



2024

中国宝武钢铁集团有限公司

China Baowu Steel Group Corporation Limited

绿色低碳发展报告

Green and Low-Carbon
Development Report



“碳”路先锋
“绿”动未来

Carbon Trailblazers
Green the Future

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A Compilation of Outstanding Green and Low-Carbon Cases in 2024

卷首语 Preface

2024 年，全球形势复杂多变，经济全球化与逆全球化激烈博弈，地缘政治的紧张局势不断加剧，全球经济环境正经历深刻变革。面对严峻复杂的竞争环境和行业长周期下行趋势，中国宝武作为全球最大钢铁企业，以“共建钢铁生态圈，共创绿色新未来”为使命，深刻研判全球政治经济动态与钢铁行业发展趋势，勇担绿色低碳转型重任，勇当“碳”路先锋，以高端化、智能化、绿色化、高效化为发展方向，抢抓发展新机遇，重塑“碳绿”新模式。

In 2024, the world faced mounting complexity and volatility as the push and pull between globalization and anti-globalization intensified, geopolitical tensions escalated, and the global economic landscape underwent significant transformation. Amid this challenging and competitive environment, and a sustained downturn in the steel industry—China Baowu, the world's largest steelmaker, has remained firmly committed to its mission to "jointly build a steel ecosystem and create a new green future". With a keen understanding of evolving global political and economic dynamics, as well as steel industry trends, the Group bravely undertakes the pivotal responsibility of green and low-carbon transformation and serves as a trailblazer on the path to decarbonization. By pursuing a development strategy focused on high-end, intelligent, green, and high-efficiency principles, China Baowu is actively capitalizing on emerging development opportunities and forging a new "carbon-green" model.

我们以产品创新驱动高端化，发布低碳品牌 BeyondECO 及首批低碳排放钢产品，低碳无取向硅钢和低碳取向硅钢均较原常规路径减碳超 30%。我们以数实融合驱动智能化，自主研发的钢铁行业大模型产品——“宝联登钢铁行业大模型”首发，为钢铁企业提供“人工智能+钢铁”解决方案。我们以低碳冶金驱动绿色化，全面推进以富氢碳循环氧气高炉技术（HyCROF）和氢冶金电熔炼工艺（HyRESP）为重点的低碳冶金工艺技术创新和商业化应用，富氢碳循环氧气高炉技术（HyCROF）荣获世界钢铁协会第 15 届“Steelie 奖”低碳生产卓越成就奖，首套百万吨级氢基竖炉顺利通过周达产功能考核。我们以整合协同驱动高效化，探索“无废集团”建设试点模式，扎实推进以能效标杆创建为核心的“极致能效”工程，构建碳排放“双控”制度体系，坚持高站位谋划、高标准推进、高质量落实各项工作。

We are driving high-end development through product innovation. With the launch of our low-carbon brand, BeyondECO, and the release of our first low-carbon steel products, both our low-carbon non-oriented and oriented silicon steel have achieved over 30% carbon emissions reduction compared to conventional production routes. We are accelerating intelligent development by integrating digital technologies with the real economy. Our independently developed large-scale AI solution for the steel industry—"xIn³Plat Steel Industry Large Model"—has been officially launched, offering an integrated "AI + Steel" solution tailored to the sector. We are advancing green development through innovation in low-carbon metallurgy, making significant strides in technological innovation and commercialization of low-carbon metallurgical processes. Key breakthroughs include the hydrogen-enriched carbonic oxide recycling oxygenate furnace (HyCROF) and the hydrogen reduction and electric smelting process (HyRESP). Notably, HyCROF was recognized with the 15th Steelie Awards from the World Steel Association for excellence in low-carbon steel production. In parallel, China's first million-metric-ton-class hydrogen-based shaft furnace successfully passed its weekly capacity performance evaluation. We are promoting high-efficiency development through integrated and synergistic coordination. We have pioneered the "Waste Free Group" pilot program and steadily advanced the "Energy Efficiency Maximization" project, which is focused on establishing energy efficiency benchmarks, and put in place a system for total carbon emissions and carbon emissions intensity control. All efforts are planned from a strategic perspective, implemented to high standards, and executed with a focus on high-quality outcomes.

面向长远，我们将锚定生态文明建设航向，以战略定力夯实绿色发展根基，以创新赋能培育转型新动能，前瞻布局技术革命与产业变革交汇机遇，系统性构建低碳发展长效机制。通过战略引领与价值创造双轮驱动，持续完善可持续发展治理体系，全面提升绿色竞争力与行业引领力，以“碳”路先锋的实践为钢铁工业绿色低碳转型提供“宝武范本”，以“绿”动未来的决心为构建人与自然和谐共生的现代化产业体系贡献“宝武方案”。

Looking ahead, we will remain firmly committed to advancing ecological progress, reinforcing the foundation for green development with strategic resolve, driving innovation to foster new engines of transformation, and actively positioning ourselves at the forefront of the technological revolution and industrial transformation. With these efforts, we aim to systematically establish a long-term framework for low-carbon development. Driven by both strategic vision and value creation, we will continue to improve our sustainability governance system and strengthen our green competitiveness, ultimately our leadership within the industry. Through trailblazing practices in carbon reduction, China Baowu is working to build a "Baowu Model" for the steel industry's green and low-carbon transformation. With unwavering commitment to green the future, we also seek to deliver "Baowu's solution" that contributes to the development of a modern industrial system founded on harmony between humanity and nature.



关于我们

About Us

中国宝武钢铁集团有限公司（以下简称“中国宝武”“宝武”“宝武集团”“集团公司”或“我们”）是国有重要骨干企业，总部位于上海。2022年6月，正式转为国有资本投资公司；2024年11月，进入世界一流企业方阵。在2024年《财富》世界500强排行榜中，连续三年排名第44位，继续位居全球钢铁企业首位。

China Baowu Steel Group Corporation Limited (hereinafter referred to as "China Baowu", "Baowu", "the Group" or "we") is a key state-owned enterprise (SOE), headquartered in Shanghai. In June 2022, it officially transitioned into a state-owned capital investment company. In November 2024, it was recognized as one of the ten central SOEs to successfully reach world-class enterprises status. Ranked 44th on the 2024 *Fortune* Global 500 for the third consecutive year, China Baowu continues to lead the global steel industry.

2024 年，中国宝武 Key Figures for China Baowu in 2024



公司定位 Company Positioning

钢铁及轻金属材料综合解决方案提供者
A comprehensive solution provider for steel and light metal materials

产业组合 Industrial Portfolio

“1+3+2” 产业体系 "1+3+2" Industrial System

- 一个核心产业：钢铁制造业
One core industry: Steel manufacturing
- 三个协同产业：绿色资源业、先进材料业、智慧服务业
Three synergistic industries: Green resources, advanced materials, intelligent services
- 两个支撑产业：产业不动产、产业金融业
Two supporting industries: Industrial real estate, industrial finance

绿色成效 Green Achievements

2024 年，集团公司全面完成中央企业 2022—2024 年任期目标和集团公司《节能减碳环保目标责任书》各项目标和任务，助力美丽中国建设。

In 2024, the Group met all performance targets set for central SOEs under the 2022-2024 term and fulfilled the full scope of objectives outlined in the *Letter of Responsibility on Energy Conservation and Environmental Protection Targets*, contributing to the national vision of building a Beautiful China.

绿色低碳

Green and Low-Carbon Development

- 全面推进以 **HyCROF** 和 **HyRESP** 为重点的低碳冶金工艺技术创新和商业化应用。

The Group made significant progress in the innovation and commercialization of low-carbon metallurgical technologies, focusing on the hydrogen-enriched carbonic oxide recycling oxygenate furnace (**HyCROF**) and the hydrogen reduction and electric smelting process (**HyRESP**) systems.

- “HyCROF 商业示范项目” 荣膺**世界钢铁协会**第 15 届 **“Steelie 奖”** 低碳生产卓越成就奖。

The "HyCROF commercial demonstration project", developed by China Baowu, received the 15th **"Steelie Awards"** from the **World Steel Association** for excellence in low-carbon steel production.

- 发布宝武低碳品牌 **BeyondECO** 授权的 **6 类** 低碳排放产品。

Six categories of low-carbon products were launched under Baowu's low-carbon brand, **BeyondECO**.

- **31 家** 法人企业纳入全国和地方**碳排放权交易**市场，历年均 **100% 履约**。

A total of **31** legal entities participated in national and regional **carbon emissions trading** markets, achieving **100% compliance** annually.



节能环保

Energy Conservation and Environmental Protection

- 环保总投资约 **45.77 亿元**，节能技改总投资约 **28.13 亿元**。

The Group invested approximately **RMB 4.577 billion** in environmental protection and approximately **RMB 2.813 billion** in energy conservation technology upgrades.

- 推进以能效标杆创建为核心的“极致能效”工程，**7 家企业**完成中国钢铁工业协会“双碳最佳实践能效标杆示范”公示或现场验收。

The Group advanced the "Energy Efficiency Maximization" project, which focused on establishing energy efficiency benchmarks. **Seven affiliated enterprises** completed either public disclosure or on-site acceptance under the "Best Practice of Carbon Peaking and Carbon Neutrality Goals—Energy Efficiency Benchmark Demonstration" by the China Iron and Steel Association (CISA).

- 钢铁企业重点工序能效达标产能占比**超 40%**。

Over 40% of production capacity in key steelmaking processes across its steel enterprises achieved benchmark-level energy efficiency.

- 宝钢股份湛江钢铁、中南钢铁鄂城钢铁荣获工业和信息化部重点用水企业 **“水效领跑者”** 称号。

Baosteel Zhanjiang Iron & Steel and Zhongnan Iron & Steel's Echeng Iron & Steel were named **"Water Efficiency Leaders"** by the Ministry of Industry and Information Technology (MIIT) among major water-consuming enterprises.

- 巩固污染治理成效，完成全过程超低排放改造的钢铁产能**超亿吨**。

The Group strengthened pollution control, completing full-process ultra-low emission upgrades across **over 100 million metric tons** of steel production capacity.

- **“无废集团”** 相关试点单位**全面完成**任务目标。

All designated entities under the **"Waste Free Group"** pilot program **met** their assigned goals and performance targets.

绿色产业

Green Industries

- 全年可再生能源利用量**超 70 亿千瓦时**，绿电交易量 **22 亿千瓦时**。

The Group's annual renewable energy usage **exceeded 70 TWh**, with **22 TWh** traded through green electricity markets.

- 自主研发的钢铁行业大模型产品 **“宝联登钢铁行业大模型”** 实现**首发**。

The Group **launched** the **"xin³Plat Steel Industry Large Model"** for the **first time**, an independently developed large-scale AI solution for the steel industry.

绿色生态圈

Green Ecosystem

- 建设并运维的**钢铁全产业链 EPD 平台**已累计发布 **219 份** EPD 报告，平台注册用户**超 6,000 家**，EPD 报告下载次数**超 50,000 次**。

The Group has developed, operated, and maintained an **environmental product declaration (EPD) platform covering the entire steel industry chain**. To date, the platform has published **219** EPD reports, attracted **over 6,000** registered users, and recorded **more than 50,000** EPD report downloads.

- 承建 **“绿色低碳供应链公共服务平台”**，参与发起**中国供应商 ESG 评级平台**。

The Group led the establishment of a **"public service platform for green and low-carbon supply chains"** and co-initiated a **platform for rating Chinese suppliers' environmental, social, and governance (ESG) performance**.

我们的绿色低碳战略

Our Green and Low-Carbon Strategy

01

新征程上，必须把美丽中国建设摆在强国建设、民族复兴的突出位置，保持加强生态文明建设的战略定力，坚定不移走生产发展、生活富裕、生态良好的文明发展道路，建设天蓝、地绿、水清的美好家园。

——2024年1月11日，中国政府发布《关于全面推进美丽中国建设的意见》

As we embark on the new journey ahead, we must place the building of a Beautiful China in a prominent position of building a great modern socialist country in all respects and rejuvenating the nation. Efforts should be made to maintain strategic resolve in advancing ecological progress and resolutely pursue a model of sound development featuring improved production, higher living standards, and healthy ecosystems. Through these efforts, we endeavor to build a beautiful homeland with blue skies, green lands, and clear waters.

——Excerpt from the *Guidelines to Comprehensively Promote the Development of a Beautiful China*, issued by Chinese Government on January 11, 2024

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指标与目标
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Objectives

中国宝武深入贯彻落实习近平主席对中国宝武“双碳”工作作出的重要批示精神，以“第一议题”等形式学习贯彻《中共中央 国务院关于全面推进美丽中国建设的意见》《习近平主席在“全面推动黄河流域生态保护和高质量发展座谈会”上的重要讲话精神》等，坚定不移贯彻落实中国政府有关美丽中国建设的重大决策部署，切实推进绿色低碳发展，增强适应气候变化的能力，努力成为行业可持续发展的引领者。

China Baowu is fully committed to implementing President Xi Jinping's key directives on the Group's carbon peaking and carbon neutrality efforts. Leveraging mechanisms such as the "First Topic" system, the Group studies and puts into practice key national policies, including the *Guidelines by the CPC Central Committee and the State Council to Comprehensively Promote the Development of a Beautiful China* and *Guiding Principles of President Xi Jinping's Important Speech at the "Symposium on Comprehensively Advancing the Ecological Protection and High-Quality Development of the Yellow River Basin"*. By resolutely implementing the major decisions of Beautiful China initiative by Chinese Government, the Group is actively advancing green and low-carbon development, strengthening climate resilience, and striving to become a global leader for sustainable development in the steel industry.



治理架构

Governance Structure

中国宝武严格落实“第一议题”学习制度，将习近平主席关于绿色低碳发展的重要指示批示精神转化为治理实践。在治理架构上，建立碳中和工作推进体制，加强顶层设计和组织领导，将绿色低碳相关议题纳入董事会的工作范围中。董事会战略与投资委员会等专业委员会负责审议长期发展战略规划，就中国宝武的战略定位、产业布局等向董事会提出建议。

China Baowu upholds the "First Topic" learning system as a core governance practice, translating the guiding principles of President Xi Jinping's important instructions and key directives on green and low-carbon development into concrete and actionable measures. A dedicated governance framework for advancing carbon neutrality has been established to strengthen top-level design and organizational leadership, integrating green and low-carbon initiatives into the Board of Directors' responsibilities, with specialized committees—such as the Strategy and Investment Committee—tasked with reviewing long-term strategic development plans and advising the Board on the China Baowu's strategic positioning and industrial planning.

治理架构 Governance Structure

负责机构 Responsible Body

工作职责 Responsibilities

董事会

Board of Directors



董事会及各专门委员会

Board of Directors and all specialized committees

战略与投资委员会、审计与风险委员会等专业委员会负责对中国宝武中长期发展战略规划进行研究并提出建议；审查中国宝武年度经营计划、投资计划并提出建议；负责检查指导全面风险管理体系的有效运行；审查全面风险管理年度工作计划和年度报告、风险管理策略和重大风险管理解决方案、合规管理战略规划、基本制度和年度报告等；审查应由董事会决定的相关事项等。

Specialized committees, such as the Strategy and Investment Committee and the Audit and Risk Committee, are tasked with researching and providing recommendations on China Baowu's medium- and long-term strategic development plans; reviewing China Baowu's annual business and investment plans and offering suggestions for improvement; overseeing and guiding the operation of the comprehensive risk management system; reviewing key oversight matters including the annual work plan and report for comprehensive risk management, risk management strategies and major risk management solutions, compliance management strategic planning, as well as foundational systems and annual report, etc; and reviewing relevant matters that require a decision by the Board of Directors, etc.



政策制度

Policies and Systems

中国宝武深化气候变化相关政策制度建设，制修订《碳达峰碳中和管理办法》《能源环保管理办法》等相关制度，完善绿色低碳制度体系，为系统推进绿色发展相关工作构建扎实制度保障。

China Baowu is steadily strengthening its policies and systems to address climate change. This includes formulating and revising key regulations such as the *Management Measures for Achieving Carbon Peaking and Carbon Neutrality* and the *Management Measures for Energy and Environmental Protection*. These efforts improve the green and low-carbon systems and provide a solid foundation for systematic advancement of green development across the organization.

《碳达峰碳中和管理办法》

Management Measures for Achieving Carbon Peaking and Carbon Neutrality

系统化、规范化推进碳达峰碳中和工作，建立高效协同的碳达峰碳中和管理推进体系，定期召开碳中和推进委员会会议、工作例会等，研究、决策、检查及推进绿色低碳发展重点工作，积极推动子公司加强碳减排数据管理、碳减排项目管理、碳排放交易管理及碳排放绩效管理工作，将下属企业吨钢碳排放和万元产值碳排放纳入责任书考核，促进全面绿色低碳转型发展。

The Measures provide a structured, standardized framework to guide the Group's carbon peaking and carbon neutrality efforts. They emphasize the importance of establishing an efficient and collaborative framework for managing and advancing carbon peaking and carbon neutrality efforts, and call for regular meetings of the Carbon Neutrality Promotion Committee, along with routine work sessions, to deliberate, decide on, review, and advance key green and low-carbon initiatives. Subsidiaries are encouraged to strengthen their carbon emissions management practices, covering data collection, project execution, carbon emissions trading, and performance tracking. Metrics such as carbon emissions per metric ton of steel and per RMB 10,000 of output are incorporated into accountability assessments to support transition toward green and low-carbon development.

《能源环保管理办法》

Management Measures for Energy and Environmental Protection

依法依规落实法人主体责任，系统地对能源环保管理责任制度、合规性管理、检查评价等作了明确要求，以进一步提升集团公司适应绿色转型升级的能源环保管理能力，实现与能源资源约束和环境承载力相适应、与环境保护相协调的高质量可持续发展。

The Measures mandate that all legal entities fulfill their primary responsibilities in accordance with relevant laws and regulations. The document sets out clear requirements for establishing energy and environmental protection management accountability systems, ensuring regulatory compliance, and conducting inspections and evaluations. These actions aim to further enhance the Group's capacity for energy and environmental protection and management in support of its green transition and upgrading efforts, and to drive high-quality, sustainable development that aligns with energy and resource constraints, environmental carrying capacity, and long-term environmental protection goals.

行动战略

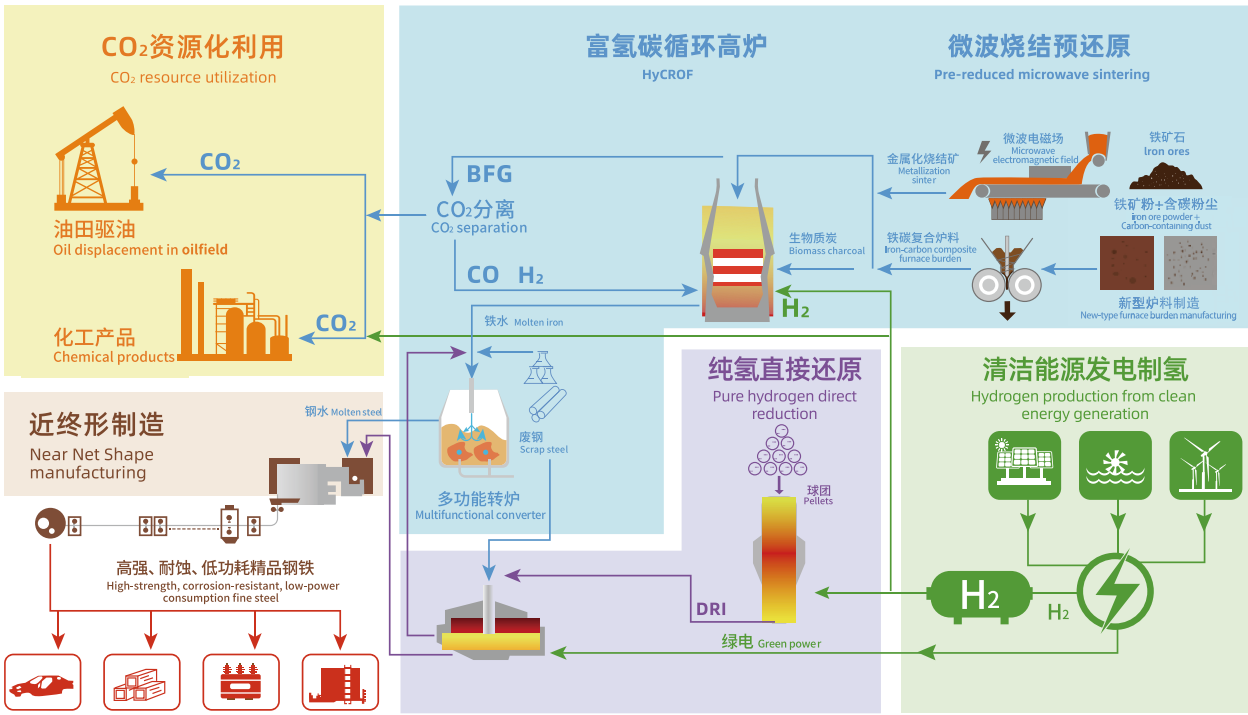
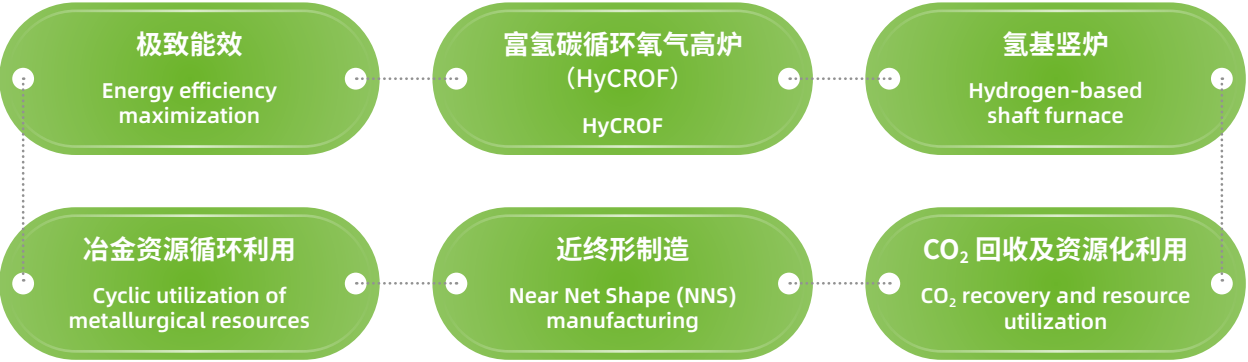
Action Strategies

中国宝武坚决贯彻落实习近平主席重要指示批示精神，积极承担推动钢铁业绿色低碳转型的重任，勇当新型低碳冶金现代产业链链长，多措并举应对气候变化带来的风险和机遇，持续完善“3+1”绿色低碳布局，加强低碳工艺技术研发、绿色低碳钢标准完善和低碳产品开发、绿色低碳能源资源布局，以及碳资产管理、碳金融服务；严格能效约束，创建能效标杆示范，持续提高能源使用效率，推进能耗双控向碳排放双控转型；实施钢铁企业全流程超低排放改造和“无废集团”试点建设，提高资源综合利用水平，为实现“双碳”目标、应对气候变化奠定坚实基础，在世界钢铁行业树立标杆形象。

China Baowu remains committed to implementing the guiding principles of President Xi Jinping's important instructions and key directives, and actively advancing the green and low-carbon transformation of the steel industry. As a bellwether in the modern industry chain of new-type, low-carbon metallurgy, the Group has adopted a holistic approach to addressing the risks and opportunities brought about by climate change. It has continued to refine its "3+1" green and low-carbon strategic framework, with a focus on the research and development (R&D) of low-carbon technologies and processes, the improvement of green and low-carbon steel standards, and the development of low-carbon products. It has also intensified efforts in optimizing green and low-carbon energy and resource allocation, as well as enhancing carbon asset management and carbon finance services. In addition, the Group has enforced strict energy efficiency measures and launched energy efficiency benchmark demonstration projects to continuously improve energy utilization efficiency, facilitating a shift from controlling for total energy consumption and energy intensity to controlling for total carbon emissions and carbon emissions intensity. At the operational level, the Group has carried out full-process ultra-low emission upgrades across its steel enterprises and initiated the "Waste Free Group" pilot program to improve comprehensive resource utilization. Together, these initiatives lay a solid foundation for achieving carbon peaking and carbon neutrality and addressing climate change, positioning the Group as a global benchmark in the steel industry.

六大技术路径

Six Major Technological Evolution Paths



中国宝武碳中和冶金技术路线图
China Baowu Metallurgical Technology Roadmap Toward Carbon Neutrality

中国宝武“无废集团”试点建设

China Baowu's "Waste Free Group" Pilot Program

2024 年以来，中国宝武以习近平新时代中国特色社会主义思想为指导，按照生态环境部正式批复的《中国宝武“无废集团”建设试点工作方案》要求，坚持精准治污、科学治污、依法治污，在持续深入推进中国宝武“固废不出厂”基础上，探索“无废集团”创新模式，发挥冶金炉窑利用处置固体废物减污降碳协同效应，助力“无废城市”建设，为深入打好污染防治攻坚战、推动实现碳达峰碳中和、建设美丽中国作出贡献。

Since 2024, China Baowu has actively advanced its "Waste Free Group" pilot program under the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. In strict accordance with the *China Baowu Pilot Work Plan for Building a "Waste Free Group"*, officially approved by the Ministry of Ecology and Environment, the Group remains committed to targeted, science-based, and lawful pollution control, deepening the "no solid waste leaving the factory" initiative across its operations while actively exploring innovative models for building a "Waste Free Group". By leveraging metallurgical kilns and furnaces for the use and disposal of solid waste, it also achieves the synergy between pollution and carbon reduction. These efforts support the development of "zero waste cities", contributing to the country's critical battle against pollution, the advancement of carbon peaking and carbon neutrality goals, and the construction of a Beautiful China.

