CHINA BAOWU

LOW CARBON and CLIMATE-RELATED NARRATIVE

The 6th APAC CCS Forum 2019

MAY 31 2019

Contents

China Baowu Overview

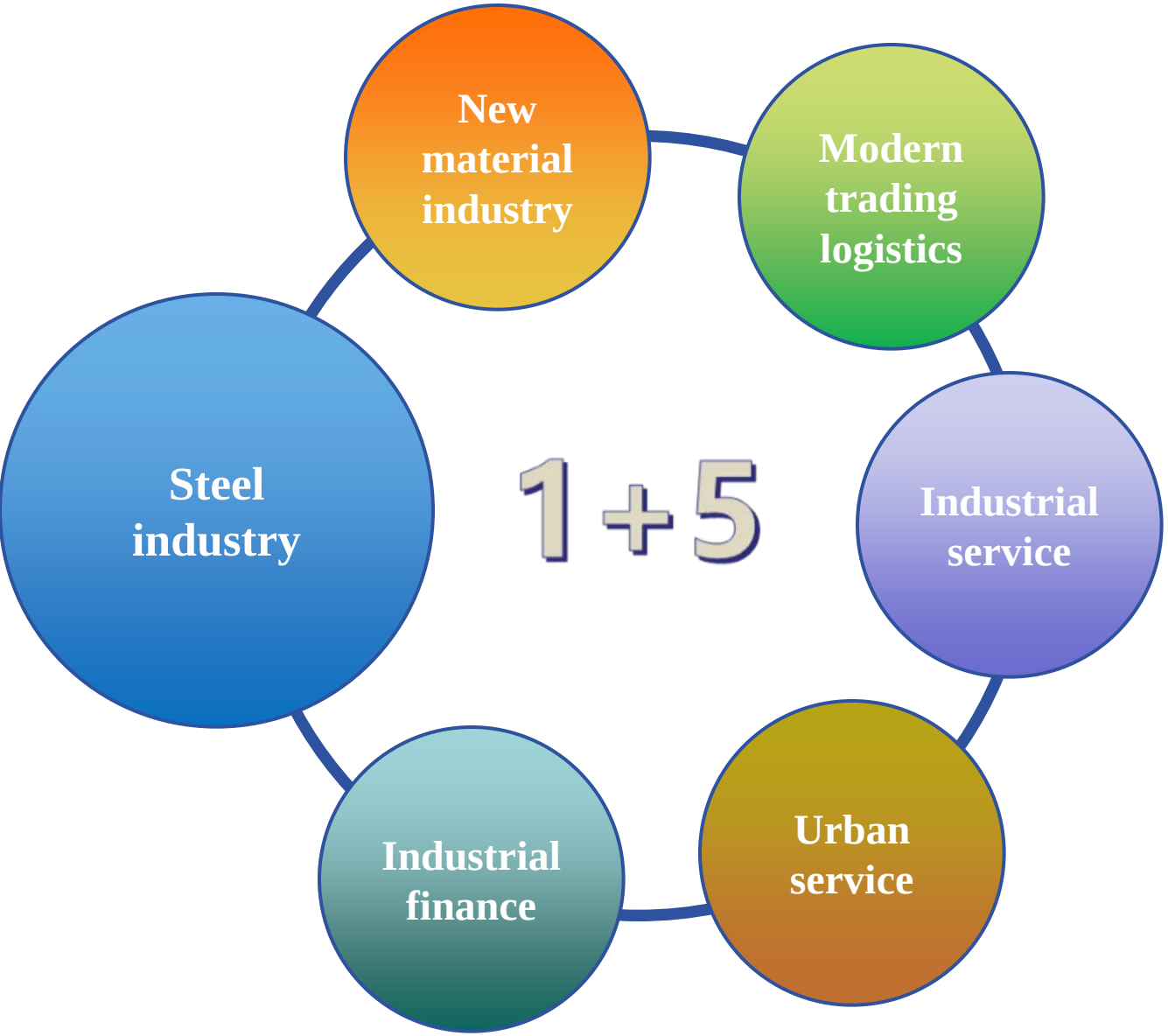
Vision: To become the leader in global steel industry and world-class business conglomerate

