Projects
<ul style="list-style-type: none"> • Heat recovery from Sinter Cooler of Sinter Plant #3. • Coal Dust Injection (CDI) in Blast Furnace 1,5,7. ★ Blast Furnace gas utilization at Boiler #6 of Power Plant-1. • Thyristorisation of Blast Furnace #3&4 skip hoist electric supply for better operation efficiency and energy conservation. • Additional BOF gas evacuation scheme for increased gas recovery. • Resizing and improvement in design of impeller of Gas Cleaning Plant (GCP) in Steel Melting Shop #1. • Independent Exhaust system for slab casters #2,3,4. • Commissioning of Variable Voltage Variable Frequency (VVVF) drive ID fan motor at Steel Melting Shop #2. • Modification in furnace of Rail & Structural Mill. • Micro-processor control system at Reheating Furnace of Plate Mill. • Replacement of CFC #11 by Li-Br based chilled water plant. • Recycling of BOF slag through Sinter Plant. • Installation of VVVF drive at BOF converter # 1, 2 and booster Fan ** 	<ul style="list-style-type: none"> • Coke Dry Quenching (CDQ) in New Battery #10. • Installation of Top gas Recovery Turbine (TRT) at Blast Furnace 7,8. • Installation of gas fired boiler for power generation from gas of New Blast Furnace #8. • Waste heat recovery from new Sinter machine. • Hot stove waste heat recovery for Coal Dust Injection unit of new Blast Furnace #8 • Replacement of Twin Hearth Furnace (THF) with BOF converters. • Installation of thin slab caster. • Installation of energy efficient compressors in oxygen plant. • Replacement of existing motors with energy efficient motors in Mills. • Walking beam furnace at Mills. • Energy efficient shaft kilns at new Refractory Material Plant # 3

Case Study

VER benefits a success story in 08-09:

The validation & verification of the two completed projects, namely “SP-3 waste heat recovery & Thyristorisation of Blast Furnace # 3&4 skip hoist electric supply” was done by independent agency M/s.RINA-Italy. In Dec'2008, these two projects of BSP, have been certified under Voluntary Emission Reduction (VER). On an average the implementation SP-3 waste heat recovery project has resulted in the reduction of 9,51,822 Tons of CO₂ till 2007-08 & BF # 3 & 4 Thyristorisation has resulted in 22,921 T of CO₂ till 2007-08.

The certification of these two projects by the independent validation/verification agency M/s.RINA-Italy, will enable BSP to claim revenues for 9,74,743 Tons of CO₂ emission reductions from the international VER market.

Ozone Depleting Substances

Under Montreal Protocol, as a part of phasing out ozone depleting substances, BSP has eliminated use of CFC-11 by replacing it with 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 has been started. To control the chemical losses, vapour phase degreasing systems are under installation, which is being implemented under the UNDP aid. Instead of Halon based fire extinguishers, FM 200 based units are only being procured. All industrial package air conditioners using CFC-12 will be replaced in phased manner by year 2010 by units using CFC free refrigerant. BSP does not produce or export any ozone depleting substances.

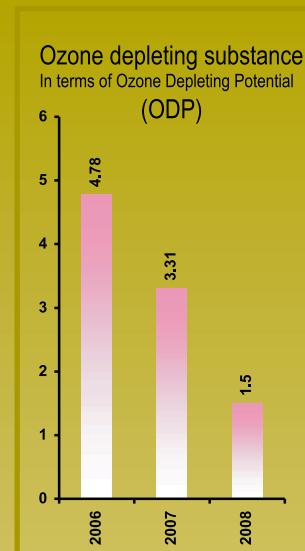
Consumption of Ozone Depleting Substance in tonnes

ODS Substances	Ozone Depleting Potential (ODP)	Year wise consumption in Tons		
		2006	2007	2008
CFC 11	1	0	0	0
CFC 12	1	2.93	2.19	1.241
Halon-1211	3	0.48	0.245	0
CTC	1.1	0	0	0
HCFC-21	0.04	0.72	0	0
HCFC 22	0.055	4.8	4.94	4.392
HCFC 142	0.06	2	1.944	0
HCFC 124	0.0125	0	0	1.005
Total		10.93	9.319	6.638
Total ODP in Tons		4.78	3.31	1.50

Product Life Cycle

Steel products are 100% recyclable in their life cycle. However it is difficult to keep track after the product leaves the plant gate and hence information is not available. BSP recycles scrap, which is generated in the plant. BSP does not account the emission due to transport of its product and workforce.