指标与目标

Indicators and Objectives

2021 年 1 月，中国宝武在钢铁行业率先发布碳达峰碳中和的路线图、时间表，力争 2050 年实现碳中和。

In January 2021, China Baowu became the first in the steel industry to announce a roadmap and timeline for carbon peaking and carbon neutrality, with a goal of achieving carbon neutrality by 2050.

中国宝武近中期碳减排目标

China Baowu's near- and medium-term decarbonization objectives

2025 年具备减碳 30% 工艺技术能力，2035 年力争减碳 30%。

To develop process technologies necessary to achieve a 30% reduction in carbon emissions by 2025 and to accomplish a 30% reduction in carbon emissions by 2035.



碳减排阶段进展

Phased Progress in Carbon Emissions Reduction

技术路径

Technological Pathways

碳减排主要措施

Key Measures in Carbon Emissions Reduction

阶段成果

Phased Outcomes

极致能效

Energy efficiency maximization

积极参与中国钢铁工业协会《钢铁企业重点工序能效标杆对标指南》《钢铁企业重点工序能效标杆评估规范》等标准的编制。

Actively participating in the formulation of group standards led by CISA, including the *Guidelines for Energy Efficiency Benchmarking of Key Process for Steel Plants* and the *Specification for Evaluation of Energy Efficiency Benchmark of Major Individual Process of Iron and Steel Enterprise(s)*.

持续开展极致能效技术推广应用。

Continuously promoting the application of energy efficiency maximization technologies.

组织各钢铁基地积极开展能效标杆创建，充分利用集团各专业团队及专家力量，交叉开展内部预评估，夯实基础管理、提升数据质量、规范示范创建。

All steel production bases were encouraged to set their own energy efficiency benchmarks. Drawing on the Group's specialized teams and technical expert resources, internal cross-site pre-assessments were carried out to strengthen foundational management, improve data quality, and standardize demonstration practices.

宝钢股份湛江钢铁、宝山基地、武钢有限完成能效标杆示范企业公示，马钢股份、梅山钢铁、太钢不锈、新钢集团完成能效标杆示范工序 / 设备公示。

Baosteel Zhanjiang Iron & Steel, Baoshan Base, and Wuhan Iron & Steel publicly disclosed their status as energy efficiency benchmark demonstrations; Masteel, Shanghai Meishan Iron & Steel, Shanxi Taigang Stainless Steel, and Xisteel completed public disclosure for energy efficiency benchmark demonstrations for specific processes or equipment.

截至 2024 年，钢铁企业重点工序能效达标产能占比超过 40%，充分体现了国资央企的绿色示范引领作用。

By 2024, over 40% of production capacity in key steelmaking processes across its steel enterprises had achieved benchmark-level energy efficiency, demonstrating the Group's leadership and model role in advancing green transformation as a central SOE.

梳理“十四五”以来国家颁布的相关政策，编制发布《钢铁行业节能减碳政策汇编（2024 版）》。

The *Compilation of Energy Conservation and Carbon Reduction Policies for the Steel Industry (2024)* was published, consolidating relevant national policy developments since the start of the 14th Five-Year Plan period.

开展外部技术寻源和内部优秀案例发掘，迭代更新发布《中国宝武极致能效技术推荐目录（2024）》。

Both external technology sources and internal best practices were identified, culminating in the release of the updated *China Baowu Catalogue of Recommended Energy Efficiency Maximization Technologies (2024)*.

技术路径 Technological Pathways	碳减排主要措施 Key Measures in Carbon Emissions Reduction	阶段成果 Phased Outcomes
极致能效 Energy efficiency maximization	持续开展极致能效技术推广应用。 Continuously promoting the application of energy efficiency maximization technologies.	■ 持续开展集团内横向对标，通过组织极致能效技术交流研讨，加大极致能效技术推广应用，促进能效标杆创建。 Ongoing horizontal benchmarking within the Group and internal technical seminars on energy efficiency maximization technologies facilitated the promotion and application of such technologies and supported the development of internal benchmarks for energy efficiency.
富氢碳循环氧气高炉 (HyCROF) HyCROF	持续推进八钢公司 2,500 立方米富氢碳循环氧气高炉 (HyCROF) 技术商业化进程。 Advancing the commercialization of Bayi Iron & Steel's 2,500 m³ HyCROF technology.	■ 2,500 立方米富氢碳循环氧气高炉切换 HyCROF 工艺后，铁水质量可控，炉况基本顺行，验证了大中型高炉采用 HyCROF 技术可行。 After transitioning to the HyCROF process, the 2,500 m³ blast furnace consistently produced hot metal of stable quality and reliable operation, demonstrating the technology's viability for applications in medium- and large-scale blast furnaces.
氢基竖炉 Hydrogen-based shaft furnace	加快推进湛江钢铁氢还原电熔炼工艺 (HyRESP) 技术项目建设。 Accelerating progress on Zhanjiang Iron & Steel's HyRESP technology project.	■ 2024 年先后完成四次工业试验和周达产功能考核，优于周达产功能考核的所有预期目标，验证了氢基竖炉长时间满负荷稳定生产的技术可行性。 In 2024, four industrial-scale trials and a weekly capacity performance evaluation were completed for the HyRESP project. All results exceeded expectations, validating the long-term, full-capacity, and stable operational feasibility of the hydrogen-based shaft furnace.
冶金资源循环利用 Cyclic utilization of metallurgical resources	充分利用含铁含碳固废、钢铁循环材料和有机生物质资源。 Maximizing the utilization of iron- and carbon-containing solid waste, recycled steel materials, and organic biomass resources.	■ 宝钢股份牵头的“大宗钢渣固废高效低碳制备高等级沥青路面材料及应用关键技术”项目荣获 2023 年度上海市技术发明奖一等奖。 The project "Key Technology for High-Efficiency and Low-Carbon Preparation of High-Grade Asphalt Pavement Materials from Bulk Steel Slag Solid Waste and Its Engineering Application", led by Baosteel, won the First Prize of the Technological Invention Award under the 2023 Shanghai Science and Technology Awards. ■ 宝武水务参与的中国科学院“无机非金属废水处理与资源回收技术及应用”项目荣获国家技术发明奖二等奖。 The project "Inorganic Non-Metallic Wastewater Treatment and Resource Recovery Technology and Application" by the Chinese Academy of Sciences, with participation from Baowu Water Technology, received the Second Prize of the State Technological Invention Award under the State Science and Technology Awards.

近终形制造 Near Net Shape (NNS) manufacturing	持续推进连铸连轧一体化工艺技术。 Continuously advancing integrated continuous casting and rolling technologies.	■ 宝武携手山西宏达钢铁集团共同推进的国内首个国产化铸轧一体式薄带铸轧项目开工建设。薄带铸轧工艺技术具有流程短、能耗低、排放少等优势，其吨钢能耗仅为常规热连轧的五分之一，二氧化碳排放仅为常规热连轧的四分之一。 Baowu, in partnership with Shanxi Hongda Iron & Steel Co., Ltd. , began construction of China's first domestically developed integrated thin-strip casting and rolling project. The thin-strip casting and rolling technology features advantages including a shorter process, lower energy consumption, and reduced carbon emissions—consuming only one-fifth the energy and emitting just one-fourth the carbon dioxide per metric ton of steel compared to traditional hot rolling methods. ■ 宝武连铸方坯免加热直接轧制首条实现量产产线诞生。 Baowu launched the first mass production line capable of directly rolling continuously cast billets without reheating. ■ 中南股份板坯智能一键浇钢系统热试成功，入选工业和信息化部 2024 年实数融合典型案例。 Guangdong Zhongnan Iron & Steel's slab intelligent one-click casting system passed thermal testing and was recognized by MIIT as a 2024 Representative Case of Digital Technology Integration with the Real Economy.
CO₂ 回收及资源化利用 CO₂ recovery and resource utilization	拓展 CO₂ 捕集资源化利用。 Expanding efforts in CO₂ capture and resource utilization.	■ 建成 CCUS 实验研究平台，开发 CO₂ 碳酸化与合成甲醇技术，拓展钢渣矿化和废水 CO₂ 资源化应用的前景，推进模块化千吨级中试平台建设。 An experimental research platform for carbon capture, utilization, and storage (CCUS) technology was established, CO₂ carbonation and methanol synthesis technologies were developed, and progress was made in steel slag mineralization and CO₂ recovery from wastewater. A modular, 1,000-metric-ton-scale pilot plant test platform is also under development. ■ 完成 CO₂ 膜分离试验平台设计，推进氢能与碳资源结合应用新方向。 A CO₂ membrane separation pilot platform was designed, and applications integrating hydrogen energy and carbon resources were explored.

“无废集团”建设进展 Progress Toward Building a "Waste Free Group"		
Key Measures 主要措施	全面推进“无废集团”建设试点工作。 Comprehensively implementing the "Waste Free Group" pilot program.	Phased Outcomes 阶段成果 “无废集团”相关试点单位全面完成了长流程钢铁企业一般工业固体废物产生强度不高于 0.68 吨 / 吨钢（不锈钢企业除外）、一般工业固体废物综合利用率大于 98% 的任务目标。 All designated entities under the "Waste Free Group" pilot program met their assigned goals and performance targets, including maintaining general industrial solid waste intensity for long-process steel production (excluding stainless steel enterprise) below 0.68 metric tons per metric ton of steel, and achieving a comprehensive utilization rate of over 98% for general industrial solid waste.

我们的绿色低碳足迹

Our Green and Low-Carbon Footprint

02

中国宝武勇当新型绿色低碳冶金现代产业链链长，在绿色制造、绿色产品、绿色产业、绿色运营、绿色生态圈等方面持续发力，为全球钢铁行业低碳转型提供宝贵经验，为建设美好生态环境和实现可持续发展贡献力量。

As a bellwether in the modern industry chain of new-type, low-carbon metallurgy, China Baowu has made sustained efforts in promoting green manufacturing, green products, green industries, green operations, and a green ecosystem. The Group endeavors to contribute valuable experience to the global steel industry's low-carbon transformation and plays an active role in supporting ecological environment improvement and sustainable development.

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Green Operations

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绿链伙伴
联动更广

Broadening Green
Chain Partnerships

绿色制造迈向更强

Advancing Green Manufacturing

中国宝武积极响应国家绿色低碳发展战略，加快绿色制造步伐，着力打造工业绿色低碳原创技术策源地，推动节能减排、低碳冶金技术的持续创新与应用；积极落实国家有关能效约束、能效达标等政策要求，打造能效标杆示范企业，系统推进节能降碳增效；坚持绿色发展理念，常态化控制“三废”排放，全面启动“无废集团”建设，大力推进绿色工厂创建，坚定不移走钢铁绿色低碳发展之路。

In support of national strategies for green and low-carbon development, China Baowu is accelerating its transition toward green manufacturing. It is committed to becoming a source of original green and low-carbon technologies, driving continuous innovation and application in energy conservation, emissions reduction, and low-carbon metallurgy. The Group has also actively implemented national energy efficiency benchmarks and constraints, established energy efficiency benchmark demonstration enterprises, and systematically advanced initiatives focused on energy conservation, carbon reduction, and operational efficiency. Upholding the principles of green development, the Group has maintained normalized control over emissions of "three wastes" (wastewater, waste gas, and solid waste), implemented the "Waste Free Group" initiative across the organization, and promoted the development of green factories, firmly advancing its path toward green and low-carbon development in the steel industry.

我们的绩效 Our performance



“HyCROF 商业示范项目”荣膺世界钢铁协会第 15 届



“Steelie 奖”低碳生产卓越成就奖。

China Baowu's "HyCROF commercial demonstration project" received the 15th "Steelie Awards" from the World Steel Association for excellence in low-carbon steel production.



环保总投资约



45.77 亿元

节能技改总投资约

28.13 亿元

The Group invested approximately RMB 4.577 billion in environmental protection and approximately RMB 2.813 billion in energy conservation technology upgrades.

重复用水率

98.59 %

固体废物综合利用率

99.60 %

危险废物合规处置率

100 %

Water reuse rate: 98.59%; Comprehensive solid waste utilization rate: 99.60%; Hazardous waste disposal compliance rate: 100%.

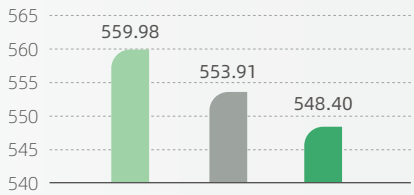
吨钢二氧化碳排放量较 2023 年下降 0.82 %



CO₂ emissions per metric ton of steel decreased by 0.82% compared to 2023.

注：吨钢二氧化碳排放量下降率按照《中国钢铁生产企业温室气体排放核算方法与报告指南（试行）》计算。

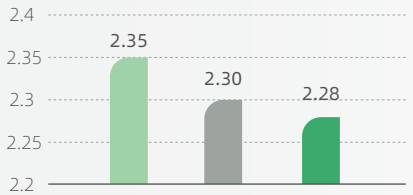
Note: The reduction rate of CO₂ emissions per metric ton of steel is calculated in accordance with the *Guidelines for Accounting and Reporting of Greenhouse Gas Emissions of Chinese Iron and Steel Enterprises (Trial)*.



吨钢综合能耗

Comprehensive energy consumption per metric ton of steel

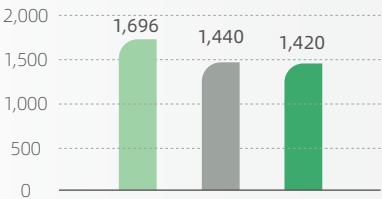
(千克标准煤 / 吨钢 | kgce/t)



吨钢耗新水量

Freshwater consumption per metric ton of steel

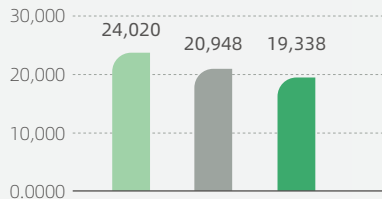
(立方米 / 吨钢 | m³/t)



化学需氧量排放量

COD emissions

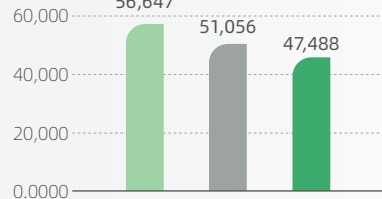
(吨 | t)



二氧化硫排放量

SO₂ emissions

(吨 | t)



氮氧化物排放量

NO_x emissions

(吨 | t)

2022 2023 2024

研发绿色低碳技术

Advancing Green and Low-Carbon Technology R&D

中国宝武积极推进节能减排技术研发、探索低碳冶金新工艺新技术，推进 2,500 立方米富氢碳循环氧气高炉商业化进程，开展湛江钢铁氢基竖炉工业化试验。

China Baowu remains committed to proactively advancing R&D in energy conservation and emissions reduction technologies, while exploring next-generation low-carbon metallurgical processes and technologies. The Group has continued to accelerate the commercialization of its 2,500 m³ HyCROF process and conducted industrial-scale trials of hydrogen-based shaft furnace technology at Zhanjiang Iron & Steel.

案例 八钢 2,500 立方米 HyCROF 商业示范线脱碳能力实现预定目标

Case Bayi Iron & Steel's 2,500 m³ HyCROF commercial demonstration line achieved targeted decarbonization performance

2,500 立方米 HyCROF 商业示范项目于 2023 年 9 月 28 日正式开始试生产，自试生产以来，公司 HyCROF 技术团队从工艺和操作两个方向，对提升 2,500 立方米 HyCROF 商业示范线脱碳能力展开技术攻关，促进脱碳能力不断提升。2024 年 9 月，脱碳系统实现作业率 100%，2,500 立方米 HyCROF 商业示范线脱碳煤气量达到预期目标。

The 2,500 m³ HyCROF commercial demonstration project commenced pilot production on September 28, 2023. Since launch, the HyCROF technical team has undertaken a series of process optimization and operational improvement initiatives aimed at enhancing the line's decarbonization capabilities. These efforts have continuously improved the system's decarbonization performance. By September 2024, the decarbonization system achieved 100% operational uptime, and the decarbonized gas output of the demonstration line met its designed target.



案例 国内首套百万吨级氢基竖炉顺利通过周达产功能考核

Case China's first million-metric-ton-class hydrogen-based shaft furnace passed the weekly capacity performance evaluation

2024 年 8 月 22 日，宝钢股份湛江钢铁百万吨级氢基竖炉实现 168 小时连续满负荷生产，顺利通过周达产功能考核，并成功验证了高氢（70% 氢气含量）冶炼条件，运行指标超过设计指标，初步掌握了氢基竖炉安全生产技术，对中国钢铁工业探索零碳绿色发展具有重要意义。

On August 22, 2024, Baosteel Zhanjiang Iron & Steel's million-metric-ton-class hydrogen-based shaft furnace achieved 168 hours of continuous full-load operation, passing the weekly capacity performance evaluation. The successful verification of stable operations under high-hydrogen conditions (70% hydrogen content), with all performance metrics exceeding design expectations, marks the first step forward in mastering the safe production techniques for this breakthrough process. It is a significant milestone in China's pursuit of zero-carbon and green transformation and development of the steel industry.



案例 湛江钢铁零碳高等级薄钢板工厂项目开工

Case Zhanjiang Iron & Steel breaks ground on zero-carbon high-grade thin steel sheet plant

2024 年 4 月 11 日，宝钢股份湛江钢铁零碳高等级薄钢板工厂项目开工，该项目是国内首个“氢基竖炉+电炉”短流程冶炼生产高等级薄钢板的近零碳生产线，对推动钢铁行业绿色低碳转型发展具有里程碑式的意义。

On April 11, 2024, Baosteel Zhanjiang Iron & Steel officially commenced construction of its zero-carbon high-grade thin steel sheet plant project. As China's first near-zero-carbon production line for high-grade thin steel sheets using a "hydrogen-based shaft furnace + electric arc furnace (EAF)" short-process smelting route, the project marks a milestone in accelerating the steel industry's green and low-carbon transformation and development.

湛江钢铁深耕氢能与钢铁的融合创新和协同发展，创新应用“氢基竖炉+电炉”短流程冶炼生产绿色高等级薄钢板，突破电炉冶炼高品质汽车板及硅钢产品的难点，开发电炉冶炼高等级板材的低氮、低硫、低氧、残余元素及夹杂物的高效控制技术，实现高品质汽车板及硅钢产品的稳定化制造和规模化供应。据测算，项目投产后相比同等生产规模的传统“高炉+转炉”长流程工艺，将实现全流程每年减少碳排放 314 万吨以上，后续通过碳捕集、森林碳汇等实现全流程零碳工厂。

Zhanjiang Iron & Steel has been at the forefront of promoting integrated innovation and coordinated development between hydrogen energy and steelmaking, pioneering the "hydrogen-based shaft furnace + EAF" short-process smelting route for the production of green, high-grade thin steel sheets. The project has overcome key technical barriers in using EAF smelting to produce high-quality automotive sheets and silicon steel products, developing advanced control technologies for reducing nitrogen, sulfur, oxygen, residual elements, and inclusions during high-grade steel sheet EAF smelting, enabling the stable and large-scale production of high-grade automotive sheets and silicon steel products. Once in operation, the project is expected to reduce annual carbon emissions by more than 3.14 million metric tons compared to the conventional "blast furnace + converter" long-process route of equivalent production scale. With the future integration of carbon capture and forestry-based carbon sinks, the project aims to realize a truly zero-carbon steel plant across the entire production cycle.



强化节约能源资源

Enhancing Energy and Resource Efficiency

能效标杆创建
Establishing
Energy Efficiency
Benchmarks

持续推进以能效标杆创建为核心的“极致能效”工程，加大极致能效技术推广应用，推动工业领域工艺设备更新，持续提升绿色发展竞争力。

China Baowu has continued to advance its "Energy Efficiency Maximization" project, which focused on establishing energy efficiency benchmarks. This includes intensifying efforts to facilitate the promotion and application of energy efficiency maximization technologies, accelerate upgrades to industrial equipment and production processes, and steadily strengthen its competitive edge in green development.

截至 2024 年底，集团公司下属钢铁企业重点工序能效达标标杆产能占比 40% 以上。

By the end of 2024, **over 40%** of production capacity in key steelmaking processes across its steel enterprises achieved benchmark-level energy efficiency.

其中，宝钢股份湛江钢铁、宝山基地、武钢有限、梅山钢铁以及马钢股份、太钢不锈、新钢集团 7 家企业陆续完成中国钢铁工业协会“双碳最佳实践能效标杆示范”公示或现场验收，集团下属企业已完成公示企业数占行业内公示企业总数近 50%，充分体现了国资央企的绿色引领示范作用。

Seven affiliated enterprises, including Baosteel Zhanjiang Iron & Steel, Baoshan Base, Wuhan Iron & Steel, Shanghai Meishan Iron & Steel, Masteel, Shanxi Taigang Stainless Steel, and Xinsteel, completed either public disclosure or on-site acceptance under the "Best Practice of Carbon Peaking and Carbon Neutrality Goals—Energy Efficiency Benchmark Demonstration" by CISA. **Nearly 50%** of all publicly recognized enterprises in the industry are affiliated with China Baowu, demonstrating the Group's leadership in green practices and its exemplary role as a central SOE.

湛江钢铁荣获 2024 年度钢铁极致能效工程能效标杆三年行动“先进企业”。

Zhanjiang Iron & Steel was recognized as a 2024 "Advanced Enterprise" for Energy Efficiency Maximization Project in the Steel Industry under the Three-Year Action Plan for Energy Efficiency Benchmarking.



案例 宝钢股份湛江钢铁、宝山基地、武钢有限入选“双碳最佳实践能效标杆示范企业”

Case Baosteel Zhanjiang Iron & Steel, Baoshan Base, and Wuhan Iron & Steel named "Best Practice of Carbon Peaking and Carbon Neutrality Goals–Energy Efficiency Benchmark Demonstration Enterprises"

湛江钢铁 Zhanjiang Iron & Steel

在“2024—2026 年能效提升计划”中，规划了 72 项节能项目。积极推进分布式光伏、风电及海上风电项目，构建了“水、陆、空”全方位绿色能源体系，厂内绿色电力装机容量突破 124 兆瓦，并积极推进厂内陆地风电项目建设，部署开发 400 兆瓦海上风电项目，年供绿色电力超 15 亿度，减排二氧化碳超 85 万吨，成为行业首批首家“双碳最佳实践能效标杆示范企业”。

Zhanjiang Iron & Steel has outlined 72 energy conservation projects in its "2024-2026 Energy Efficiency Improvement Plan". The company is actively advancing distributed photovoltaics and onshore and offshore wind power projects, establishing a multi-dimensional green energy system spanning "land, sea, and air" with an installed capacity of in-plant renewable energy exceeding 124 MW. Additionally, the company is pushing forward with onshore wind power project development within its plant and initiating development of a 400 MW offshore wind power project. Upon completion, these projects are expected to supply over 1.5 billion kWh of green electricity annually and reduce CO₂ emissions by more than 850,000 metric tons. As a result, Zhanjiang Iron & Steel has been recognized as one of the first enterprises of the steel industry to be named a "Best Practice of Carbon Peaking and Carbon Neutrality Goals–Energy Efficiency Benchmark Demonstration Enterprise".



宝山基地 Baoshan Base

2021 年起构建能效标杆组织推进体系，锚定各工序能耗历史最好水平和行业最优水平，深入开展对标找差等相关工作。三年多来在工序协同、技术节能、能源系统、绿色能源、智慧制造等方面成绩斐然。截至 2024 年 6 月，提前三年完成《宝山基地发展规划 2022—2027》中技术节能量的目标任务。

Since 2021, Baoshan Base has put in place a dedicated organizational framework to drive energy efficiency benchmarking, setting targets aligned with both its best historical performance and industry-leading energy consumption standards across all processes. Over the past three years, it has made remarkable progress in areas such as process coordination, technological energy conservation, energy systems optimization, green energy adoption, and intelligent manufacturing through comprehensive benchmarking and gap analysis. By June 2024, Baoshan Base had already met the targets for technology-driven energy savings set in the *Baoshan Base Development Plan (2022-2027)*—three years ahead of schedule.



武钢有限 Wuhan Iron & Steel

以“系统推进，极致提效”为指导思想，以“双碳最佳实践能效标杆示范工厂”创建为抓手，深度挖掘管理、技术、工艺改进节能潜力，实现“极致高效助推极致能效、极致能效助力极致降本”。2019 年—2024 年期间完成节能类投资项目 61 项，累计投资 82.39 亿元，技术节能量 60.58 万吨标准煤。

Guided by the philosophy of "systematic advancement for efficiency maximization", Wuhan Iron & Steel has actively explored energy conservation opportunities across management, technology, and process optimization, with the goal of establishing itself as a "Best Practice of Carbon Peaking and Carbon Neutrality Goals–Energy Efficiency Benchmark Demonstration Factory" and achieving a state where "peak operational efficiency drives maximum energy efficiency, which in turn enables radical cost reductions". From 2019 to 2024, the company has completed 61 energy conservation projects, investing a total of RMB 8.239 billion and achieving technology-driven energy savings equivalent to 605,800 metric tons of standard coal.