Mission: Drive the green intelligent transformation development of steel ecosphere, and promote the common growth of all stakeholders

Strategy: Synergetic development of related industries with steel industry as the basis

Values: Integrity, Synergy, Innovation, Sharing

China Baowu Overview



Steel industry:
Carbon steel, stainless steel, special steel manufacturing and steel product further processing

New material industry:
Iron-based, carbon-based, light metal, etc. materials manufacturing and further processing

Modern trading logistics:
Internet-based service system integrating the trading, logistics and finance, etc. of staple commodities

Industrial service:
The business such as engineering technology, information technology, energy conservation and environmental protection, etc.

Urban service:
Comprehensive development and construction of parks, operation service of parks and relevant supporting service, park fund

Industrial finance:
Supply chain finance, industrial fund, assets management and social wealth management, etc.

China Baowu Overview

In 2018, China Baowu achieved the best operating performance in China's steel industry, generating operating revenue of RMB 439.8 billion and profit of RMB 33.8 billion, ranking 162th among the Fortune Global 500 companies with annual steel output of 67.05 million tons.

- Carbon steel
- Special steel
- Stainless steel
- Steel further processing

Contents

World Climate Change Related Background

COP21: At the Paris climate conference in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal, which includes:

- A short-term goal to reach peak emissions as soon as possible.
- A longer term goal to limit average global warming to 'well below' 2 degrees Celsius (2° C) above pre-industrial times
- 'Efforts' being made to limit warming to 1.5° C

COP21·CMP11
PARIS2015
UN CLIMATE CHANGE CONFERENCE

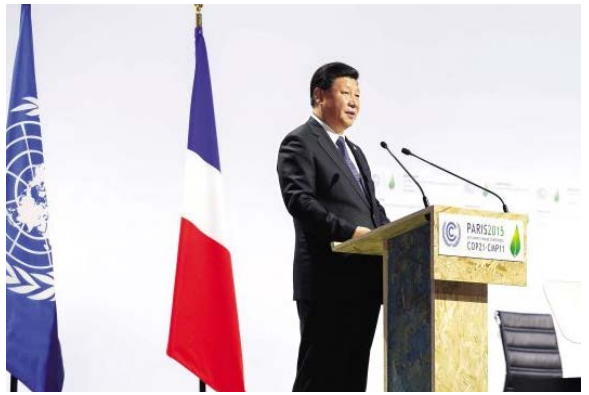
National Climate Change Strategy

"11th Five"

* Energy intensity per unit GDP decreased by 20%.

"12th Five"

* Energy consumption per unit GDP decreased by 16%.
* Reduction of carbon dioxide emissions per unit GDP by 17%;
* Forest stock is 14.3 billion cubic meters.



"13th Five"

* Energy consumption per unit GDP decreased by 15%.
* Reducing carbon dioxide emissions per unit GDP by 18%;
* Non-fossil energy accounts for 15% of primary energy consumption.
* The forest coverage increased to 23.04%, and the forest stock increased by 1.4 billion cubic meters.

2020

*Carbon dioxide emissions per unit GDP fell by 40%-45% from 2005.
*Non-fossil energy accounts for about 15% of primary energy consumption.
* Forest area and stock increased by 40 million hectares and 1.3 billion cubic metres, respectively, compared with 2005.

2030

* Carbon dioxide emissions will reach peak around 2030 and make efforts to peak as soon as possible.
*Carbon dioxide emissions per unit GDP decreased by 60% to 65% compared with 2005.
* Non-fossil energy accounts for about 20% of primary energy consumption.
* Forest stock increased by 4.5 billion cubic metres over 2005.

