G20 Global Summit on Financing Energy Efficiency, Innovation and Clean Technology

Activities of Japanese steel industry for a Low Carbon Society

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After the two oil crises in the 1970’s, Japanese steel industry improved the energy efficiency by promoting investment for R&D and implementation of energy saving technologies.

**Accumulative Investment for energy saving and environmental technologies**

- **1971~1989**
  - Energy Saving: 20%
  - Investment: ¥3 trillion

- **1990~2012**
  - Energy Saving: 12%
  - Investment: ¥1.8 trillion

*Source: Ministry, Economy and Trade, Japan*
Utilization of energy saving technologies in the Japanese steel industry

- Japanese steel industry reduced gross consumption by process improvements
- Energy recovery is contributing to reduce net consumption in recent years

Source: The Japan Iron and Steel Federation

Process improvements and innovation
continuous casting, PCI, coal moisture control, optimization of logistics, SCOPE21

Byproduct gas use
gas holder, high-efficiency gas turbine combined cycle generation, hydrogen amplification, CO₂ recovery

Exhaust heat recovery
TRT, CDQ, regenerative burners, mid-low temp. heat recovery

Waste material use
waste plastics and tires

Source: The Japan Iron and Steel Federation
Energy intensity of major steel producing countries

*Japanese steel industry achieves the lowest energy intensity (unit energy consumption per ton of crude steel) among the world’s major steel producing countries.*

Integrated steel mills

EAF

Source: Research Institute of Innovative Technology for the Earth (RITE)
Technology Transfer of Energy Saving Technologies

CDQ, TRT and other major types of equipment alone are already lowering annual aggregate CO₂ emissions in China, Korea, India, Russia, Ukraine, Brazil and other countries by approximately 60 million tons in 2017.

<table>
<thead>
<tr>
<th>Energy Saving Technology</th>
<th>No. of units</th>
<th>CO₂ Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coke dry quenching (CDQ)</td>
<td>96</td>
<td>19.69</td>
</tr>
<tr>
<td>Top-pressure recovery turbines (TRT)</td>
<td>62</td>
<td>11.02</td>
</tr>
<tr>
<td>Byproduct gas combustion (GTCC)</td>
<td>52</td>
<td>21.90</td>
</tr>
<tr>
<td>Basic oxygen furnace OG gas recovery</td>
<td>21</td>
<td>8.21</td>
</tr>
<tr>
<td>Basic oxygen furnace sensible heat recovery</td>
<td>7</td>
<td>0.90</td>
</tr>
<tr>
<td>Sintering exhaust heat recovery</td>
<td>6</td>
<td>0.88</td>
</tr>
</tbody>
</table>

Total emission reduction: 62.59Mt

Source: The Japan Iron and Steel Federation
# India-Japan Public and Private Collaborative Meeting on iron and steel industry (1/2)

## Purpose

To encourage **technology transfer** from Japanese to Indian steel industry and thereby contribute to the **energy saving** in India and in the world.

## Members – Public and Private sectors of India and Japan

### India

**Public members and observers**
- Ministry of Steel
- Bureau of Energy Efficiency etc.

**Private members and observers**
- Indian steel companies
  - (SAIL, RINL, TSL, JSW, JSPL, BSPL, BSL, Essar, MECON etc.)

### Japan

**Public members and observers**
- Ministry of Economy, Trade and Industry/ NEDO / JBIC / JETRO

**Private members and observers**
- The Japan Iron and Steel Federation
  - (Nippon Steel & Sumitomo Metal, JFE steel, Kobe steel, Nisshin Steel etc.)
Meetings – since 2011

Cooperative Approach

1st meeting (New Delhi) 2nd meeting (New Delhi) 3rd meeting (Tokyo) 4th meeting (Tokyo) 5th meeting (New Delhi) 6th meeting (Tokyo) 7th meeting (Jaipur) 8th meeting (Kitakyushu) 9th meeting (Mumbai)

Three pillars of the energy management in the steel plant

ISO14404


Technologies Customized List

Technology reference of energy saving technologies suitable for each country/region

Energy Management System

Help steel plants to establish a framework to plan, do, check and act for the energy saving activities
Steel Plant Diagnosis using ISO14404

As of 2019,
- Diagnosed 9 sites
- Remains 4 sites

1. Bhilai (SAIL)
2. Rourkela (SAIL)
3. Visakhapatnam (RINL)
4. Jamshedpur (TATA)
5. Vijayanagar (JSW)
6. Dolvi (JSW)
7. Angul-Dhenkanal (Bhushan)
8. Bokaro (SAIL)
9. Durgapur (SAIL)
10. Hazira (Essar)
11. IISCO, Bumpur (SAIL)
12. Raigarh (Jindal Steel & Power)
13. Jharsuguda (Bhushan Power & Steel)
14. Kalinganagar (TATA)

Diagnosed by Japanese experts
Not diagnosed by Japanese experts
Advantages of Technologies Customized List

1. The benefit of technology implementation is clearly demonstrated
   - Indicate CO\textsubscript{2} reduction effect and payback time for the collaborative country or region, based on country-based energy prices, plant installation cost and CO\textsubscript{2} emission factor

2. Technologies listed on TCL are reliable
   - Effects of the technologies are proven through Japanese steelmakers’ operating experiences

3. Easy to reach out to further information when necessary
   - Include in contact detail of supplier companies which have the best available technologies

The 9th India-Japan Public and Private Collaborative Meeting on Iron and Steel Industry

“India side’s thanked the updating of TCL and they mentioned that they would like to diffuse it to stakeholders in India and also expect to continually have a Public and Private Collaborative Meeting.” (Minutes of the meeting)
1. “Visualizing” energy saving benefits and contribution to emission reductions are the base to develop a favorable investment environment and to encourage international cooperation
   - “Common Methodologies” to calculate Emissions / Energy Intensity
   - Steel Sector has developed and uses ISO14404

2. Sector Base PPP on BAT List (Technology Customized List) and Plant Diagnosis, and Peer Review process are effective to reduce risks

3. “Upfront” Financial Support / Incentives with coordinated domestic policy supports are the Key in developing countries
   - No clear Cash Flow from Energy Savings
   - Longer Recovery Periods (than process expansion)
   - High Discount Rate
   + Energy Saving Policies (Reporting, Benchmarking, Intensity Targets etc.)
Thank you
Technological innovation is the key to reconcile economic growth and emission reduction.

Technological innovation and dissemination