HBIS practice and action plans for low-carbon development
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China's low-carbon development

Background of low-carbon development – Three milestones

- United Nations Framework Convention on Climate Change (1992)
- Kyoto Protocol (1997)
- Paris Agreement on Climate Change (2015)

For the first time, set a specific target for limiting global warming to well below 2°C above the pre-industrial levels of 1750, and pursue efforts to limit temperature increase even further to 1.5°C.
China's low-carbon development

China's low-carbon commitment – Intended Nationally Determined Contributions submitted to the UN in 2015

A set of commitments to be reached by 2030:

- to achieve peak CO$_2$ emissions (and to make every possible effort to peak earlier);
- to lower CO$_2$ emissions per unit of GDP by 60 to 65 percent from the 2005 level;
- to increase the share of non-fossil energy in primary energy consumption to around 20%;
Chinese President Xi announced:
China is willing to contribute more to fight against climate change, as it aims to bring carbon emissions to a peak by 2030, and achieve carbon neutrality by 2060 with more forceful policies and measures.
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Low-carbon development of the Chinese steel industry is imperative.

- Among heavy industries, the iron and steel sector ranks first when it comes to CO₂ emissions.
- The iron and steel sector directly accounts for 2.6 Gt CO₂ emissions annually, 7% of the global total.
- As the largest steel producing country, China produces about 50% of the world’s total crude steel.
BF-BOF route dominates the steel production process in China.

- The CO₂ emission intensity of BF-BOF route is nearly 3 to 4 times higher than EAF route.
- In 2019, BF-BOF steelmaking route accounted for 89.6% of China’s total crude steel output, while EAF route accounted for 10.4%.
- As for capacity replacement project, Govt. encourages steel companies to develop EAF capacity.
Low-carbon development of the Chinese steel industry

Establishment of nationwide carbon emission trading system

**Carbon emission trading pilots**
- Seven carbon emission trading pilots, including 5 cities (Beijing, Tianjin, Shanghai, Chongqing, Shenzhen) and 2 provinces (Hubei and Guangdong), were established by 2014.
- Carbon trading pilots covered energy-intensive and CO₂ emission intensive industries, including power generation, steel, cement, etc.

**National ETS Phase 1**
- National carbon emission trading system (ETS) was established in China in 2017.
- At phase 1, only power generation sector was included.

**National ETS Phase 2**
- China will step up the launch of nationwide ETS in the period from 2021 to 2025 and expand from single sector to multiple sectors.
- Steel industry may be included in nationwide ETS during this period.
Ultra-low emissions in the Chinese steel industry

In April 2019, five ministerial depts. jointly issued 《Guidance on Promoting the Implementation of Ultra-Low Emissions in the Iron and Steel Industry》

- **Main targets**: By end-2025, nationwide over 80% capacity should complete the transformation and reach ultra-low emission standards.
  - The Ultra-Low Emission Limit Values (ELVs) are among the most stringent ELVs globally.
  - Cover all production processes, including raw material yard, sintering, pelletising, coking, iron-making, steel-making, rolling, captive power plants, and bulk material transportation.
  - Clean transportation (railway, waterway, pipeline, etc.) of raw materials and products accounting for over 80%.

- According to CISA statistics in Nov. 2020, 229 steel producers nationwide, with a total C. S. capacity of 620 Mt/a, are carrying out upgrades to meet ultra-low carbon emission standards.
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HBIS at a Glance

- **Crude steel output**: 46.6 Mt
- **Total Asset**: 462 billion RMB
- **Revenue**: 354 billion RMB
- **Tax Payment**: 43.4 billion RMB
- **Total employees**: 127000+

No. 218 in 2020 Fortune 500
No. 59 in China Top 500
No. 18 in China Top 500 manufacturing companies
Strong comprehensive competitiveness by MPI
Chairmanship (2019-2021)
No. 35 in China Top 100 multinational companies
Snapshots of HBIS green development

- TangSteel site recognised as the cleanest steel plant
- Water treatment center, won worldsteel Excellence in sustainability Steelie Award
- TangSteel New District - Fully enclosed unmanned stockyard
- Enclosed silos for coal storage
- Enclosed stockyards across all steel-making subsidiaries
Roadmap of carbon emission peaking and carbon emission neutrality

Four stages: carbon peak, steady reduction of carbon emissions, further reduction of carbon emissions, and in-depth decarbonisation, to achieve carbon peak by 2022 and carbon neutrality by 2050.

