



环境报告 2004
ENVIRONMENTAL
REPORT



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董事长：谢企华
Chairwoman: Xie Qihua

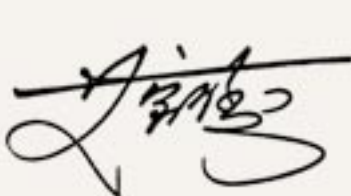
环境是人类赖以生存的基本条件，也是人类社会得以可持续发展的物质基础。保护人类生存的环境，实施可持续发展战略，已成为当今社会“和平与发展”的共识。要使这个共识成为大家都遵守的行为准则，则需要包括众多生产企业在内的各种利益集团的共同承诺和不懈努力。

1987年，联合国世界环境与发展委员会对“可持续发展”作了一个准确的诠释：“能满足当代的需要，同时不损及未来世代发展的需要”。在工业与经济高速发展的现代社会，我们必须摒弃以牺牲环境为代价的发展，追求人与自然和谐共处的可持续发展，这是我们唯一的选择。

宝钢建厂以来，高度重视并致力于环境保护和治理工作，努力建设“蓝天、绿地、繁花”的花园式工厂。为此我们坚持清洁生产，推出绿色产品，实施循环经济，在保持快速发展的同时，厂内环境质量也得到同步保护和提高。

在将这本《环境报告》奉献给大家的同时，我们郑重承诺：宝钢将一如既往地作出努力，持续改善我们社区的生存环境，营造更加美好的生活空间。

董事长：

总经理：



总经理：艾宝俊
President: Ai Baojun

Environment constitutes the prerequisite for the survival of human being as well as the material base for the sustainable development of our society. Therefore it is the common view of all people who desire "Peace and Development" to protect our living environment and practice the strategy of sustainable development. To bring this view into the operational norm that everyone observes, all the interest groups including various enterprises should pledge their commitments and make unremitting efforts.

In 1987, the Environment and Development Commission of the United Nations gave an exact interpretation of the term "sustainable development: "to meet the needs of the present without compromising the ability of future generations to meet their own needs". In an era of rapid development in industry and economy, we must spurn the ways of development at the expenses of the environment but seek sustainable development achieved under harmonious coexistence between man and the nature. We have no choice than this one.

Since the inception of Baosteel, we have always attached importance to environmental control and protection and strived to build a gardenlike plant of "azure sky, green land and clusters of flowers everywhere". For this aim, we have practiced clean production, manufactured green products and adopted the mode of recycle economy. Baosteel's rapid growth is achieved alongside with careful protection and constant improvement of our plant environment.

At the time we bring forth this "Environmental Report 2004", we pledge that we will, as before, make constant efforts to improve the environment of our community and create a better and more beautiful living space.

Chairwoman: Xie Qihua

President: Ai Baojun



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2003年版《宝钢股份环境报告》首次向社会介绍了宝山钢铁股份有限公司（以下简称“宝钢股份”）环境保护的方针、措施及生产过程中的主要环境因素，得到社会的认可与赞许。作为国内率先发布环境报告的企业，我们的初衷是“让社会了解宝钢股份，并接受社会监督”。

2004年版宝钢股份环境报告，将对宝钢股份环境保护的基础性工作及生产工艺中涉及的环境问题作进一步阐述，我们将坦诚地讲述生产过程中的环境问题，并向您报告2004年宝钢股份对持续改进环境所做的努力。

宝钢股份始终将环境保护工作视作对社会应尽的责任与义务，始终以严格苛求的态度自我要求。

我们希望2004年版环境报告，能继续得到您的关注，并对我们提出宝贵的意见和建议。

In our *Environmental Report 2003*, we introduced, for the first time, the environmental protection policy of Baosteel Co. Ltd. (hereinafter referred to as Baosteel), the measures we adopted and major environmental factors in the course of production, which won warm response and wide acclaim from various social circles. As the first domestic enterprise to publish its environment report, we intended to "let the society know Baosteel and subject it to the supervision from the public".

In *Environmental Report 2004*, we will further elaborate on the fundamental work undertaken in environmental protection and environmental problems related to production technologies. We will frankly discuss environmental problems existing in our production and describe all the efforts we have made in 2004 for steady environment improvement.

Baosteel, environment-conscious, has set high standards for environmental protection and always deemed it its own responsibility and obligation to protect and improve the environment.

We sincerely wish you would give *Environmental Report 2004* sustained attention and concern as well as valuable suggestions.





宝钢股份，前身为宝山钢铁（集团）公司。2000年2月，由上海宝钢集团公司独家发起组建股份制上市公司，同年12月在上海证券交易所上市。

宝钢股份位于上海市北翼，北濒长江，东临吴淞口。主厂区占地18.98平方公里，公司员工15421人。

宝钢股份是中国现代化程度最高的大型钢铁联合企业。1978年12月动工兴建，至2000年底，一、二、三期工程全部建成。整体技术装备具有大型化、连续化、自动化的特点。主要产品为冷轧、热轧板卷、无缝钢管、线材和钢坯材。设计产能为：年产钢1100万吨。

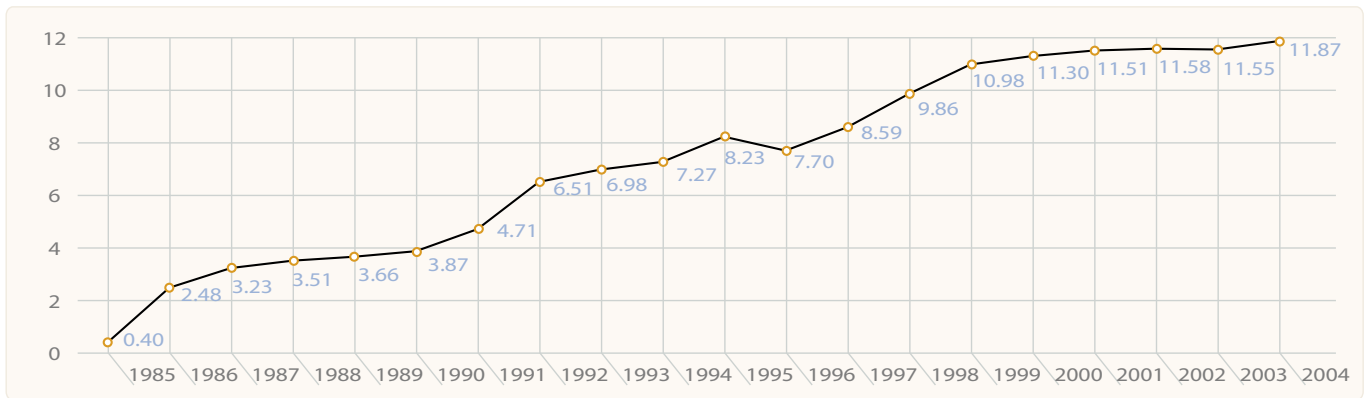
宝钢股份十分重视生产建设与环境的可持续发展，不断加大环保投入，全面推行清洁生产，坚持绿色制造和营销，按照严于国家标准的企 业标准实施环境管理。

1998年1月通过环境管理体系ISO14001认证，2001年5月通过首次换证审核，2004年7月通过第二次换证审核；2004年6月通过综合管理体系英国标准协会（BSI）认证。

2004年7月，《财富》杂志公布的世界500强企业中，上海宝钢集团公司排名372位，宝钢股份作为下属核心企业为此作出了卓越贡献。2004年12月，标准普尔将宝钢股份的信用评级从“BBB”调升至“BBB+”，前景展望为“稳定”。

主要产品销售情况（单位：万吨）

产品种类	2004年	2003年	
冷轧	660.64	549.30	包括普冷、热镀锌、电镀锌、彩涂、电镀锡、电工钢等，主要用于汽车、家电、包装等行业
热轧	274.13	334.00	包括管线钢、铁路车辆用钢、建筑用钢、集装箱用钢等，主要用于管线、建筑、铁路车辆、机械等行业
钢管	108.04	82.82	包括油井管、高压锅炉管等，主要用于石油、锅炉、机械加工等行业
线材	57.91	56.99	包括冷墩钢、预应力钢丝、钢帘线等，主要用于机械制造业
钢坯	58.26	87.31	包括模具钢、车轴坯、气瓶钢等



钢产量：百万吨 Steel Output : million ton



Baosteel Co. Ltd., formerly known as Baoshan Iron and Steel (Group) Corporation, was reestablished in February, 2000 as a stock company by Shanghai Baosteel Group Corporation and was listed at Shanghai Stock Exchange in December the same year.

Baosteel is located in the north flank of Shanghai, adjacent to the Yangtze River on the north and close to Wusong Harbor on the east. The main plant covers an area of 18.98 km², with a total staff of 15421.

Baosteel, the largest and most modernized integrated iron and steel manufacturer in China, began its plant construction in December 1978 and witnessed the completion of the first, second and third phase of the project by the end of 2000. With its advanced and large equipments capable of continuous and automatic production, the plant boasts a designed annual production capability of 11 million tons of steel, the main products including cold rolled sheets, hot rolled sheets, seamless pipes, wire rods and billets.

With full attention to sustainable development of both production and environment, Baosteel has steadily increased its environmental protection input, vigorously promoted clean production, always adhered to the policy of green production and marketing, and carried out environmental control according to its own enterprise standards which are more demanding than those set by the State.

Baosteel passed ISO14001 Environment Management System Certification in January 1998, the first re-certification for certificate renewal in May 2001 and second re-certification in July 2004. The company has also passed the certification by BSI for integrated management systems in June 2004.

Shanghai Baosteel Group Corporation ranked No. 372 on the list of Global 500 released by Fortune in July 2004, an achievement which owed a lot to Baosteel, its core subsidiary. In December 2004, Standard & Poor's raised Baosteel's credit rating from BBB up to BBB+, with a stable outlook.

Sales of Major Products (Unit: million ton)

Product	2004	2003	
Cold rolled	6.6064	5.4930	including cold rolled, hot dipped galvanized, electro-galvanized, color coated and electro tin-plated and electrical steel, mainly used in automobiles, household appliances and packing
Hot rolled	2.7413	3.3400	including steel pipe, steel for railroad carriages, construction and containers, mainly used in fields like piping, construction, railway and machinery etc.
Steel pipe	1.0804	0.8282	including pipes for oil well and high-pressure boilers, applicable mainly to oil field, boilers and machinery.
Wire rod	0.5791	0.5699	including frusta steel, pre-stressed steel wire, tire cord etc, used mainly in machine manufacturing.
Billet	0.5826	0.8731	including die steel, axle bloom and gas cylinders



环境方针 Guideline

控污染、节资源、兴利用，建设生态型钢铁企业

Construct an ecotype steel enterprise through pollution prevention, resources and energy conservation and waste recycling