水资源管理 Water Resource Management

严格落实国家最严格水资源管理制度，将源头减量和用水总量控制作为提高水资源利用水平的重要一环持续推进，严格实施取水许可制度，严格按许可取用水，以用水排水智慧管理和节水项目为抓手，全面加强节约用水管理，并重点推进中水回用与循环水系统升级，依托管网检漏等技术提升回收效率，全面提升水资源利用效率，同步实现水资源循环利用与污染物减排的协同增效。2024 年，集团公司重复用水率为 98.59%。

China Baowu has strictly adhered to China's most stringent water resource management standards, with source-level reduction and total water consumption control as strategies to improve water resource utilization. The Group has enforced a strict water withdrawal permit mechanism, ensuring all withdrawals and usage fully comply with regulatory requirements. Additionally, through smart water consumption and discharge management and water conservation initiatives, it has significantly strengthened its conservation practices, focusing on reclaimed water reuse and upgrades to circulating water systems. Technologies such as pipeline leakage detection have also been implemented to improve water recovery efficiency. These efforts have collectively improved water resource utilization efficiency and created synergy between water recycling and pollutant reduction. In 2024, the Group achieved a water reuse rate of 98.59%.



2024 年 In 2024

集团公司重复用水率为

98.59%

the Group achieved a water reuse rate of 98.59%.

案例 宝钢股份湛江钢铁、中南钢铁鄂城钢铁获国家重点用水企业“水效领跑者”称号

Case Baosteel Zhanjiang Iron & Steel and Zhongnan Iron & Steel's Echeng Iron & Steel named "Water Efficiency Leaders" among major water-consuming enterprises

2024 年 12 月，工业和信息化部公布了 2024 年重点用水企业、园区水效领跑者名单，13 家钢铁企业入选“水效领跑者”，宝钢股份湛江钢铁以单位产品取水量 1.31 立方米 / 吨、99.4% 的水重复利用率位列钢铁行业第一，鄂城钢铁以亮眼成绩榜上有名。

In December 2024, the MIIT released its 2024 list of "Water Efficiency Leaders" among major water-consuming enterprises and industrial parks. Of the 13 steel enterprises selected, Baosteel Zhanjiang Iron & Steel topped the industry rankings with a water withdrawal intensity of 1.31 m³ per metric ton of product and a water reuse rate of 99.4%. Echeng Iron & Steel was also named to the list in recognition of its outstanding performance.

湛江钢铁 Zhanjiang Iron & Steel

通过加强全厂水系统顶层策划，灵活调整取、用水管理，从“取、制、供、用、回”等环节系统制定节水治水策略，推进源头减水、分级供水、分质用水及水系统集中管控，不断实现极致水效。

Through top-level design of its plant-wide water network and flexible management of water intake and use, Zhanjiang Iron & Steel has developed a full-cycle water conservation and management strategy that spans "withdrawal, treatment, supply, use, and reuse". By advancing source-level reduction, tiered water supply, fit-for-purpose water use, and centralized water system control, the company will continue to drive high-efficiency water use across its operations.

鄂城钢铁 Echeng Iron & Steel

成立节能减排领导小组等管理机构，以“三条红线”管理制度为依托，全方位管控取用水、排水等流程。将各工序新水消耗指标纳入考核，督促整改以提升管理、节约水资源。遵循“源头削减、过程管控、资源利用”原则，实施废水治理等项目，降低新水消耗。

Echeng Iron & Steel has established a dedicated energy conservation and emissions reduction leadership group, supported by a broader governance structure, and adopted a "three red lines" water management system to oversee water withdrawal, use, and discharge across its operations. Freshwater consumption targets are incorporated into the performance evaluations of each production process, with corrective actions monitored and enforced to improve water use efficiency. The company has also lowered freshwater consumption through wastewater treatment projects and related initiatives in line with the principles of "source-level reduction, process control, and resource utilization".

案例 太钢集团太钢不锈钢入选黄河流域高质量发展节水型工业企业典型案例

Case TISCO's Shanxi Taigang Stainless Steel selected as a representative case of water-efficient industrial enterprises for supporting high-quality development in the Yellow River basin

2024 年 11 月，水利部黄河水利委员会发布 16 个黄河流域高质量发展节水型工业企业典型案例，太钢不锈钢入选，山西省仅有 2 家企业获此殊荣。太钢集团在全工序推广分质供水、闭路循环、蒸发空冷、反渗透膜处理、市政生活废水深度处理等先进节水工艺技术，先后建成轧区废水处理系统、冶炼废水处理系统、膜法水处理系统、生活污水处理系统、中水深度处理系统、轧钢废水分质处理系统等新型污水处理工程，用水效率明显提高。2024 年，太钢不锈钢处理城市污水及中水总量 2,492.87 万吨，再生水全量回供城市湿地公园。

In November 2024, the Yellow River Conservancy Commission of the Ministry of Water Resources recognized 16 enterprises as representative cases of water-efficient industrial enterprises for supporting high-quality development in the Yellow River basin. Shanxi Taigang Stainless Steel was one of only two enterprises selected from Shanxi Province. TISCO has been implementing advanced water conservation technologies throughout its operations, including quality-based water supply, closed-loop circulation, evaporative air cooling, reverse osmosis membrane treatment, and deep treatment of municipal wastewater. It has also completed a range of new-type wastewater treatment projects, including wastewater treatment systems for rolling and smelting processes, membrane-based water treatment systems, domestic sewage treatment systems, advanced reclaimed water treatment systems, and quality-based wastewater treatment systems for rolling operations. These initiatives have led to significant improvements in water-use efficiency. In 2024, Shanxi Taigang Stainless Steel treated 24.9287 million metric tons of urban sewage and reclaimed water. All reclaimed water was returned to the city's wetland parks.

加快创建绿色工厂

Accelerating the Development of Green Factories

中国宝武深学细悟习近平生态文明思想，牢固树立“绿水青山就是金山银山”的理念，认真落实污染防治要求，坚决扛起生态环境保护政治责任，有序推进“无废集团”试点建设，积极创建绿色工厂，奋力将绿色打造成为集团高质量发展的鲜明底色。

China Baowu has continued to advance the study and implementation of Xi Jinping Thought on Ecological Civilization, embracing the vision that "lucid waters and lush mountains are invaluable assets". It has diligently fulfilled its responsibilities in pollution prevention and control, taking concrete steps to meet its political commitments in ecological and environmental protection. In support of these efforts, the Group has steadily advanced its "Waste Free Group" pilot program and the development of green factories, striving to make green development a defining feature of its high-quality development.

2024 年 In 2024

马钢集团马钢交材、太钢集团钢科公司、宝钢包装兰州宝钢制罐、宝武清能马钢气体入选 2024 年度国家级“绿色工厂”公示名单。自 2017 年工业和信息化部发布首批绿色制造名单至今，集团内超 30 家企业先后入选。

Magang Group's Masteel Rail Transit Materials Technology, TISCO's Steel Science Company, Baosteel Packaging's Lanzhou Baosteel Can Manufacturing, and Baowu Clean Energy's Anhui Magang Gas Technology were named 2024 national "green factories". Furthermore, more than 30 China Baowu-affiliated enterprises have been included in the Green Manufacturing list since the MIIT released its first list in 2017.

废水治理

Wastewater Treatment

强化废水排口合规管理，确保排口设置合规、监测规范、排放达标。持续推进雨污分流管控和消缺，提升雨污分流管理能力。持续跟踪推进钢铁企业用水和排水情况，降低取水强度和废水排放强度。

China Baowu has continued to strengthen compliance management at wastewater discharge outlets by ensuring proper installation, standardized monitoring, and regulated discharge. The Group has also strengthened its capacity for managing the separation of rainwater and sewage through continuous oversight and corrective measures. In addition, water consumption and discharge performance across its steel enterprises have been closely monitored, with a focus on reducing both freshwater withdrawal intensity and wastewater discharge intensity.

2024 年 In 2024

各钢铁基地废水排放总量较去年下降 **12.3** %。
Total wastewater discharge across all steel production bases decreased by **12.3**% year-on-year.

废气超低排放改造

Upgrades for Ultra-Low Waste Gas Emissions

制定《中国宝武钢铁企业超低排放改造工作方案》《中国宝武焦化企业超低排放改造工作方案》，着力推进废气超低排放改造工作。2024 年，继续以项目化推进废气超低排放改造，开展超低排放结对协同，结合被协同基地超低排放改造不同进展及需求，开展方案论证、技术交流、现场支撑、评估监测支撑等全方位协同。

To guide its efforts in upgrading the organization to achieve ultra-low waste gas emissions, China Baowu has developed the *China Baowu Work Plan for Upgrading Affiliated Steel Enterprises to Achieve Ultra-Low Emissions* and the *China Baowu Work Plan for Upgrading Affiliated Coking Enterprises to Achieve Ultra-Low Emissions*. In 2024, the Group continued to advance these upgrades through a project-based approach. To support implementation across various bases, the Group established a pairing and collaboration mechanism that provided targeted support to each base according to its specific progress and needs. This included solution evaluations, technical exchanges, on-site assistance, and performance monitoring and evaluations.

2024 年 In 2024

超 **80** % 钢铁产量完成全过程超低排放改造，“全面实施超低排放改造，推动企业高质量发展”实践成果入选《中央企业绿色低碳优秀实践案例集》。
Over **80**% of Baowu's steel output was upgraded to achieve full-process ultra-low emissions. The practical case "Comprehensively Implementing Ultra-Low Emission Upgrades to Promote High-Quality Development" was selected for inclusion in the *Collection of Outstanding Green and Low-Carbon Practices of Central SOEs*.

案例 重庆钢铁焦炉煤气精脱硫项目热试车成功

Case Successful hot commissioning of coke oven gas deep desulfurization project at Chongqing Iron & Steel

为实现对后端焦炉煤气用户尾气 SO₂ 指标的源头管控、根本治理，中南钢铁重庆钢铁将焦炉煤气治理作为突破口，全力推进焦炉煤气精脱硫项目超低排放的建设。2024 年 6 月，重庆钢铁焦炉煤气精脱硫项目热负荷调试成功，净化后的 H₂S 含量低于 20 毫克 / 标准立方米，每年可从源头降低 SO₂ 排放约 1,068 吨，环保效益明显。

To control emissions at the source and achieve substantial reductions in sulfur dioxide (SO₂) emissions from the tail gas of downstream coke oven gas users, Chongqing Iron & Steel (a subsidiary of Zhongnan Iron & Steel) has advanced the development of its coke oven gas deep desulfurization project for ultra-low emissions, using coke oven gas treatment as a key breakthrough. In June 2024, the project successfully completed hot load commissioning, achieving purified H₂S concentrations below 20 mg/Nm³. The project is expected to reduce SO₂ emissions at the source by approximately 1,068 metric tons annually, delivering significant environmental benefits.

SO₂
每年可从源头降低 SO₂ 排放约 **1,068** 吨
The project is expected to reduce SO₂ emissions at the source by approximately **1,068** metric tons annually



绿色运输

Green Transportation

截至 2024 年底，宝钢股份宝山基地、武钢有限、湛江钢铁、梅山钢铁，马钢股份、长江钢铁，中南钢铁中南股份、鄂城钢铁以及太钢不锈总计九家基地完成包括清洁运输在内的全过程超低排放改造评估监测公示；重庆钢铁、八一钢铁、武昆股份完成清洁运输超低排放评估监测公示；已完成清洁运输超低排放改造评估监测公示的钢铁基地，结合属地地理条件因地制宜，采用铁路、水路、管道或管状带式输送机等清洁运输方式，汽车部分采用国六或新能源方式运输。

By the end of 2024, nine bases—including Baosteel's Baoshan Base, Wuhan Iron & Steel, Zhanjiang Iron & Steel, and Shanghai Meishan Iron & Steel, along with Masteel, Changjiang Iron & Steel, Guangdong Zhongnan Iron & Steel of Zhongnan Iron & Steel, Echeng Iron & Steel, and Shanxi Taigang Stainless Steel—had completed the evaluation, monitoring, and public disclosure of full-process ultra-low emission upgrades, encompassing clean transportation measures. Chongqing Iron & Steel, Xinjiang Bayi Iron & Steel, and Wugang Group's Kunming Iron & Steel also completed the evaluation, monitoring, and public disclosure of upgrades specifically for ultra-low emissions during clean transportation. Each of these bases has implemented clean transport solutions tailored to local geographical conditions, such as rail, waterways, pipelines, or tubular belt conveyors. For road transportation, vehicles used comply with China VI vehicle emission standards or are powered by new energy sources.

马钢集团 Magang Group

马钢股份以清洁物流为抓手，2024 年清洁运输比例月均 80% 以上，全面推广国六及新能源车辆，新能源车辆占比 14.28%。

Masteel gives prominence to clean logistics, maintaining an average monthly clean transportation rate of over 80% in 2024. The company has also promoted widespread adoption of vehicles compliant with China VI vehicle emission standards and new energy vehicles, with the latter accounting for 14.28% of its fleet.

中南钢铁 Zhongnan Iron & Steel

重庆钢铁矿石及辅料采购、产品及副产品销售采用水运、铁运及氢能车辆运输，2023 年清洁运输已达到超低排要求，完成清洁运输公示，实现绿色低碳运输。

Chongqing Iron & Steel has utilized waterway and railway transport, along with hydrogen-powered vehicles, for the transportation of ores, auxiliary materials, products, and by-products. In 2023, the company met ultra-low emission standards for clean transportation, completed public disclosure, and successfully transitioned to green and low-carbon logistics.

八钢公司 Bayi Iron & Steel

将清洁运输作为超低排 A 级绩效达标工作的重要组成部分，2024 年原料进厂、产品出厂清洁运输比例达到 86% 以上。

The company prioritizes clean transportation as a critical component for achieving Grade-A performance in ultra-low emissions. In 2024, clean transportation accounted for over 86% of inbound raw materials and outbound product logistics.

废弃物排放管理

Waste Disposal Management

优选 15 家先行先试企业，围绕固体废物源头减量最大化、出厂最小化、收集贮存规范化、利用处置最优化、资源再生产品化、监管监控智慧化工作目标，按“一厂一策”统筹开展“无废集团”试点工作。

China Baowu has designated 15 pilot enterprises to spearhead the "Waste Free Group" pilot program, following a "one factory, one policy" model. These enterprises are expected to advance the pilot program in alignment with the goals of maximizing solid waste reduction at the source, minimizing off-site discharge, standardizing collection and storage practices, optimizing waste utilization and disposal, promoting the productization of recycled resources, and enhancing intelligent supervision and monitoring systems.



2024 年 In 2024

优选先行先试企业

15 家

China Baowu has designated 15 pilot enterprises



2024 年 8 月 21 日至 23 日，中国宝武于武汉工程职业技术学院举办首期“无废集团”专题研修班暨中国宝武危险废物应急救援处置培训教育基地授牌仪式和中国宝武危险废物利用处置中心（华中区域）揭牌仪式，标志着中国宝武在践行无废发展理念、打造“无废集团”示范标杆的道路上迈出了关键一步。

From August 21 to 23, 2024, China Baowu held its first themed training session on the "Waste Free Group" program at the Wuhan Engineering Institute. The event also featured the inauguration ceremony of the China Baowu Emergency Response and Disposal Training and Education Base for Hazardous Waste, along with the unveiling of the China Baowu Center for Hazardous Waste Utilization and Disposal (Central China Region), underscoring the Group's continued commitment to advancing its zero waste development philosophy and building a benchmark "Waste Free Group".

循环经济

Circular Economy

中国宝武实施全面节约战略，推进各类资源节约集约利用，积极践行“无废”理念，探索创新大型钢铁企业集团固体废物环境管理模式，打造“无废集团”试点。构建“6+1+1”的“无废集团”建设试点工作体系，建成华中、华北、华南、上海、华东、西南 6 个区域性固体（危险）废物利用处置中心、1 个危险废物应急救援处置培训基地、1 套危险废物全过程信息化管控平台。中国宝武通过钢铁基地固废返生产利用内部小循环、集团范围不同法人之间设施共享中循环、产城融合协同处置社会固废外部大循环等方式，推动集团绿色发展低碳化转型。

China Baowu has advanced a comprehensive conservation strategy by promoting the efficient and intensive use of various resources. Embracing the "zero waste" philosophy, the Group is pioneering innovative models for solid waste management within large-scale steel conglomerates and developing pilot projects under the "Waste Free Group" program. To support this initiative, Baowu has established a "6+1+1" pilot framework comprising six regional centers for solid (hazardous) waste utilization and disposal (in Central China, North China, South China, Shanghai, East China, and Southwest China), one emergency response and disposal training and education base for hazardous waste, and one digital platform for full-process hazardous waste management. The Group's green development and low-carbon transformation efforts are anchored in a three-tier closed-loop system: a small internal loop that recycles solid waste back into production at individual steel bases; a medium-sized loop that enables infrastructure and resource sharing among the Group's legal entities; and a large external loop that promotes industry-city integration through the collaborative treatment of off-site solid and hazardous waste.

铁资源与废钢循环利用 Iron resource and scrap steel recycling

宝钢股份内部实现铁资源回收再入炉，外部与用户建立废钢直回收体系，2024 年直接回收用户废钢 60 万吨，提升废钢在高等级汽车用钢中的使用比例，降低碳足迹。马钢集团持续推进废钢资源高效利用，充分利用含铁含碳固废中的铁、碳等有价值资源，减少矿石、焦炭、废钢等新资源消耗，2024 年本部废钢用量 263 万吨，废钢占比 15.08%。太钢集团 2024 年废钢回收再利用量 117 万吨，一般工业固废综合利用率达 99.53%，返生产利用率 24.24%。

Baosteel has established a closed-loop internal recycling system for iron resources by reintroducing recovered iron into the furnace, while externally building a direct scrap recovery network with end users. In 2024, Baosteel directly recovered 600,000 metric tons of user scrap, increasing the proportion of scrap used in high-grade automotive steel production, thereby contributing to a reduced carbon footprint. Meanwhile, Magang Group has continued to enhance scrap utilization efficiency by fully recovering valuable components such as iron and carbon from solid waste containing these materials, helping reduce the consumption of primary resources like iron ore, coke, and scrap steel. In 2024, Magang Group consumed 2.63 million metric tons of scrap steel at its headquarters, with scrap accounting for 15.08% of total input materials; whereas TISCO recycled 1.17 million metric tons of scrap steel, achieving a 99.53% comprehensive utilization rate for general industrial solid waste, with 24.24% of that waste being reused within its own production processes.

废弃物与钢渣处理利用 Waste and steel slag disposal and recycling

中南钢铁中南股份 2024 年废弃物循环利用量 113.5 万吨，固废综合利用率达 100%。新钢股份推进钢渣环保升级改造项目，投运后年处理转炉渣 67.5 万吨、二次渣 116 万吨，提升资源循环效率。

In 2024, Guangdong Zhongnan Iron & Steel (a subsidiary of Zhongnan Iron & Steel) recycled 1.135 million metric tons of waste, achieving a 100% comprehensive utilization rate for solid waste. Meanwhile, Xinyu Iron & Steel advanced its steel slag environmental upgrade project, which, upon commissioning, will process 675,000 metric tons of converter slag and 1.16 million metric tons of secondary slag annually, improving resource recycling efficiency.

包装材料循环利用 Packaging material recycling

宝钢股份遵循 3R 原则（即减量化、再利用、再循环），实现发货产品包装材料回收再处置，所有产品包装材料（内外防护用钢板、铁护角、包装用垫木 / 塑料、防锈纸等）均符合欧盟包装和包装废弃物标准。太钢集团采用简包装、轻量化包装及材料再利用。宝钢包装制定塑料托盘回收制度，清洗再利用包装物；加大废铝保级循环，优先采购绿电高、回收铝量大的供应商原料，铝制易拉罐使用再生原料，推动产品轻量化与可回收。中钢国际推行全流程绿色包装，采用循环金属材料、可降解轻量化材料，优化运输能耗。

Baosteel has consistently applied the 3R principle (Reduce, Reuse, Recycle) to recover and reuse packaging materials from shipped products, with all materials (including protective steel plates, metal edge protectors, wooden/plastic dunnage, and anti-corrosion paper) in full compliance with the European Union (EU) Packaging and Packaging Waste Directives. TISCO has adopted simplified, lightweight packaging and material reuse strategies. Baosteel Packaging has developed a plastic pallet recovery system to wash and reuse packaging materials, while also promoting closed-loop aluminum recycling by prioritizing procurement from suppliers with high green electricity usage and recycled aluminum content. These recycled aluminum are then used in can production to support lightweight and recyclable product development. Further, Sinosteel Engineering & Technology has implemented a full-process green packaging solution, incorporating recyclable metal and biodegradable lightweight materials while optimizing transportation energy consumption.

案例 宝钢股份自主创新研发钢渣资源化利用关键技术

Case Baosteel's independently developed key technology for steel slag resource utilization

2024 年，宝钢股份自主创新研发的《大宗钢渣固废高效低碳制备高等级沥青路面材料及工程应用关键技术》荣获 2023 年度上海市技术发明奖一等奖。钢渣是炼钢过程中的副产物，其中的游离氧化钙含量是影响钢渣资源化利用的关键因素，宝钢股份采用“倾翻装置 + 扒渣机 + 高效滚筒”的三位一体设备以及无废物排放清洁处理系统，使熔融态钢渣从 1,600°C 迅速冷却至 100°C 以下并破碎成 15 毫米以下的颗粒，游离氧化钙控制在 3% 以下，晶粒尺寸降低 30%。“钢渣向何处去”这个困扰钢铁行业多年的世界性难题有了“宝武方案”，该技术还被引入中钢（中国台湾地区）、邯钢、宁波钢厂、韩国浦项、印度 TATA、巴西浦项等国内外知名钢企，并在上海、湖北、广西、内蒙古等地应用，建设公路超过 3,000 公里，应用钢渣沥青混凝土 3,000 万吨。

In 2024, Baosteel's independently developed *Key Technology for High-Efficiency and Low-Carbon Preparation of High-Grade Asphalt Pavement Materials from Bulk Steel Slag Solid Waste and Its Engineering Application* won the First Prize of the Technological Invention Award under the 2023 Shanghai Science and Technology Awards. Steel slag, a by-product of the steelmaking process, contains free calcium oxide (f-CaO), a critical factor that limits its reuse as a resource. To address this challenge, Baosteel introduced a three-in-one equipment combining "a tipping device, mucking loader, and high-efficiency drum", alongside a clean treatment process with zero waste emissions. This system enables the rapid cooling of molten steel slag from 1,600°C to below 100°C, followed by crushing into particles smaller than 15 mm—effectively reducing f-CaO content to below 3% and decreasing particle size by 30%. This breakthrough serves as "Baowu's solution" to the long-standing global challenge of steel slag disposal that has troubled the industry for decades. Since its launch, the technology has been adopted by major steel enterprises in China and abroad, including China Steel Corporation (Taiwan), Hansteel, Ningbo Iron & Steel, POSCO (South Korea and Brazil), and TATA Steel (India). It is also applied across regions including Shanghai, Hubei, Guangxi, and Inner Mongolia, supporting the construction of over 3,000 kilometers of roadways and the use of 30 million metric tons of steel slag asphalt concrete.

2024 年 In 2024

宝钢股份荣获 2023 年度上海市技术发明奖一等奖

Baosteel won the **First Prize** of the Technological Invention Award under the 2023 Shanghai Science and Technology Awards

案例 宝钢股份武钢有限钢渣减量与循环项目实现源头减量

Case Slag reduction and recycling project at Baosteel's Wuhan Iron & Steel has achieved source reduction

武钢有限通过加大铸余渣回用、减少熔剂消耗、减少脱硫渣扒铁措施减少固废产生量。2024 年，钢渣产生量 195.43 万吨，同比源头减量 13.48%。

Wuhan Iron & Steel reduced the solid waste driven by enhanced reuse of casting slag, reduced flux consumption, and iron recovery from desulfurization slag. In 2024, Wuhan Iron & Steel produced 1.9543 million metric tons of steel slag, registering a 13.48% reduction at the source compared to 2023.

通过推进钢渣在冶金过程中的再利用，特别是在武汉市“碱性炉渣返烧结降碳技术”专项支持下，2024 年武钢有限成功实现炉渣资源在炼铁流程中的试用，累计使用 1.75 万吨。同时积极参与杭州、宜春固废应用大会，分享钢渣应用经验，并在武汉市青山区右岸大道、岱黄高速等项目中推广，钢渣骨料用量超 3 万吨。

In addition, with advanced steel slag reuse in metallurgical processes and support from Wuhan's specialized project "Technology of Returning Alkaline Furnace Slag to Sintering for Carbon Reduction", Wuhan Iron & Steel began trial use of furnace slag in its ironmaking operations in 2024, with a cumulative application of 17,500 metric tons. Meanwhile, it has also participated in the Solid Waste Application Conferences held in Hangzhou and Yichun, sharing its experience in steel slag utilization. In addition, it has promoted the application of steel slag in infrastructure projects, including You'an Avenue in Qingshan District, Wuhan, and the Daijiashan-Huangpi Expressway, with over 30,000 metric tons of steel slag aggregate used.



2024 年 3 月，中南股份和富宝资讯联合主办“2024 广东区域废钢龙头交流会”，加强区域内废钢回收、加工、配送，积极促进区域再生资源循环经济和“双碳”事业发展。

In March 2024, Guangdong Zhongnan Iron & Steel partnered with Fubao to co-host the "2024 Guangdong Regional Scrap Steel Leaders Exchange Conference", strengthening regional collaboration across the scrap steel value chain—from collection and processing to distribution. The initiative aims to accelerate the development of a regional circular economy for recycled resources and support efforts to achieve China's carbon peaking and carbon neutrality goals.