Steel Low Carbon Pathway &CO_2 Footprint

Pathways / Groups

Circular Economy

Enhancing the recycling of steel (eg scrap in BOF/EAF)* and its by-products, Resource efficiency (eg SPIRE)

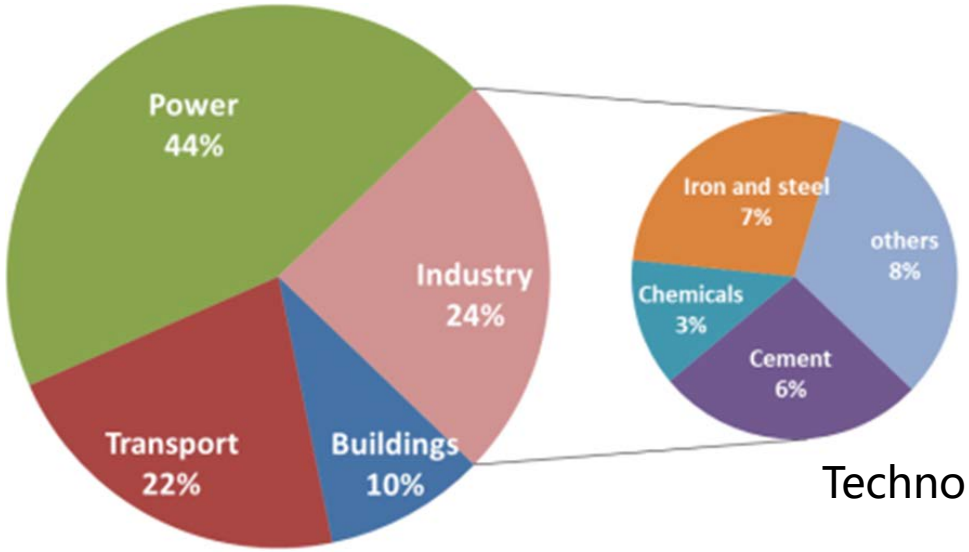
* BOF = Blast Oxygen Furnace
EAF = Electric Arc Furnace

Smart Carbon Usage (SCU)

- Process Integration with reduced use of carbon (+CCS)
- Carbon Valorisation/ Carbon Capture and Usage (CCU) (+CCS)

Carbon Direct Avoidance (CDA)

- Hydrogen
- Electricity



Over 1.7 billion tonnes of steel are produced globally last year and it still continues to increase.