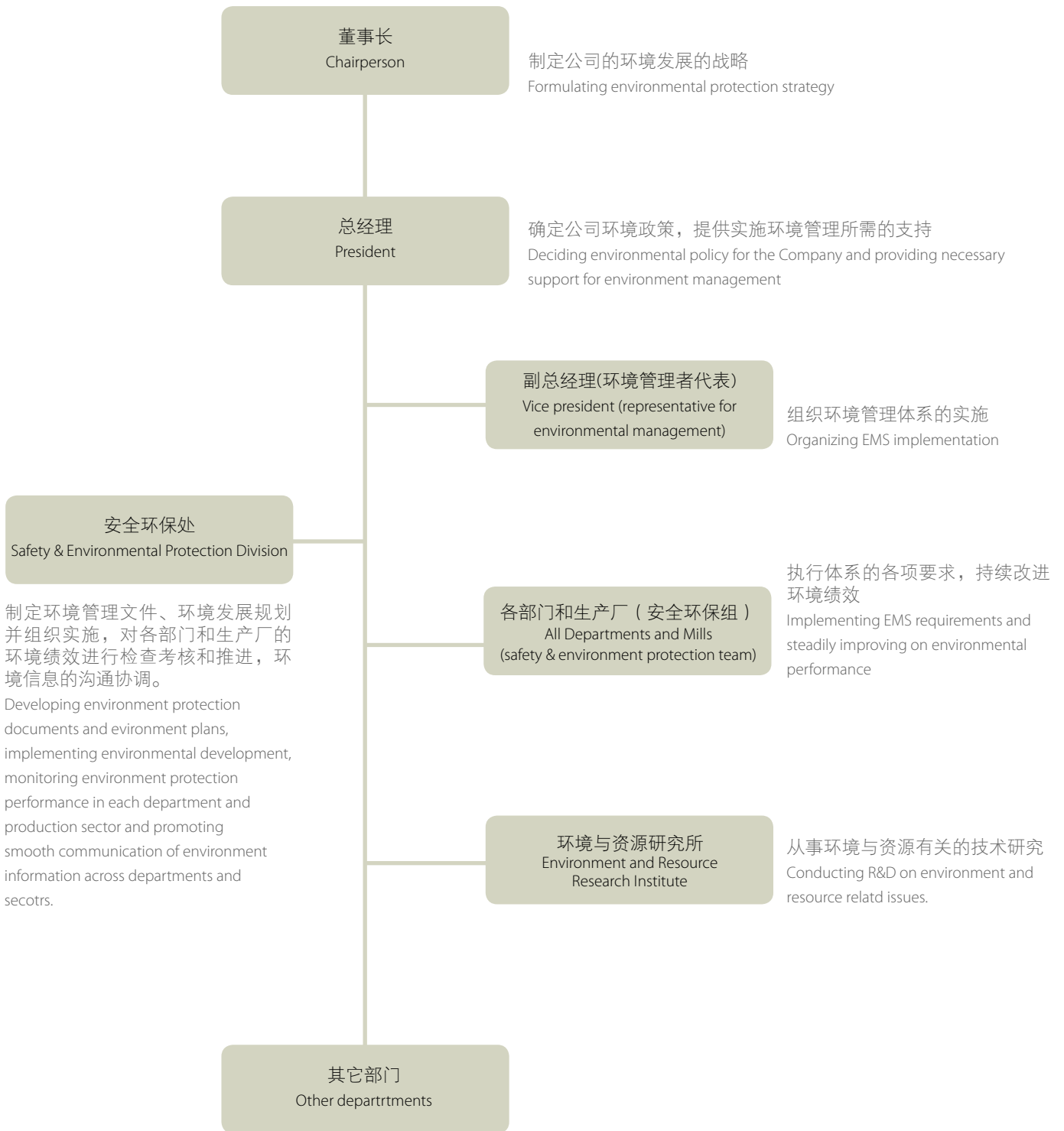
公司承诺

- 严格遵守国家和地方的环保法律法规，以严于国家、地方的宝钢股份环保标准进行控制；加强污染防治，努力实现全面达标，排量递减。
- 从原燃材料、设备、物资的采购，到钢铁冶炼、产品制造、成品外运全过程预防和控制污染，各阶段努力减轻环境负荷，实现清洁生产。
- 不断改进工艺，节省资源、能源，开展三废综合利用，推进循环经济。
- 全员参与，建设生态型钢铁企业；加强国际合作，促进环境保护发展。
- 坚持走新型工业化道路，在快速发展生产的同时，努力营造一流的生态环境。

Company Commitments

- To strictly abide by the laws and regulations stipulated by both the Central Government and the local government; to exercise control over the environment according to internal control standards which are stricter than those set by the State and the local government; contribute more efforts to prevent and combat pollution so as to steadily reduce pollutant discharge and reach all the standards set for pollution control.
- To prevent and control pollution in the whole operation course from the procurement of raw materials, equipment and other goods to iron and steel smelting, product manufacturing and shipping and delivery; to minimize pressure on the environment in every stage and achieve clean production.
- To steadily update technology, conserve resources and energy, promote recycle economy through the comprehensive reuse of waste gas, water and residues.
- To develop an ecotype steel manufacturer with active involvement of all employees and promote environmental protection by strengthening international cooperation.
- To adopt a new industrilization strategy and strive to create a first class ecological environment while pursuing rapid development.





Creating An Environment-friendly Enterprise 创建环境友好企业



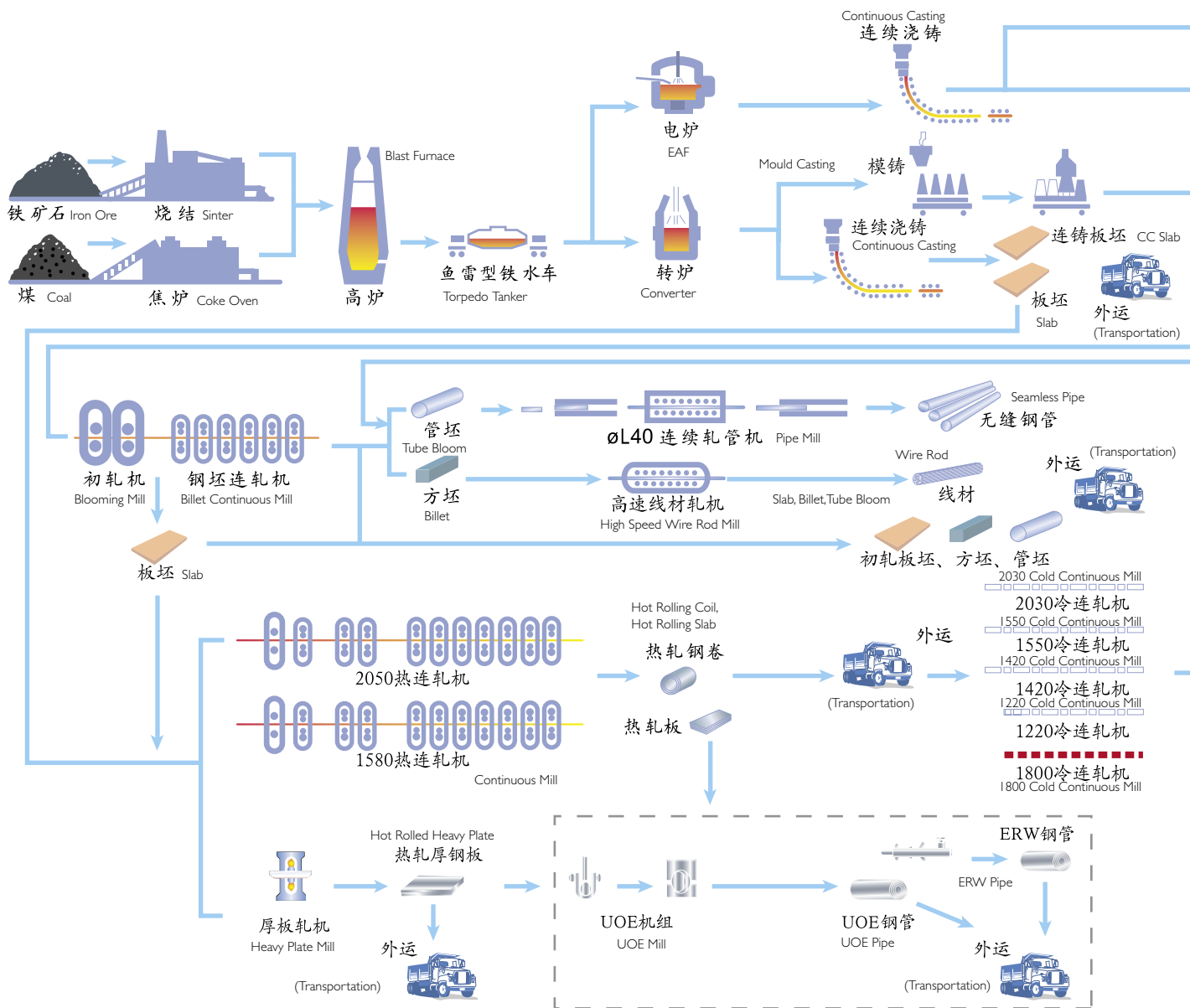
借鉴发达国家防治污染和提高效能的经验，国家环保局于2003年发起了“创建环境友好企业”活动，对申报的企业在污染防治、环境管理、产品对环境的影响程度等方面设置了22项考核指标。达到这些指标，则意味着企业在原材料采购、工艺选择、生产过程管理、各项环境指标、履行社会责任等方面均属佼佼者。“环境友好企业”，是在清洁生产、污染治理、节能降耗、资源综合利用等方面都处于国内领先水平企业，是国内工业企业在贯彻落实科学发展观、走新型工业化道路和实践循环经济方面的示范和表率，是目前中国企业在环境保护方面的最高荣誉。

宝钢股份于2003年成立了推进委员会，并结合创建环境友好企业活动制定了2004~2009年环境节能规划，2004年成立了环境综合治理委员会专门推进环境保护工作。至2004年底已完成该活动的全部基础工作，并通过了国家环境保护总局的验收，宝钢股份将成为中国冶金行业 and 上海市首家获此殊荣的企业。

With reference to the experience of developed countries in environmental protection and effective pollution control, the State Environmental Protection Administration launched a program called “Creating Environment-Friendly Enterprises” in 2003, in which 22 checking targets are set for enterprise in pollution prevention and control, environment management and product effects on the environment. To meet these requirements, an enterprise has to distinguish itself in all aspects ranging from raw material purchase, technology adoption, production process management, environmental control to the fulfillment of social responsibilities. “An Environment-Friendly Enterprise”, therefore, must be the one who takes the lead in clean production, pollution control, energy conservation, consumption reduction and comprehensive utilization of resources, and the one who acts as a role model in pursuing scientific development, seeking a new path of industrialization and promoting recycle economy. “An Environment-Friendly Enterprise” is the highest honor an enterprise could gain for environmental protection in China.

In view of the program of “Creating an Environment-Friendly Enterprise”, Baosteel set up a Promotion Committee in 2003, which laid down the 2004—2009 environment control and energy conservation plan, and, in 2004, set up a Comprehensive Environment Control Committee to further promote environmental protection. By 2004, all the basic work for the program was completed and passed the inspection by the State Environmental Protection Administration. Hence, Baosteel will become the first winner of the honorable title “an Environment-Friendly Enterprise” in Shanghai as well as in China’s metallurgical industry.





宝钢股份生产主原料为铁矿石，辅原料为石灰石、白云石等，外购能源主要为煤炭。

Baosteel uses iron ore as the raw material, with limestone and dolomite etc. as supplementary materials. The chief energy it purchases takes the form of coal.

