



CEFIA
Cleaner Energy
Future Initiative
for ASEAN
ASEAN+3

Progress of Flagship Projects

- Activities of SteelEcosol -

23rd July 2024

The 6th Government-Private Forum
on the Cleaner Energy Future Initiative for ASEAN

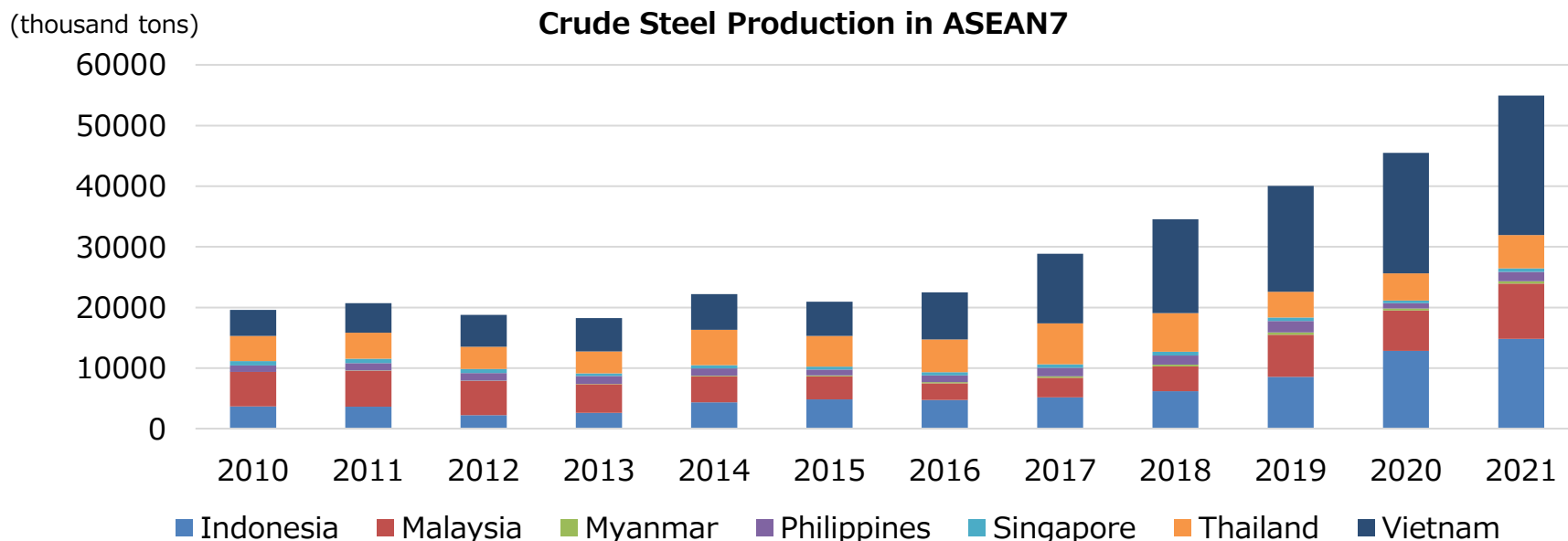
Fumitaka Kato, Dr.

The Committee member for
International Environmental Strategic Committee
The Japan Iron and Steel Federation

Senior Manager, Environment Planning Div.
Nippon Steel Corporation

SteelEcosol's Mission: Promote the Diffusion of BAT in ASEAN Steel Industry

- Steel sector is responsible for about **8% of global final energy demand** and **7% of global direct energy-related CO₂ emissions***
- Innovative technologies (e.g., hydrogen ironmaking) are being developed to achieve carbon neutrality in the steel sector, but these technologies will not be widely available immediately
- Until such innovative technologies become available, **improving energy efficiency through Best Available Technologies (BAT) will play an important role in the ASEAN steel industry**, where steel making capacity is/will be increasing
- **SteelEcosol aims to promote energy conservation in the ASEAN steel industry by BAT adoption and operational improvements**



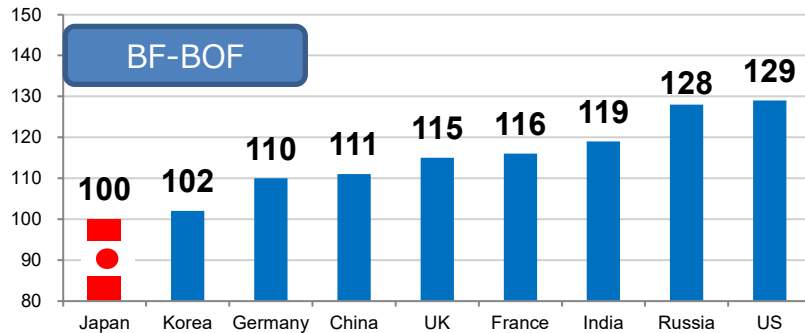
*Source: Iron and Steel Technology Roadmap, IEA (2020) <https://www.iea.org/reports/iron-and-steel-technology-roadmap>