绿色精品实现更优

Delivering Higher-Quality Green Products

中国宝武以“高强度、高耐蚀、高效能”为核心，持续推动绿色产品创新，打造了多款独有、首发绿色精品，如低碳排放硅钢、高强水电钢板、耐候光伏用钢等，致力于为建筑、桥梁、交通运输、能源、船舶、农机等领域提供高性价比、长寿命、低能耗的绿色材料解决方案，以实际行动践行“双碳”目标，为行业绿色转型树立标杆。

China Baowu has consistently led in green product innovation with a focus on "high strength, high corrosion resistance, and high efficiency". The Group has launched a portfolio of proprietary and pioneering high-quality green products, including low-carbon silicon steel, high-strength hydroelectric steel plates, and weather-resistant steel for photovoltaic applications. These products offer cost-effective, durable, and energy-efficient green material solutions for sectors such as construction, bridge construction, transportation, energy, shipping, and agricultural machinery. With these innovations, the Group is contributing meaningfully to advancing China's carbon peaking and carbon neutrality goals and setting a strong example for green transformation across the industry.

我们的绩效 Our performance



发布 BeyondECO 品牌，同步推出冷轧汽车板高强钢、冷轧汽车板高表面外板，高牌号极低铁损取向硅钢、高效高牌号无取向硅钢，无缝钢管气瓶钢，热轧建筑用钢 6 类低碳排放钢产品。

The Group launched the BeyondECO brand and introduced six certified low-carbon steel product categories. These include high-strength cold-rolled automotive steel, high-surface cold-rolled automotive exterior steel, ultra-low iron loss high-grade oriented silicon steel, high-efficiency high-grade non-oriented silicon steel, seamless steel cylinder steel, and hot-rolled steel for construction.

碳排放权交易履约

Carbon Emissions Trading Compliance Rates from 2022–2024

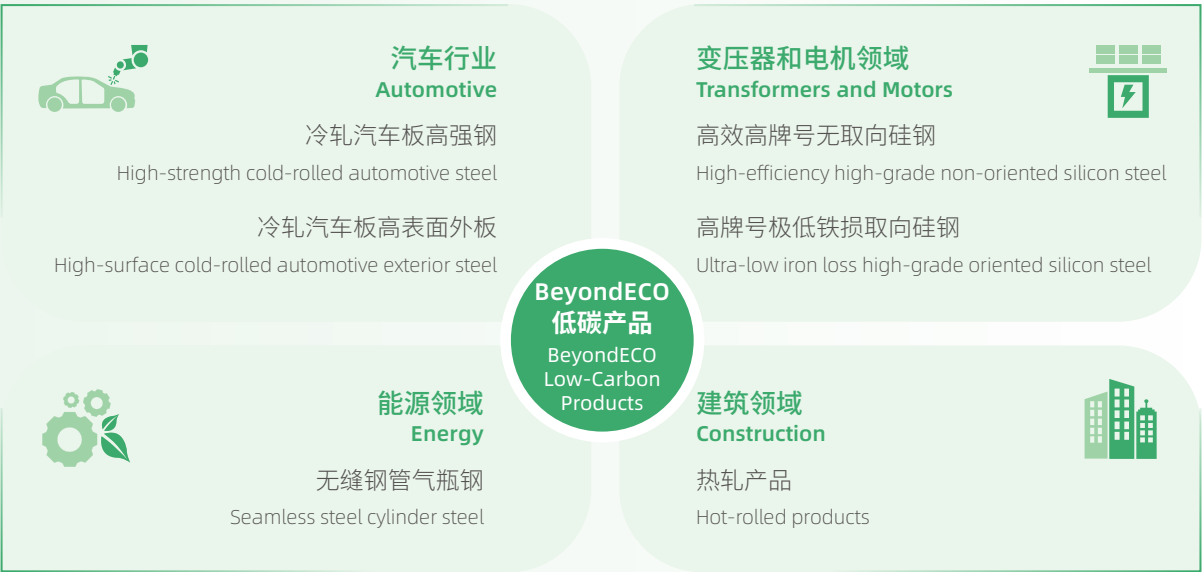


案例 发布 BeyondECO 品牌，推出系列低碳排放钢产品

Case BeyondECO brand and low-carbon steel products portfolio were launched

2024 年 10 月 23 日，中国宝武绿色低碳品牌——BeyondECO 在全球低碳冶金创新论坛暨第九届宝钢学术年会上正式对外发布。“Beyond”代表宝武以科技创新为驱动，不断超越自我、追求极致；字母“d”与“嫩芽”代表宝武以“数智”赋能未来，孵化绿色低碳新技术；“ECO”代表宝武以“共建钢铁生态圈，共创绿色新未来”为使命，将绿色作为企业的生命底色和战略基色。宝钢股份同步推出了经过严格认证、首批使用该品牌的 6 类低碳排放钢产品，在支持交通、能源、建筑、电力等行业的转型发展方面发挥了重要作用。

On October 23, 2024, China Baowu officially launched its green and low-carbon brand, BeyondECO, at the Global Low-Carbon Metallurgy Innovation Forum 2024 & the 9th Baosteel Biennial Academic Conference. The term "Beyond" embodies Baowu's commitment to continuous self-advancement and excellence through technological innovation. The stylized letter "d" designed as a budding sprout, represents the company's dedication to empowering the future with digitalization and intelligent transformation, as well as the incubation of emerging green and low-carbon technologies. Meanwhile, "ECO" reflects Baowu's mission to "jointly build a steel ecosystem and create a new green future", positioning green practices as the very foundation and strategic core of its development. During the event, Baosteel unveiled six rigorously certified low-carbon steel product categories under this brand. These products are set to play a key role in driving transformation across industries including transportation, energy, construction, and power generation.



2024 年 11 月
November 2024

宝钢股份实现国内首卷 BeyondECO-30% 热轧低碳排放产品成功交货，标志着宝钢热轧产品聚焦原创性、引领性绿色钢铁前沿技术取得新突破。

Baosteel delivered China's first coil of BeyondECO-30% hot-rolled low-carbon steel, marking a significant breakthrough in its development of original and leading-edge green steel technologies for hot-rolled products.

2025 年 2 月
February 2025

宝钢股份湛江钢铁成功首发 BeyondECO-30% 厚板产品，并顺利完成首批生产，标志着湛江钢铁在低碳排放厚板产品领域已具备规模化生产能力，正式步入商业化推广阶段。相比传统厚板产品，BeyondECO-30% 厚板产品的碳足迹降低了 30% 以上。

Baosteel Zhanjiang Iron & Steel launched its first BeyondECO-30% thick steel plate and completed the initial production batch, demonstrating the company's readiness for scaled production of low-carbon thick plates. This milestone also marks its official transition into commercial promotion. Compared with conventional thick plates, BeyondECO-30% reduces the carbon footprint by over 30%.

2025 年 6 月
June 2025

BeyondECO-30% 厚板产品获得中国钢铁工业协会低碳排放产品认证。

The BeyondECO-30% thick steel plate has obtained the Low-Carbon Emission Product Certification from the China Iron and Steel Industry Association.

BeyondECO



中国宝武低碳品牌 BeyondECO 发布。
Launch of China Baowu's low-carbon brand, BeyondECO.

能源电力

Energy and Power

清洁低碳、安全高效的能源电力系统是实现碳达峰碳中和的关键。中国宝武以优质钢材助力国家能源转型，支持核电、水电、风电、光伏等领域建设，推动能源电力行业绿色发展。

A clean, low-carbon, safe, and efficient energy and power system is key to achieving carbon peaking and carbon neutrality. China Baowu is contributing to this national energy transition by supplying high-quality steel products for the development of nuclear, hydro, wind, and solar power projects, driving the green transformation of the energy and power sector.

核 电
Nuclear Power

案例 齐心构筑 “华龙一号”

Case Concerted efforts in the development of "Hualong One"

“华龙一号”是我国具有自主知识产权的三代核电技术堆型，是推动我国核电工业从无到有、从小到大、从弱到强的一张“国家名片”。

"Hualong One", China's third-generation nuclear power technology with proprietary intellectual property, has become a "symbol of remarkable national progress" in advancing China's nuclear power sector industry—marking the country's rise from nothing to something, from small beginnings to global strength.

宝钢股份 Baosteel

宝山基地厚板应用于“华龙一号”堆型安注箱设备，成功实现进口替代，总供货量约 1,500 余吨。武钢有限取向硅钢精品应用在“华龙一号”福清 5 号核电、三澳 1—4 号发电机组的发电机定子铁芯上，总供货量约 2,600 吨，具有材料国产化替代的示范效应。

Baoshan Base supplied approximately 1,500 metric tons of thick plates for the safety injection tanks of the "Hualong One" reactor, successfully replacing imported materials. In addition, Wuhan Iron & Steel provided around 2,600 metric tons of high-grade grain-oriented silicon steel for the stator cores of generators used in Hualong One's Fuqing 5 and San'ao 1 to 4, effectively replacing imported materials while serving as a model for material localization.

太钢集团 TISCO

不锈钢板应用在“华龙一号”堆内构件中，2016 年以来总供货量上万吨。所用核一级不锈钢板是太钢集团解决“卡脖子”技术的典型代表产品之一，是核电站所有材料中技术和质保要求等级最高的产品。

Since 2016, TISCO has delivered over 10,000 metric tons of stainless steel plates for the internal components of the "Hualong One" reactor. Meeting the most stringent technical and quality assurance standards required in nuclear power applications, these nuclear-grade stainless steel plates are among TISCO's flagship solutions in overcoming critical technology chokepoints.

案例 宝武特冶旗下宝银广州公司核电蒸发器用 U 形管投产

Case Baowu Special Metallurgy's Baoyin Guangzhou commissions production of U-bent tubes for nuclear steam generators

2024 年 11 月，宝武特冶旗下宝银广州公司核电蒸发器用 U 形管项目在广

In November 2024, Baoyin Guangzhou, a subsidiary of Baowu Special Metallurgy, officially began production of U-bent tubes for nuclear steam generators at its new facility in Guangzhou.



核电蒸汽发生器用 U 形管是核电站“心脏主动脉”，一直以来是制约我国核电发展的三大瓶颈之一。宝银广州公司作为专业从事核电管研发制造的高端装备科技企业，继 2007 年在江苏宜兴首次实现我国核电管国产化后，此次在广州南沙再启第二大生产基地，标志着宝银广州公司具备了每年建设 7 台百万机组核电站的核电管保供能力。

U-bent tubes, often referred to as "aorta of the reactor core", are essential to nuclear power plants and have long been one of three major bottlenecks limiting the development of China's nuclear power sector. Baoyin Guangzhou, a high-end equipment and technology company specializing in the R&D and manufacturing of nuclear-grade tubing, first achieved domestic production of such tubes in Yixing, Jiangsu Province, in 2007. The commissioning of its second production base in Nansha marks a major milestone, enabling the company to meet the annual demand for nuclear-grade tubes needed to support the construction of seven one-million-kilowatt-class nuclear power units.

宝武特冶 Baowu Special Metallurgy

镍基合金 U 形传热管、水室隔板和不锈钢支承板批量应用在“华龙一号”核电蒸汽发生器中，其水室隔板、支承板用热轧板为宝武特冶国内独家供货。宝武特冶也是目前全球唯一可同时配套供应这三大类核岛关键材料且具备产业化能力的企业。

Hualong One's nuclear steam generators make extensive use of nickel-based alloy U-shaped heat transfer tubes, water chamber baffles, and stainless steel support plates. Baowu Special Metallurgy is the sole domestic supplier of the hot-rolled plates used in both the water chamber baffles and support plates, and remains the only company in the world capable of producing and supplying all three categories of these critical nuclear island materials at an industrial scale.



宝钢股份宝山基地厚板、武钢有限取向硅钢精品，太钢集团不锈钢板，宝武特冶镍基合金 U 形传热管、水室隔板和不锈钢支承板应用于“华龙一号”全球首堆。

The thick plates of Baosteel's Baoshan Base, highgrade grain-oriented silicon steel of Wuhan Iron & Steel, stainless steel plates of TISCO, and nickel-based alloy U-shaped heat transfer tubes, water chamber baffles, and stainless steel support plates of Baowu Special Metallurgy were applied to the world's first "Hualong One" reactor.

水电
Hydropower

案例 宝钢股份 1,000 兆帕级高强水电钢板在全球最高水头抽蓄电站批量成功应用

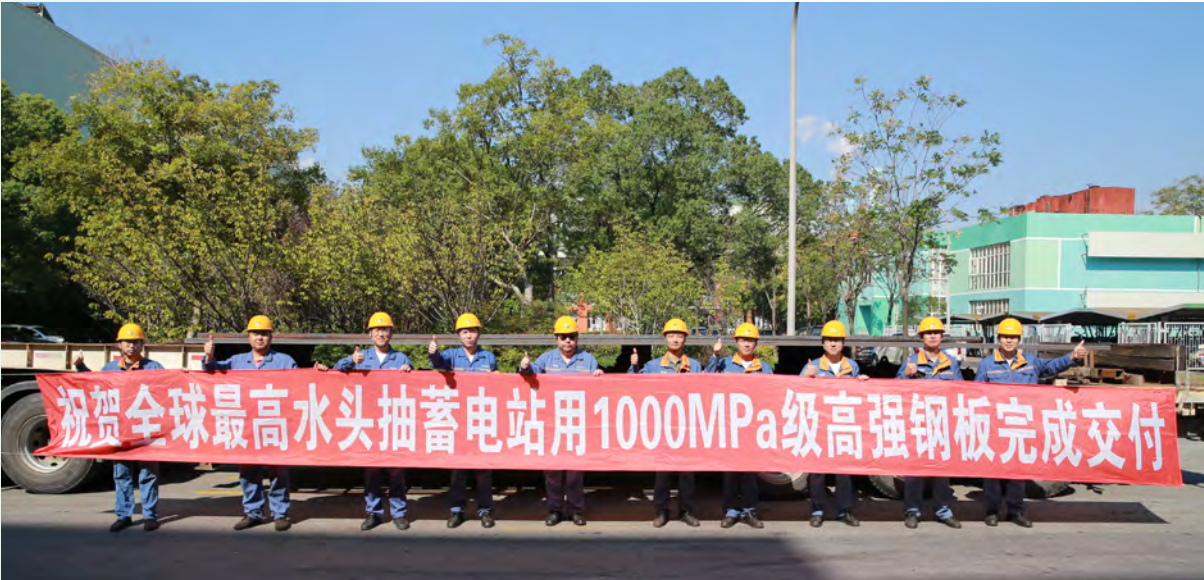
Case Successful batch application of Baosteel's 1,000-MPa high-strength hydropower steel plates in the world's highest-head pumped storage power station

2024 年 9 月，采用宝钢股份 1,000 兆帕级高强钢板建造模型钢岔管在浙江天台抽水蓄能电站圆满完成水压爆破试验；12 月，额定水头全球最高的抽水蓄能电站 1,638 吨压力钢管用 1,000 兆帕级水电高强钢板完成交付。

In September 2024, a bifurcated steel pipe prototype made with Baosteel's 1,000-MPa high-strength steel plates successfully passed a hydroburst test at the Tiantai Pumped Storage Power Station in Zhejiang Province. By December, a total of 1,638 metric tons of these plates were delivered for use in the penstocks of the world's highest-head pumped storage power station.

浙江天台抽水蓄能电站是目前国内在建项目中单机容量最大、单级斜井国内最长、额定水头全球最高的抽蓄电站，HD 值*高达 5,000m.m，首台机组计划于 2025 年底前发电。电站采用的 1,000 兆帕级高强钢板是国内水电行业的首次规模应用。成功应用后，将为 1,000 兆帕级高强钢在国内后续特大水电工程、超高水头抽蓄电站、大容量冲击式发电机组关键核心承压部件上的大规模应用提供坚实的技术支撑，意义重大。

The Tiantai Pumped Storage Power Station in Zhejiang Province is currently the largest of its kind under construction in China, featuring the country's highest single-unit capacity and longest single-stage inclined shaft, as well as the world's highest rated water head. With an HD value * of 5,000 m·m, the station's first generating unit is scheduled to begin operation by the end of 2025. The project also marks the first successful large-scale application of 1,000-MPa high-strength steel plates in China's hydropower sector, laying a solid technical foundation for the broader use of this material in future large-scale hydropower projects, ultra-high-head pumped storage stations, and critical pressure-bearing components of large-capacity impulse turbine units—a major milestone for the industry.



* HD 值，即管道的内直径 D(m) 和其承受的水头 H(m) 的乘积，是标志压力管道规模及技术难度的重要参数值。

* The HD value—defined as the product of a pipe's inner diameter (D, in meters) and the corresponding water head (H, in meters)—is a key indicator of the scale and technical complexity of pressure pipelines.

案例 太钢供应辽宁清原抽水蓄能水电站所需高强磁轭钢产品

Case TISCO supplied high-strength magnetic yoke steel for Liaoning Qingyuan Pumped Storage Hydroelectric Power Plant

2024 年 1 月，国网新源辽宁清原抽水蓄能水电站 1 号机组顺利通过 15 天的试运行，正式投入商业运行。水电站建设所需高强磁轭钢产品全部由太钢供应，总量达 1,716 吨。清原抽水蓄能项目首台机组被评为“发电抽水双工况精品机组”，成功跨入全国先进水平行列。

In January 2024, unit 1 of the Qingyuan Pumped Storage Hydroelectric Power Plant in Liaoning Province, developed by State Grid Xinyuan, entered commercial operation after completing a successful 15-day trial run. TISCO supplied all 1,716 metric tons of high-strength magnetic yoke steel required for the station's construction. The first generating unit of Qingyuan pumped storage facilities was recognized as a "Model Unit for Dual-Mode Power Generation and Pumping", successfully positioning it among China's leading pumped storage facilities.



天然气
Natural Gas

案例 太钢集团自主开发液化天然气储罐用超低温钢

Case TISCO independently developed ultra-low temperature steel for LNG storage tanks

面对储罐特大型化及市场激烈的竞争，太钢集团液化天然气储罐用碳钢团队于 2024 年开发出低成本、超高洁净度、高止裂性能的 06Ni9DR 产品，吨钢降本增效 3,000 元，节约大量贵重的镍资源，并成功应用于中海油浙江三期全球最大的 27 万立方米特大型 LNG 储罐建造。凭借优异的产品和服务质量，太钢在浙江 LNG 三期项目三家供应商中脱颖而出，独获中海油绿能港浙江宁波能源有限公司“2024 年度浙江 LNG 三期项目接收站工程优秀物资供应服务单位”荣誉称号。太钢 27 万立方米特大型液化天然气储罐用超低温钢市占率第一，推动了我国特大型 LNG 储罐建设由跟随者成为领跑者，为保障我国的能源安全战略做出了积极贡献。

In 2024, in response to the growing scale of LNG storage tanks and a more competitive market, TISCO's carbon steel team for liquefied natural gas storage tanks launched 06Ni9DR—a steel product with lower cost, ultra-high cleanliness, and exceptional crack-arrest performance. This innovation reduced unit steel costs by RMB 3,000 per metric ton and significantly conserved valuable nickel resources. The product was successfully deployed in Phase III of CNOOC's Zhejiang LNG Project, home to the world's largest 270,000-m³ ultra-large LNG storage tank. With its superior product performance and service quality, TISCO outperformed two other suppliers and was exclusively awarded the title of "Outstanding Material Supply and Service Provider for the Zhejiang LNG Project Phase III Receiving Terminal Project in 2024" by CNOOC Green Energy Port Zhejiang Ningbo Energy Co., Ltd. Holding the leading market share in ultra-low temperature steel used for 270,000-m³ ultra-large LNG storage tanks, TISCO is shifting China's role from follower to frontrunner in ultra-large LNG tank construction, making a meaningful contribution to the country's energy security strategy.



宝钢股份保供中俄东线天然气管道长江盾构穿越工程 X80M-18 米加长管，创下中俄东线全线线路管口径最大、壁厚最厚、单重最重纪录。
Baosteel's X80M -18 meters extended pipes used in the Yangtze River shield tunneling section of the China-Russia east-route natural gas pipeline set new records for the largest diameter, thickest wall, and heaviest single pipe used along the entire route.

风电
Wind Power

案例 宝钢股份新一代海上风电用钢达到国际领先水平

Case Baosteel's next-generation steel for offshore wind power applications meets leading international standards

宝钢股份致力于绿色能源风电用钢产品的研发及技术应用研究，不断优化产品制造工艺，向市场提供具备高强度、高韧性、易焊接及耐疲劳特性的风电用钢产品。创新研发团队历时两年，利用新一代调控技术，成功研制出屈服强度介于 355-YP460 兆帕的新一代海上风电用钢。经过业内专家的权威评定，该成果已达到国际领先水平。2024 年 6 月，宝钢股份中标华润福建连江外海海上风电场基础桩项目，充分展现了宝钢股份在风电领域的技术实力和市场竞争力。

Committed to advancing R&D and application of steel products for green wind energy, Baosteel is continuously optimizing its manufacturing processes to deliver high-strength, high-toughness, weldable, and fatigue-resistant steel products tailored for wind power applications. After two years of focused R&D, Baosteel's R&D team successfully developed a next-generation steel with yield strengths between 355 and YP460 MPa for offshore wind power applications using cutting-edge control technologies. Industry expert evaluations have confirmed the product meets leading international standards. In June 2024, Baosteel won the contract to supply foundation piles for the China Resources Fujian Lianjiang Offshore Wind Farm, further demonstrating its strong technical capabilities and competitive edge in the wind power market.



案例 八钢公司风电钢产品通过中国船级社权威认证

Case Bayi Iron & Steel's steel products for wind power applications were certified by China Classification Society

2024 年 7 月，八钢公司风电钢产品以卓越品质、规范流程成功通过中国船级社质量认证有限公司权威审核认证。

In July 2024, Bayi Iron & Steel's steel products for wind power applications, with their superior performance and process compliance, passed the rigorous audit and certification conducted by the China Classification Society Certification Company.



光伏
Solar Power

案例 八钢公司光伏管桩用端板产品助力新疆光伏产业发展

Case The end plates for pipe piles used in PV installations of Bayi Iron & Steel contribute to the Xinjiang's PV industry

2024 年 5 月，八钢公司金属制品公司成功研发并生产出光伏管桩用端板产品。该产品利用八钢公司中厚板轧制余料作原材料，经过激光切割、冲压、精密加工而成，具有高强度、耐抗震等优良性能，可广泛应用于光伏管桩的安装与固定，预计可实现年增量 2 万吨以上，满足疆内光伏管桩市场需求，助力新疆光伏产业迅速发展。

In May 2024, Xinjiang Bagang Metal Products Co., Ltd. successfully developed and produced end plates for pipe piles used in photovoltaic (PV) installations. These products are made from the company's medium-thick plate rolling scrap materials, using laser cutting, stamping, and precision machining. They offer high strength and excellent seismic resistance, making them well-suited for use in PV pipe pile installation and fixation. With projected annual output growth exceeding 20,000 metric tons, the new product line is set to help meet growing market demand and fuel the rapid expansion of Xinjiang's PV industry.



交通运输

Transportation

推进交通运输绿色转型是实现经济社会可持续发展的重要途径。中国宝武聚焦轨道交通和公路交通运输领域，匠心打造绿色精品，以实际行动助力交通运输行业的绿色低碳发展，为构建绿色交通贡献积极力量。

The green transformation of the transportation sector is a key driver of sustainable economic and social development. With a focus on rail and road transport, China Baowu has consistently delivered high-quality green steel products, actively supporting the transportation sector's transition to green and low-carbon development and contributing meaningfully to the development of a green transportation system through concrete actions.

汽车
Automotive

案例 宝钢股份湛江钢铁铝硅镀层产品为汽车行业注入“轻”动力

Case Baosteel Zhanjiang Iron & Steel launched Al-Si coated steel for safer lightweight vehicles

2024 年 9 月，宝钢股份湛江钢铁铝硅镀层新产线正式投产，标志着宝钢在掌握拥有自主知识产权的全强度系列铝硅镀层材料研发、制造领域取得重大突破，迈进高性能铝硅镀层材料批量化、稳定化生产的新阶段。

In September 2024, Baosteel Zhanjiang Iron & Steel commissioned its new Al-Si coated steel production line. This milestone marks a major breakthrough of Baosteel in the R&D and manufacturing of full-strength range of Al-Si coated materials with proprietary intellectual property, paving the way for stable, large-scale production of high-performance Al-Si coated steel.

宝钢股份湛江钢铁铝硅镀层材料主要应用于汽车纵梁、保险杠、立柱加强板、地板中通道、车顶加强梁等汽车安全结构，拥有出色的机械性能、优异的耐蚀性能及焊接性能，能够使车辆更安全、更经济、更环保。

Designed for use primarily in critical automotive safety components—including longitudinal beams, bumpers, pillar reinforcements, center floor tunnels, and roof reinforcements—these coated steel offer exceptional mechanical strength, corrosion resistance, and weldability, supporting the automotive sector's shift toward safer, more economical, and environmentally friendly vehicles.