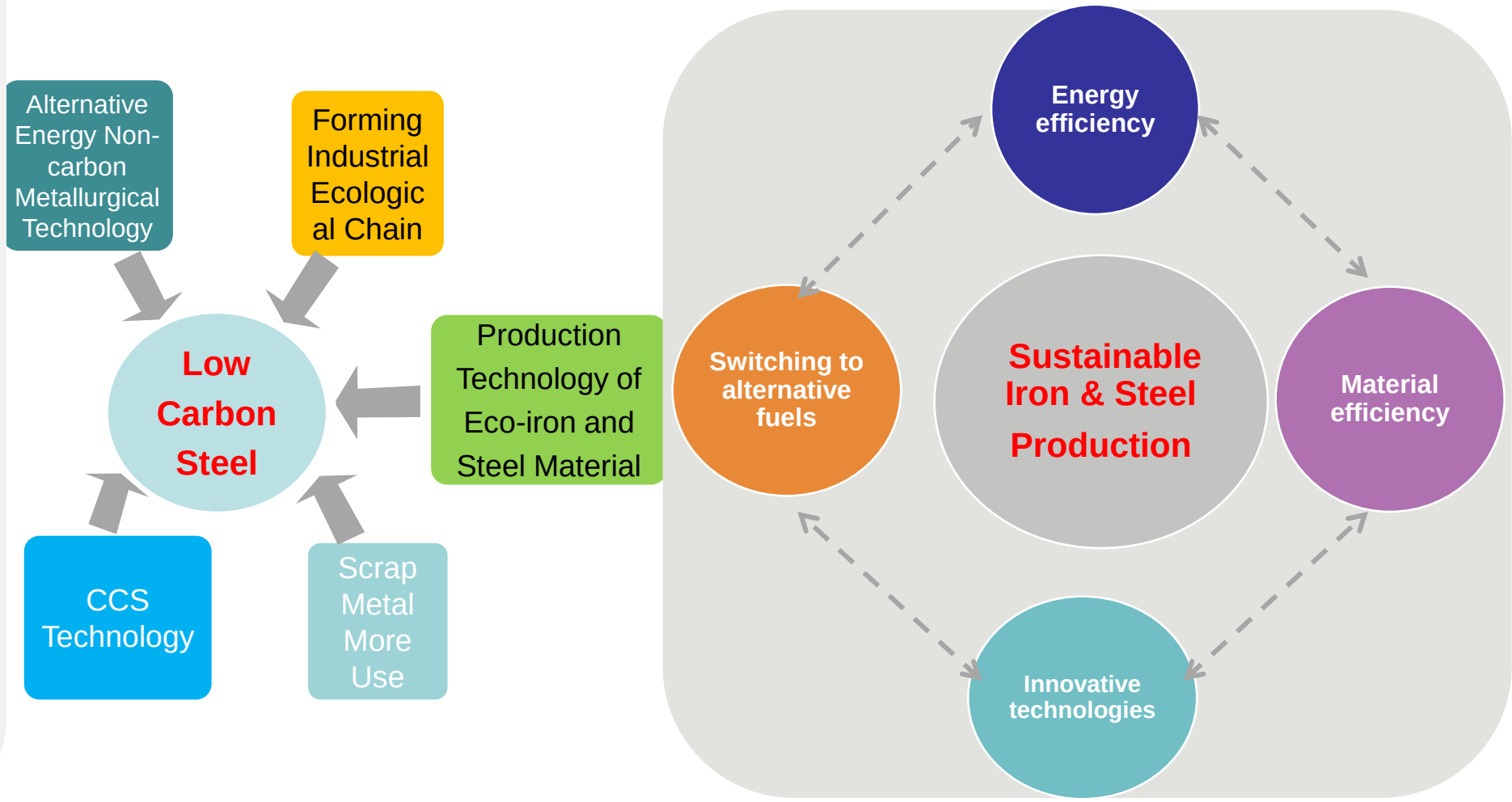
Direct emissions from global steel production represented almost 7% -9% of global total. (industry 24%) , so we must focus on reducing emission s from our steel sector

Technology Pathway by Eurofer 2018; Direct CO_2 emission source by IEA 2014

Low Carbon & Sustainable Steel Strategy

Starting with iron and steel production process, the company actively explores the energy-saving technology of the whole process, contributes to the construction of ecological civilization and realizes low-carbon development to achieve system-level sustainable benefits.