How cooperation with Japan benefits ASEAN Steel Industry

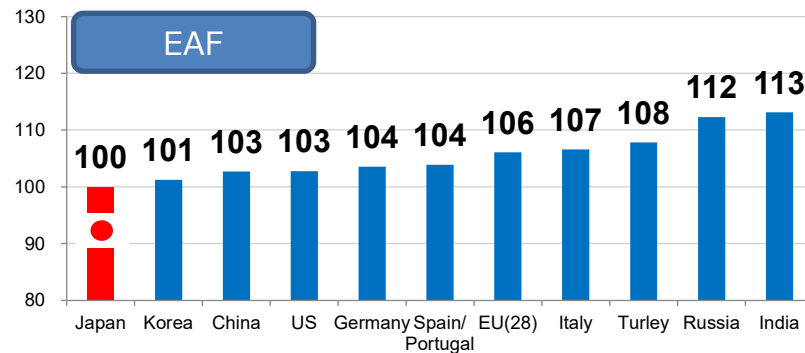
- **Japan's steelmaking process is the most energy-efficient in the world by deployment of the Best Available energy-saving Technologies (BAT)**
- Knowledge of the Japanese steel industry will be beneficial in promoting energy conservation in the ASEAN steel industry

Energy efficiency by country/region (2019)

Indexed as Japan 100



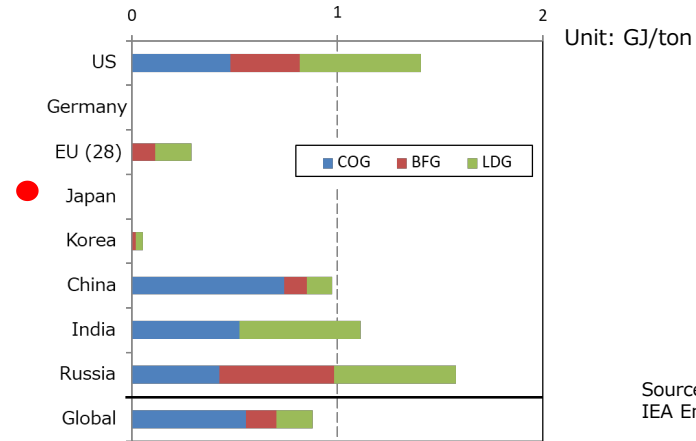
Source: RITE, "Estimation of Energy Intensity as of 2019 (Steel Sector - Blast Furnace - Basic Oxygen Steel)."



Source: RITE, "Estimation of Energy Intensity as of 2019 (Steel Sector - Electric Furnace Steel)."

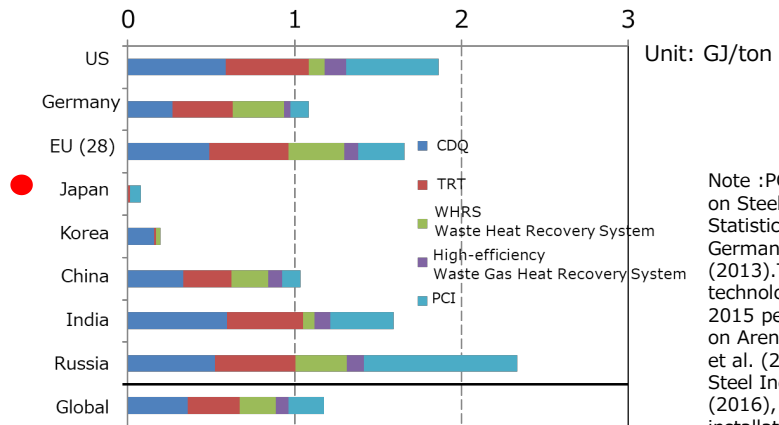
Potential of Energy Saving Technologies(2019)

【Potential for the recovery and efficient use of by-product gases】



Source: RITE estimates based on IEA Energy Balance Table (2021).