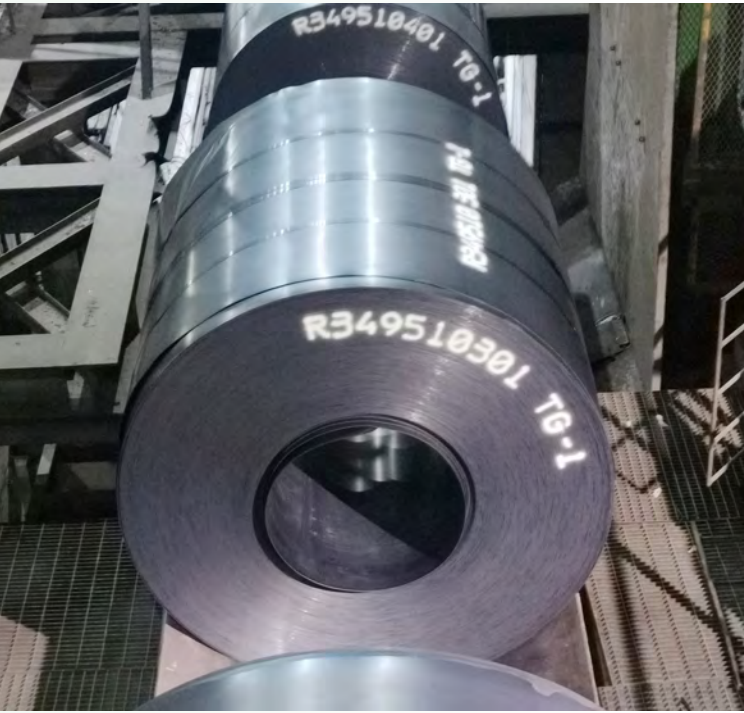


案例 太钢提供的世界最高强度轻量化车轮用钢实现全球首发首用

Case TISCO debuted world-leading high-strength lightweight wheel steel in global first use

2024 年 8 月，由太钢提供的世界最高强度汽车车轮用钢，在通过行业严苛材料认证的基础上加工制作成新型车轮。通过 6 个多月路试验证，成功应用于国内外著名汽车品牌的新能源高端车型。经首发产品评审认定，太钢这一品种钢实现了 1,300 兆帕级温成型汽车车轮钢的全球首发首用。

In August 2024, TISCO's high-strength steel for automotive wheels—currently the strongest of its kind globally—made its official debut in high-end new energy vehicles from leading automakers both in China and abroad following rigorous industry certification and over six months of real-world road testing with the newly developed wheels. According to the official evaluation of the initial batch, this marks the world's first launch and use of 1,300-MPa warm-formed steel for automotive wheels.



高铁 High-Speed Rail

案例 马钢集团马钢交材打造“绿色低碳”弹性高铁车轮

Case Magang Group's Masteel Rail Transit Materials Technology pioneered "green and low-noise" elastic high-speed rail wheels

2024 年 1 月，马钢高速车轮整列装配“复兴号”载客运行。为了让“绿色低碳”的弹性车轮驶入百姓生活，在缺乏高精尖精五轴机床的情况下，马钢交材技术团队用最传统的“接刀法”攻克精加工难题，再次打破国外技术垄断，推动我国轨道交通行业进入“绿色低碳”全新阶段，也为加速长三角轨道交通一体化贡献了马钢力量。

In January 2024, a full set of high-speed rail wheels developed by Magang was installed on a "Fuxing bullet train" and began passenger service. Committed to bringing "green and low-noise" elastic wheels into everyday use, the technical team at Masteel Rail Transit Materials Technology overcame major challenges in precision machining using the traditional segmented "Jiedao" manual machining technique—even without access to high-grade, high-precision, advanced five-axis CNC equipment. Their success not only broke yet another foreign technology monopoly but also ushered in a new era of "green and low-noise" product innovation in China's rail transit sector. It also represents Magang's contribution to the development of an integrated rail transit network in the Yangtze River Delta.

桥梁 Bridge

案例 宝钢股份桥梁钢助力“轨道上的长三角”

Case Baosteel's steel for bridge construction enabled "rail-connected Yangtze River Delta"

2024 年 10 月，宝钢股份高强度桥梁结构用 Q500qE 系列钢以及双相不锈钢复合板，成功中标甬舟铁路西堠门特大桥和杭州湾跨海铁路大桥项目。

In October 2024, Baosteel secured contracts for two landmark projects—the Xihoumen Bridge on the Ningbo-Zhoushan Railway and the Hangzhou Bay Cross-Sea Railway Bridge—supplying its Q500qE series high-strength structural steel and duplex stainless steel composite plates.

铁路钢桥面板作为主要受力构件，直接承受铁路荷载，其耐久性要求尤为突出，且运营期间的检修和维护工作非常困难，是整个结构耐久性设计的薄弱环节。宝钢股份的双相不锈钢复合板解决方案为桥梁的长期稳定运营提供坚实保障，有效解决海洋铁路桥梁面板在运营期间的腐蚀维护问题。

As the primary load-bearing component of railway bridges, steel deck panels are directly exposed to the heavy load of railway traffic, placing exceptionally high demands on durability. Yet due to the complexity of in-service inspection and maintenance, they remain the most vulnerable element in the bridge's long-term structural integrity. Baosteel's duplex stainless steel composite plate solution provides a robust defense for long-term operational stability, effectively addressing corrosion and maintenance challenges for marine railway bridges during their service life.



建筑建造

Building and Construction

当前，节能、环保、绿色、可持续发展已成为建筑行业的大趋势。中国宝武深耕绿色建筑领域，全力打造绿色钢铁精品，以高品质的产品助力建筑行业实现节能低碳高质量转型。

With energy efficiency, sustainability, and environmentally conscious development becoming dominant trends in the construction sector, China Baowu is leading this transition to green construction by delivering high-quality green steel solutions that support the development of energy-efficient, low-carbon, and high-performance buildings.

案例 内地首例——上海恒隆广场扩建项目 100% 采用宝钢低碳钢，减碳 35%

Case The expansion project of Shanghai Plaza 66 becomes Chinese mainland's first to fully adopt Baosteel low-carbon steel—cutting carbon emissions by 35%

2024 年底，恒隆地产宣布上海恒隆广场三期扩建项目的地上结构钢板（将加工成为钢梁和钢柱）及钢筋近乎 100% 采用宝钢股份提供的低碳排放钢材，成为中国内地首个在建筑结构中近乎全面应用低碳排放钢的商业地产项目，将建筑钢材的总隐含碳排放量较传统钢材降低 35%。

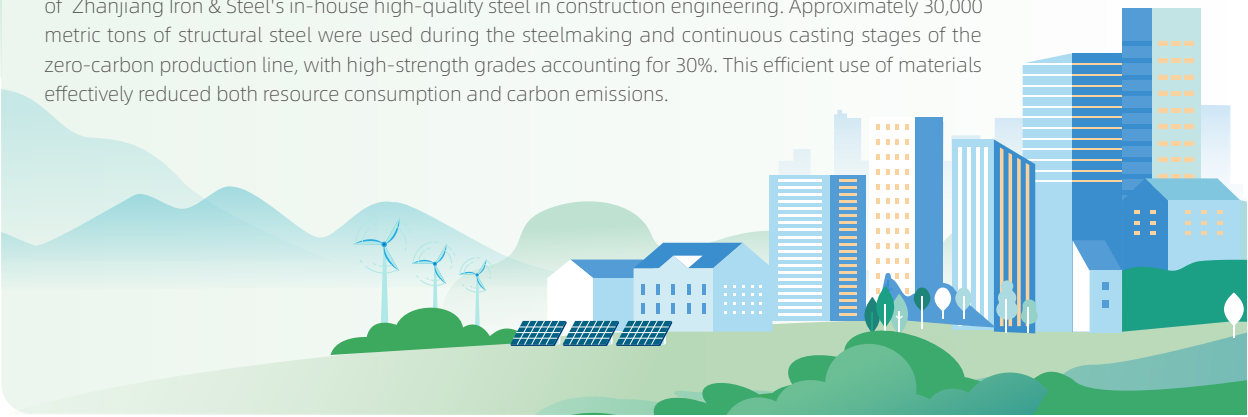
In late 2024, Hang Lung Properties announced that nearly all the above-ground structural steel plates (used for beams and columns) and rebar used in Phase III of the Plaza 66 expansion project in Shanghai were supplied by Baosteel's low-carbon steel. This marks the first commercial real estate project in the Chinese mainland to adopt low-carbon steel for nearly all its structural elements, reducing embodied carbon emissions by 35% compared to traditional steel.

案例 宝钢股份湛江钢铁自产高品质钢材应用于零碳厂房

Case Baosteel Zhanjiang Iron & Steel applied its in-house high-quality steel in zero-carbon factory buildings

宝钢股份湛江钢铁零碳高等级薄钢板工厂项目零碳厂房钢结构首次采用湛江钢铁自产 Q390、Q420 高品质钢材，这些钢材具有高强度、高韧性及优秀焊接性能，可显著增强承载与抗震能力，开创了湛江钢铁自产钢材应用于工程建设的先例。在零碳产线炼钢工程与连铸工程中，钢结构用钢约 3 万吨，其中高强钢占比约 30%，通过高效利用材料，有效降低资源消耗与碳排放。

Baosteel Zhanjiang Iron & Steel's zero-carbon factory buildings under the zero-carbon high-grade thin steel plant project mark the first application of its in-house Q390 and Q420 high-quality steels in the construction sector. Known for their high strength, toughness, and weldability, these steels significantly enhanced load-bearing capacity and seismic performance, representing the first-ever application of Zhanjiang Iron & Steel's in-house high-quality steel in construction engineering. Approximately 30,000 metric tons of structural steel were used during the steelmaking and continuous casting stages of the zero-carbon production line, with high-strength grades accounting for 30%. This efficient use of materials effectively reduced both resource consumption and carbon emissions.



案例 马钢集团首款建筑用水性涂层彩涂板成功下线

Case Magang Group launched its first water-based color-coated steel sheet for construction

2024 年 12 月，马钢首款建筑用水性涂层彩涂板成功批量下线。这款新型彩涂板产品的涂层厚度、加工性能、外观色泽等各项理化性能都高于国家标准，标志着马钢在环保型彩涂板研发领域取得了重大突破。

In December 2024, Magang successfully rolled out its first batch of water-based color-coated steel sheets for construction. The new product surpasses national standards in coating thickness, processing performance, and surface finish, representing a significant breakthrough in Magang's R&D of environmentally friendly color-coated steel sheets.



案例 太钢集团为华北“一带一路”物流枢纽工程量身定制建筑不锈钢

Case TISCO delivered customized architectural stainless steel solution for major "Belt and Road" logistics hub in North China

2024 年 4 月，太钢集团建筑用不锈钢产销研团队成功为客户提供量身定制的长寿命、免维护、绿色环保型建筑用 TJ17A 产品解决方案，并因此中标华北地区某“一带一路”国际物流枢纽重点工程金属屋面订单。

In April 2024, TISCO's architectural stainless steel production, marketing, and R&D team tailored a solution involving the TJ17A architectural stainless steel for a client. The customized solution, designed for long service life, zero maintenance, and environmental sustainability, secured the contract for the metal roofing of a key international logistics hub project under the "Belt and Road" Initiative in North China.



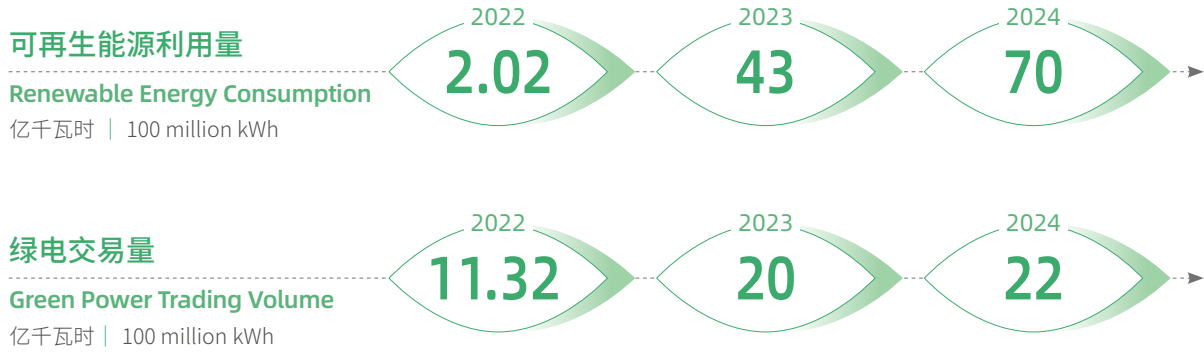
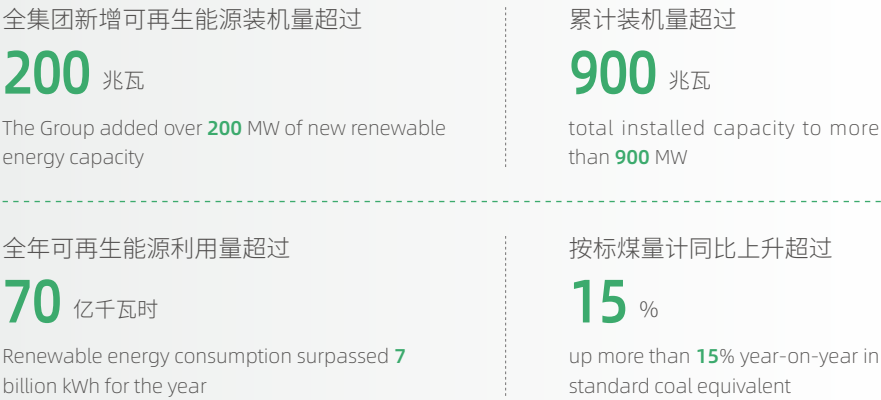
绿色产业开辟新局

Forging New Paths in Green Industries

中国宝武持续完善优化“1+3+2”产业体系，加快绿色资源和能源布局，在具备资源、能源、物流优势的区域研究布局绿色资源，加大新能源建设开发力度，推进海上风电、陆上风电项目开发，稳步推进风光制氢一体化项目。

China Baowu has consistently strengthened its "1+3+2" industrial system while accelerating the strategic development of green resources and energy. The Group is actively exploring opportunities for green development in regions with strengths in resources, energy, and logistics, scaling up efforts to develop new energy sources. This includes expanding its presence in both offshore and onshore wind power projects, and steadily promoting integrated wind-solar-hydrogen production projects.

我们的绩效 Our performance



绿色资源能源

Green Resources and Energy

探索绿色炉料产业布局，初步形成“以绿色炉料产能为主体，配套绿色能源为支撑，适当延伸生产绿色钢铁为补充的海外绿色炉料（钢铁）产业链体系”布局思路。聚焦绿电持续推进新能源资源布局，稳步推进扎布耶二期、三门峡源网荷储项目实施。宝武清能全年新能源并网投运量超 600 兆瓦。开展面向低碳冶金氢基能源大规模供应技术攻关和冶金场景储能技术产业化应用研究。

With a presence in the green furnace materials industry, China Baowu has preliminarily established an "overseas green furnace material(steel) industrial chain strategically centered on green furnace material production, which is supported by green energy and appropriately extends into green steel manufacturing" layout idea. With a focus on green power, the Group is steadily expanding its footprint in new energy and resource development, with key projects including Phase II of the Zabuye Salt Lake project and the Sanmenxia source-network-load-storage integration project making solid progress. In 2024, Baowu Clean Energy connected over 600 MW of new energy capacity to the grid and brought it into operation. The Group has also launched major R&D initiatives on large-scale hydrogen-based energy supply technologies for low-carbon metallurgy, as well as the industrial application of energy storage technologies in metallurgical settings.

案例 宝武资源积极承担绿色低碳冶金炉料保障责任，打造绿色矿山和绿色钢铁产业链

Case Baowu Resources supplies green and low-carbon metallurgical furnace materials to develop green mines and build a green steel industry chain

2024 年初，宝武资源提出打造包括“近零碳矿山”“无人采选矿山”“无协力矿山”“无尾矿山”“无事故矿山”在内的“五无”矿山建设，确立首批 4 家零碳示范产品、产线建设项目，明确六个维度的创建路径和三年创建目标，形成创建方案。10 月，宝武资源启动零碳示范项目建设，围绕标准化基础知识、标准制修订程序、标准化文件起草、铁矿石标委会及国际化工作开展专项培训，旨在以零碳铁矿石为原料，为钢铁端提供新的降碳通道，在打造绿色矿山和绿色钢铁产业链上迈出新的步伐。

In early 2024, Baowu Resources introduced a plan to develop "five-zero" mines, featuring near-zero carbon emissions, zero-labor mining and processing, zero auxiliary operations, zero tailings, and zero accidents. As part of the efforts, the company identified an initial group of four zero-carbon demonstration products and production lines and formulated a detailed implementation plan with a clear three-year roadmap defined across six key dimensions. In October, Baowu Resources officially kicked off its zero-carbon demonstration projects. Targeted training programs were carried out, covering topics such as the fundamentals of standardization, procedures for formulating and revising standards, drafting of standardization documents, participation in iron ore standards committees, and international standard alignment. Through these efforts, Baowu Resources is paving a new path to decarbonize the steel industry using zero-carbon iron ore as a raw material, marking a significant step forward in developing green mines and building a green steel industry chain.



案例 西藏扎布耶盐湖绿色综合开发利用项目投入试生产

Case Trial production began at green integrated development and utilization project at Zabuye Salt Lake in Xizang

2024 年 6 月，宝武西藏扎布耶盐湖绿色综合开发利用万吨电池级碳酸锂项目迈入试生产阶段。项目最大的技术亮点是“零污染零水耗”，不会给盐湖带入新的物质，同时自产淡水，也不消耗水资源。项目达产后可年产电池级碳酸锂 9,600 吨、工业碳酸锂 2,400 吨，可供 20 万至 30 万台电动轿车使用，按每台轿车年行驶 2 万公里计算，相较于燃油车每年可减少二氧化碳排放量约 200 万吨。12 月，宝武清能西藏扎布耶源网荷储一体化综合能源站汽轮发电机首次并入孤网发电成功，随着熔岩储热系统后续的分列投入，将为扎布耶锂业二期项目的生产运营提供可靠的能源保障。

In June 2024, Baowu's green integrated development and utilization project at Zabuye Salt Lake in Xizang entered trial production, featuring a 10,000-metric-ton annual capacity for battery-grade lithium carbonate. The project adopts a "zero pollution, zero water consumption" approach, introducing no external substances into the salt lake and generating its own freshwater for internal use, with virtually no dependence on natural water sources. Once fully operational, the project will yield 9,600 metric tons of battery-grade and 2,400 metric tons of industrial-grade lithium carbonate annually—enough to power 200,000 to 300,000 electric vehicles. Based on an average travel distance of 20,000 km per vehicle per year, this would reduce CO₂ emissions by approximately 2 million metric tons annually compared to gasoline-powered vehicles. In December, Baowu Clean Energy successfully connected the turbine power generator of its Zabuye source-network-load-storage integrated energy station in Xizang to the island grid for the first time. Once the lava thermal storage system is commissioned, the station will provide reliable and stable energy support for Phase II of the Zabuye lithium project.



案例 宝钢股份宝山基地、武钢有限推进光伏项目与绿电交易

Case Baosteel's Baoshan Base and Wuhan Iron & Steel scale up PV projects and green power trading

2024 年，宝钢股份不断提升清洁能源的使用比例，强化厂房屋顶光伏项目的开发力度，确保高效利用可再生能源。宝山基地利用厂区大、厂房多的优势，以“100 平方米以上屋面光伏应设尽设”为原则，积极推进分布式光伏发电，已建成国内最大的厂房屋顶光伏项目群，投运装机容量 148 兆瓦峰值，年发电量超过 1 亿度，光伏发电量占比突破总用电量的 1%；绿电采购方面，根据最新交易规则，全力组织年度交易，首次实现年度安全校核量超过 9 亿千瓦时。实时跟踪月度各输电通道余量，就近寻源，开展月度交易，2024 年全年完成绿电交易 10.79 亿千瓦时。武钢有限光伏发电量累计 4,454 万千瓦时，同比提升 275%；完成绿电采购 8 亿千瓦时，同比提升 35.7 倍。

In 2024, Baosteel significantly expanded its clean energy utilization by expanding rooftop PV installation projects and improving the efficiency of renewable energy use. Adopting the principle of "installing rooftop PV wherever roof area exceeds 100 m²", the Baoshan Base had made good use of its extensive facility space and numerous workshops, actively promoting distributed PV generation. The result is the largest rooftop PV project cluster in China, with a total installed capacity of 148 MWp and an annual power generation exceeding 100 million kWh. PV power now accounts for more than 1% of the base's total power consumption. On the green power procurement front, Baoshan Base has conducted annual trading in strict accordance with the latest market regulations, successfully passing a safety verification threshold of over 900 million kWh for the first time. It has also monitored in real time transmission capacity across power channels and prioritized local sourcing for monthly transactions, completing a total of 1.079 billion kWh of green power trading in 2024. Meanwhile, Wuhan Iron & Steel generated a total of 44.54 million kWh through solar power, recording a 275% year-on-year increase. It also procured 800 million kWh of green power, representing a 35.7-fold increase over the previous year.



2024 年 10 月，中南钢铁中南股份厂区光伏发电合作二期项目的重要子项——炼铁厂 B 型原料大棚屋顶光伏发电项目成功并网发电。

In October 2024, the rooftop PV power generation project on the B-type raw material warehouse at the ironmaking plant was successfully connected to the grid. It was a key sub-project under Phase II of the PV collaboration at the plant site of Guangdong Zhongnan Iron & Steel (a subsidiary of Zhongnan Iron & Steel).



2024 年 8 月，宝武清能与宝地资产在宝山宾馆签署战略合作框架协议，双方将共同推进新能源项目、绿色低碳园区建设等方面的深度合作。

In August 2024, Baowu Clean Energy and Baoland Real Estate Asset Management signed a strategic cooperation framework agreement at Baoshan Hotel, deepening collaboration in new energy projects and the development of green and low-carbon industrial parks.



2024 年 2 月，宝山区发展改革委与宝武清能签订战略合作协议，双方将在技术创新、清洁能源、“双碳”领域等方面开展务实合作。

In February 2024, the Baoshan District Development and Reform Commission and Baowu Clean Energy signed a strategic cooperation agreement to jointly advance practical collaboration in technology innovation, clean energy, and carbon peaking and carbon neutrality efforts.



2024 年 10 月，宝地资产绿色低碳园区建设产出新成果，共祥路 889 号 3 兆瓦光伏发电项目成功并网。

In October 2024, Baoland Real Estate Asset Management marked a key milestone in developing green and low-carbon industrial parks, successfully connecting its 3-MW PV power generation project at No. 889 Gongxiang Road.



2024 年 7 月，宝武水务合肥供水公司 954.1 千瓦峰值分布式光伏项目成功并网发电。

In July 2024, Baowu Water Technology's Hefei Water Supply Company successfully connected its 954.1 kWp distributed PV project to the grid.



2024 年 11 月，中钢集团所属 Samancor 铬业 TFC 冶炼厂一期光伏项目正式开工。

In November 2024, construction officially began on Phase I of the PV project at the TFC Smelter operated by Samancor Chrome, a subsidiary of Sinosteel.

绿色智慧服务

Green Intelligent Services

智慧服务业充分发挥功能保障作用，确保主业稳定运行；发挥“加速器”作用，全力助推宝武数字化转型、智能化升级及绿色低碳可持续发展。

The intelligent service sector plays a vital role in safeguarding the stable operation of Baowu's core businesses. Acting as a powerful "accelerator", it actively drives the Group's digital transformation, intelligent upgrading, and green, low-carbon and sustainable development.

宝信软件

Baosight

高度重视人工智能技术，特别是大模型在钢铁行业绿色、低碳发展的支撑作用，探索人工智能技术及大模型在钢铁行业绿色低碳创新应用，从设备、工序、界面、基地及公司全流程等维度研发能效提升技术，打造高炉领域大模型（设备）、热轧工序极致能效（工序）、板坯直轧（界面）、全流程能效诊断（基地全流程）、碳数据平台（公司全流程）等特色解决方案，助力中国宝武绿色低碳转型，推动钢铁行业高质量发展。

Baosight places strong emphasis on artificial intelligence (AI) technologies, especially the role of large-scale AI models in supporting green and low-carbon development in the steel industry. The company has been actively exploring innovative applications of AI technology and large-scale AI models in the green and low-carbon transformation of the steel sector, with a focus on the R&D of energy efficiency improvement technologies across multiple dimensions, including equipment, processes, interfaces, and full-process operations at both base and enterprise levels. Featured solutions include the large-scale AI model for blast furnaces (equipment level), energy efficiency maximization in hot rolling (process level), slab direct rolling (interface level), end-to-end energy efficiency diagnostics (base-wide), and a carbon data platform (enterprise-wide). These solutions empower China Baowu's green transformation and drive high-quality development in the steel sector.

欧冶云商

Ouyeel

依托数据采集和算法模型，实现产业链全流程碳排放数据可知，助力打造绿色低碳供应链。由中国钢铁工业协会牵头、欧冶云商建设并运维的钢铁全产业链 EPD 平台已累计发布 219 份 EPD 报告，为钢铁及相关产业链绿色低碳转型创造了有效价值。

By leveraging data collection and algorithmic modeling, Ouyeel enables full visibility into carbon emissions data covering the entire industrial chain, helping build a green and low-carbon supply chain. The environmental product declaration (EPD) platform covering the entire steel industry chain—led by CISA and developed, operated, and maintained by Ouyeel—has published 219 EPD reports to date, creating substantial value for the green and low-carbon transition of the steel industry and its extended industrial chain.