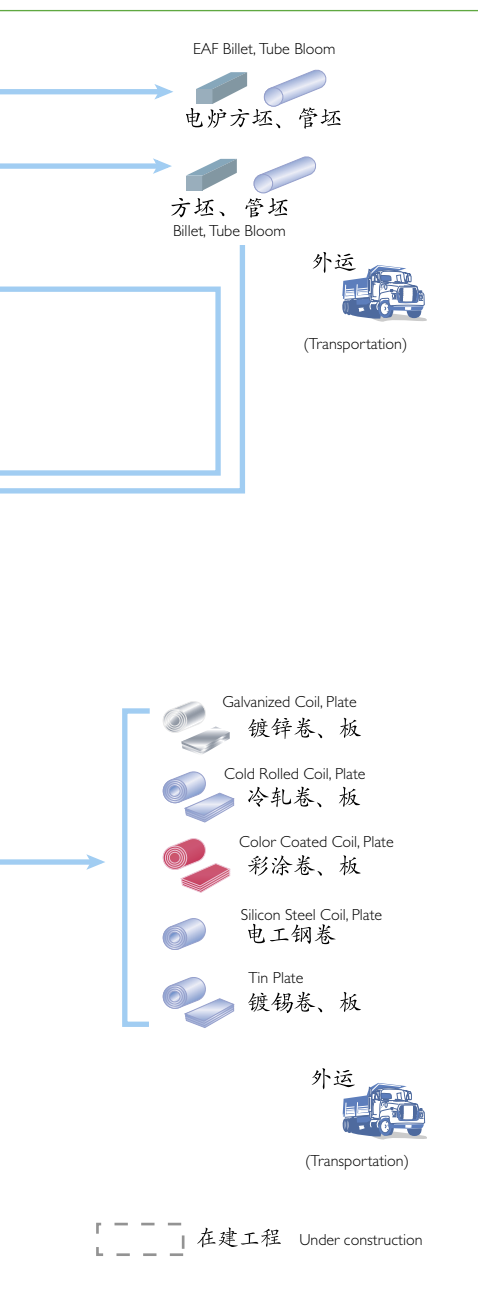
资源和能源的投入量

铁矿石	1761万吨
原煤	1101万吨
白云石	44.2万吨
石灰石	155.1万吨
工业水	4842万吨
重油	1303吨

生产过程中排放的污染物主要有SO₂、烟粉尘、COD、石油类等。

2004年排放的主要污染物 (单位: 吨)

污染物	排放量	主要产生工序
二氧化硫	23844.4	电厂、烧结
烟粉尘	10180.4	炼铁、炼钢、轧钢、焦化
化学耗氧量	423.9	轧钢、焦化
石油类	15.64	轧钢、机修
氨氮	13.27	焦化



Material and Energy Consumption

Iron Ore	17.61 million tons
Coal	11.01 million tons
Dolomite	0.442 million tons
Limestone	1.551 million tons
Industrial Water	48.42 million tons
Heavy Oil	1303 tons

The major pollutants discharged in the course production include SO₂, dust, COD and oils, etc.

Major Pollutants Discharged in 2004 (Unit: ton)

Pollutant	Discharged quantity	Major Production Processes
SO ₂	23844.4	Power plant, sintering
Dust	10180.4	Iron smelting, steel making, steel rolling, coking
Chemical Oxygen Consumption	423.9	Steel rolling, coking
Oils	15.64	Steel rolling, machine repair
NH ₃ -N	13.27	Coking



建厂之初，宝钢股份就以世界最先进的污染控制水平作为环保设计标准，并于1993年、2001年两次修订环保设计标准，进一步明确了环境保护的设计原则、设计要求，2004年再次修订和增补了环保设计标准，以严于国家和地方的环境标准进行控制。

Since its establishment, Baosteel has been aiming at world-class pollution control and accordingly designed its own standards for environmental protection, which, after two revisions in 1993 and 2001 respectively, further clarified the designed principle and requirements for environmental protection. In 2004, Baosteel once more revised and supplemented its design codes for environmental protection, which place higher demand on pollution control than the State's and the local government's standards do.

宝钢股份环保标准与法规标准的比较

污染物	单位	法规标准	宝钢标准
石油类	mg/L	10	5
悬浮物	mg/L	150	100
布袋除尘器	mg/Nm ³	120	30
干式电除尘器	mg/Nm ³	120	80
湿式电除尘器	mg/Nm ³	120	35
HCl	mg/Nm ³	100	10~30

A comparison between state and Baosteel standards

Oils	Unit	State	Baosteel
Suspended Particles	mg/L	10	5
bag Filters	mg/L	150	100
Fabric Bage Dust Collector	mg/Nm ³	120	30
Dry Electrostatic Precipitator	mg/Nm ³	120	80
Wet Electrostatic Precipitator	mg/Nm ³	120	35
HCl	mg/Nm ³	100	10~30



钢铁工业属能源密集型产业，生产过程中要消耗各种能源，同时产生大量的余能(余热、余压)，如副产焦炉煤气、高炉煤气、转炉煤气及各类高温烟气。

Steel making is an energy-intensive industry which consumes various energy sources in production while giving off much surplus energy (in the form of heat and pressure), such as the by-product gases from the coke oven, blast furnace and converter as well as all kinds of high temperature smokes.

宝钢股份2004年购入能源 Energy Purchased in 2004

洗精煤633万吨，动力煤199万吨，喷吹煤233万吨，柴油1.17万吨，电力1303万千瓦时。合计外购能源994万吨标准煤，自耗能源801万吨标准煤。

Extractive coal: 6.33 million tons; power coal: 1.99 million tons; injection coal: 2.33 million tons; diesel oil: 0.0117 million tons; electricity: 13.03 million kws. Total purchased enegy amounted to 9.94 million tons of standard coal and total energy consumption reached 8.01 million tons of standard coal.

能源控制中心 Energy Control Center

2004年余能回收总量折标准煤93.98万吨 (2.75×10^7 GJ)，占宝钢股份能源总使用量的11.7%，较2003年度多回收余能折标准煤2万吨；吨钢综合能耗由1999年的731千克标准煤降至675千克标准煤，降幅为7.66%。

2004年焦炉副产煤气回收利用率为100%，高炉煤气回收利用率为99.84%，转炉煤气采用OG和LT法回收，全年回收能量折标准煤29.22万吨 (8.55×10^6 GJ)，连续16年实现了转炉负能炼钢。

注：1GJ==34.18千克标准煤

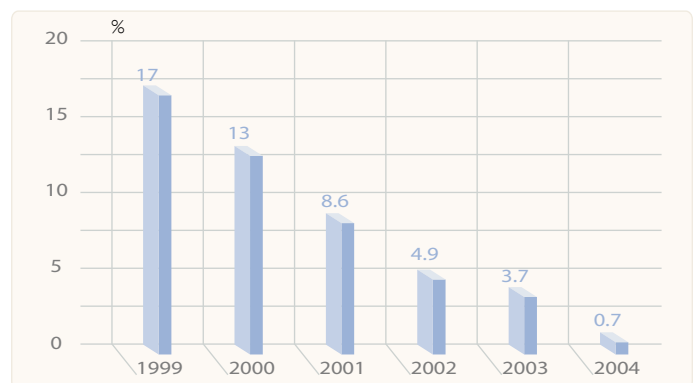
1吨标煤=29.26GJ

In 2004, the residue energy retrieved amounted to 9.398 tons of standard coal (2.75×10^7 GJ), accounting for 11.7% of Baosteel's total energy consumption, 20 thousand tons of standard coal more than that retrieved in 2003. Energy consumption per ton of steel reduced from 731 kg standard coal in 1999 to 675 kg in 2004, a drop of 7.66%.

In 2004, the recovery rate of coke oven gas is 100% and that of BF gas reaches 99.8%. Converter gas is treated and recovered through OG and LT processes and the retrieved energy totaled 0.2922 million tons of standard coal (8.55×10^6 GJ). Converter residue energy has been utilized in steel making for the past 16 years.

Note: 1GJ==34.18 kg standard coal

one ton of standard coal=29.26GJ



氧气放散率 Oxygen Dispersion Rate

转炉煤气LT法回收

LT Converter Gas Recovery

自备电厂大型发电机组高效管理高效运转，全年发电量79.23亿千瓦时，除自用外净供社会电网3.56亿千瓦时，供电煤耗325克/千瓦时。

宝钢股份共有4台干熄焦余热发电机组，余热发电量3.01亿千瓦时，较2003年增加0.16亿千瓦时，全年回收能源折标准煤9.64万吨(2.82×10^6 GJ)。

对烧结、钢管等工序高温烟气进行余热回收，全年回收余热蒸汽折标准煤43.8万吨(1.28×10^7 GJ)。

3座高炉均设有炉顶余压发电机组 (TRT)，全年发电量3.66亿度，回收能源折标准煤11.72万吨 (3.43×10^6 GJ)。

Baosteel's own power plant, equipped with large-scale electricity generators, is effectively managed and efficiently run. Electricity generated in the year reached 7.923 billion kWh, which, apart from that for its own use, still leaves a surplus of 356 million kWh transmitted to external power grid. The coal consumption for power supply is 325 gram per kWh.

Baosteel has 4 generators using residue heat recovered by CDQ technique, the electricity generated totaling 301 million kWh, 16 million more than that of 2003. Energy retrieved in the year equals to 0.0964 million tons of standard coal (2.82×10^6 GJ).

Waste heat was retrieved from high temperature smoke and gas discharged from sintering and steel pipe making process, recovered energy from waste heat and steam in the year amounting to 0.438 million tons of standard coal (1.28×10^7 GJ).

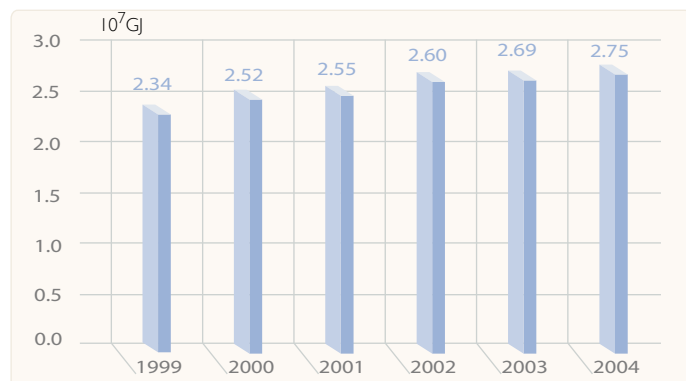
Three blast furnaces are equipped with TRT (the blast furnace top pressure recovery turbine) which utilizes residue pressure to generate electricity. The total electricity output in the year reached 366 million kWh, energy recovered equal to 0.1172 million tons of standard coal (3.43×10^6 GJ).

TRT发电

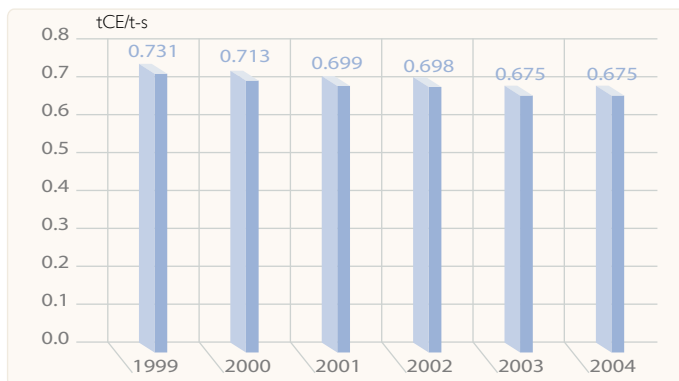
TRT Electricity Generation

通过提高管理水平、改进工艺、增设液化装置等措施，2004年氧气放散率降至0.7%，为历史新低。

With enhanced management, improved technologies and additional liquefying apparatuses, oxygen dispersion rate in 2004 dropped to 0.7%, thus setting a new historical record.