World Steel Association (WSA), Brussels is promoting Life Cycle Study for steel products. At present restricting the scope of the study is limited from mining of raw materials to the dispatch of material from steel plant gates. At Bhilai Steel Plant, LCA has proved to be very successful in analysing inputs to the processes and discharges to the atmosphere. As per IISI norms the tracking of performance and significant impacts of products and services beyond the gate is not considered, hence has not been assessed and reported. National Metallurgical Laboratory (NML) has issued 30 recommendations after review of the National level LCA study. All the 26 recommendations relevant to BSP have been implemented. BSP is participating in the LCA update 2008 organized by World Steel Association (formerly International Iron & Steel Institute) Brussels





Environmental expenditure;

Total Environment protection expenditures and investments by type

Area	Revenue expenditure in Crores	Capital Expenditure in Crores
Pollution prevention	56.32	
Global Environment Protection		206.9
Resource Circulation	30.8	
Environment management activities	0.15	
Research & development	2.29	
Social activities	1.42	
Total	91.54	206.9
Grand Total	298.44	

R&D efforts in Resource conservation , process improvement & Environmental Monitoring

- Development of minimum thermal energy sintering operation in SP-III by installation magnetic water conditioner before mixing and preheating the sinter mix.
- Improved performance at SP-II by application of abrasion resistant ceramic materials in the wind legs and castable in the wind main.
- Introduction of curtain flue ignition system in Machine 3 & 4 of SP-II to reduce fuel gas consumption by 40%.
- Reduction of specific fuel combustion and productivity improvement at Wire Rod Mill by increased combustion and automation of zonal gas control valves.
- Reduction of front and looping cobble at RSM.
- System for cutting line flow bloom length at SMS-II.
- Doubling of saw blade life at RSM by reducing the pitch of teeth and heat treatment.
- Development of centralized mill monitoring system at Merchant Mill for Environment improvement:
- Reduction of coke breeze consumption at SP-II by preheating sinter mix.
- Enhancement of coal dust injection rate at BF #7 by optimizing the operational parameters.
- Enhancement of lining life of steel ladle at SMS-II from 63 heats to 78 heats.
- Enhancement of lining life of steel ladle at SMS-I from 63 heats to 78 heats.
- Enhancement of lining life of ladles at Blast Furnaces by optimizing the refractory lining in different zones of ladle
- Development of usage of LD slags as a raw material in cement kiln.
- Optimization of parameters for Hot Metal desulphurization for achieving low sulphur.
- Development of NOx monitoring system in flue gases using IR ray based equipment in association with MECON.

Land Use

Bhilai Steel Plant does not fall in protected or sensitive area. Areas of operation of the company do not have any World Heritage sites or Biosphere Reserves/ Protected areas. The Environmental Impact Assessment Studies conducted for all the units have revealed that, no reportable changes to natural habitats have occurred from the company's products, services and activities

Units	Revenue area in Hectares	Forest area in lease in Hectares	Non-forest area in Hectares
Bhilai Steel Plant (Works)	3248.9	Nil	3248.9
Bhilai Township	2939.9	Nil	2939.9

Out of the land under Steel Plant , 1100 hectares is used for water reservoirs

Land use pattern at Mines

Name of the Mine	Leased Area in Hectares	Forest Land in Hectares	Revenue Land in Hectares
Rajhara Mechanized Iron ore Mines	220.42	100.76	119.66
Dalli Mechanized Iron ore Mines	719.6	283.6	436
Dalli Forest range Manual Iron ore mines	100	100	Nil
Mahamaya dunki Iron Ore Mines	1522.67	1522.67	Nil
Kalwar Nagur iron ore Mines	938.06	938.06	Nil
Nandini Mechanised Lime stone Mines	526.34	Nil	526.34
Hirri Dolomite Mines	128.77	Nil	128.77

Mining lease area reclaimed & surrendered to Forest department till date

Sl No	Name of Mining Lease	Original ML area (Hectares)	Present ML area (Hectares)	Area Surrendered (Hectares)
1	Pandridalli & Rajhara Pahar ML	291.49	220.42	71.07
2	Rajhara Hills ML	1038.58	719.6	289.81
3	Dalli Forest Range ML	244.94	100.00	144.94

Green Belt Development

Bhilai Steel Plant is committed to its environmental policy in which afforestation finds a pre-dominant place. BSP has put in a major effort to promote greenery in and around Bhilai. This includes organized tree plantation on large scale; development of gardens and parks in Mines, Works area and Township; rehabilitation of slag dumps; seed broadcasting and encouraging employees/citizens / students to take up green belt development.

Today Bhilai and its mines has an estimated population of 54 lakh trees. This comprises of 30.5 lakh trees inside the plant, and township and 23.5 lakh trees in the mines.

Development of gardens inside & outside the plant:

The plant and township are replete with gardens and trees. Some of the gardens developed inside the plant & township are:

Inside Plant	<ul style="list-style-type: none"> 15 gardens over 30 acres inside the plant 3 nurseries with 25000 plants of 125 flora varieties.
BSP Township	<ul style="list-style-type: none"> 6 major gardens including 'Maitri Bagh' the best garden in Chhattisgarh in 125 acres with zoo & Musical fountain.

Eco-clubs

42 eco-clubs registered with MOEF are functioning in BSP schools under the National Green Corps (NGC) programme of Ministry of Environment & Forests (MOEF). Under this scheme, students participate in the various environmental activities and enhance awareness in the township and commercial areas. by taking out rallies and door to door interaction.