【Potential for the major energy saving technologies】



Note :PCI is evaluated based on Steel Federation "Steel Statistics Handbook 2021" and German Steel Federation (2013). The other four technologies are based on the 2015 penetration rate (based on Arens et al. (2017), Schulz et al. (2015), China Iron and Steel Industry Yearbook (2016), etc.) and the actual installations

ASEAN and Japan Steel Industries started exchanges in energy conservation in 2014

- **ASEAN-Japan Steel Initiative (AJSI)**, started in 2014, contributes to energy saving and environmental protection in ASEAN through mutual and collaborative platform

Purpose

- Exchange knowledge and experiences and thereby contribute to the energy saving and environmental protection in ASEAN
- Encouraging technology transfer from Japan to ASEAN steel industry

Participants

Public Sector
Ministries and governmental institutions related to steel industry and energy saving in ASEAN and Japan



Private sector
ASEAN Iron and Steel Council (AISC), national association in ASEAN, JISF and its member companies, Engineering Companies

Main Activities

1 Steel Plant Diagnosis



2 Technologies Customized List



3 Public and Private Collaborative Seminar



We have conducted steel plant diagnoses at 16 steel plants in ASEAN

Outline

- Check **operation and energy consumption status** and evaluate **energy efficiency** level of the steel plant using **ISO14404***
 - **Visualize the effect of CO2 reduction**
 - Provide **feedback for operational improvement and technology implementation** by Japanese experts
- *ISO14404 is an international standard for calculating CO2 emissions and energy consumptions from a steel plant.

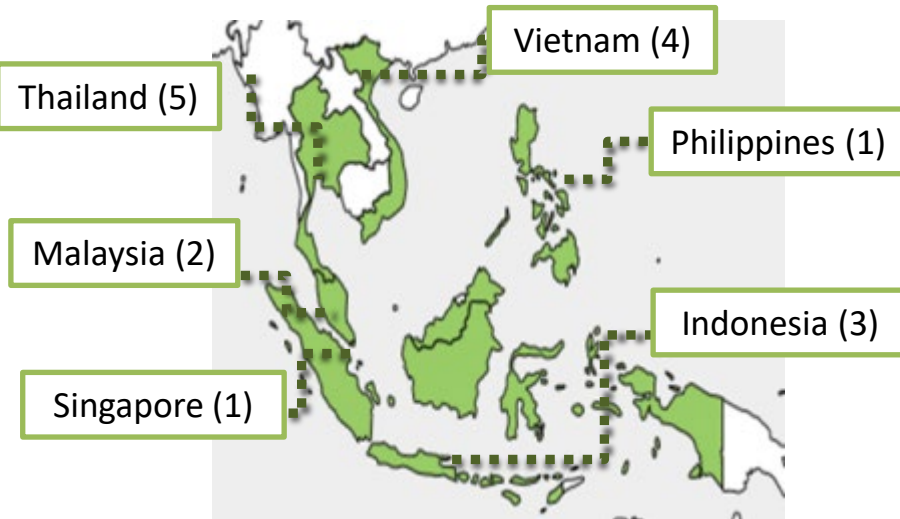
Benefit

- The steel plant can understand their current energy consumption status and CO2 emissions
- The Japanese experts will recommend energy conservation measures specifically for that plant

Steel plants who participate in the diagnosis can receive a lot of information from Japanese experts about current operation.

Steel plant diagnosis history in ASEAN

Diagnosis can be executed both on-line and off-line



Example schedule for on-site diagnosis

	Day1	Day2	Day3	Day4
AM	Greeting, Introduction, & Confirmation of the energy data	Continuous Cast Diagnosis	Discussion & Summarize the results	Reporting & Discussion
PM	Electric Arc Furnace Diagnosis	Hot Rolling Diagnosis	Discussion & Summarize the results	Additional information

Review of SteelEcosol Activities in 2023

- 1) **On-site Steel Plant Diagnosis** at a steel plant in ASEAN
- 2) **Follow up survey** of Steel Plant Diagnosis in 2022
- 3) Related Event: **AJSI webinar**

Review of Steel Ecosol Activities in 2023FY

1) On-site Steel Plant Diagnosis at a steel plant in ASEAN

✓ Proposed energy efficiency measures

	type	Proposed energy efficiency measures	CO2 reductions
①-1	Revamping	Hot Direct rolling without Reheating Furnace	<u>49,800 t-CO2/y</u>
①-2	Operational	Reduced heat loss through capacity matching	Cannot quantify
①-3	Operational	Raising the billet charging temperature to Reheating Furnace	Cannot quantify
②	Revamping	Oxygen burners for ladle preheating	<u>2,450 t-CO2/y</u>
③	Revamping	Tundish Plasma Heater	<u>4,400 t-CO2/y</u>
④	Revamping	Waste heat recovery of sinter cooler	<u>8,400 t-CO2/y</u>
⑤	Operational/ Investment	Minimizing pressure fluctuation of gas holder	Cannot quantify
⑥		Inter-process optimization through energy/CO2 management system	Cannot quantify

✓ Estimated CO2 reduction

65,050* tCO2/y

*CO2 reductions are estimated and provisional values based on assumptions.