余能回收 Waste Energy Recovery



吨钢综合能耗 Comprehensive Energy Consumption per Ton of Steel

干熄焦余热发电

用氮气作为载体吸收焦炭显热经余热锅炉产生蒸汽，部分并网供用户使用，部分用于发电。现有3座焦炉全部采用这一技术。

厚料层烧结

1#烧结机料层厚度由400~500mm增加到800mm以上，烧结矿一级品率由74%提高到92%，工序能耗由80.7kgCE/t(烧结矿)降至56.5kgCE/t(烧结矿)。

烧结烟气余热利用

烧结烟气通过余热锅炉产生余热蒸汽，蒸汽产生量为68.2kg/t(烧结矿)。

高炉喷吹煤粉

高炉喷吹煤粉可以代替部分焦炭，达到节约能源、减少焦炭使用量、优化外购能源结构的目的，高炉喷煤量200kg/t(铁水)。

高炉煤气发电

高炉煤气中可燃成份少、不可燃惰性气体含量高，属低热值清洁燃气。1997年建成投产的145MW燃气—蒸汽联合循环热电装置(CCPP)，2004年共使用富余高炉煤气25.2亿Nm³、发电8.19亿千瓦时，折标准煤28.75万吨。

转炉煤气LT干法净化和除尘灰热压块

250吨转炉煤气采用LT干法电除尘净化和除尘灰热压块技术，不消耗水资源，同时降低了除尘风机的电力消耗，除尘灰经热压块后返回转炉用于炼钢，利用流程短且污染物排放少。

转炉尘泥循环清洁利用

300吨转炉采用二级文丘里煤气回收技术。宝钢股份在消化吸收新日铁OG泥脱水配入烧结矿利用技术后，自行开发了循环清洁利用新技术，将OG泥浆浓缩后直接通过管道输送至烧结厂，均匀后喷入烧结原料混合机。此项技术取消了脱水，输送过程实现密闭化，消除了二次污染。

转炉尘泥循环清洁利用

一、二热轧均已实现连铸坯的热送热装，该技术可以有效利用连铸板坯显热。



Electricity generation by waste heat recovered through CDQ technique

Nitrogen is used as the carrier to absorb coke's sensible heat and steamed is produced when nitrogen flows into exhaust-heat boiler. Part of the steam is transmitted through pipelines for use and part is used to generate electricity. The technique has been employed in all the three coke ovens.

Thick substrate sintering

The substrate thickness in the sinter is increased from 400mm or 500mm to over 800mm. Grade-one sinter ore rises from 74% to 92%. Process energy consumption reduces from 80.7kgCE/t (sinter ore) to 56.5 kgCE/t (sinter ore).

Energy recovery from sinter fume

Steam is produced when sinter fume flows into surplus heater boiler, the steam produced reaching 68.2kg/t (sinter ore).

BF coal powder injection

Coal powder for blast furnace injection can be used as a substitute for coke to save energy, reduce coke consumption and optimize energy structure. Coal powder injection amount reaches 200kg/t (molten iron).

Generating electricity by BF gas

low in inflammable components and high in nonflammable inert gases, BF gas is a type of clean gas with low heat value.

The 145MW gas-steam combined cycle power plant (CCPP), completed and put into operation in 1997, utilized 2.52 billion Nm³ of redundant BF gas and produced 819 million kws of electricity, equal to 0.2875 million tons of standard coal.

Converter gas dry purification by LT technique and collected dust hot pressed into block

Coal gas from the 250-ton converter is purified and reused with LT dry ESP dust-removing purification technique and collected dust hot block pressing technique. The technology consumes no water and reduces the power consumption of de-dust fans. Removed dust, when hot pressed into blocks, can be reused in the converter for steel making. The recycle flow is short and pollutant discharge remains very low.

Converter sludge clean recycle

The 300-ton convertor adopts two-tier Venturi coal gas recovery technique. Drawing on NSC's technique of OG sludge dehydration as a composite in sintering ore, Baosteel developed its own converter sludge recycle method. With this method, OG sludge is condensed and transported to the sinter by pipeline, then injected into sintering material blender after it is well mixed. The technique needs no dehydration treatment and ensures sealed delivery, thus eliminating chances of repeated pollution.

CC-HCR

CC-HCR is achieved in the first and second of hot rolling. The technique makes full use of CC billets'sensible heat.

其他主要清洁生产技术还有：

焦化剩余污泥和焦油渣用于炼焦配煤
烧结辅底料减少粉尘排放
烧结环冷机余热回收
高炉热风炉烟气余热回收
滚筒法钢渣处理
固态钢渣热闷罐
铸余渣格栅法喷涂垫罐等出渣处理
除尘灰采用密封罐车输送
不溶性阳极镀锌镀锡

Other major clean production techniques include:

Surplus sludge and tar residue coked and reused in coking coal blending;
Sintering substrate to reduce dust discharge;
Waste heat recovery from waste gas out of sinter circular cooler;
Recovery of flue gas waste heat from hot BF;
Steel slag treatment by rotating drum technique;
Hot closed pot method of dealing with solid steel slag;
Method of catcher grid and spray coating for slag output after casting;
Removed dust delivery by sealed container;
Galvanizing and tinning with insolvable anode



烟粉尘控制

Smoke, dust control

各生产工序共安装大型高效除尘器219台（其中高效布袋除尘器192台、电除尘器27台）。2004年布袋除尘器排放浓度已控制在20mg/Nm³以下，干式电除尘器排放浓度控制在80mg/Nm³以下，湿式电除尘器排放浓度已控制在30mg/Nm³以下。烟粉尘排放量为0.86kg/t-s。

219 large dust collectors (including 192 efficient bag filters and 27 electrostatic precipitators) were installed to control waste smoke and dust in the whole production flow. In 2004, the outlet dust density of bag filters was below 20mg/Nm³; that of dry electrostatic precipitators was below 80mg/Nm³ and that of wet electrostatic precipitators below 30mg/Nm³. The discharge of dust was 0.86kg/t-s.

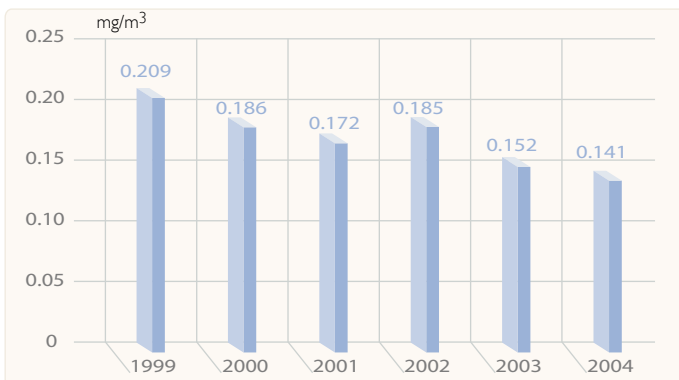


原料区域减少扬尘

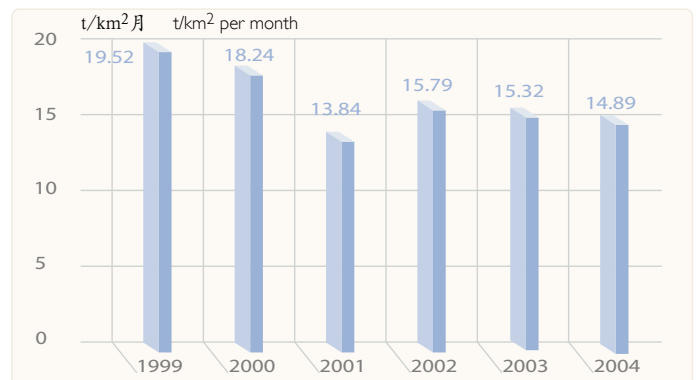
Fugitive dust reduction in the raw material yard

原料区域采取料堆限高、顶部削平、远程控制洒水、喷洒凝固剂、设置洗车台、地面清扫等措施，不同的皮带运输机采用不同的清扫方式（拥有3项皮带清扫器发明专利），各类除尘灰采用真空吸引压送罐车运输。

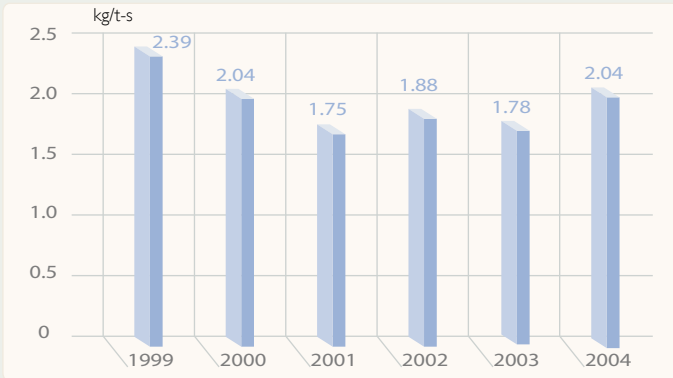
In the raw material yard, the following measures are taken to reduce dust, pile height limit, pile top chopping, water spraying with remote control, concretion glue spraying, setting vehicle washing station, floor cleaning, different cleaning methods for different belt conveyers (with three patents for belt cleaners), and vacuum loading and tank car transportation of removed dust and ash.



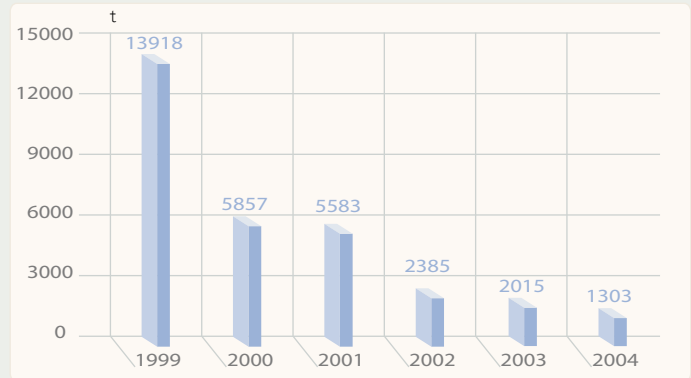
厂区TSP浓度 TSP density in the factory



厂区降尘 Dust fall in the factory



SO₂吨钢排放量 SO₂ discharge per ton of steel



重油使用量 Heavy oil consumption

SO₂控制

SO₂ control

原料、能源采购严格控制含硫量，要求烧结采用高铁低硫配矿方案，SO₂排放量低于同等规模烧结厂，并开展了3#烧结机机头烟气的脱硫研究工作。由于近年来燃煤紧张，购入原煤的含硫量和灰份呈上升趋势，致使本年度SO₂排放总量较2003年有所增加。

自备电厂2#燃煤（350MW）发电机组湿式石灰石—石膏法烟气脱硫项目已于2004年6月开始打桩施工建设，该工艺脱硫效率可以达到95%，预计2005年底建成投产。3#燃煤（350MW）发电机组烟气脱硫项目也于2004年启动，预计2007年建成投入运行。

含硫量高的重油燃料，使用量逐年减少，2004年降至历史新低。

The sulphur content is taken as a key determinant in raw material and energy purchase. It is required that sintering process adopts an ore-mixing recipe featuring high iron content and low sulphur content and that its SO₂ discharge should be lower than that from a sinter factory of the same-size. Baosteel has also researched on the desulphurization of the gas emitted from #3 sinter machine head. Because of coal supply shortage in recent years, the coal we purchased has a higher percentage of sulphur and ash content, therefore total discharge of SO₂ in the year 2004 is relatively greater than that of 2003.

The pile-driving and construction work of the wet limestone-plaster desulphurization project for #2 coal-fired generator unit (350MW) of Baosteel's power plant began in June, 2004. The project, with a desulphurization rate of 95%, is scheduled to be completed and put into operation by the end of 2005. Desulphurization project for #3 generator unit (350MW) also started in 2004 and is to be completed and put into operation in 2007.

The consumption of heavy fuel oil with high sulphur content shrinks steadily, the figure of 2004 being the lowest.