- **2021**  Release roadmap for carbon peaking and carbon neutrality
- **2022**  Reach carbon peak
- **2025**  Reduce carbon emissions by 10% or above, as compared to carbon peak
- **2030**  Reduce carbon emissions by 30% or more compared to carbon peaking
- **2050**  Reach carbon neutrality

Released on March 12, 2021
Implementation pathways and technological solutions

- Optimise industrial layout and process structural reform, and promote carbon emission reduction throughout the whole production process
- Optimise energy use and build multi energy structural systems to accelerate low carbon transformation
- Carry out life cycle assessment to improve steel materials’ performance and life span
- Build a low carbon circular economy industrial chain to achieve synergised carbon reduction
- Advance low carbon technology R&D and implementation through science and technological innovation
- Advocate low carbon production and lifestyle among all employees
Carbon Asset Management Corporation

- Back in May 2017, in response to China’s intention to build a nationwide ETS, HBIS Group took the lead to set up a carbon asset management company.
- The company is positioned to "tap the asset attributes of carbon quotas, use financial tools to maintain and increase its value, and serve the group's low-carbon development strategy."
- Much work has been done, including personnel training, improvement of management and control systems, establishment of carbon data management platform etc., to prepare for the national carbon trading market.
A joint HBIS-UQ (University of Queensland) Innovation Centre for Sustainable Steel was established in 2016, to develop a full-chain process integrated CO2 capture, utilisation and storage (CCUS) technologies with steelmaking processes for HBIS.

CCUS Technology development during the period of the 14th Five-Year Plan (2021-2025):

- Cooperate with the Chinese Academy of Sciences, the top Chinese R&D institute, to study CO2 capture and utilisation technologies.
- To explore efficient and cost-effective CO2 capture and separation technologies and come up with a strategic roadmap for CCUS application in the steel industry.
Stride into the hydrogen era - hydrogen refueling demonstration station

- Hydrogen source: coke oven gas, which contains 60% hydrogen.
- In August 2020, the first HBIS hydrogen refueling demonstration station was put into operation, the first permanent hydrogen refueling station operated by a steel company in China.
- The country’s first 49-tonne hydrogen fuel cell heavy truck entered operation in parallel, making a complete green and recyclable industrial logistic system.
- Located at the HBIS HanSteel site, the station has a daily refueling capacity of 500 kg with 35MPa and 70 Mpa pressure and can fill nearly 20 49-tonne hydrogen fuel cell trucks.
- Second H₂ station came onto stream in HBIS TangSteel site this October.
To build China’s first 1.2 Mt/a hydrogen DRI plant in HBIS XuanSteel, Zhangjiakou City.

- Phase 1: hydrogen source-coke oven gas, capacity 0.6 Mt/a, end-2021
- Phase 2: hydrogen source-electrolytic hydrogen making through clean distributed energy, capacity 0.6 Mt/a

With Hydrogen DRI + EAF steelmaking route, CO$_2$ emission will be reduced by 40%-60% compared to traditional BF-BOF route.

Through this demonstration project, HBIS is planning to build Xuanhua Area, Zhangjiakou City, into a hydrogen energy technology radiation centre, to propel the global steel industry into the hydrogen era.
HBIS practice and action plan for low-carbon development

Upgrading and transformation of urban steel plants

Process reform

New HBIS ShiSteel Mill
Switch from BF-BOF steelmaking to a new generation of green low carbon EAF mill

New HBIS TangSteel Mill
Create a new generation of integrated steel plant featured green, intelligence and brand in coastal area

Transformation and upgrading

XuanSteel: High-tech base
Build a high-end core component manufacturing base and hydrogen steelmaking demonstration project
Advance the global steel industry to move into the hydrogen era (2021-2025)

- To build hydrogen refueling station network in Beijing-Tianjin-Hebei Region.
- By 2025, **14 hydrogen and gas refueling stations** will be built, with the capacity to serve more than 1,000 hydrogen fuel cell vehicles and 6,000 LNG vehicles per day. This will make a breakthrough in the process of replacing diesel trucks with hydrogen fuel cell trucks in the region.
- To advance R&D on hydrogen steelmaking technology and build a global hydrogen metallurgy R&D centre.
- Three hydrogen DRI projects, located in Zhangjiakou, Tangshan, and Handan, respectively, will be completed with a capacity of 1.2Mt/a each, to provide green and high-quality materials for domestic EAF production.
HBIS low carbon development philosophy: **human beings, steel and environment co-exist in harmony.**

Focusing on process reform, relocation, upgrading and transformation, energy efficiency improvement and cutting-edge low carbon technologies, HBIS is aiming to build itself into a new generation of steel company featured **green, intelligence and brand**, playing an exemplary role for the green, low carbon and sustainable development of the global steel industry.