Low Carbon Process Path Exploration

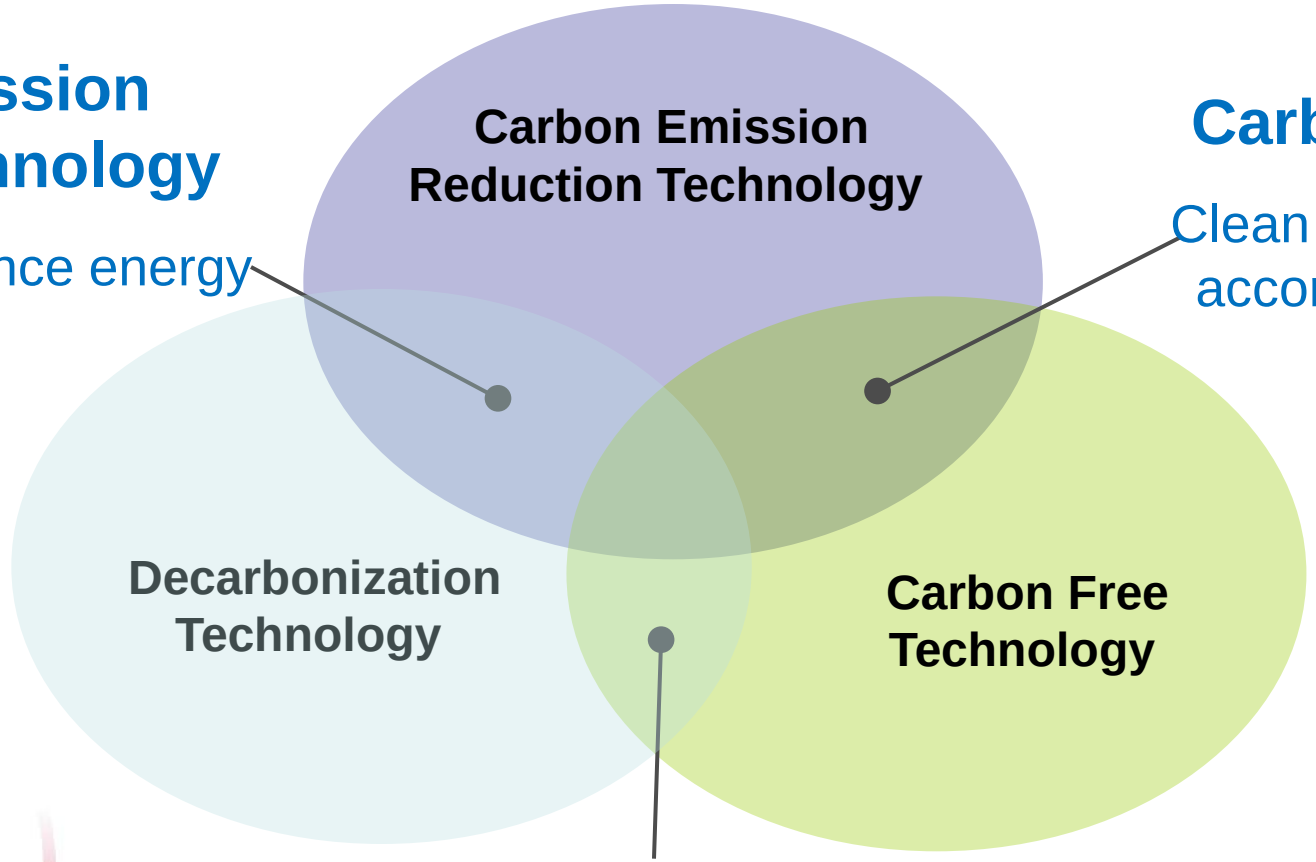


Contents

Low Carbon Development

Carbon Emission Reduction Technology

Main measures to Enhance energy efficiency



Carbon Free Technology

Clean energy utilization according to local conditions

Decarbonization Technology

CCS in Research and test stage

Low Carbon Practice—Gold Sun Project

Sustainable green power for steel production

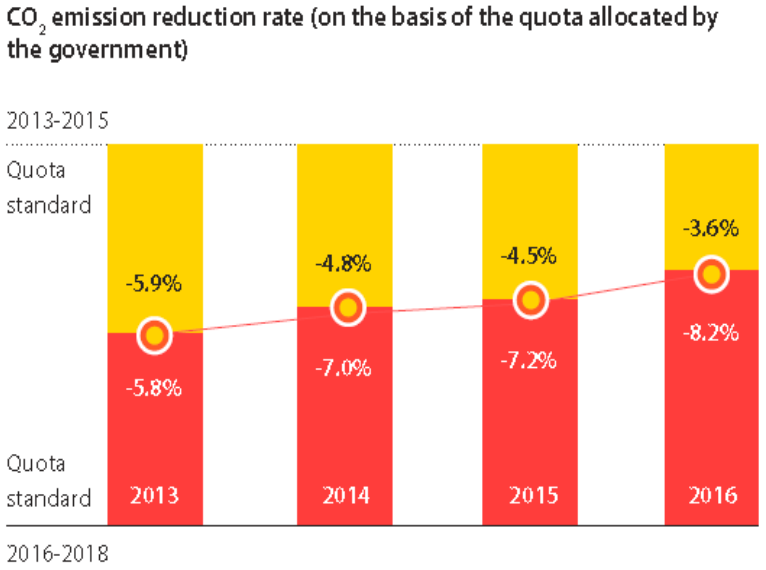
The Golden Sun Demonstration Program is a national initiative launched by Chinese government, aiming to promote the application of photovoltaic power in different industries and thus accelerate transformation of China's energy structure.

