Sustainable development transition from the perspective of China and Baosteel

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IEA, Sustainable Development Transition Experts' Diag. Mar. 29, 2019
CONTENTS

1. Introduction to China Baowu Group and Baosteel

2. Review of sustainable development transition

3. Baosteel's exploration and practice for sustainable transition

4. Personal view
China Baowu Group is the most competitive steel companies in China, and Baosteel is the core subsidiary of China Baowu Group.
I. Introduction to Baosteel

Baosteel's 4 manufacturing bases

Total production in 2017: 47 million tons
Sales in 2017: $43.3 billion dollars*

Notes: exchange ratio by the end of Dec. 31, 2017

Baosteel's 6 strategic products

- Electrical Steel
- Automotive Steel
- High grade heavy plate
- Tin-plate
- High grade steel sheets
- Steel for energy and pipeline
I. Introduction to Baosteel

Baosteel is one of the global steel enterprises with the most complete carbon steel varieties among the global listed steel companies.

2017 Operation Overview

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2017 vs. 2016 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Volume</td>
<td>million tons</td>
<td>22.49</td>
<td>24.63</td>
<td>46.53</td>
<td>88.5%</td>
</tr>
<tr>
<td>Total Operating Revenue</td>
<td>RMB billion</td>
<td>164.1</td>
<td>185.7</td>
<td>289.5</td>
<td>55.9%</td>
</tr>
<tr>
<td>Total Profit</td>
<td>RMB billion</td>
<td>1.76</td>
<td>11.52</td>
<td>24.04</td>
<td>108.7%</td>
</tr>
<tr>
<td>Net Profit</td>
<td>RMB billion</td>
<td>0.65</td>
<td>9.21</td>
<td>20.40</td>
<td>121.5%</td>
</tr>
</tbody>
</table>

Baosteel versus other steel companies
(with an annual output of 20+ million tons)

- Total profit ranked 3rd
- Profit per ton of steel ranked 2nd
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Countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals - Sept. 2015

Issuing of the 13th 5-year Plan for Economic and Social Development of the PRC - March 2016
Chapter 53: “We will actively implement 2030 Agenda for Sustainable Development”


Published by Ministry of Foreign Affairs of the PRC
First report in the world summarising the measures and experience of China's implementation on SDG.

China is playing an active role in promoting global sustainable development.
The economy has doubled in the past 10 years, while key pollutants emission and energy consumption intensity have decreased substantially;

- The energy structure has changed significantly with the share of coal consumption decreased from 1.0 to around 0.6

*China has made big efforts for pollution prevention and carbon reduction.*
### Emission standards of Iron & Steel Industry

- **全流程、全工序覆盖 (Covering full flow and all processes)**
- **细化污染物种类和排放限值 (Fully specification of pollutants and ELVs)**
- **大幅收紧限值标准，世界行业范围内领先 (Industry-leading ELV standard)**

**2012年6月27日发布 (Issued on June 27, 2012)**
**2012年10月1日施行 (Into effect on Oct. 1, 2012)**
**2012－2014年分阶段实施 (2-stage Implementation 2012-2014)**
**2015年全面执行 (Zero-tolerance implementation since 2015)**

### All new Pollutant Discharge Permit - Jan. 2018

- **Strict pollutant amount ceiling for discharging side adjusted to regional environmental volume**

### Pollutant Discharge Tax - Jan. 2018

- **Tax mechanism for promoting the company for pollution reduction**

### Ultra-low Emission Limit Value

- **Action of Combat for Blue Sky - June 2018**
- **Impose stricter ELVs for pollutant emission**
- **Come into action by region and by stage**

#### Sinter stack

<table>
<thead>
<tr>
<th>Pollutant (mg/m³)</th>
<th>Current Standards</th>
<th>Special Limit</th>
<th>Ultra-low Emission</th>
<th>POSCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>50</td>
<td>40</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>SO₂</td>
<td>200</td>
<td>180</td>
<td>35</td>
<td>~500</td>
</tr>
<tr>
<td>NOₓ(as NO2)</td>
<td>300</td>
<td>300</td>
<td>50</td>
<td>400</td>
</tr>
</tbody>
</table>

#### Blast Furnace

<table>
<thead>
<tr>
<th>Pollutant (mg/m³)</th>
<th>Current Standards</th>
<th>Special Limit</th>
<th>Ultra-low Emission</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>SO₂</td>
<td>100</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>NOₓ(as NO2)</td>
<td>300</td>
<td>300</td>
<td>150</td>
</tr>
</tbody>
</table>

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**Severe environmental protection pressure promotes the steel industrial green upgrading.**
Quota on Coal Consumption

- Coal consumption amount control, by region and phase, target for promoting steel industry's energy structure transformation
- Energy intensity limit sets higher industry admission for new built plant and impose pressure on advanced steel plant

Energy Intensity Limit

- Renovation of Norm of specific energy consumption for crude steel (GB21256-2013)