NO_x控制

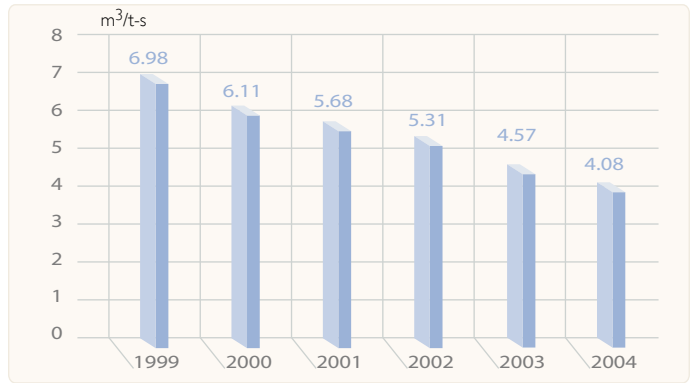
NO_x control

NO_x主要来源于燃料燃烧过程，宝钢股份目前采取的控制措施主要为低氮氧化物燃烧技术。3#燃煤发电机组、以高炉煤气为燃料的CCPP发电机组和轧钢系统部分加热炉采用了低氮氧化物燃烧器，可减少NO_x排放40%。

2004年对电厂1#燃煤发电机组进行了低氮氧化物燃烧技术改造，采用燃料分级和空气分级燃烧技术，预计1#发电机组氮氧化物的产生量可以减少60%。

NO_x mainly stems from fuel burning. Baosteel currently adopts low-nitrogen combustion technique to control NO_x discharge. Low-nitrogen burners were applied to 3# generator unit, CCPP generator unit powered with BF gas as well as some heaters in steel rolling system, a measure that reduces 40% of NO_x discharge.

In 2004, 1# coal-fired generator unit was renovated with the adoption of low-nitrogen oxide combustion technique as well as fuel and air staging methods. It is estimated that 1# generator unit will reduce nitrogen oxide discharge by 60%.



钢吨新水用量 Water Consumption per Ton of Steel

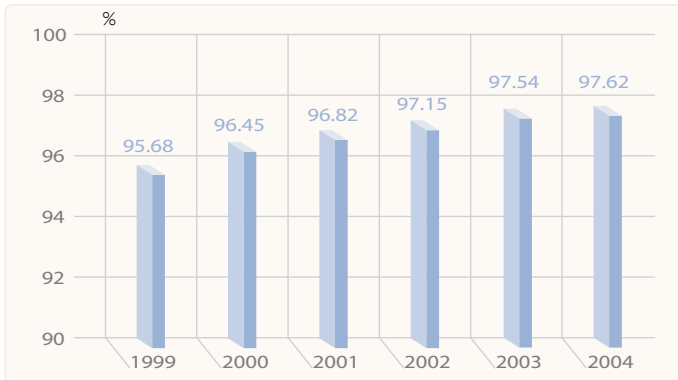
通过系统内部的用水循环、系统间串接使用和中水处理后取代新水等措施，吨钢新水耗量已由1999年的6.98m³降至2004年的4.08m³、较2003年减少10.7%，全年工业用水总量较2003年减少8.5%。

各生产单元均设有比较完备的循环供水和废水处理系统，全部实现了清浊分流。各生产单元产生的废水首先在生产单元内部处理后循环利用，2004年水循环率平均为97.62%。

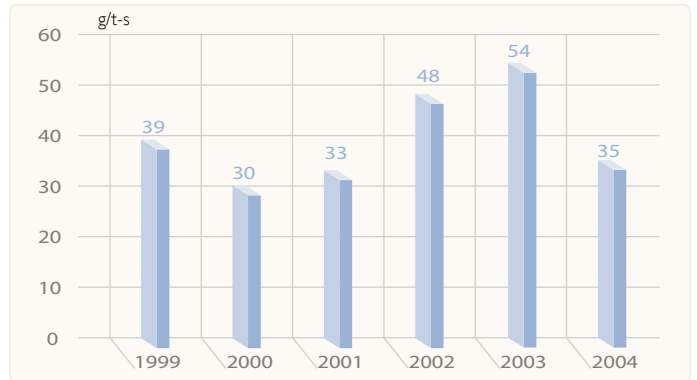
炼铁和炼钢生产单元处理后排出的废水首先考虑本系统串接使用，如净循环排污到浊循环，浊循环排污到煤气洗涤水系统，煤气洗涤排污到渣处理系统等。轧钢生产单元处理排出的含油废水进入第一、第二中央水处理厂含油废水处理系统集中处理后再次循环使用，如用于原料场、烧结、高炉和马路洒水。部分生活污水处理以后用于绿化及工业补充水。

2004年9月，对部分冷轧废水实施并网处理，直接并入串接水管网补充原料场洒水，减少直接外排水量 $47.6 \times 10^4 \text{ m}^3$ ，预计2005年可减少直接外排废水 $150 \times 10^4 \text{ m}^3$ 以上。





水循环率 Water Recycling Rate



吨钢COD排放量 COD Discharge per Ton of Steel

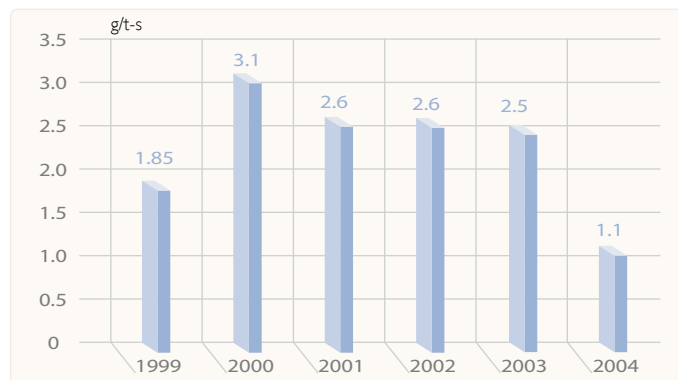


Waste water is recycled in internal systems and also delivered through connection pipes to other water supply networks for reuse and intermediate water is treated as a substitute for clean water. All these measures significantly reduced water consumption. Water consumption per ton of steel reduced from 6.98m³ in 1999 to 4.08m³ in 2004, a drop of 10.7% as against that of 2003. Total water consumption in 2004 dropped by 8.5% as compared with that of 2003.

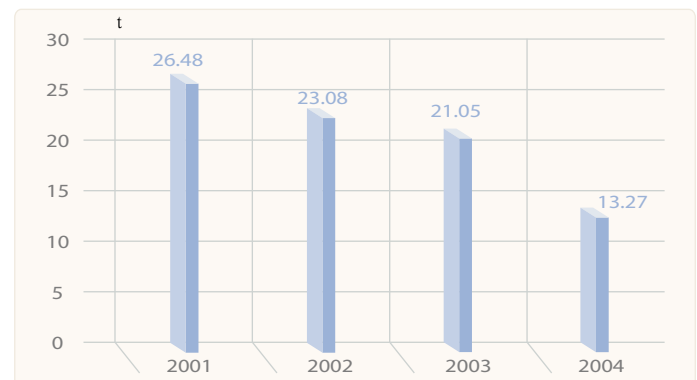
Each production unit has relatively independent water circulation and wastewater treatment systems; clean and unclean water are thus separately delivered and supplied. Wastewater discharged by each production unit will be first treated and reused in the internal system. Water recycling rate amounted to 97.62% in 2004.

The waste water discharged by steel-making units is first treated and delivered to the internal networks for its own use. For instance, it could be delivered through connection pipes from clean circulating exhaust system to unclean circulating system, then to coal gas washing system; and from coal gas washing system delivered to slag treatment system etc. The oil-containing waste water discharged by the steel rolling unit will be collected and treated in the first and the second central water treatment plants, then put to reuse in raw material yard, in sinters, blast furnaces or as spraying water for streets and roads. Part of the domestic sewage is reused to water trees and grass or used for industrial purpose.

In Sept. 2004, part of the wastewater from cold rolling mill was collected and directed into water supply networks and used to spray raw material yard, thus reducing 47.6×10⁴ m³ of the external discharge. It is estimated that this figure will amount to 150×10⁴ m³ by 2005.



吨钢石油类排放量 Oils Discharge per Ton of Steel



NH₃-N排放总量 NH₃-N Total Discharge

Comprehensive Reutilization
综合利用

宝钢股份十分重视固废物的资源化开发利用，近年来成功开发了水渣微粉技术、格栅法铸余渣处理、滚筒法钢渣处理、钢渣在除锈磨料领域应用等多项专利技术。

Baosteel has always devoted great attention to the development of recycling techniques for solid wastes. In recent years, it has successfully developed a number of techniques which were awarded patent rights, including BF slag powder technology, and cast slag catcher grid treatment, Steel slag treatment by rotating drum technique and steel slag reused as a grinding material for dust removal, etc.



研究开发的综合利用技术主要有：

- 钢渣在铁路路基上作道渣和钢渣改良软土地基
- 钢渣无熟料水泥
- 全钢渣砼制品
- 钢渣在地下工程的应用
- 粉钢渣在水泥生料中的应用
- 宝钢钢渣超细粉应用
- 以钢渣为原料加工海洋用块的制造技术

Major techniques for comprehensive use:

- Steel slag used as clinker ballast on railroad roadbed and for improving soft foundation;
- Steel slag cement;
- Steel slag concrete ware;
- Steel slag used in underground works;
- Steel slag powder used as supplementary cement raw material;
- Applications of Baosteel's Ultra-fine steel slag powder;
- Technique of manufacturing steel slag block used in ocean exploration.



高炉渣

BF slag

2004年高炉渣产生量为264万吨，采用水淬工艺，水渣全部用于生产矿渣微粉和用作生产矿渣硅酸盐水泥的掺和料。用高炉渣生产水泥，可以节约大量的石灰石资源，同时减少CO₂排放量约40%。

BF slag in 2004 amounted to 2.64 million tons. Treated with water quenching technology, the molten slag can be reused to produce ground granulated slag and as a raw material in making slag-Portland cement. Much limestone will be saved if BF slag is used to produce cement while the discharge of CO₂ is reduced by 40%.

高炉矿渣微粉生产线

BF slag powder grinding line

矿渣微粉是一种新型绿色建筑材料，替代水泥用作混凝土原料，具有抗氯碱侵蚀、抗微收缩、与钢筋粘结力强、后期强度高特点。宝钢矿渣微粉现已广泛应用于上海磁悬浮、卢浦大桥、上海科技馆及大、小洋山港等国家重大工程基础设施建设，并会同国内有关研究单位编制了该产品的国家标准。

As a new green construction material, ground granulated BF slag is used to as a substitute for cement. Resistant to chlorine and alkali corrosion, anti-shrinkage, strongly coherent with reinforcing steel bar and high in anaphase strength, Baosteel's fine slag powder has been widely used in state major engineering projects such as Shanghai Magnetic Elevated rail line, Lupu Suspension Bridge, Shanghai Science and Technology Museum, Dayangshan Harbor and Xiaoyangshan Harbor. Baosteel also worked with research departments concerned in the country to formulate the State Standards for the product.



钢渣

Steel slag

2004年产生量为145.7万吨。主要采用闷罐法、浅盘水淬法和滚筒法处理，经分选废钢后部分返回烧结配入烧结原料，部分用于生产钢渣路沿石、地面砖、隔离墩等建材产品；其余钢渣用于水泥厂生料原料、冶金人工砂、冶金人工卵石、土体加固混合材、软地基加固规格料、工程灌注旋喷桩规格料、钢结构喷丸料等建材产品和半成品。2004年钢渣综合利用率为100%。

In 2004, Baosteel turned out 1.457 million tons of steel slag, which was processed by salver water quenching and rotating drum technique. After steel scrap is picked out, part of the slag will be sent back to the sinter, where it is mixed with sintering material, and part of it is turned into construction material such as slag pavement plate, floor tile, isolation frusta. The rest is used as raw material for cement production, metallurgical artificial grit, metallurgical artificial pebble, reinforcing mixture for earthy structure, reinforcing standard material for soft foundation, reinforcing standard material for engineering perfusion revolving stakes and steel structure spraying pellet material. In 2004, comprehensive reuse rate of steel slag reached 100%.