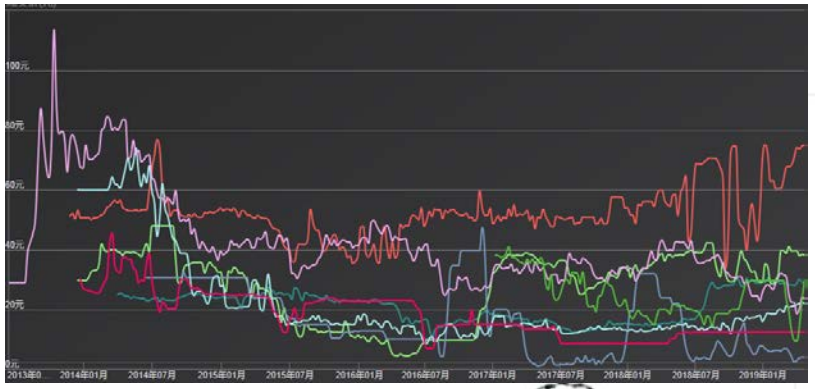
Baostell installed photovoltaic power capacity amounts to 90MWp with annual power generation capacity by 80 million kwh, and the annual carbon dioxide emission can be reduced by 65,000 tons.

Baosteel has played a leading and demonstration role in the application of clean energy in iron and steel industry

Low Carbon Practice—China ETS

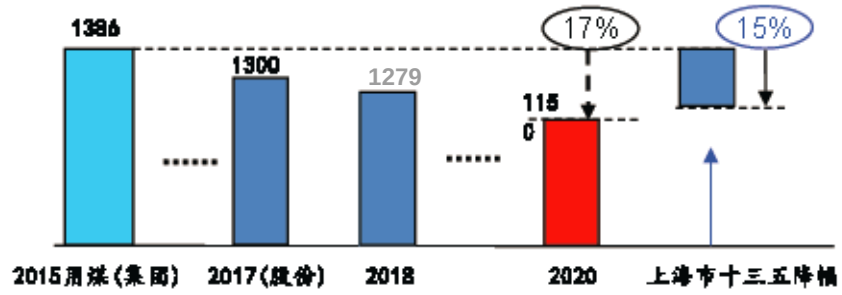
Since 2013 China Baowu has actively participated in Pilot Carbon Trading Scheme.





Baosteel CO_2 Emission Intensity Ratio(Based on 2014)

Baoshan



Cutting Coal Plan (In Shanghai)

Research in Carbon Storage Process

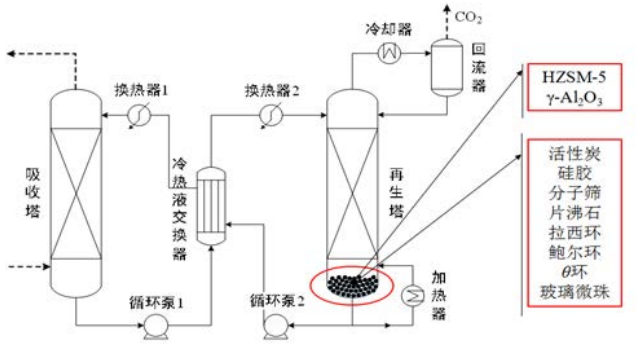
Experimental study of carbon capture from BFG

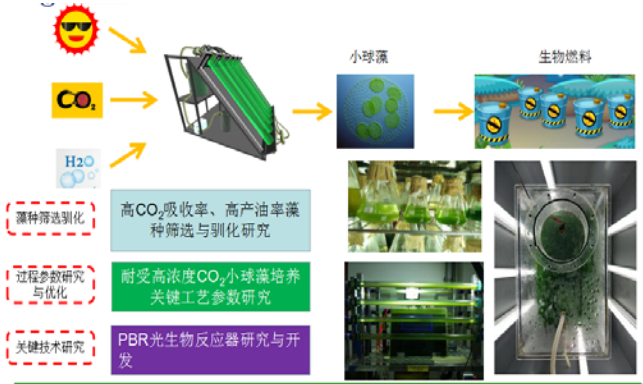
Research Background--BF Gas with High CO_2 concentration.
BF process CO_2 emission is about 60%-70% in BF-BOF route.