中钢国际

Sinosteel Engineering & Technology

针对有关键技术进行系统研究与集成开发，形成了包含绿色矿山、带式焙烧机球团、HyCROF、氢基竖炉直接还原铁工艺、高精度长材轧制、热轧带钢、中厚板智能轧制、大型烧结机头烟气袋式除尘等系列关键技术与自主可控设备，助力钢铁业转型升级。

Focusing on the systematic research and integrated development of existing key technologies, Sinosteel Engineering & Technology has built a comprehensive portfolio of critical technologies and autonomous and controllable equipment. These include green mining, travelling grate pelletizing, HyCROF, hydrogen shaft furnace direct reduced iron (DRI) processes, high-precision long product rolling, hot-rolled strip steel, intelligent rolling of medium and thick plates, and baghouse dedusting for large sintering machine head exhaust. These innovations contribute to the transformation and upgrading of the steel industry.

欧冶工业品

Obei

形成产品碳核算平台核心技术能力，引导 944 家供应商开展碳核算，累计发布 2,209 份碳足迹核算报告。以碳核算助推供应链低碳发展的一系列低碳管理模式先后获得中国钢铁工业协会管理创新二等奖、宝山区绿色低碳实践先锋、中国宝武管理创新一等奖和社会责任标杆案例四项荣誉。

Obei has developed core technical competencies for a carbon accounting platform, guiding 944 suppliers through the carbon accounting process and issuing 2,209 carbon footprint accounting reports to date. A series of low-carbon management models—designed to advance low-carbon development across the supply chain through carbon accounting—have earned four prestigious honors successively, including the Second Prize in Management Innovation from CISA, the Green and Low-Carbon Practice Pioneer Award from Baoshan District, as well as the First Prize in Management Innovation and the CSR Benchmark Case from China Baowu.

宝武智维、宝武重工

Baowu Equipment Intelligent Technology and Baowu Heavy Industries

将数智化冶金技术贯穿于绿色低碳工艺变革全流程，助力钢铁主业高质量发展；加大低碳冶金原创工艺技术重点项目投入，推动冶金装备集成创新，助力钢铁制造绿色转型。

These two subsidiaries have embedded digital and intelligent metallurgical technologies throughout the full green and low-carbon transformation process, thereby advancing the high-quality development of the core steel business. Additionally, they have ramped up investment in key projects focusing on the original low-carbon metallurgical processes and technologies, driving integrated innovation in metallurgical equipment and supporting the green transformation of steelmaking.

案例 中国宝武自主研发的钢铁行业大模型首发

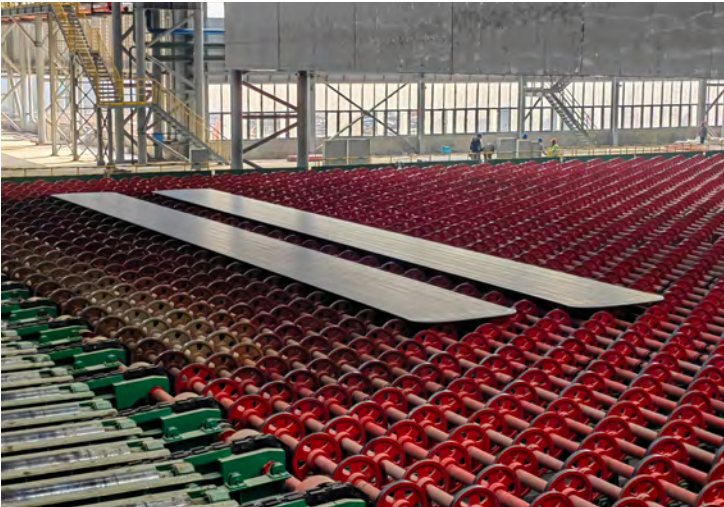
Case China Baowu unveiled its self-developed large-scale AI model for the steel industry

2024 年 10 月 23 日，中国宝武自主研发的钢铁行业大模型产品——“宝联登钢铁行业大模型”在 2024 年全球低碳冶金创新论坛暨第九届宝钢学术年会上首发。模型采用基础大模型、行业垂类大模型、应用场景领域模型三层架构，涵盖研发、生产、运营、服务等多个关键环节，广泛用于企业智慧制造、智慧治理、智慧服务等主题场景，以及高炉大模型、转炉大模型、配煤配矿大模型、云表检大模型、研发设计大模型等领域模型。模型的发布，不仅为钢铁企业提供了一体化、集成化的“人工智能+钢铁”解决方案，更为推动钢铁行业绿色低碳发展贡献了宝武力量。

On October 23, 2024, China Baowu officially launched its self-developed large-scale AI model for the steel industry—"xln³Plat Steel Industry Large Model" at the Global Low-Carbon Metallurgy Innovation Forum 2024 & the 9th Baosteel Biennial Academic Conference. The model adopts a three-tier architecture consisting of base large model, industry-specific vertical model, and application-level domain



models. It covers multiple critical stages such as R&D, production, operations, and services, which can be widely applied across scenarios including enterprise intelligent manufacturing, intelligent governance, and intelligent services. It also supports specialized domain models such as the blast furnace model, converter model, coal and ore blending model, cloud-based surface inspection model, and R&D design model. The launch of this model not only provides the steel industry with an integrated "AI + Steel" solution, but also represents Baowu's strong contribution to advancing the industry's green and low-carbon transformation.



2024 年 2 月，中钢国际中钢设备 EPC 总包建设的铜陵景钢 3,500 毫米中厚板项目投产，采用中钢设备具有自主知识产权的全线自动化控制软件和模型包，其超高水平的智能控制系统、自动控制系统硬件、系统软件及现场总线技术，代表了当今中厚板生产线最先进的自动化技术及未来的发展方向。

In February 2024, Sinosteel MECC, a subsidiary of Sinosteel Engineering & Technology, successfully commissioned the 3,500 mm medium and thick plate project for Tongling Jingchang Steel Products under an EPC contract. The project adopts a full suite of automated control software and model packages developed by Sinosteel MECC with independent intellectual property rights. Featuring a state-of-the-art intelligent control system, automation control system hardware, system software, and fieldbus technology, it represents the most advanced automation technology currently available for medium and thick plate production lines, and points to the future direction of technological development in the field.

案例 宝武智维、宝武重工自主研发鱼雷罐加盖成套设备

Case Baowu Equipment Intelligent Technology partnered with Baowu Heavy Industries to independently develop a complete set of torpedo ladle covering equipment

2025 年 1 月，由宝武智维、宝武重工马钢检修自主研发的鱼雷罐加盖成套设备，已先后收获 3 批次 88 台套的市场订单，并于 2024 年 12 月入选安徽省国内先进首台套重大技术装备，标志着该设备的技术指标已达到国内同类产品先进水平，并可替代进口。

In January 2025, Baowu Equipment Intelligent Technology partnered with Baowu Heavy Industries' Magang Equipment Maintenance to independently develop a complete set of torpedo ladle covering equipment, which has already secured three batches of orders totaling 88 sets. In December 2024, it was recognized as a First Set of Major Advanced Technological Equipment by Anhui Province, marking that its technical performance has reached a leading level among domestic products of its kind and can serve as an import substitute.

鱼雷罐加盖成套设备是紧密贴合钢企“双碳”战略需求，聚焦高温铁水输运装备关键技术领域，构建的智能运维与智慧输运管理一体化系统，可实现高温铁水低碳化输运设备运维与调度管理的综合效能优化，是一个节能、智能、环保的全生命周期管理流程的数智化产品。

The complete set of torpedo ladle covering equipment is designed to align with the strategic needs of steelmakers for achieving the "dual carbon" goals. Focusing on key technologies for high-temperature molten iron transportation, it has established an integrated system for intelligent operation and maintenance and intelligent transportation management. The system enables comprehensive efficiency optimization in the operation, maintenance, and dispatching management of high-temperature molten iron transportation equipment under a low-carbon framework, serving as a digital and intelligent product that supports energy-saving, smart, and eco-friendly management throughout the entire lifecycle.

该项目已在马钢股份和宝钢股份梅山钢铁成功应用，在环境保护与节能减排方面具有显著的经济与社会效益。鱼雷罐加盖后可有效防止运输铁水过程中的烟气外溢，显著减少烟尘排放；减少铁水在运输、倒罐、入炉过程中的辐射散热，降低铁水温度下降速度，提高能源利用效率，经在马钢股份应用对比，项目实施后可实现混铁车运输铁水综合温度降低 15℃。

The project has been successfully implemented at Masteel and Baosteel's Shanghai Meishan Iron & Steel, delivering significant economic and social benefits in terms of environmental protection and energy conservation. By covering the torpedo ladle, the system effectively prevents fume leakage during hot metal transportation, significantly reducing dust emissions. Additionally, it minimizes radiant heat loss throughout the transport, reladling, and furnace charging processes, thereby slowing down the temperature drop of the hot metal and improving the efficiency of energy utilization. Comparative data from its application at Masteel shows that the project may reduce the overall temperature drop of hot metal in torpedo cars by 15°C.



绿色产业金融

Green Industrial Finance

充分利用宝武生态圈资源，推动产融“双向”赋能、“双向”支撑和“双向”融合，探索融融协同（金融业不同机构、业态之间的协同合作）新模式，夯实宝武特色金融业务基本盘。

By fully leveraging the resource advantages within Baowu's ecosystem, the Group has advanced "bidirectional" empowerment, support, and integration between industry and finance. It has actively explored new models of inter-financial collaboration to solidify the foundation of Baowu's characteristic financial services.

华宝信托 Hwabao Trust

为了实现绿色金融推进绿色产业发展的目标，华宝信托于 2021 年设立 ESG 系列信托计划。进一步增加绿色债券、绿色公募基金作为投资标的，致力于打造一款以绿色金融为背景，投资范围涵盖债券、基金、碳配额的“固收+”投资类信托产品。截至 2024 年底，华宝信托 ESG 系列信托计划规模约 1.5 亿元，业绩在市场同类产品中名列前茅。信托计划持有碳配额近 20,000 吨，在获得投资收益的同时，充分发挥信托制度和跨市场资产配置的优势，推动全国碳排放权交易市场建设，产品支持国家“双碳”战略，实现金融机构服务实体经济的目标。

To support green industries through green finance, Hwabao Trust launched its ESG series trust plans in 2021. The investment portfolio increasingly includes green bonds and green public funds, aiming to create a "fixed income plus" investment trust product that aligns with green financial principles and covers bonds, funds, and carbon allowances. As of the end of 2024, the ESG trust plan had reached a scale of approximately RMB 150 million, ranking among the top performers in its class. The plan holds nearly 20,000 metric tons of carbon allowances, leveraging the advantages of the trust system and cross-market asset allocation to generate investment returns while contributing to the development of China's national carbon emissions trading market. The products support national goals for carbon peaking and carbon neutrality, demonstrating the financial sector's service to the real economy.

华宝证券 Hwabao Securities

打造涵盖研究咨询业务、大投行服务、碳金融等多项业务的综合绿色金融服务模式。为企业提供全生命周期的投资银行服务，引导社会资源向新质生产力集聚；打造特色产业研究团队，提供产融结合服务、投资研究服务及 ESG 研究，连续 4 年出品的《钢铁生态圈产业研究年度报告》助力投资者、生态圈企业把握市场及产业发展趋势；为客户提供包括碳储备降本履约、碳资产保值增值和碳金融产品创新在内的全方位、定制化碳资产金融服务，助力宝武及生态圈实体经济高质量发展。

Hwabao Securities has developed a comprehensive green financial services model that integrates research consulting, bulge bracket, and carbon finance. It provides full-lifecycle investment banking services to enterprises and channels societal resources toward new quality productive forces. Hwabao Securities has established a specialized industry research team to provide services in industry-finance integration, investment research, and ESG research. Its *annual Steel Ecosystem Industry Research Report*, published for four consecutive years, has helped investors and ecosystem enterprises grasp market and industry trends. Additionally, Hwabao Securities offers all-around, customized carbon asset financial services to its customers, including cost reduction and compliance through carbon allowance reserves, preservation and appreciation of carbon asset value, and innovation in carbon financial products, supporting the high-quality development of the real economy across Baowu and its broader ecosystem.

华宝股权 Hwabao Equity Investment Fund Management

于 2022 年设立并管理百亿规模的宝武绿碳基金，通过产业基金投资支持中国宝武钢铁产业链生态圈相关绿色低碳产业的发展。截至 2024 年底，宝武绿碳基金累计投资项目 17 个，累计投资额约 36.41 亿元。

In 2022, Hwabao Equity Investment Fund Management established and has since managed the Baowu Green Carbon Fund, a RMB 10 billion industrial investment fund that supports the development of green and low-carbon industries related to China Baowu's steel industry chain and ecosystem. By the end of 2024, the Fund had invested in 17 projects, with a total investment amount of approximately RMB 3.641 billion.

财务公司 Baowu Group Finance Company

投放绿色信贷基金金额 83.38 亿元，与欧冶云商 EPD 平台签署战略合作协议，支持钢厂屋顶光伏、马钢污水处理、矿山综合利用、八钢 HyCROF 等项目建设。

Baowu Group Finance Company disbursed RMB 8.338 billion in green loans and signed a strategic cooperation agreement with Ouyeel's EPD platform. These funds supported various initiatives, including rooftop PV installations at steel plants, wastewater treatment at Magang, integrated resource utilization at mines, and the HyCROF project at Bayi Iron & Steel.

案例 华宝证券完成中山市首批“碳普惠”项目

Case Hwabao Securities completed Zhongshan's first batch of "Carbon Inclusive" project

2024 年 2 月，华宝证券完成对中山四海家具制造有限公司 68 个项目、共计 4,618 吨碳普惠核证减排量（PHCER）的认购。此举是中山市首批“碳普惠”核证减排量交易，充分展现了华宝证券在碳金融创新交易服务上的专业能力和独特优势。

In February 2024, Hwabao Securities completed the purchase of 4,618 metric tons of Puhui Certified Emission Reductions (PHCER) across 68 projects from Zhongshan Four Seas Furniture Mfg. Ltd. This marked the first batch of "Carbon Inclusive" certified carbon emission reduction transactions in Zhongshan, fully demonstrating Hwabao Securities' professional expertise and distinct strengths in carbon finance innovative trading services.



案例 华宝证券助力构建上海碳普惠平台

Case Hwabao Securities contributed to Shanghai's Carbon Inclusive Platform

2024 年 10 月 29 日，由上海市生态环境局牵头的上海碳普惠平台面向全社会开启公开测试。为助力上海碳普惠碳积分商城健康有序运行，华宝证券开发建设华宝证券碳积分商城，入驻上海碳普惠碳积分商城，是首批唯一一家证券公司入驻并参与公开测试的权益方。



On October 29, 2024, the Shanghai Carbon Inclusive platform—initiated by the Shanghai Municipal Bureau of Ecology and Environment—was officially opened for public testing. To support the healthy and orderly operation of the platform's carbon credit marketplace, Hwabao Securities developed and launched its own carbon credit mall, which was integrated into the Shanghai Carbon Inclusive Carbon Credit Mall. It was the first and only securities firm among the initial batch of participating stakeholders to be included and take part in the platform's public testing phase.

案例 财务公司做好绿色金融文章，助力企业高质量发展

Case Baowu Group Finance Company promotes green finance to support high-quality development

财务公司充分发挥产业金融平台功能，2024 年累计开立绿色信贷专项承兑汇票 1.1 亿元，办理银票贴现 1.3 亿元，以“绿色工艺 + 绿色金融”的协同创新模式，精准支持中国宝武旗下专业环保企业完成三大关键升级：更新改造水渣微粉生产线；实施除尘系统超低排放改造；通过供应链金融服务加速资金周转，助力矿粉产品市场占有率提升。

In 2024, Baowu Group Finance Company fully leveraged its functions as an industrial finance platform. It issued a total of RMB 110 million in dedicated green acceptance bills and processed RMB 130 million in discounted commercial bills, precisely innovating a collaborative model of "green processes + green finance", and supporting three key upgrades for a specialized environmental protection enterprise under China Baowu, including upgrading and retrofitting the water-slag superfine powder production line, implementing ultra-low emission retrofitting of the dust removal system, and supplying chain financial services to accelerate fund turnover and expand market share.



绿色运营焕发新机

Revitalizing Green Operations

中国宝武积极倡导绿色低碳、简约适度的生活方式，营造绿色低碳生活氛围，开展环保公益活动，举办专项劳动竞赛，守护生态环境。

China Baowu actively promotes a green, low-carbon, minimalist, and moderate lifestyle and fosters a green and low-carbon culture. Through environmental public welfare activities and themed labor competitions, the Group is committed to protecting the ecological environment.

我们的绩效

Our performance



办公用电量（宝武大厦）较 2023 年下降

17,855.82 千瓦时

Electricity consumption for office use at Baowu Building in 2024 decreased by **17,855.82** kWh compared to 2023.



在云南省宁洱县梅子镇、磨黑镇等地实施碳汇造林

203 亩

In Meizi Town and Mohei Town of Ning'er County, Yunnan Province, China Baowu undertook carbon sink afforestation totaling **203** mu (approx. 13.53 hectares)

人工林抚育

1,300 亩

while also tending **1,300** mu (approx. 86.67 hectares) of planted forests



天然林抚育

700 亩

700 mu (approx. 46.67 hectares) of natural forests

环保培训

Environmental Protection Trainings

中国宝武每年组织一系列能源环保与碳减排方面的相关培训与宣传活动。2024 年，集团公司组织能源环保统计实务培训、焦化行业超低排放政策培训、极致能效技术交流、“无废集团”专题研修、重点流域生态环境保护主题研修等活动，邀请生态环境部等部委专家开展政策研修和培训，营造浓厚绿色低碳发展氛围。

Each year, China Baowu organizes a series of training and awareness programs focused on energy conservation, environmental protection, and carbon reduction. In 2024, the Group hosted sessions on practical training in energy and environmental statistics, ultra-low emission policy training for the coking industry, technical exchanges on energy efficiency maximization, special workshops on the "Waste Free Group" program, and thematic seminars on ecological protection in key river basins. Experts from the Ministry of Ecology and Environment and other governmental bodies were invited to lead training and policy interpretation sessions, helping to foster a strong internal culture of green and low-carbon development.



中国宝武举办 2024 年节能宣传周、低碳日主题活动暨极致能效技术交流研讨会。
China Baowu held the 2024 Energy Efficiency Promotion Week, Low Carbon Day Themed Events & Technical Exchange Seminar on Energy Efficiency Maximization.

主题活动

Thematic Campaigns

中国宝武大力推进绿色宣贯，结合重要节点开展“节能宣传周”“低碳日”“六五环境日”“全国生态日”等主题活动；参加 2024 年全国节能宣传周启动仪式，宣传绿色低碳发展理念，弘扬绿色低碳发展的价值导向；组织知识竞赛、应急演练等丰富多彩的主题活动，提升全员绿色低碳意识，营造良好的绿色低碳发展氛围。

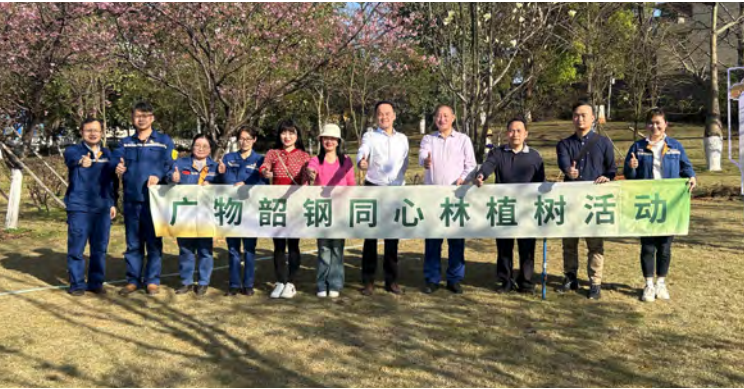
China Baowu vigorously promotes environmental awareness through various thematic campaigns tied to key dates, including China Baowu Energy Efficiency Promotion Week, Low Carbon Day, World Environment Day (June 5), and National Ecology Day. The Group participated in the opening ceremony of the 2024 National Energy Efficiency Promotion Week, promoting the concept of green and low-carbon development and advocating the values it represents. A variety of themed activities—such as knowledge competitions and emergency drills—were organized to raise employees' awareness of green and low-carbon. These efforts aim to foster a strong atmosphere for green and low-carbon development across the organization.



宝钢股份举行以“我为宝钢添新绿，美丽宝钢更美丽”为主题的 2024 年春季植树和公司开放日活动。
Baosteel hosted the 2024 Spring Tree Planting and Open Day event under the theme "Bringing More Green to Baosteel, Making Beautiful Baosteel Even Greener".



宝钢股份举办以“美丽宝山 绿色宝钢”为主题的 2024 年六五环境日宝山区主场活动。
A themed campaign titled "Beautiful Baoshan, Green Baosteel" was held in celebration of World Environment Day on June 5 at Baosteel's headquarters in Baoshan District.



中南钢铁中南股份与广物中南携手开展“广物韶钢同心林”植树活动。
Guangdong Zhongnan Iron & Steel (a subsidiary of Zhongnan Iron & Steel) partnered with GW Zhongnan to organize the "GW & Shaogang Unity Forest" tree-planting initiative.



八钢公司八一钢铁开展春季植树活动。
The Xinjiang Bayi Iron & Steel of Bayi Iron & Steel carried out a spring tree planting campaign.



新钢集团开展环保主题厂区开放日活动。
Xinsteel hosted a plant open day themed environmental protection.



西藏矿业开展节能宣传周和低碳日主题宣传活动。
Tibet Mineral Development conducted promotional activities for Energy Efficiency Promotion Week and Low Carbon Day.



宝武资源围绕“绿色转型 节能攻坚”主题，策划开展集体签名倡议、绿色徒步大会等活动。
Baowu Resources launched group activities such as a collective signature pledge and a green walking challenge under the theme "Green Transformation, Energy Efficiency Drive".



华宝信托与成都市金堂县土桥镇朝阳社区联合举办零碳嘉年华活动。
Hwabao Trust co-hosted a Zero-Carbon Carnival with the Chaoyang Community in Tuqiao Town, Jintang County, Chengdu.

绿色办公

Green Office Practices

中国宝武积极构建绿色、环保、低碳可持续的办公环境，通过使用节能灯具、电脑休眠设置、离岗关灯、无纸化办公等方式节约能源资源，鼓励员工养成节能习惯；提倡绿色低碳生活方式，鼓励员工选择环保产品，践行光盘行动，积极参与垃圾分类和环保公益活动，提升环保意识；鼓励员工选择公共交通、骑行或步行等低碳方式，以实际行动减少个人交通出行产生的碳排放，共建低碳未来。

China Baowu is committed to creating a green, environmentally friendly, low-carbon, and sustainable office environment. The Group promotes energy and resource conservation through practical measures such as using energy-saving lighting, setting computers to sleep mode, turning off lights when away from workplaces, and encouraging paperless workflows. Employees are encouraged to develop energy-saving habits and adopt green, low-carbon lifestyles by choosing eco-friendly products, practicing the "Clean Plate" campaign, and actively participating in waste sorting and environmental public welfare activities to raise their environmental awareness. The Group also advocates for low-carbon commuting options such as public transportation, biking, or walking, thereby reducing personal carbon footprints from daily travel and jointly contributing to a low-carbon future.

劳动竞赛

Labor Competitions

2024 年，根据《关于组织开展中国宝武 2024 年“建功‘四化’‘四有’，创建世界一流”劳动和技能竞赛的指导意见》，组织开展包括全国重点大型钢铁生产设备节能降耗对标竞赛、“运营效率提升”劳动竞赛、“极致低碳”劳动竞赛等在内的中国宝武第四届职工技能竞赛，并定期揭晓竞赛排行、弘扬先进典型，推动全员贯彻落实“双碳”战略，把绿色低碳的理念内化于心、外化于行，为建设美丽中国贡献力量。

In 2024, based on the *Guidelines on Organizing China Baowu's 2024 Labor and Skills Competitions Themed "Contributing to High-End, Intelligent, Green, and High-Efficiency Development, Pursuing Order-Driven Production, Margin-Limited Output, Profit-Driven Revenue, and Cash Flow-Generating Profit, and Building a World-Class Enterprise"*, China Baowu organized the Fourth Staff Skills Competition. This included a national benchmarking competition focused on energy-saving and consumption-reducing measures for large-scale steel production equipment, an "Operational Efficiency Enhancement" competition, and an "Extreme Low-Carbon" themed labor competition. The Group regularly released competition rankings and commended role models to inspire others. These efforts aim to mobilize all employees to fully implement the "dual carbon" strategy, internalize the concept of green and low-carbon development, and put it into practice, thereby contributing to the building of a Beautiful China.