自备电厂粉煤灰

Baosteel power plant's coal ash

年产生量为31.7万吨，18万吨磨细粉煤灰用作混凝土添加剂，其余湿灰渣主要用作道路路基材料，并完成生产砌块试验。

The power plant annually turns out 0.317 million tons of coal ash, of which 0.18 million tons of ground coal ash is used as cement additive. The rest wet coal ash is mainly used as roadbed material. The experiment of block making proved to successful.

含铁尘泥

Iron-containing sludge and dust

年产生量为21.6万吨，全部回到生产工序利用。转炉OG泥经冷压块后返回用作炼钢的原料或通过泵送烧结厂用作配料，转炉LT干灰经热压块后返回转炉作为炼钢原料，含铁除尘灰通过专用真空吸引压送罐车运至烧结厂尘灰回收站，经加工后配入烧结原料。

The annual turnout of iron-containing dust and sludge is 0.216 million tons, all of which is recycled in the production flow. After it is cold pressed, converter OG sludge is reused as raw material for steel making or delivered by pump to the sinter as supplementary material. LT dry dust in the converter is hot pressed into blocks and returned to the converter as raw material for steel making. And iron-containing dust is delivered through special-purpose vacuum loaded slurry tankers to sinter dust collection center, where it will be mixed with sinter material after processing.

废酸再生技术

Waste acid regeneration technique

冷轧生产线已全部采用鲁特纳法（RUTHNER）废酸再生技术，2004年回收再生盐酸20.3万吨、氧化铁粉3.49万吨。氧化铁粉经深加工后用于生产高性能磁性材料。

Cold rolling mills adopt RUTHNER method to regenerate waste acid. By 2004, Baosteel had regenerated 0.203 million tons of hydrochloric acid, 0.0349 million tons of ferric oxide powder. After further processing, ferric oxide powder is used to produce magnetic material of high performance.

废油

Waste oil

统一回收至废油堆场，分类后经废油再生净化器生成净化油，调配成液压油、柴油、防锈油等合格油料。2004年利用量为743吨。

Waste oil is collected to the waste oil storage site. After it is sorted, the oil will be processed in a regenerator and the refined oil is made into hydraulic pressure oil, diesel oil and lubricating oil. In 2004 the reprocessed oil amounted to 743 tons.

危险废物

Hazardous waste

2004年产生量为4904吨，全部回收后专业化处理，安全处置率为100%。

In 2004, Baosteel turned out 4904 tons of hazardous waste, all of which was innocuously treated.

综合利用效益

Benefits gained from comprehensive utilization

2004年公司内返生产利用各类固体废物162万吨，产生直接经济效益8.54亿元。

In 2004 Baosteel recycled and utilized 1.62 million tons of waste, yielding revenue of 854 million yuan.



宝钢股份综合利用技术主要有

- 高炉水渣磨细
- 滚筒法钢渣处理
- 热闷罐法处理固态钢渣
- 钢渣回烧结利用
- 格栅法处理铸余渣
- 转炉污泥泵送烧结
- 除尘焦粉喷吹高炉
- 焦油渣回配煤系统
- 除尘灰做脱硅剂
- 粉煤灰做造渣剂



Baosteel's comprehensive utilization techniques include

- BF granulated slag fine grinding
- Steel slag treatment by rotating drum technique
- Hot closed pot method of dealing with solid steel slag
- Steel slag recycled in sinter mill
- Cast slag catcher grid treatment
- Recycle converter sludge to sinter by the converter pump
- Dust removing coke powder for blast furnace injection
- Recovering coke tar slag for coal blending
- Removed dust reused as silicon removal
- Coal ash as an ingredient for slag generation



Noise Control
噪声控制

厂界噪声

Noise at the Boundary

单位: dB(A) Unit: dB(A)

	昼间 Daytime	夜间 Nighttime
南厂界 South boundary	60.6	54.4
东厂界 East boundary	57.0	52.6
西厂界 West boundary	59.2	53.4
标准 Standard	65	55

宝钢股份是我国特大型钢铁联合企业，生产工序复杂、产品种类繁多，噪声源的种类和数量也相当多，目前采用的控制措施主要有：

各类除尘风机、气体压力阀安装消声器、包扎隔音材料，大型风机同时建造隔音罩；蒸汽及其它气体放散管安装消音器，设置消音坑；

空压机、氮压机、氧压机、煤气压缩机等，包扎隔音材料、安装消音器、设置隔音罩；

自备电厂发电机组设置隔音罩；

各类大型风机、真空泵等安装消音器、包扎隔音材料、设置隔音罩或建造隔音间；

破碎机、粉碎机、振动筛设置隔声罩或隔声间；

厂界设绿化隔离带，减轻了噪声对厂界外社区的影响。

经长期监测，宝钢股份厂界噪声昼间和夜间均达到功能区所要求的《工业企业厂界噪声标准(GB12348-90)》Ⅲ类标准。

Baosteel is the largest integrated steel producer in China. Since its highly diversified products are manufactured with complicated procedures, noises may be as many and as varied as its products. The measures for noise control are as follows:

- To install mufflers to de-dust fans and pressure valves, or wrap up with sound insulation material; apart from these, large fans are encased with sound insulation mask;
- To install mufflers to steam and gas vent pipelines, near which muffling pits are prepared;
- To equip air compressor, nitrogen compressor, oxygen compressor and coal gas compressor etc. with mufflers and isolation masks; to wrap up with noise isolation material;
- To install noise isolation masks around generator units in its power plant;
- To install mufflers on large fans and vacuum pumps, wrap up with noise isolation material or set up noise isolation mask and isolation booth around these devices;
- To set up the noise insulation mask or isolation booth around crushers, pulverizers and oscillation sieves;
- To create a green belt around the plant so as to lessen the impact of the noises on neighbouring areas.

With long-term monitoring and control, the noise discharged at the boundary of the plant in both daytime and nighttime conforms to the standard of category III as stipulated in "Standard of noise at boundary of industrial enterprises (GB12348-90)".



环境监测站，现有实验室面积2500m²，主要监测设备120余台，专业技术人员38名，承担生产全过程的环境监测。

With a laboratory of 2500m², 120 major monitoring devices and 38 professionals, the Environmental Monitoring Station exercises environmental monitoring over the whole production flow.



环境空气监测	厂区内外设环境空气自动监测点5个，监测因子为SO ₂ 、NO ₂ 、CO、TSP，另设降尘监测点18个，年总监测量为597项次。
烟道气监测	设监测点223个，监测因子为SO ₂ 、NO _x 、粉尘、温度、废气量、除尘效率等，年总监测量为1056项次。
废水监测	设监测点72个，监测因子30项，主要为pH、SS、COD、BOD、Cr ⁶⁺ 、石油类、挥发酚、氰化物、氨氮等，年总监测量为6472项次。
Ambient air monitoring	There exist five automatic monitoring spots inside and outside the plant with SO ₂ , NO ₂ , CO and TSP as the test items and 18 monitoring spots for dust-fall; total test factors in the year numbered 597.
Flue gas monitoring	223 monitoring spots are responsible for monitoring SO ₂ , NO _x , dust, temperature, waste gas quantity and dust-removing effect; total test factors in the year numbered 1056.
Waste water monitoring	monitoring spots are responsible for monitoring 30 kinds of substance, including pH, SS, COD, BOD, Cr ⁶⁺ , petroleum, volatilization hydroxybenzene, cyanide and NH ₃ -N, etc., total test factors in the year numbered 6472.

Plant Greening
厂区绿化



宝钢股份注重科学发展观，重视人与环境、人与自然的和谐发展，采用了科学设计手法，按生产区域划分栽种不同的植物，因地制宜，不断丰富植物配置。2004年末厂区绿化面积为933万m²，绿化率41.8%。

厂区内现有乔木386万株，灌木2290万株，草坪112万m²；植物共有423种，分属111科、290属。

由于大面积的厂区绿化，为鸟类的生息、繁殖提供了良好的生态环境。厂区现有鸟类13目、27科、84种。

十多种野生动物和梅花鹿、孔雀等养殖动物在这里生殖繁衍。

With a scientific view of development, Baosteel has always stressed the harmonious relationship between man and nature and well-balanced development of both man and nature. With scientific and well-conceived designing, different plants were planted in different production areas and new type of trees and grasses were steadily added to increase its flora variety. By the end of 2004, the greening area in the plant had amounted to 9.33 million m², with a greening rate of 41.8%.

Inside the plant, there grow 3.86 million arbors and 22.90 million shrubs and the lawn covers an area of 1.12 million m², with 423 species of trees and grasses which are subdivided into 111 families or 290 genera.

Large areas of greening provide a good ecological environment for birds to live and multiply. Now birds settling in the plant fall into 13 items, or 27 families or 84 genera.

The plant also shelters a dozen of wild animals and domesticated animals like spotted deer and peacocks.





2004年开展的的环保类研发项目主要有：

- | | |
|--|------------------------------|
| 燃煤锅炉采用气体燃料再燃的NO _x 技术研究 | 2050蓄热加热炉自动烧钢模型及炉群C方式研究 |
| 低压锅炉提高燃烧高炉煤气比例研究 | 热镀（铝）锌钢板无铬后处理技术的应用研究 |
| 煤与废塑料共焦化试验技术研究 | 宝钢电镀锌产品生命周期评价 |
| 高炉实现低MgO炉渣冶炼研究 | 冷轧6价铬及锌的危险废物无害化处理及综合利用应用技术研究 |
| 转炉钢渣高温变性处理工艺的试验研究 | 无Cr环保型V、W和K涂层无取向电工钢新产品的开发 |
| 脱硅渣制取长效硅肥技术研究 | 无铬耐指纹产品的生产工艺研究 |
| 钢渣吸收二氧化碳的基础研究 | 电镀锌无铬磷化、钝化产品的生产工艺研究 |
| RH真空槽炉衬无铬化技术研究 | 无铬自润滑电镀锌产品的生产工艺研究 |
| 宝钢用后含碳耐材再利用的研究 | 宝钢水源生态治理与研究 |
| 焙烧CO ₂ 气体回收及在转炉底吹上的应用研究 -
转炉底吹二氧化碳应用技术研究 | 钢铁企业能耗指标体系研究 |



Major R&D projects of environmental protection in 2004:

- Technological research on NO_x for gas fuel reburning in coal-fired boilers
- Research on raising the proportion of BF gas in low pressure boilers
- Research on the trial technique of co-carbonization of coal and waste plastics
- Smelting research of low MgO slag in blast furnaces
- Research on test for processing the high-temperature performance change of steel slag in converters
- Technical research on long-effective silicon fertilizer made of desilicated slag
- Basic research on CO_2 absorption by steel slag
- Technical research on chromium-free lining of RH vacuum vessel
- Research on the recycling of carbon-containing refractory used in Baosteel
- Application technique research on baking CO_2 recovery and reuse for converter bottom blowing ---- technical research of CO_2 application to converter bottom blowing
- Research on automatic steel-melting model by 2050 heat-reserved heating stove and of C style for cluster of furnaces
- Application research on chromium-free processing for hot galvanized (aluminum-plated) armor plates
- Assessment of Baosteel's galvanized product lifecycle
- Research on application technology of non-hazardous treatment and comprehensive reuse of dangerous waste from cold rolling like chromium 6 and zinc
- Development of new products in non oriented electrical steel with coatings V,W and K which are environmental friendly and Cr.-free.
- Research on production technology of chromium-free and fingerprint-resistant products
- Research on production technology of chromium-free phosphorized and passivated electrogalvanized products
- Research on production technology of chromium-free self-lubricating electrogalvanized products
- Research and control of Baosteel aquatic ecological conditions
- Research on energy consumption index system for steel enterprises