<table>
<thead>
<tr>
<th>Process</th>
<th>Limit value (kgce/t)</th>
<th>Admission value (kgce/t)</th>
<th>Advanced value (kgce/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coking (top mounted)</td>
<td>≤155</td>
<td>≤150</td>
<td>≤125</td>
</tr>
<tr>
<td>Sintering</td>
<td>≤56</td>
<td>≤55</td>
<td>≤51</td>
</tr>
<tr>
<td>Blast Furnace</td>
<td>≤446</td>
<td>≤435</td>
<td>≤417</td>
</tr>
<tr>
<td>BOF</td>
<td>≤0</td>
<td>≤-10</td>
<td>≤-8</td>
</tr>
</tbody>
</table>

1kgce=29.3MJ

Data from state statistical Bureau

Action for controlling coal consumption amount:
- The action plan for prevention and treatment of air pollution
- Interim Measures for replacement of coal consumption in key areas
Sustainable transition in China's I&S industry

- Severe environmental pressure
- Strict coal consumption quota
- High requirement for energy efficiency

Renovation of envirmt. protection equipment:
- Sinter/Coking/BF/BOF/EAF flue gas de-Sox, de-Nox, de-Dust, de-dioxion...
- Enclosure of stockyard/silo...

Energy efficiency improvement:
- Sensible heat recover
- Reduction of gas loss
- Utilization of clean energy
- Research for low-carbon Process
- CCUS...

Advanced steel plants acts positively in response to external circumstance change, achieving green upgrading and improving competitiveness in steel market, while backward steel plants get “de-capacity”.

Get de-capacity
In-compliance
Sustainable development transition

Not-in-compliance
Large-scale steel plants with multi-manufacturing base explore for effective mechanism for making full advantage of inter-base performance comparison, eg. China Baowu Group, HBIS, Shandong Steel....

Steel plants enhance exchange in the field of envirmt protection and energy

Industrial NGO, Worldsteel/CISA/MPI..., bridges the exchange

Intra-section exchange has been enhanced, and industrial NGOs, such as Worldsteel/ CISA/MPI is playing an important role.
Steel plants look out the section, seeking for cross-section cooperation and providing necessary services to the city communities.

- **TISCO**: Reuse of municipal sewage for steel manufacturing after membrane treatment;
- **Baosteel**: disposal of waste paint bucket by metallurgical furnace, utilization of steel-making slag for construction material fabrication;
- Steel plant in Northern China (**Ansteel, Shandong steel**...): waste heat recovery for heat supply for community
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Big efforts have been made to be in compliance with the local governments' requirement in past years.

How to meet with new requirement for envirmt protection?
How to deal with bottleneck with regional energy consumption limit and envirmtal volume?
How to get along with local communities and get welcomed again by city?
Concept of Eco-city & Eco-Steel

Eco city
Eco steel

Eco Environ.
green emission

City Infra.
City business system

City system Industry Zone Urban steel

Steel production Energy utilization Resource utilization

Local Waterway

Coal, coke
Electricity/gas/water
Traffic&logistic
manufacturing support

Aux. material
HR/Culture

Traffic
water/air/soil

Job/Economy

Community Local natural environment City solid waste City recycle

Market

Resource
(heat recovery, waste recycling)

by products
products

City minery (waster)
Practice in Carbon Management

- China's Carbon trading pilot started from 2011
- 3 manufacturing base of Baosteel involved
- Baosteel's participation in carbon management:
  - carbon trade implementation from 2013
  - participation in local carbon trade policy making
  - compilation of inner carbon management policy
  - Energy structure optimisation and low carbon process development......

Solar energy
Sinter sensible heat recovery
High scrap ration process
Interface energy efficiency improvement

Practices for sustainable development transition

CCUS Roadmap
Application of Metallurgical furnace for solids treatment

a) **Surge of demand** for compliance disposal of industrial solid waste and hazardous waste, while **limited capacity** in city is a bottleneck.

b) Compliance disposal of solid waste and hazardous waste by qualified industrial plant is **encouraged by government**
   - Shanghai Environmental Protection Agency: Notice on the implementation of pilot disposal of waste paint and coating barrels(2015)
   - ...

c) Possess of various metallurgical furnace makes it possible for steel plant to contribute to deal with the city's bottleneck.
   - High temperature (Up to 1600℃)
   - Well equipped gas cleaning facilities
   - Zero secondary waste

Relatively low cost, Non-harzard disposal, Elimination of environmental risk.
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1. Responsible countries are taking active roles in promoting sustainable development transition, laying the ground for SDG realised.

2. Severe pressure from environmental protection and energy saving, promoting by phase and adjusting to regional environment capacity, force the steel plants for the green transformation.

3. Advanced steel plants take the lead for application of new technology, establishing model for peer steel plants, bringing the whole industry towards sustainable development transition.

4. The industrial NGOs are playing an important role in bridging the intra-section exchange.

5. Steel plants could look out of the section, seeking for cross-section cooperation and providing necessary services to the city communities.
Enormous small steps made by individuals, great leap for the society's sustainable development.

- China and India leads in making a greener earth by land-use management
- China's steel plant, especially Baosteel, contributes to land-greening.

Baoshan Base, Shanghai
Greening rate: >35%

Qingshan Base, Wuhan
Greening rate: >20%

Meishan Base, Nanjing
Greening rate: >40%

Dongshan Base, Zhanjiang
Greening rate: >35%

Note: Data of greening rate by the end of 2018
Thanks for your attention.