全国重点大型钢铁生产设备节能降耗对标竞赛

光荣榜

高炉赛项

- 冠军炉：**
4000m³级及以上：宝钢股份东山基地3号高炉
- 3000m³级：宝钢股份青山基地6号高炉
- 2000m³级：新钢集团^Q9号高炉
- 优胜炉：**
4000m³级及以上：
宝钢股份宝山基地3号高炉
太钢集团太钢不锈^Q6号高炉
- 3000m³级：山钢股份莱芜基地3800高炉

“运营效率提升”劳动竞赛

光荣榜

经营现金流优胜单位

第1名：中南钢铁
第2名：宝钢包装
第3名：西藏矿业
第4名：宝武碳业^a
第5名：马钢集团

平台型子公司现金流优胜单位

宝武原料

资产负债率优胜单位

第1名：宝武资源
第2名：宝信软件^a
第3名：宝钢股份
第4名：欧冶链金
第5名：宝武环科、宝武水务

“铁矿资源保障”劳动竞赛

光荣榜

国内自产矿合规增产优胜矿山

第1名：宝武资源八钢矿业和合矿
第2名：宝武资源八钢矿业蒙库矿
第3名：宝武资源八钢矿业叶尔羌矿
第4名：宝武资源武钢资源程潮矿
第5名：宝武资源马钢矿业罗河矿
第6名：太钢集团太钢矿业岚县矿
第7名：宝武资源马钢矿业南山矿
第8名：太钢集团太钢矿业尖山矿
第9名：宝武资源马钢矿业白象山矿
第10名：宝武资源梅山矿业
第11名：宝武资源昆钢矿业板块临沧矿
第12名：宝武资源武钢资源金山店矿

国内自产矿降本优胜矿山

第1名：宝武资源八钢矿业敦德矿
第2名：太钢集团太钢矿业尖山矿
第3名：太钢集团太钢矿业岚县矿
第4名：宝武资源武钢资源程潮矿
第5名：宝武资源马钢矿业罗河矿
第6名：宝武资源马钢矿业南山矿
第7名：宝武资源梅山矿业
第8名：宝武资源武钢资源金山店矿

“跨基地工序对标协同创效”劳动竞赛

高炉高效经济运行
赛项

光荣榜

综合竞争力获奖炉

冠军炉：
宝钢股份宝山基地4号高炉

亚军炉：
山钢股份日照基地1号高炉

季军炉：
宝钢股份东山基地2号高炉

进步最快炉：
山钢股份莱芜基地1号高炉

成本冠军炉

4000m³及以上：宝钢股份东山基地3号高炉

3000m³级：宝钢股份青山基地7号高炉

2000m³级：新钢集团9号高炉

2000m³级以下：中南钢铁鄂城钢铁2号高炉

开展劳动竞赛。
Launching labor competitions.

碳汇

Carbon Sinks

自 2022 年起支持云南省宁洱县开展全国林业碳汇试点，2024 年在梅子镇、磨黑镇等地实施碳汇造林 203 亩，人工林抚育 1,300 亩，天然林抚育 700 亩，提升森林固碳能力。优化碳汇交易功能，新增林业碳票登记管理模块，推动碳汇收益惠及林农。2024 年初首批碳汇交易中，66 户林农获得 6.1 万元分成。中国宝武于 2023 年联合地方林业部门打造全国首个林草碳汇数据信息化管理平台。该平台已在宁洱县应用，实现碳汇资源数字化监测与交易管理，提升碳汇项目的透明度和可追溯性。

Since 2022, the Group has supported Yunnan Province's Ning'er County as a national forestry carbon sink pilot. In 2024, a total of 203 mu (approx. 13.53 hectares) of carbon sink afforestation were undertaken by China Baowu in Meizi and Mohei Towns, alongside the tending of 1,300 mu (approx. 86.67 hectares) of planted forests and 700 mu (approx. 46.67 hectares) of natural forests, thereby enhancing forest carbon sequestration capacity. To optimize carbon sink trading, the Group added a forestry carbon credit registration module, ensuring that carbon sink revenues benefit local forest farmers. In early 2024's first carbon sink transactions, 66 forest farmers received a total of RMB 61,000 in revenue shares. In 2023, the Group jointly launched China's first digitized platform for forestry and grassland carbon sink data management with local forestry authorities. The platform is currently active in Ning'er County to enable digital monitoring and trading management of carbon sink resources and improve the transparency and traceability of carbon sink projects.

守护生态

Ecological Preservation

集团公司积极贯彻落实长江经济带、黄河流域生态保护和高质量发展重大国家战略，先后编制印发《中国宝武长江流域环境保护总体规划》《中国宝武黄河流域生态环境保护总体规划》，指导并跟踪督促所属企业持续加强长江经济带、黄河流域所属企业的生态环境保护；积极推进生物多样性保护和生态修复治理等工作，尽可能降低业务经营对生态系统和物种的影响，坚决守牢生态环境保护底线，为建设美丽中国 and 实现人与自然和谐共生积极作出贡献。

The Group has actively implemented major national strategies for ecological protection and high-quality development across the Yangtze River Economic Belt and the Yellow River Basin. It has issued the *China Baowu Yangtze River Basin Environmental Protection Master Plan* and the *China Baowu Yellow River Basin Ecological and Environmental Protection Master Plan*. These plans aim to guide, monitor, and urge affiliated enterprises to continuously enhance ecosystem protection within the regions. In parallel, the Group has actively promoted biodiversity conservation as well as ecological restoration and governance to minimize business operational impacts on ecosystems and species. In doing so, we remain firmly committed to upholding the bottom line of ecological and environmental protection, and actively contributing to the building of a Beautiful China and the realization of harmonious coexistence between humanity and nature.

生物多样性保护

Biodiversity Conservation

宝钢股份 Baosteel

将生物多样性保护融入生产运营全生命周期，对项目规划、建设、生产运营等各节点进行生物多样性保护和土地利用评估；根据生物多样性风险评估结果，不断更新完善短期及长期管理策略，将业务运营带来的生物多样性影响降到最低；通过建立贯穿项目规划、建设、运营全过程的生物多样性保护管理体系，系统推进生态保护战略落地。

Baosteel has consistently integrated biodiversity protection into the entire lifecycle of its production and operations. It has conducted biodiversity conservation and land use assessments at all stages, including project planning, construction, and production and operations. The company has continuously updated and improved its short- and long-term management strategies based on biodiversity risk assessment results, aiming to minimize the impact of its operations on biodiversity. Moreover, Baosteel has put in place a biodiversity protection management system that spans the entire process of project planning, construction, and operations, systematically promoting the implementation of its ecological protection strategy.

中钢国际 Sinosteel Engineering & Technology

主动避让生态敏感区及生物多样性热点区域，严格限制施工范围至用地红线内。开展区域生物遗传资源调查并建立数据库，标记、避让保护性植物。实施施工期实时生态监测，雨季重点防控水土流失，旱季强化扬尘治理。积极推行绿色采购，优先选用可持续来源的原材料，减少对生态系统的依赖；在产品设计中融入生态理念，降低全生命周期对生物多样性的影响。

The company has actively avoided ecologically sensitive and biodiversity hotspot areas, and strictly limited construction within approved boundaries. It has conducted surveys of regional biological genetic resources and established a dedicated database to identify and mark protective plants for avoidance. Moreover, the company has implemented real-time ecological monitoring during construction, with rainy-season water and soil erosion control and dry-season dust suppression measures in place. Actively promoting green procurement, the company gives priority to sustainably sourced raw materials to reduce reliance on ecosystems. Ecological principles have been integrated into product design to minimize impacts on biodiversity throughout the entire product lifecycle.

宝武资源 Baowu Resources

根据《“十四五”环境保护规划》，以矿山企业为重点，以生物多样性净零损失为目标，在矿山运营的全生命周期以源头避免、影响减控、异地补偿的层级减缓方式开展生物多样性保护，并鼓励港口企业开展海港生物多样性保护，支持和协助地方海岛开展相关行动。宝武资源西非公司严格遵守生物多样性保护相关国际标准及几内亚相关法律法规，将生物多样性保护融入项目运营，2024 年，开展项目施工前生物多样性调查标记关键栖息地 55 个，迁移动物 114 只、重新安置植物 912 株、记录 16 个当地物种。

According to its *Environmental Protection Plan during the "14th Five-Year Period"*, the company focuses on mining enterprises and aims for net zero loss of biodiversity. The plan adopts a tiered mitigation approach—prioritizing avoidance at the source, impact mitigation, and off-site compensation—throughout the entire lifecycle of mining operations to protect biodiversity. It also encourages port enterprises to engage in marine biodiversity protection and supports local islands in carrying out related initiatives. Baowu Resources West Africa adheres to international biodiversity standards and local Guinea laws and regulations, integrating biodiversity practices into project operations. In 2024, pre-construction biodiversity surveys were conducted, marking 55 critical habitats, with 114 animals and 912 plants relocated and 16 local species documented.

宝钢包装 Baosteel Packaging

马来西亚宝钢制罐志愿者前往雪邦黄金海岸参与沙滩清理活动。对塑料瓶、废弃渔网、包装袋等海洋污染物进行全面清理，助力改善雪邦黄金海岸的环境质量，提升区域海洋生态系统的稳定性。

Volunteers from Baosteel Can Making (Malaysia) participated in a beach cleanup activity at Sepang Gold Coast, where they conducted a thorough removal of marine debris such as plastic bottles, discarded fishing nets, and packaging waste. The initiative aims to improve the environmental quality of Sepang Gold Coast and enhance the stability of the local marine ecosystem.

案例 宝钢股份梅山钢铁保护长江流域生物多样性
Case Baosteel's Shanghai Meishan Iron & Steel supports biodiversity protection in the Yangtze River Basin

宝钢股份梅山钢铁遵循《中华人民共和国长江保护法》等政策文件要求，建立并更新了“长江大保护”行动方案，该方案涵盖了节能低碳、水资源管理、固废利用与处置、废气超低排、码头与船舶运输管理等维度，推进绿色低碳高质量发展，持续改善岸线及区域环境，支撑长江流域生物多样性保护工作的落实。

Baosteel's Shanghai Meishan Iron & Steel has established and updated the Action Plan for Yangtze River Protection in strict accordance with relevant policy documents such as the *Yangtze River Protection Law of the People's Republic of China*. The action plan covers energy conservation and carbon reduction, water resource management, solid waste utilization and disposal, ultra-low emissions of waste gas, and regulation of port and vessel transportation. These measures collectively advance green, low-carbon, and high-quality development, while constantly improving the shoreline and regional environment and supporting biodiversity protection in the Yangtze River Basin.

此外，梅山钢铁在推进涉及南京长江江豚省级自然保护区、长江大胜关长吻鮠铜鱼国家级水产种质资源保护区的项目时，依法开展渔业资源影响评估及江豚保护专项论证，同时采取一系列科学有效的措施，最大限度减轻项目对保护区域的影响。

In recent years, when advancing projects in the Jiangsu Provincial Nature Reserve for the Yangtze Finless Porpoise in Nanjing and the National Aquatic Germplasm Resources Reserve for *Leiocassis longirostris* and *Coreius heterodon* at Dashengguan in the Yangtze River—Shanghai Meishan Iron & Steel has conducted fisheries resource impact assessments and special evaluations on finless porpoise conservation in accordance with the law. Meanwhile, a series of scientifically grounded mitigation measures have been taken to minimize project impacts on protected areas to the greatest extent possible.

案例 宝钢股份宝山基地水库开展生物多样性与生态系统调查
Case Biodiversity and ecosystem survey conducted at the reservoir of Baosteel's Baoshan Base

宝钢股份宝山基地水库水质评估项目涵盖了生物多样性、生态系统状态以及污泥生态的综合调查与科学评估工作。具体内容包括：

The water quality assessment project conducted at the reservoir of Baosteel's Baoshan Base encompassed a comprehensive investigation and scientific evaluation of biodiversity, ecosystem conditions, and sludge ecology. The project mainly included the following surveys:

生物多样性与生态系统调查
Biodiversity and ecosystem survey

全面评估水库的浮游生物群落、鱼类种群结构、底栖生物多样性等生态体系的关键要素，形成专业性的鱼苗 / 螺类补充或鱼类捕捞管理建议方案，以促进水库生态平衡的恢复与维护。

A comprehensive evaluation of key ecological elements such as plankton communities, fish population structures, and benthic biodiversity within the reservoir. Based on the findings, professional recommendations were developed for fish fry or mollusk supplementation and fishing management strategies to support the restoration and maintenance of ecological balance in the reservoir.

库区底泥特性调查
Bottom sediment characterization survey

细致分析底泥的物理化学性质及污染状况，评估其对水库生态功能的影响，明确日常监测所需的关键指标，制定详尽的监测计划及长期管理策略，保障水生生物的生境安全。

A detailed analysis of the physical and chemical properties of bottom sediments and their pollution levels was conducted to assess their impact on the reservoir's ecological functions. Key indicators for routine monitoring were identified and a detailed monitoring plan and a long-term management strategy were proposed to ensure the safety of aquatic habitats.

案例 宝钢股份开展生物多样性调查
Case Baosteel conducted a biodiversity survey

植树节期间，宝钢股份在宝山基地记录形成了《宝钢生物图鉴》，共计发现 97 种鸟类、18 种兽类、13 种两栖爬行类、111 种昆虫和 420 种植物，展现了宝山基地丰富的生物多样性资源。

During the Tree-Planting Day period, Baosteel documented its findings in the *Baosteel Biodiversity Atlas* at the Baoshan Base. The survey recorded a total of 97 bird species, 18 mammal species, 13 amphibian and reptile species, 111 insect species, and 420 plant species, showcasing the Baoshan Base's rich biodiversity resources.

生态修复治理
Ecological Restoration and Governance

中钢国际

Sinosteel Engineering & Technology

采用先进施工技术优化流程，减少土地扰动；推行“边建设、边复垦”模式，施工中同步实施土壤改良、植被恢复，恢复原地类或可利用状态。积极参与和推动生态修复工程设计，充分考虑土地的自然条件、生态环境和周边资源，确保项目布局规划科学合理，避免敏感生态区域遭到破坏，减少自然资源侵占。

The company has optimized project workflows with advanced construction techniques to minimize land disturbance. It adopts a "build-and-reclaim" model, whereby soil remediation and vegetation restoration proceed simultaneously during construction to reinstate land to its native or usable state. The company has actively participated in and made progress in ecological restoration engineering design. By taking natural conditions of the land, ecosystem conditions, and nearby resources into full consideration, it ensures scientifically sound project layout planning, thereby preventing damage to sensitive ecological areas and minimizing encroachment into natural resources.

宝武资源

Baowu Resources

重钢矿业西昌矿实施滑坡体治理等多项防护工程，同步开展水保监测、矿山地质环境保护与土地复垦监测工作，共计撒播花草种 7.7 万余平方米。马钢矿业张庄矿开展植被恢复工作，南山矿完成高村采场生态修复约 2.1 万平方米，罗河矿累计种植乔木 110 株、灌木 219 株、铺设草皮 7,100 平方米、撒草籽 1,360 平方米。西芒杜铁矿项目重新造林 42.8 公顷，共计 64,775 株植物；对道路边坡、弃土场等处喷播复绿面积达 4.3 万平方米，边坡复绿面积约 6.5 万平方米。

At the Xichang mine operated by Chonggang Mining, a series of protective projects, including landslide mass remediation works, have been implemented, alongside water and soil conservation monitoring as well as monitoring for mine geological environment protection and land reclamation. Over 77,000 square meters have been sown with grass and flower seeds. At Magang Mining's Zhangzhuang mine, vegetation restoration has been initiated, and the Nanshan mine has completed approximately 21,000 square meters of ecological restoration at the Gaocun mining site. The Luohe mine has seen the planting of 110 trees, 219 shrubs, installation of 7,100 m² turf, and sowing of 1,360 m² grass seed. The Simandou iron mine project has completed reforestation over an area of 42.8 hectares, planting a total of 64,775 trees. Additionally, hydroseeding for revegetation was carried out on road slopes, waste dumps, and other areas, covering approximately 43,000 square meters, with slope revegetation totaling around 65,000 square meters.



宝武资源安徽皖宝投入 927.77 万元，实施桃冲青阳矿环境整治、秀山矿绿色矿山建设，矿区环境大幅改善。
Baowu Resources' Anhui Wanbao invested RMB 9.2777 million for the environmental renovation at the Taoshong Qingyang mine and the green mining construction at Xiushan mine, significantly improving the mining environment.



宝武资源马钢矿业南山矿对东山采场展开复垦治理，进行了地貌重塑、植被重建、生态重构等系列工作，实现从铁矿采坑到阡陌良田的绿色蝶变。
The Nanshan mine of Magang Mining, a subsidiary of Baowu Resources, carried out land reclamation and ecological treatment at the Dongshan mining site, including landform reshaping, vegetation restoration, and ecosystem reconstruction—achieving a green transformation from iron ore pits to fertile fields.



宝武资源大冶矿绿化复垦基地——“石海绿洲”。
The greening and reclamation base at Baowu Resources' Daye mine is known as an "oasis amid the stone sea".



宝武资源梅山矿业每年投资约 450 万元进行绿化维护等工作，促进矿区环境提档升级，矿区绿化覆盖率已达到可绿化面积的 100%。
Baowu Resources' Meishan Mining annually invests around RMB 4.5 million in greening and maintenance activities to upgrade the mining environment, achieving 100 % vegetation coverage across its greenable area.

产城融合

Industry-City Integration

积极践行绿色循环发展理念，全力推进“无废城市”建设，深度助力产城融合。宝武环科、宝武水务通过高效处置上海河道底泥、成功投运温州飞灰资源化项目以及南京社会废油桶处理产线等，显著提升城市固危废处理能力，更创新性地利用钢铁冶炼协同处置城市废弃物，有效破解城市环境治理难题，有力推动了钢铁产业与城市共生共荣。

China Baowu has actively implemented green and circular development principles and vigorously promoted the construction of "zero waste cities" to boost in-depth industry-city integration. Baowu Environment and Resource Technology and Baowu Water Technology have significantly enhanced the city's capacity for managing solid and hazardous waste in a multi-pronged approach. Relevant measures include efficiently handling dredged river sediment in Shanghai, successfully commissioning the fly ash recycling project in Wenzhou, and launching the waste oil drum treatment line in Nanjing. These efforts innovatively leverage steelmaking synergies to tackle urban waste issues, effectively addressing urban environmental governance challenges, strongly advancing the symbiotic growth of the steel industry and the city.

案例 污泥处置量突破 20 万吨，宝武环科、宝武水务助力“无废城市”建设

Case Sludge treatment exceeding 200,000 metric tons—Baowu Environment and Resource Technology and Baowu Water Technology support the construction of "zero waste cities"

宝武环科、宝武水务紧贴城市环境治理要求，紧抓环保市场发展机遇，紧扣城市污泥处置技术和服务能力提升，2024 年全量获得上海市杨浦区虬江河、小吉浦河的河道底泥处置三份合同。为完成处置任务，城市污泥团队深挖潜能，产能不断突破，日产量先后攻克 1,000 吨、2,000 吨、3,000 吨，单日最高处置量达 3,966 吨，单月最高达 58,909 吨。全年累计接收处置量超 20 万吨，相比前一年同期翻两番，创下新纪录，有力推动了“无废城市”建设。

Aligning closely with urban environmental governance requirements and capitalizing on the development opportunities in the environmental protection market, Baowu Environment and Resource Technology and Baowu Water Technology prioritize the improvement of urban sludge disposal technologies and service capabilities. In 2024, the companies secured three full-scale contracts for the disposal of dredged sediment from the Qiujiang River and Xiaojipu River in Yangpu District, Shanghai. To fulfill the task, the urban sludge team continuously pushed capacity limits, achieving successive breakthroughs in daily processing volumes—from over 1,000 metric tons to 2,000 metric tons, then 3,000 metric tons—with a peak single-day record of 3,966 metric tons and a record monthly high of 58,909 metric tons. The total annual volume of sediment received and treated had exceeded 200,000 metric tons, a fourfold increase compared to the same period last year. This milestone has set a new record and significantly contributed to the development of "zero waste cities".

2024 年 In 2024

全年累计接收处置量超

20 万吨

The total annual volume of sediment received and treated had exceeded 200,000 metric tons



2024 年 8 月，宝武环科、宝武水务下属温州环发的温州市生活垃圾焚烧飞灰资源化利用项目正式启动投料试运行。截至 12 月，该项目已累计处置原灰超过 4,800 吨，具备达产能力。作为温州首个飞灰资源化利用项目，将助力温州市在生活垃圾焚烧飞灰处置上，逐步从传统的填埋方式迈向资源化利用方式。

In August 2024, Wenzhou Environmental Development, a subsidiary of Baowu Environment and Resource Technology and Baowu Water Technology, officially launched the trial operation of Wenzhou's municipal solid waste incineration fly ash recycling project. By December, the project had processed over 4,800 metric tons of raw fly ash in total and achieved full production capacity. As Wenzhou's inaugural fly ash resource utilization initiative, the project will help Wenzhou gradually shift from traditional landfill disposal to resource utilization in the treatment of fly ash from municipal solid waste incineration.



2024 年 9 月，宝武环科、宝武水务旗下环科南京社会废油（漆）桶处理产线正式投入运营。

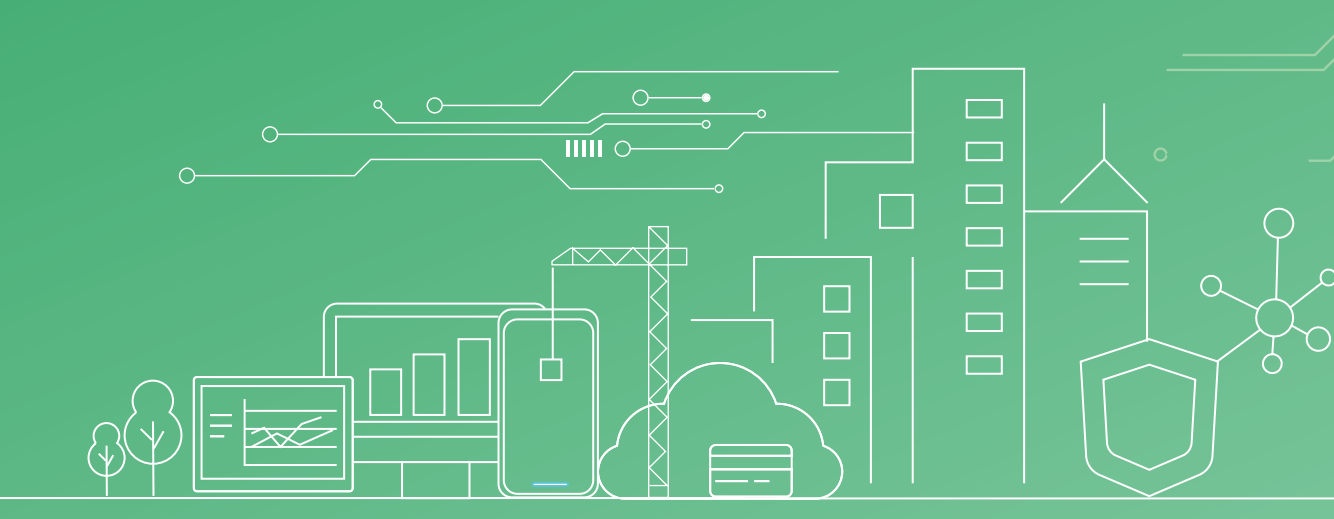
In September 2024, Baowu Huanke Nanjing Resources Utilization, a subsidiary of Baowu Environment and Resource Technology and Baowu Water Technology, commenced full operation of its waste oil (paint) drum treatment line.

绿链伙伴联动更广

Broadening Green Chain Partnerships

2024 年，中国宝武通过构建标准体系、打通平台互联、深化行业生态联动，推动行业进步与绿色低碳发展。

In 2024, China Baowu continued to advance industry-wide progress and green low-carbon development by developing standard systems, facilitating platform interconnectivity, and deepening industry ecosystem linkage.



我们的绩效 Our performance



标准体系共建 Jointly developing the standard system

- 发布《2024 年度低碳冶金创新基金项目指南》，以资金支持驱动技术创新。

We released the *2024 Guide for Low-Carbon Metallurgy Innovation Fund Projects* to drive technological innovation through funding.

- 编发《钢铁行业 EPD 平台蓝皮书》，编制《低碳排放钢评价方法》团体标准，建立行业低碳产品评价体系。

We prepared and released the *Blue Book of the EPD Platform for the Steel Industry* and formulated the group standard *Evaluation Method for Low-Carbon Steel*, laying the groundwork for a comprehensive low-carbon product evaluation system in the industry.

平台互联共建 Boosting platform interconnectivity

- 完善中国钢铁行业 EPD 平台机制，与瑞典、意大利平台签署互认备忘录，推动中国全产业链 EPD 平台的国际互认。

We improved the mechanism of the EPD platform for China's steel industry and signed mutual recognition memoranda of understanding (MOUs) with Swedish and Italian platforms to advance international mutual recognition of China's full-industry-chain EPD platform.

行业生态共建 Co-building the industrial ecosystem

- 参与全球低碳冶金创新论坛、上海国际碳中和博览会等顶级行业活动，输出氢冶金、CCUS 等实践经验。

We participated in top-tier industry events such as the Global Low-Carbon Metallurgy Innovation Forum and the Shanghai International Carbon Neutrality Expo in Technologies, Products and Achievements, sharing our practical experience in hydrogen metallurgy and CO₂ capture, utilization and storage (CCUS).

- 加入 CN100 绿色低碳供应链链主企业联盟，共建碳服务生态圈。

We joined the CN100 Green and Low-Carbon Supply Chain Alliance, making concerted efforts to build a carbon services ecosystem.

- 承建“绿色低碳供应链公共服务平台”，参与发起中国供应商 ESG 评级平台，通过数字化工具赋能供应链绿色协同。

We led the establishment of a "public service platform for green and low-carbon supply chains" and co-initiated a platform for rating Chinese suppliers' ESG performance, empowering green supply chain collaboration via digital tools.

案例 《2024 年度中国宝武低碳冶金创新基金项目指南》发布

Case China Baowu releases the 2024 Guide for Low-Carbon Metallurgy Innovation Fund Projects

2024 年 10 月 23 日，《2024 年度中国宝武低碳冶金创新基金项目指南》在全球低碳冶金创新论坛上正式发布。该指南继续聚焦低碳冶金绿色原料、低碳燃料、生物质能、冶金资源综合利用、CCUS 等领域，鼓励开展钢铁及相关领域新材料、新产品、新技术、新工艺等基础及应用基础研究，助力低碳冶金技术进步和行业转型升级。

On October 23, 2024, China Baowu officially released its 2024 Guide for Low-Carbon Metallurgy Innovation Fund Projects at the Global Low-Carbon Metallurgy Innovation Forum. The guide maintains its focus on key fields such as low-carbon metallurgical green raw materials, low-carbon fuels, biomass energy, integrated utilization of metallurgical resources, and CCUS. It encourages both fundamental and applied fundamental research on new materials, products, technologies, and processes in steel and related sectors to accelerate technological progress and transformation in the low-carbon metallurgical industry.