Investment in Environmental Protection

环保投资

宝钢股份一、二、三期环保投资为43.4亿元，占基建总投资的5%，建成大型环保设施316套；其中除尘设施219套，废水处理设施64套，其他环保设施33套。

2004年，重大项目投资70.74亿元，其中环保投资3.83亿元，占年度总投资的5.4%。

2004年，主要环保改造项目投入环保资金9642万元。

2004年宝钢股份主要环保改造项目

Baosteel major revamping projects of environmental protection in 2004

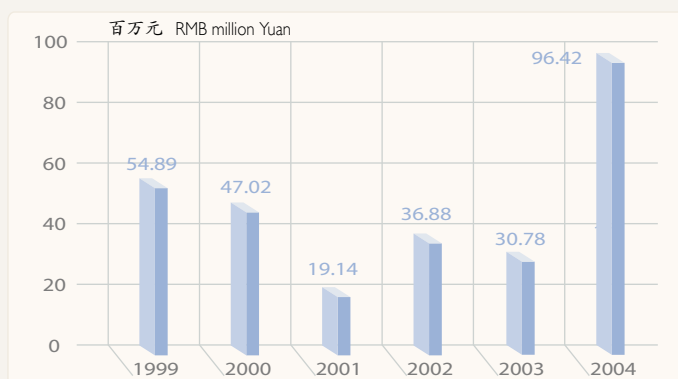
大气环境治理 Air quality control	2DL ESCS本体改造
	1、2DL环境清扫系统改造
	粒铁回收除尘设备改造
	焙烧露天输送原料的皮带机吊紧装置封闭
	二炼钢精炼冷钢切割场扬尘控制
	电炉副原料除尘改造
	混铁车修理站区域增设除尘设施
	炼铁厂焦炉一期装煤车除尘系统改造
	炼铁原烧区域环境综合治理
	2#燃煤发电机组脱硫
水环境治理 Water quality control	二炼钢RH砌筑位砌砖机沉淀改造
	1、2号炉COG煤气集水井改造
	防止港矿扬尘污染调节水质
	2030冷轧废水回用改造
渣治理 Dreg control	电厂输煤设备粉尘治理及排水改造
	固废场增设除尘灰地坪及挡墙
	宝钢固废处置场增设厂区清扫垃圾处置点
	固废物处置场PH值调节装置搬迁
	固废物处置场主干道改造

Baosteel's phase I, II and III investment in environmental protection reaches 4.34 billion yuan, accounting for 5% of the total investment of capital construction. Now 316 large sets of facilities for environmental protection have been completed, including 219 sets for dust-removing, 64 sets for waste water treatment and 33 sets for other purposes.

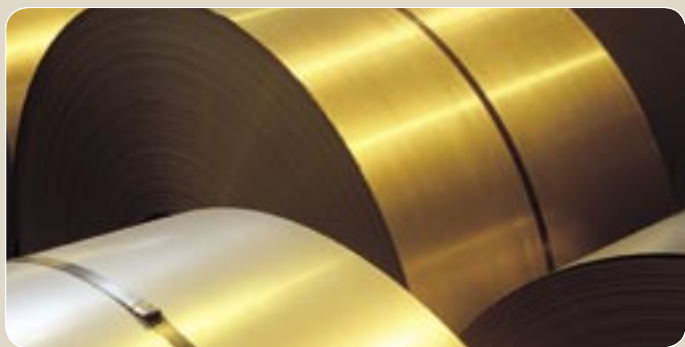
In 2004, 7.074 billion yuan was contributed to major projects, among which 383 million yuan was invested in environmental protection, accounting for 5.4% of the total investment of the year.

In 2004, 96.42 million yuan was invested in major revamping projects of environmental protection.

Revamping 2DL ESCS body
Revamping 2DL environment cleaning system
Revamping dust-removing equipment of iron particle recovery processing
Enclosing suspension equipment of the belt carrier for shipping raw material to the roaster in the open
Dust control in the cutting ground of cold rolled pure steel by No. 2 steelmaking mill
Revamping the dust-collector for raw material in electric furnace
Installing more dust-removing equipment in torpedo tanker repair site
Revamping the dust-removing system for first-phase cokery coal scuttle in iron making factory
Comprehensive control over the environment of puddling zone
De-sulfuring of 2# coal-powered generator unit
Revamping the bricklayer deposition in RH laying spot of No. 2 steelmaking mill
Revamping COG gas and water collecting well of No.1 and No. 2 furnace
Preventing the pollution of ore dust in the wharf and improving water quality
Revamping the recycling equipment for waste water discharged by 2030 cold roller
Dust control for coal carrier and drainage revamping in the power plant
Building more dust-collecting ground and fence wall in solid waste storage and disposal site
Increasing plant rubbish disposal spots in solid waste storage and disposal site
Removing PH value regulating device of the solid waste storage and disposal site
Revamping the trunk road in the solid waste storage and disposal site



常规环保改造项目投资 Investment in Revamping Projects of Regular Environmental Protection



汽车板

使用高强度钢板的汽车可以使用更少的钢材、节约资源，由于重量更轻则可以节约燃料、减少污染物的排放；使用耐腐蚀性能好的钢板，可以延长车体的使用寿命，从而达到节约钢材资源的目的。

宝钢股份先后开发了汽车用热轧高强度钢板、冷轧高强度IF钢、冷轧高强度低合金钢、冷轧TRIP钢、冷轧双相钢、冷轧烘烤钢，开发了采用纯锌、锌铁和锌镍镀层的耐蚀汽车用钢板，近期将开发强度级别更高的钢板。

镀锡板DI材

DI材又称DWI材，即可冲压并变薄拉伸材料。宝钢股份成功开发的镀锡板DI材主要用于取代铝合金DI材制造两片钢罐，由其制造的两片钢罐在野外环境下1年就可降解，是两片铝罐在同样条件下降解速度的10倍。

镀锡板DI材生产能耗低于铝合金DI材，可节约大量能源。由于其强度远高于铝合金DI材，持续减薄、降低成本的空间更大，节约的能源也更多。

非调质塑料模具钢

一般钢厂提供退火态的模具钢，由用户加工成模具后经过热处理才能使用，热处理过程中不仅消耗能源，而且还会造成环境污染。

宝钢股份成功开发了非调质系列塑料模具钢，利用轧后空冷硬化达到所需要的硬度。该系列塑料模具钢硬度从HRC20至HRC42，覆盖了目前常用塑料模具钢的硬度范围，具有模块截面硬度分布均匀，抛光性能和补焊性能良好，易于加工等特点。开模后不经热处理而直接使用，消除了热处理工序对环境造成的污染，而且节约了能源。

耐火耐候钢

建筑钢结构具有自重轻、施工快、强度高、跨度大的优势，但存在两大问题：一是大气环境中的腐蚀，二是发生火灾时钢结构软化失效。

宝钢股份独立开发成功了耐火耐候钢。该钢种具有优异的耐大气腐蚀性能和耐火性能，耐候性是普通钢的两倍以上，耐火极限在四小时以上。该钢种可以大大减少防锈涂装和防火涂装，有些建筑甚至可以不用涂装直接使用。

高压锅炉管产品

宝钢股份T91高压锅炉管主要用于替代进口，制造大容量高参数超临界、超超临界电站锅炉高温过热器和再热器。超临界、超超临界电站锅炉的优点是煤耗比我国平均供电煤耗分别低99g/kWh和138g/kWh，SO₂、NO_x及粉尘排放量可减少至235mg/m³、205mg/m³和31mg/m³，热效率可提高5%以上。



Automobile sheet

By using high strength sheet, the automobile consumes less steel and energy. As lighter in weight, the automobile saves fuel and discharges less pollutants. Corrosion-resistant, the sheet also helps to lengthen automobile's lifecycle and therefore saves steel and energy.

Baosteel has developed hot-rolled high-strength steel plate, cold-rolled high-strength IF steel, cold-rolled high-strength low-alloy steel, cold-rolled TRIP steel, cold-rolled dual-phase steel, cold-rolled baked steel as well as corrosion-resistant automobile steel sheet with zinc, zinc-iron or zinc-nickel coating. Recently it has brought forth steel plate of even higher grade and higher strength.

DI tin-plate

DI plate, also known as DWI (Drawn and Walled Iron), can be thinned and extended by pressing. Baosteel's tinned DI plate is produced to replace aluminum alloy coated DI plate in two-flake steel can manufacturing. The tin made of tinned DI plate can be degraded within one year in the open, ten times faster than that made of aluminum under the same conditions.

DI tin plate production consumes less energy and resources than aluminum alloy DI plate does. As its strength is much higher than the latter, DI tin plate can still be thinned considerably with cost and energy further reduced.

Non-quenched-tempered plastic die steel

As steel plant usually provides anneal die steel, users have to process it into a die with heat treatment, which not only consumes energy but causes pollution.

Baosteel has successfully developed a series of plastic die steel which attains the required strength through air cooling and hardening processing after rolling. The strength of the series varies from HRC20 to HRC42, covering the whole strength range of common plastic die steel. The steel is of even strength in cross section and can be easily polished, welded and processed. When moulded, it can be used directly without heat treatment, therefore saves energy and causes no pollution.

Fire-weather-resistant steel

Construction steel structure is light, easy to construct and of high strength and large span. However, it has two shortcomings: 1) easily corroded in atmospheric condition; 2) easily intenerated in case of fire.

Baosteel has independently developed fire-weather-resistant steel which well stands atmospheric corrosion and is fire-proof. Its weather-resistant power is two times stronger than ordinary steel and refractory limit is over 4 hours. The steel greatly reduces rust-resistant coating and fire-proof coating and even requires no coating in some buildings.

High-pressure boiler pipe

The development of T91 high-pressure boiler pipe by rendered the importation of similar products unnecessary. The pipe can be made into heat-conducting tube and reheating tube of the boiler in the supercritical or ultra-supercritical power plants of large capacity and high parameters. The boilers in supercritical or ultra-supercritical power stations have advantages over average ones in China in that its coal consumption are 99g/kWh and 138g/kWh less than average ones respectively and the discharge of SO_2 , NO_x , dust can be reduced to 235mg/m³, 205mg/m³, 31mg/m³ with an over 5% increase in heat efficiency.