Research Objective： To develop low cost CO_2 separation technology and create a sustainable CCS business model by integrated gas utilization technology.

工艺参数优化研究平台

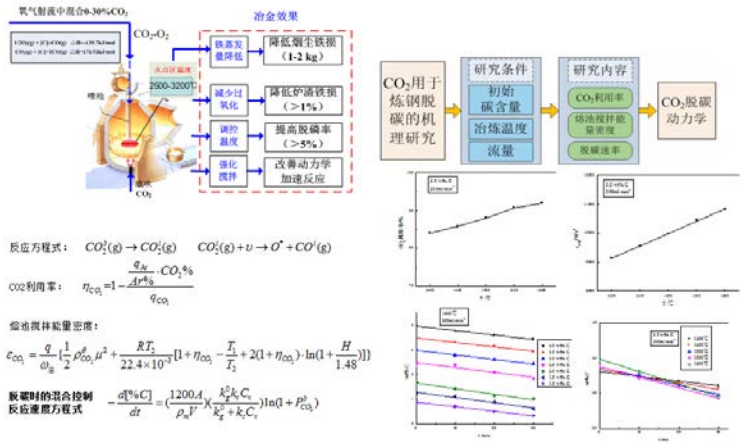
现场高炉煤气验证实验平台



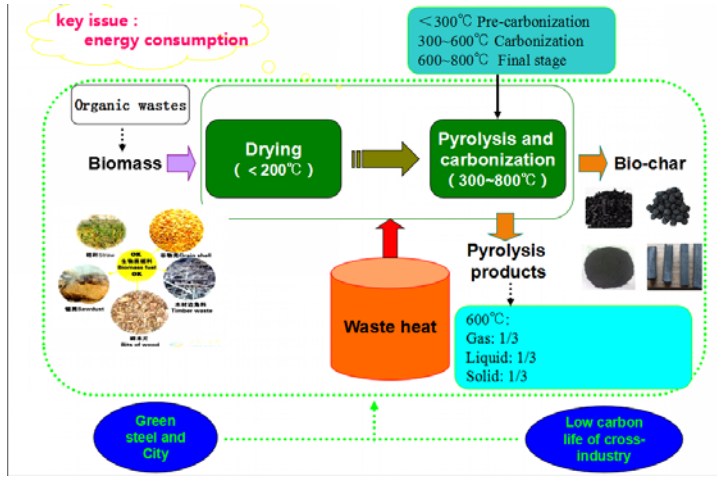


Illumination (lux)	X_0(g/L)	X_{max}(g/L)	m	μ(d^{-1})	R^2	Average production(mg/L/d)	Max production(mg/L/d)
1000	0.15	1.06±0.04	1.92±0.12	0.25±0.02	0.96	78.92±6.51	172.58±4.26
3000	0.15	1.49±0.05	2.18±0.08	0.35±0.03	0.98	103.65±9.06	267.45±12.81
8000	0.15	1.82±0.12	2.61±0.17	0.57±0.02	0.98	182.54±7.35	329.71±15.12
13000	0.15	1.89±0.09	2.63±0.13	0.64±0.04	0.99	203.96±14.9	302.56±21.98
20000	0.15	1.83±0.15	3.21±0.13	0.72±0.03	0.98	217.45±17.5	365.67±15.63

Research of carbon fixed by algae



Study of CO_2 blowing in converter



Synergistic Carbon Storage

Low Carbon Technological Innovation Trend

Building a Open Innovation System for Iron and Steel Research & Development

Baosteel is Planning to Build a new 'Future Steel Plant' in Jiangsu Province

China Baowu Technological Innovation of Low Carbon Metallurgical Process

- CO_2 separation and gasification test of top gas
- Rich oxygen blast furnace
- Develop coupling research of nuclear hydrogen metallurgy

CCUS

Rich oxygen BF process

Hydrogen Metallurgy

China Baowu signed the Framework Agreement on Strategic Cooperation of Nuclear Energy-Hydrogen Production-Metallurgy Coupled Technology with China Nuclear Group and Tsinghua University.


THANK YOU