案例 宝武主办 2024 绿色发展数智供应链大会，构建钢铁全产业链碳管理新生态

Case Baowu hosted the 2024 Digital and Intelligent Supply Chain Conference for Green Development, shaping a new carbon management ecosystem for the entire steel industry chain

2024 年 10 月，由宝武主办、欧冶云商承办的 2024 绿色发展数智供应链大会成功举办。大会发布了《低碳排放钢评价方法》团体标准、碳足迹计算与管理平台 ICM，完成了绿色供应链与碳足迹管理合作协议签署以及欧冶钢铁供应链联合体签约。

The 2024 Digital and Intelligent Supply Chain Conference for Green Development, hosted by China Baowu and organized by Ouyeel, was successfully held in October 2024. The conference saw the launch of the group standard *Evaluation Method for Low-Carbon Steel* and the carbon footprint calculation and management platform, ICM. It also featured the signing of a cooperation agreement on green supply chain and carbon footprint management, as well as the contract signing of the Ouyeel Steel Supply Chain Consortium.

《低碳排放钢评价方法》团体标准基于近 3.5 亿吨粗钢产品的碳排放基础数据，数据规模庞大、内容丰富，为中国低碳排放钢标准的制定树立了新标杆。碳足迹计算与管理平台 ICM 由欧冶云商开发，拥有完全自主化 LCA 计算能力并涵盖主要钢铁产品种类及生产流程实景和背景数据，标志着钢铁行业向碳足迹管理数字化、智能化迈入了重要一步，对提升钢铁全产业链 LCA 能力建设、构建中国本土钢铁全产业链碳数据库具有重要意义。

The group standard, *Evaluation Method for Low-Carbon Steel*, was developed based on a robust dataset of carbon emissions from approximately 350 million metric tons of crude steel, making it both extensive in scale and rich in content. It sets a new benchmark for the formulation of low-carbon steel standards in China. The carbon footprint calculation and management platform, ICM, developed by Ouyeel, features fully autonomous life cycle assessment (LCA) calculation capabilities and incorporates real-world and background data across major steel product categories and production processes. This marks a significant step toward digital and intelligent carbon footprint management in the steel industry. It also plays a crucial role in enhancing life cycle assessment (LCA) capabilities across the entire steel industry chain and in building a localized, full-industry-chain carbon emission database tailored to China's steel sector.



案例 《钢铁行业 EPD 平台蓝皮书》首次公开发布

Case First public release of the *Blue Book of the EPD Platform for the Steel Industry*

2024 年 6 月，《钢铁行业 EPD 平台蓝皮书》首发，展示了中国钢铁行业绿色低碳高质量发展的阶段性成果，为 EPD 报告发布、企业绿色低碳转型决策提供可信依据。

In June 2024, the *Blue Book of the EPD Platform for the Steel Industry* was released for the first time, highlighting the phased achievements of China's steel sector in pursuing green, low-carbon, and high-quality development. The publication provides credible references for EPD report disclosures and corporate decision-making in green and low-carbon transformation.

中国宝武积极践行绿色低碳转型发展战略，委托欧冶云商推动 EPD 相关工作，向中国钢铁工业协会申请承担了中国钢铁行业 EPD 平台的建设运营工作。平台 2021 年 11 月启动建设、2022 年 5 月正式上线；2023 年制定 GPI 平台通用规则 2.0 版，夯实平台运作基础，通过 ISO27001 安全体系认证，借助区块链等信息安全技术，保障系统安全高效；2024 年，发布了国内首份《钢铁行业 EPD 平台蓝皮书》。自平台上线以来，已先后开发了 14 份产品种类规则 (PCR)，为钢铁行业环境绩效披露提供了技术指南，平台累计发布 219 份 EPD 报告，平台注册用户超过 6,000 家，EPD 报告下载次数超过 50,000 次。

Committed to advancing its development strategy for green and low-carbon transformation, China Baowu has entrusted Ouyeel to spearhead EPD-related efforts and applied to CISA to undertake the construction and operation of the EPD platform for China's steel industry. The platform was initiated in November 2021 and officially went live in May 2022. In 2023, it released Version 2.0 of the General Programme Instructions (GPI), laying a solid foundation for platform operation. The same year, the platform obtained ISO 27001 information security management systems certification, with blockchain and other information security technologies employed to ensure system security and efficiency. In 2024, it published China's first *Blue Book of the EPD Platform for the Steel Industry*. Since its launch, the platform has developed 14 Product Category Rules (PCRs), offering technical guidance for environmental performance disclosure in the steel industry. To date, it has published 219 EPD reports, attracted over 6,000 registered users, and recorded more than 50,000 downloads of EPD reports.



案例 欧冶云商承接绿色低碳供应链公共服务平台建设和运维工作

Case Ouyeel undertook construction, operation, and maintenance of the public service platform for green and low-carbon supply chains

2024 年 1 月，欧冶云商与宝山区签署合作协议，欧冶云商将承担建设绿色低碳供应链公共服务平台责任。该平台要求建立一套符合中国国情市情、衔接国际规则的产品碳足迹管理体系，以提升标准计量、数据采集能力，并实施产品碳标识认证制度。通过统一管理规则和数据共享，形成丰富的产品碳足迹应用场景，推动供应链重点环节绿色低碳转型，促进碳足迹国际国内衔接互认，致力覆盖全产业链、辐射长三角、服务全国。

In January 2024, Ouyeel signed a cooperation agreement with the people's government of Baoshan District to undertake the responsibility for constructing and operating the public service platform for green and low-carbon supply chains. The platform is tasked with building a product carbon footprint management system tailored to China's national and municipal conditions and aligned with international norms. It aims to enhance standardized measurement and data collection capabilities and implement a product carbon labeling certification system. By standardizing management rules and enabling data sharing, the system will create diversified carbon footprint application scenarios, drive green and low-carbon transitions across key supply chain segments, and foster mutual recognition between international and domestic carbon footprint standards—ultimately covering the entire industrial chain, influencing the Yangtze River Delta, and serving the whole country.



案例 宝武绿色低碳供应链实践亮相上海国际碳中和博览会主旨论坛

Case Baowu's green and low-carbon supply chain practices showcased at the keynote forum of the Shanghai International Carbon Neutrality Expo in Technologies, Products and Achievements

2024 年 6 月 7 日，宝武绿色低碳供应链的创新实践亮相上海国际碳中和博览会主旨论坛，为实现碳中和目标贡献出更多“宝武智慧”。主旨论坛上，CN100 绿色低碳供应链链主企业联盟成立，绿色低碳供应链案例集发布。宝武作为联盟的倡议和发起单位之一，成为首批加入 CN100 绿色低碳供应链链主企业联盟的单位。同时，作为中国钢铁行业绿色低碳高质量发展的阶段性成果——钢铁行业 EPD 平台案例也被收录进绿色低碳供应链案例集。

On June 7, 2024, Baowu's innovative practices in building a green and low-carbon supply chain were showcased at the keynote forum of the Shanghai International Carbon Neutrality Expo in Technologies, Products and Achievements, contributing "Baowu's wisdom" to the carbon neutrality goal. At the forum, the CN100 Green and Low-Carbon Supply Chain Alliance was officially launched, and a collection of green and low-carbon supply chain cases was released. Baowu, as a co-initiator and one of the first member enterprises, became one of the first entities to join the CN100 Green and Low-Carbon Supply Chain Alliance. At the same time, the EPD platform for the steel industry—an important milestone in the sector's green, low-carbon, and high-quality development—was also included in the published collection as a representative case.



结语

Conclusion

我们以绿色定义钢铁底色，以低碳冶金驱动绿色化发展，通过持续完善“钢铁绿色工艺技术、绿色低碳资源与能源、绿色低碳钢标准和产品以及碳资产碳金融管理”的“3 + 1”绿色低碳布局，推动“碳绿协同”，重塑未来钢铁，助力美丽中国建设。

We take green as a defining feature of steel and drive green development through low-carbon metallurgy. By continuously polishing our "3+1" green and low-carbon strategic framework—encompassing "green steelmaking processes and technologies, green and low-carbon resources and energy sources, green and low-carbon steel standards and products, as well as carbon asset and carbon finance management"—we remain committed to fostering "synergies between decarbonization and greening". Through these efforts, we aim to reshape the future of steel for contributing to the national vision of building a Beautiful China.

附录 Appendix

关键绩效 Key Performance Indicators

环境绩效 Environmental Performances				
指标 Indicator	单位 Unit	2022	2023	2024
环保投入 ¹ Investment in environmental protection ¹	亿元 RMB 100 million	151.36	155.97	45.77
万元产值（收入）综合耗能（可比价） ² Comprehensive energy consumption per RMB 10,000 of output value/revenue (comparable price) ²	吨标准煤 / 万元 tce/RMB 10,000	0.99	0.92	0.94
吨钢耗新水量 Fresh water consumption per metric ton of steel	立方米 / 吨钢 Cubic meters/metric ton of steel	2.35	2.30	2.28
重复用水率 Water reuse rate	%	98.27	98.23	98.59
废水排放量 ^{3、4} Liquid discharge volume ^{3、4}	万吨 10,000 metric tons	8,895	8,235	10,293
化学需氧量排放量 ² Chemical oxygen demand emissions ²	吨 Metric tons	1,696	1,440	1,420
二氧化硫排放量 ² Sulfur dioxide emissions ²	吨 Metric tons	24,020	20,948	19,338
氮氧化物排放量 ² Nitrogen oxides emissions ²	吨 Metric tons	56,647	51,056	47,488
固体废物综合利用率 Comprehensive utilization rate of solid waste	%	99.75	99.90	99.60
危险废物合规处置率 Hazardous waste disposal compliance rate	%	100	100	100
吨钢二氧化碳排放量下降率 The reduction rate of CO ₂ emissions per metric ton of steel	%	0.15	1.35	0.82
办公用电量（宝武大厦） Electricity consumption for office use at Baowu Building	千瓦时 kwh	427,032.41	415,681.82	397,826.00

宝武集团旗下所有钢厂均已开展超低排放改造，且多数企业超低排放改造工作已于 2024 年完成，故 2024 年环保投入金额大幅降低。

¹ All steel mills under China Baowu have been engaged in ultra-low emission upgrades. As most of the upgrading efforts were completed in 2024, the Group's investment in environmental protection for the year decreased significantly.

² 受下属企业整合重组转出影响，收入减少，2024 年数据同比还原后较上年下降 5% 以上。

² Due to the transfer of certain subsidiaries as part of consolidation and restructuring, total revenue declined. After adjusting for comparable scope, the data for 2024 decreased by over 5% year-on-year.

³2024 年，宝武集团环保实绩中开始包含太钢集团外供社会资源化直接使用的水量。

³ Starting in 2024, China Baowu's environmental performance data began to include the volume of water directly supplied to external users for resource utilization by TISCO.

⁴2023 年，宝武集团环保实绩中开始包含中钢集团数据，故 2022 年还原了包括中钢集团在内的环保实绩。

⁴ Starting in 2023, China Baowu's environmental performance data began to include that of Sinosteel; accordingly, the data for 2022 was retrospectively adjusted to reflect the inclusion of Sinosteel.

《2024 年绿色低碳优秀案例汇编》 A Compilation of Outstanding Green and Low-Carbon Cases in 2024

序号 No.	单位 Subsidiary	案例名称 Case Title
01	宝钢股份 Baosteel (10 项) (10 cases)	1# 焦炉烟气净化超低温脱硝催化剂应用实践（宝山基地） Application of ultra-low temperature denitrification catalyst in 1# coke oven flue gas purification (Baoshan Base)
02		取向 DCL 机组降低退火炉氢气浓度（宝山基地） Reducing hydrogen concentration in the oriented DCL annealing furnace (Baoshan Base)
03		极限废钢比下低碳排放钢减碳技术能力提升（武钢有限） Enhancing decarbonization technological capabilities of low-carbon steel under maximum scrap ratio (Wuhan Iron & Steel)
04		炼铁厂烧结活性炭烟气净化智能控制模型（湛江钢铁） Intelligent control model for sintering activated carbon flue gas purification in the ironmaking plant (Zhanjiang Iron & Steel)
05		冷轧脱脂剂循环系统消除碱性泡沫装置（湛江钢铁） Alkaline foam elimination device for the cold-rolled degreasing agent circulation system (Zhanjiang Iron & Steel)
06		冷轧镀锌锌低温脱脂技术应用（梅钢冷轧厂） Application of low-temperature degreasing technology for cold-rolled aluminized zinc (Meishan Cold Rolling Plant)
07		“6+1”打造“无废工厂”新典范（梅钢公司） "6+1" Model: Creating a new benchmark for "Zero Waste Factory" (Meishan Iron & Steel)
08		BeyondECO-60% 超低碳排放气瓶管示范项目（钢管条钢事业部、中央研究院） BeyondECO-60% ultra-low carbon emission gas cylinder pipe demonstration project (Steel Pipe and Bar Business Unit, Baowu Central Research Institute)
09		宝钢股份“绿色无废城市钢厂”建设实践（宝山基地） Baosteel's practice of building a "Green and Zero Waste Urban Steel Mill" (Baoshan Base)
10		冷轧厂建成先进盐酸再生系统，助力绿色无废城市钢厂建设（冷轧厂） Cold rolling plant's advanced hydrochloric acid regeneration system supports the construction of a green and zero waste urban steel mill (Cold Rolling Plant)
11	中南钢铁 Zhongnan Iron & Steel (5 项) (5 cases)	基于 TRT 发电工艺技术研究及应用（鄂城钢铁） Research and application of TRT-based power generation technology (Echeng Iron & Steel)
12		厚板线原料区域火切机及去毛刺机系统升级改造（重庆钢铁） System upgrade of flame cutting and deburring machines in the raw material area of the thick plate production line (Chongqing Iron & Steel)
13		热熔渣制备矿棉在中南股份的运用（中南股份） Application of molten slag in mineral wool production (Guangdong Zhongnan Iron & Steel)

序号 No.	单位 Subsidiary	案例名称 Case Title
14	中南钢铁 Zhongnan Iron & Steel	协同处置城市存量污泥，以实际行动践行厂城融合（鄂城钢铁） Collaborative treatment of municipal sludge: Promoting integration of plant and city with concrete actions (Echeng Iron & Steel)
15	(5 项) (5 cases)	建设集中式危险废物仓库，打造规范贮存标杆（重庆钢铁） Construction of centralized hazardous waste warehouse as a benchmark for standardized storage (Chongqing Iron & Steel)
16	马钢集团 Magang Group	压缩空气吸附干燥加热工艺技术创新与应用（能源环保部） Innovation and application of compressed air adsorption drying and heating technology (Energy and Environment Protection Division)
17		废水再利用 助力工业生产绿色转型（冷轧总厂） Wastewater reuse to support green transformation in industrial production (Cold Rolling Plant)
18		钢包纯氧烘烤改造（长材事业部） Ladle pure-oxygen baking retrofit (Long Steel Products Business Unit)
19		GB175 水泥新国标背景下，马钢拓展钢渣资源化利用新途径的创新实践（马钢制造管理部、能源环保部、技术中心） Innovative practice in expanding slag recycling under the updated GB175 national standard on cement (Magang Manufacturing Management Department, Energy and Environmental Protection Department, and Technology Center)
20		铁尾矿建材石粉再选，回收低品位粉矿（安徽马钢张庄矿业有限责任公司） Recovery of low-grade ore powder by reconcentrating stone powder from iron tailings (Anhui Magang Zhangzhuang Mining Co., Ltd.)
21	太钢集团 TISCO	开发钢渣风碎技术，实现节能减碳增效（马钢股份） Development of air crushing technology for steel slag to save energy, reduce carbon emissions, and improve efficiency (Masteel)
22		转炉顶底复吹 CO ₂ 资源化能源化综合应用（太钢不锈） Integrated application of BOF top-bottom blowing with CO ₂ for resource and energy utilization (Shanxi Taigang Stainless Steel)
23		燃机低温烟气干基式 SNCR 脱硝技术的开发与应用（太钢不锈能源部） Development and application of dry-based SNCR denitrification technology for low-temperature turbine flue gas (Energy Department of Shanxi Taigang Stainless Steel)
24		浮选底流泵电机更新换代，利用新技术实现节能降耗（岚县矿业有限公司） Energy-saving motor replacement for flotation underflow pumps using new technology (Lanxian Mining Co., Ltd.)
25		宝钢德盛能源综合利用 - 高炉煤气发电项目（能源环保部） Baosteel Desheng Stainless Steel comprehensive energy utilization and blast furnace gas power generation project (Energy and Environment Protection Division)
26	宝武智维 Baowu Equipment Intelligent Technology	酸洗机组预洗硫酸改盐酸，源头减量 60%（太钢不锈冷轧厂） Replacing sulfuric acid with hydrochloric acid for pre-washing in pickling units to achieve 60% source emission reduction (Cold Rolling Plant of Shanxi Taigang Stainless Steel)

序号 No.	单位 Subsidiary	案例名称 Case Title
27	太钢集团 TISCO	酸泥源头减量攻关（宝钢德盛冷轧厂） Breakthrough in source emission reduction of pickling sludge (Cold Rolling Plant of Baosteel Desheng Stainless Steel)
28	(7 项) (7 cases)	烧结机头灰资源综合利用项目（太钢不锈加工厂） Comprehensive utilization of sintering head ash resources (Processing Plant of Shanxi Taigang Stainless Steel)
29	宝信软件 Baosight	超低排放一体化管控平台开发应用——中南股份环境管控一体化平台建设工程（EPC）项目（自动化服务事业本部能环事业部） Development and application of an integrated ultra-low emission control platform: Guangdong Zhongnan Iron & Steel's EPC project for integrated platform construction (Energy and Environmental Protection Business Unit of Automation Service Business Unit)
30	八钢公司 Bayi Iron & Steel	转炉工序煤气回收负能炼钢工艺优化（八一钢铁） Process optimization of converter gas recovery for negative energy steelmaking (Xinjiang Bayi Iron & Steel)
31		HyCROF 低碳冶金技术迭代升级探索与实践（八一钢铁） Exploration and practice of HyCROF low-carbon metallurgical technology upgrades (Xinjiang Bayi Iron & Steel)
32		全过程持续优化球团工序能耗（巴州钢铁） Continuous energy consumption optimization in the pelletizing process (Bazhou Steel)
33	新钢集团 Xinsteel	以废治废，八钢半干法脱硫灰用于烧结湿法脱硫实践（八一钢铁） Treating waste with waste: Bayi Iron & Steel uses semi-dry desulfurization ash for wet desulfurization in sintering (Xinjiang Bayi Iron & Steel)
34		降低 2050 热轧 1 号加热炉炉体散热损失 Reducing the heat loss of No.1 furnace on the 2050 hot rolling line
35		煤气高效化利用控制模型开发与应用（数智化部） Development and application of high-efficiency gas utilization control model (Digital and Intelligent Development Department)
36	(2 项) (2 cases)	变压吸附制氧技术优化（能源环保部） Optimization of pressure swing adsorption (PSA) oxygen production technology (Energy and Environmental Protection Department)
37	宝武资源 Baowu Resources	利用选矿尾矿库回水势能发电的应用实践（富蕴蒙库铁矿有限责任公司） Application of hydropower generation using return water potential from a beneficiation tailings pond (Fuyun Mengku Iron Ore Co., Ltd.)
38		综合能效技术在大宗散货船舶效能提升中的成功实践（上海宝钢航运有限公司） Successful practice of comprehensive energy efficiency technology in improving the efficiency of bulk cargo ships (Shanghai Baosteel Shipping Co., Ltd.)
39		基于城市矿山尾矿全资源化综合利用实践（梅山矿业） Comprehensive utilization practice of urban mine tailings for full resource recovery (Meishan Mining)

序号 No.	单位 Subsidiary	案例名称 Case Title
40	武钢集团 Wugang Group (5 项) (5 cases)	钢铁企业碳素流智慧系统建设与应用实践（昆明钢铁） Development and application of a smart carbon flow system for steel enterprises (Kunming Iron & Steel)
41		提升转炉煤气回收率，实现减碳增效（武昆股份炼钢厂） Improving converter gas recovery to reduce carbon emissions and enhance efficiency (Steelmaking Plant, Wugang Group's Kunming Iron & Steel)
42		集中供热改造 促进低碳节能（园区物业服务事业部） Centralized heating retrofitting to promote low-carbon energy efficiency (Park Property Services Business Unit)
43		锡泥资源再生项目（武汉钢铁有限公司、武钢日铁（武汉）镀锡板有限公司） Tin sludge resource regeneration project (Wuhan Iron & Steel Co., Ltd., WISCO-Nippon Steel Tinplate Co., Ltd.)
44		从“多源固废”到“多源减碳”的实践（武汉钢铁有限公司、武汉钢电股份有限公司） From "multi-source solid waste" to "multi-source decarbonization" (Wuhan Iron & Steel Co., Ltd., Wuhan Steel and Power Co., Ltd.)
45	中钢集团 Sinosteel	尾矿充填胶凝材料研发与应用（山东富全矿业有限公司） R&D and application of cementitious backfill materials for tailings (Sinosteel Shandong Fuquan Mining Co., Ltd.)
46	宝武碳业 Baowu Carbon	改质沥青余热综合利用节能减污降碳实践（武汉宝聚炭材料有限公司） Comprehensive utilization of modified pitch residual heat to save energy and reduce pollutant and carbon emissions (Wuhan Baoju Carbon Materials Co., Ltd.)
47	宝武环科 Baowu Environment and Resource Technology (2 项) (2 cases)	高炉热态渣高值化利用，助力“无废集团”建设（山西资源循环利用有限公司） High-value utilization of hot-state slag from blast furnaces to build a "Waste Free Group" (Shanxi Resource Recycling Co., Ltd.)
48		矿粉智能工厂管控系统新模式：让“300 万吨水渣一键制粉”变废为宝成为现实（上海宝钢新型建材科技有限公司、上海宝田新型建材有限公司） New model of intelligent control system for iron ore powder factories: Turning "3 million metric tons of water slag into valuable powder with one click" into a reality of waste-to-resource transformation (Shanghai Baosteel New Building Materials Technology Co., Ltd., Shanghai Baotian New Building Material Co., Ltd.)
49	宝钢工程 Baosteel Engineering (3 项) (3 cases)	湛江钢铁厚板厂浊循环水系统节能技术研究及应用（上海宝钢节能环保技术有限公司） Research and application of energy-saving technologies for turbid circulating water systems in the thick plate factory of Zhanjiang Iron & Steel (Shanghai Baosteel Energy Conservation and Environmental Protection Technology Co., Ltd.)
50		碱性球团生产工艺技术创新与应用（山西太钢工程技术有限公司） Innovation and application of alkaline pellet production technology (Shanxi Taigang Engineering Technology Co., Ltd.)
51		绿色钢结构智造工厂整体解决方案研究与示范（宝钢建筑工程科技有限公司） Research and demonstration of integrated solutions for green steel structure intelligent manufacturing factory (Shanghai Baosteel Construction Engineering Technology Co., Ltd)

序号 No.	单位 Subsidiary	案例名称 Case Title
52	宝钢金属 Baosteel Metal (2 项) (2 cases)	废水回收再利用（宝玛克科技武汉分公司） Wastewater recycling and reuse (Wuhan Branch, Baomarc Technology.)
53		巢湖宝镁镁渣循环利用项目（宝武镁业巢湖云海镁业有限公司） Magnesium slag recycling project of Chaohu Baowu Magnesium (Baowu Magnesium Chaohu Yunhai Magnesium Co., Ltd.)
54	宝钢包装 Baosteel Packaging (2 项) (2 cases)	环境在线监测系统建设（安全环保部） Development of an online environmental monitoring system (Safety and Environmental Protection Department)
55		彩印区域无组织排放改造项目（武汉宝钢包装有限公司沌口制罐分公司） Fugitive emissions control project in the color printing area (Zhuankou Can Manufacturing Branch, Wuhan Baosteel Packaging Co., Ltd.)
56	宝武水务 Baowu Water Technology (2 项) (2 cases)	烧结烟气脱硫脱硝节能改造（韶关分公司） Energy-Saving retrofit for sintering flue gas desulfurization and denitrification (Shaoguan Branch)
57		利用脱氮污泥中和酸性废水（山西分公司） Neutralization of acidic wastewater using denitrification sludge (Shanxi Branch)
58	欧冶云商 Ouyeel	新能源重卡在产成品运输中的应用实践（欧冶云商物产南京） Application of new energy heavy-duty trucks in finished product transportation (Ouyeel's Materials Industry Nanjing)
59	宝地资产 Baoland Real Estate Asset Management	强化全生命周期管理，积极创建“无废园区”——数智宝地·罗泾园（能源环保部） Strengthening full lifecycle management to actively build a "ZeroWaste Park" – Smart Baoland · Luojing Park (Energy and Environmental Protection Department)
60	欧冶链金 Ouyeel Lianjin Recycling Resources	“平台 + 基地”双轮驱动，引领废钢行业智慧化发展 Dual-driven model of "platform + base" leading smart development in the scrap steel industry
61	宝武清能 Baowu Clean Energy	全球首创空气分离气体产品 PCR 发布 World's first PCR for air separation gas products officially released



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