经济型抗腐蚀油套管系列产品

该产品针对占我国油田比例很大的贫油气井所研制。经过近4年的研发，宝钢股份已成功开发出具有独立知识产权的系列抗H₂S和CO₂腐蚀性能的经济型油套管，其抗CO₂腐蚀性能较常规油套管可提高5倍以上。该系列产品在塔里木、江汉、四川等油田得到成功应用。

热镀（铝）锌无铬钝化后处理钢板

热镀（铝）锌钝化钢板作为高附加值的表面处理钢板之一，已被广泛应用于家用电器、AV/OA电器的裸露件，具有优良的耐腐蚀性、加工性。传统的钝化处理是在钢板表面进行铬酸盐（主要成分Cr⁶⁺）处理而成。

宝钢股份2004年启动了“热镀（铝）锌钢板无铬后处理技术的应用研究”，目前完成了1550无铬（不含Cr⁶⁺、Cr³⁺）热镀锌钝化钢板的实验室研究，已开始着手准备机组试生产。

自粘接涂层电工钢

电工钢片多通过焊接或铆接组装成铁芯，而焊接会造成铁芯边部短路、磁特性变差。自粘接涂层电工钢通过冲片、叠片、加压、加热即可获得层间粘接强度很高的铁芯，特别适合于其他固定方式会导致扭曲或刚性不够以及微型电机不便于铆接和焊接的情况，且磁性能损伤少，电机也可以做得更小。

宝钢股份自主开发的水性自粘接涂层电工钢性能稳定，自粘接涂层T-剥离强度从进口产品的3N/mm增加到5~6N/mm，较德国蒂森的溶剂型涂层更环保，技术上更先进，已有产品已向用户供货。

高效电工钢

传统工艺生产的冷轧无取向电工钢，中低牌号产品磁感高铁损也高，高牌号铁损低其磁感也低。而高效电工钢通过成分和工艺的调整优化，解决了传统牌号中出现的铁损和磁感相互矛盾的问题，是一种具有高磁感、低铁损的电工钢材料，满足了高效节能电机和EI变压器的需要。

宝钢股份开发的高效电工钢，在冰箱压缩机、EI铁心和中型电机上使用，均取得了良好效果。

汽车结构件内高压成形技术

减轻结构重量以节约运行中的能量是汽车工业长期追求的目标，也是先进制造技术发展的趋势之一。内高压成形正是适应这种需求开发出来的一种空心变截面轻体构件的先进制造技术，与冲压焊接工艺相比，具有减轻重量、节约材料、减少零件和模具数量、介质可循环使用等优点，被认为是具有良好发展前景的汽车车身绿色制造技术。

宝钢股份目前正联合国内汽车行业和知名院校开展集内高压成形工艺设计、模具开发、样件试制和小批量生产于一体的产业化关键技术攻关和工程化应用平台建设，以推动国内车身制造业在该技术领域的发展。

Economical corrosion-resistant petroleum casing pipe

This product targets at deficient oil and gas wells which account for a great proportion in China's oil field. After four-year effort, Baosteel has developed economical H₂S- and CO₂- resistant casing pipe series which have acquired independent intellectual property right. The CO₂-resistant power is six times as strong as average ones. The product series have been used in oil fields in Tarimu, Jiangnan and Sichuan.

Hot dip (aluminum) galvanized & passivated steel plate

As a high value-added surface treated steel plate, hot-dip (aluminum) galvanized & passivated steel plate is widely used in household appliance, the exposed components of AV and OA electrical appliances. This plate is easy to process and strongly corrosion-resistant. Traditional passivation is done with chromic acid on the surface of the plate (main component: Cr⁶⁺).

In 2004, Baosteel stated "the application research on hot dip galvanized (aluminum) plate chromium-free processing. Now the laboratory research of 1550 chromium-free hot dip galvanized & passivated plate has been completed and trial production of the plate is under way.

Self-adhesive coating electrical steel

Electrical steel sheet is usually assembled into an iron core by welding or riveting. Welding might cause short circuit around the brink of the iron core, thus decreasing its magnetic property. By stamping, piling, pressing and heating, self-adhesive coated electrical steel can be used to produce iron cores with high adhesion between the lays. Such iron cores are especially suitable for motors which might be twisted or not stable enough when fixed by other methods, and also for mini-motors which can not be fixed by riveting or welding. This material causes little magnetic damage and can reduce motor size.

The water based self-adhesive coated electrical steel, independently developed by Baosteel, is stable in property. The split strength of self-adhesive coating T- is 5~6N/mm, as against 3N/mm of the imported product. Compared with German Thyssen solvent coating, our product is more environmental friendly and more technologically advanced. It has been available to users.

Highly effective electrical steel

The medium-and-low grade products of cold rolled non-oriented electrical steel made by traditional technology are of high magnetic susceptibility and therefore are of high iron loss. The highly efficient electrical steel, with its components readjusted and technology optimized, resolves the conflict between iron loss and magnetism susceptibility existing in traditional products. The new product is of high magnetic susceptibility and low iron loss and meets the conditions as required by highly efficient motors and EI transformers.

The highly efficient electrical steel by Baosteel is applied to refrigerator compressors, EI iron cores and medium-sized motors, which proves to be fully satisfactory.

Internal high-pressure shaping for automobile structural member

To reduce structure weight and save energy is a goal that automobile industry has been pursuing for a long time and also one of the targets that advanced manufacturing technology aims at. Internal high-pressure shaping is an advanced manufacturing technology of hollow variable section light-weight structure in answer to the demand; Compared with stamping and welding technology, internal high-pressure shaping boasts such merits as reducing weight, economizing materials, reducing number of parts and moulds and recycling use of medium, etc. It is seen an environmental friendly manufacturing technique for automobile body with good development prospects.

Baosteel is now in cooperation with other domestic auto enterprises and prestigious universities to launch research on key industrialization techniques for the small-scale production that combines internal high-pressure shaping designing, mould development, trial manufacturing of sample, and also to construct engineering application platform so as to promote the development of internal high-pressure shaping in domestic auto industry.



工业旅游

Industrial Tourism

2004年，开展了以“绿色宝钢美丽家园”为主题的都市工业旅游活动，结合社会各阶层游客的需要推出了宝钢可持续发展“科普生态游”和生产工艺考察“宝钢发展之路”，并重新设计了参观线路。

2004年接待参观游客4.83万人，2001年以来累计接待19.15万人。

In 2004, Baosteel launched “green baosteel, our beautiful home” urban industrial tour, and to cater to tourists of different sectors, it redesigned touring routes and offered “science popularization and ecological tour” to show Baosteel’s sustainable development as well as “Baosteel’s development road tour” for those who are interested in production technologies.

In 2004, Baosteel received 48,300 visitors. Since 2001, tourists received totals 191,500.

技术输出

Technology Exportation

传统的钢渣处理工艺残钢回收率低、运行能耗大、污染环境、危险性高、渣利用效率低。宝钢股份1996年开始对此进行研究，1998年6月世界上第一台全新方式的短流程渣处理试验装置在宝钢股份二炼钢投入使用，并在此基础上共提出专利申请16项、技术秘密15项，形成了4个系列适应不同工况条件的新型产品。该技术通过技术贸易方式输出到河北宣钢，2004年上半年已顺利投产。

Traditional slag processing technology has such drawbacks as low scrap recovery rate, high energy consumption in operation, environmental pollution and low slag use rate. In 1996, Baosteel began research on this subject. In June 1998, the first trial equipment for short-flow slag processing in the world was put into operation in Baosteel’s No.2 steelmaking mill, an invention which was awarded 16 patent rights and 15 technical knowhows, and developed 4 series of new products for different working conditions. The technology was exported to Xuanhua Steel plant in Hebei Province by means of technology exportation and was put into operation in 2004.

发布环境质量周报

Weekly Environment Quality Announcement

在《宝钢日报》、宝钢电视台等向社会发布宝钢股份厂区大气环境质量周报。

	质量等级与质量描述					
	总悬浮颗粒		二氧化硫		二氧化氮	
	等级	描述	等级	描述	等级	描述
12月4日	一级	优	一级	优	一级	优
12月5日	二级	良好	二级	良好	二级	良好
12月6日	二级	良好	二级	良好	二级	良好
12月7日	一级	优	二级	良好	一级	优
12月8日	一级	优	一级	优	一级	优
12月9日	一级	优	一级	优	一级	优
12月10日	一级	优	一级	优	一级	优

Both "Baosteel Daily" and Baosteel TV station release report on weekly atmospheric environment quality in the plant.

	Quality Grade and Quality Description					
	Total suspended particle		SO ₂		NO ₂	
	Grade	Description	Grade	Description	Grade	Description
Dec. 4	I	excellent	I	excellent	I	excellent
Dec. 5	II	fine	II	fine	II	fine
Dec. 6	II	fine	II	fine	II	fine
Dec. 7	I	excellent	II	fine	I	excellent
Dec. 8	I	excellent	I	excellent	I	excellent
Dec. 9	I	excellent	I	excellent	I	excellent
Dec. 10	I	excellent	I	excellent	I	excellent

1998年1月
通过华夏审核中心
ISO14001环境管理体系认证

1998年6月
通过英国UKAS认证

2000年5月
被评为1998~1999年度上海
环境保护先进集体

2001年5月
通过ISO14001首次换证审核

2001年11月
被上海市经济委员会评为上
海市资源节约综合利用十佳
企业

1998

2000

2001

January 1998
passed the ISO14001 certification
of environmental management
system by Huaxia Certification
Center

June 1998
passed UKAS certification

May 2000
awarded the title "1998~1999
outstanding unit for
environmental protection in
Shanghai"

May 2001
passed the first verification for
ISO14001 certificate renewal

November 2001
listed among "Shanghai top
ten enterprises for resource
conservation and comprehensive
use" by Shanghai Economic
Commission



2002年5月

宝钢股份成为上海市首批获得“国家节水标志”使用权的企业

2002年10月

宝钢股份作为上海都市工业观光的唯一旅游景点向社会开放，并正式入围全国工业旅游示范点

2003年4月

被中国钢铁工业协会评为全国重点钢铁企业环境保护先进单位

2003年9月

1550冷轧带钢工程获“国家环境保护百佳工程”称号

2004年6月

被上海市环境保护局和上海市人事局评为2002~2003年度上海市环境保护先进集体

2004年6月

英国标准协会对宝钢股份综合管理体系进行首次审核，宝钢股份质量、职业健康安全 and 环境管理体系等均顺利通过认证

2004年6月

首次向社会公开发布环境报告

2004年9月

被全国冶金绿化委员会评为全国冶金绿化先进单位

2004年3月

被国家环境保护总局评为全国环境保护先进企业

2004年5月

在青岛举行的第二届中国国际专利与名牌博览会上，宝钢股份“短流程渣处理技术”获得金奖

2004年11月

“短流程渣处理技术”在德国纽伦堡举行的“新思维、新发明、新技术”国际展览会上获得金奖

2002

May 2002

listed among the first group enterprises in Shanghai entitled to use "state water saving emblem"

October 2002

opened to the public as the sole tourist site for urban industrial tourism in Shanghai, and was officially on the short list of Model Spot for National Industrial Tourism

2003

April 2003

awarded the title "outstanding key metallurgic enterprise for environmental protection on state level" by China Iron & Steel Industry Association

September 2003

1550 cold rolling strip steel project won the title "top 100 projects for environmental protection on state level"

2004

June 2004

awarded the title "2002~2003 model unit for environmental protection in Shanghai" by Shanghai Environmental Protection Bureau and Shanghai Personnel Bureau.

June 2004

BSI inspected Baosteel's comprehensive management systems and the quality, occupational health & safety and environment management systems all passed certification

June 2004

released the environmental report to the public for the first time

September 2004

awarded the title "state outstanding unit for greening in metallurgical industry" by National Greening Committee in Metallurgical Industry.

March 2004

awarded the title "state model enterprise for environmental protection" by China Administration of Environmental Protection.

May 2004

Baosteel's "short-flow slag processing technology" won gold prize at 2nd International Patent and Famous Brand Exposition of China held in Qindao

November 2004

"short-flow slag processing technology" was awarded gold prize in "Ideas, Inventions, New Products Exhibition" held in Nuremberg, Germany.



宝山钢铁股份有限公司
BAOSHAN IRON & STEEL CO., LTD.