✓ Feedback from the steel plant

“Calculation of CO2 emissions according to ISO 14404 is very useful in accurate assessment of the current situation. Some of the proposed measures for each process are particularly valuable and could be useful tools for future planning and implementation.”

Review of Steel Ecosol activities in 2023FY

2) Follow up survey of online steel plant diagnosis in 2022

- ✓ Follow-up on **the status of energy use and planning and implementation status** of measures proposed at the steel plant diagnosis.
- ✓ Proposed energy efficiency measures in 2022

Type	Proposed energy efficiency measures	CO2 reductions
For EAF		
(1) Operational	Reducing heat-loss by shortening TTT (Tap to Tap Time)	Cannot quantify
(2) Revamping	Scrap pretreatment with scrap shear	5,600 t-CO2/y
(3) Operational	Effective use of combustibles in scrap	5,600 t-CO2/y
For Reheating Furnace (RHF)		
(1) Operational	Air ratio control	3,800 t-CO2/y
(2-1) Operational	Raising temperature of combustion air	3,000 t-CO2/y
(2-2) Revamping	High temperature recuperator for reheating furnace	1,700 t-CO2/y
(2-3) Revamping	Regenerative burner for reheating furnace	3,400 t-CO2/y

- ✓ Results of follow-up
 - For RHF (2-2): **Decided to install**
 - For RHF (2-3): **Continue study to install**
- ✓ Future task
 - Verify the effectiveness of project implementation

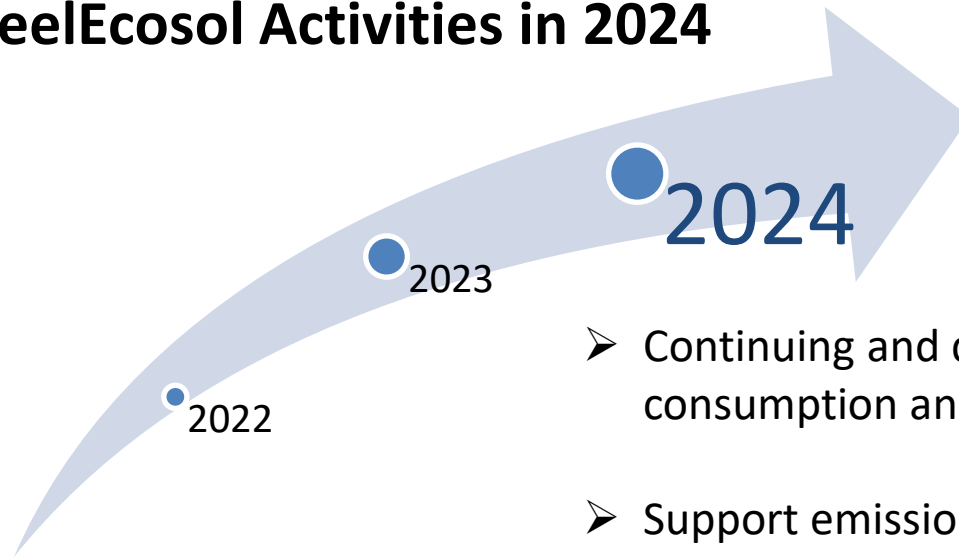
- ✓ Other issues confirmed during follow-up
- **Bad quality of available steel scrap**, which can lead to increased electricity consumption in Electric Arc Furnace
 - ➡ Japanese experts will continue follow-up and support considering measures to prevent deterioration of energy intensity

3) Related Event: AJSI webinar

- ✓ **Information sharing** on government and corporate initiatives on **carbon neutrality in the steel industry** in Japan and ASEAN
- ✓ **Over 170 people** from 8 countries joined



SteelEcosol Activities in 2024



- Continuing and deepening efforts to reduce energy consumption and CO2 emissions in steel industry
- Support emission reduction project implementation through steel plant diagnosis and follow-up activities
- Information sharing through the TCL (BAT list) and public-private meetings

We continue to collaborate between ASEAN-Japan steel industry with support of CEFIA.

Thank you!



