



CEFIA
Cleaner Energy
Future Initiative
for ASEAN
ASEAN+3

Progress of Flagship Projects

- Activities of SteelEcosol -

17th October 2025

The 8th Government-Private Forum
on the Cleaner Energy Future Initiative for ASEAN

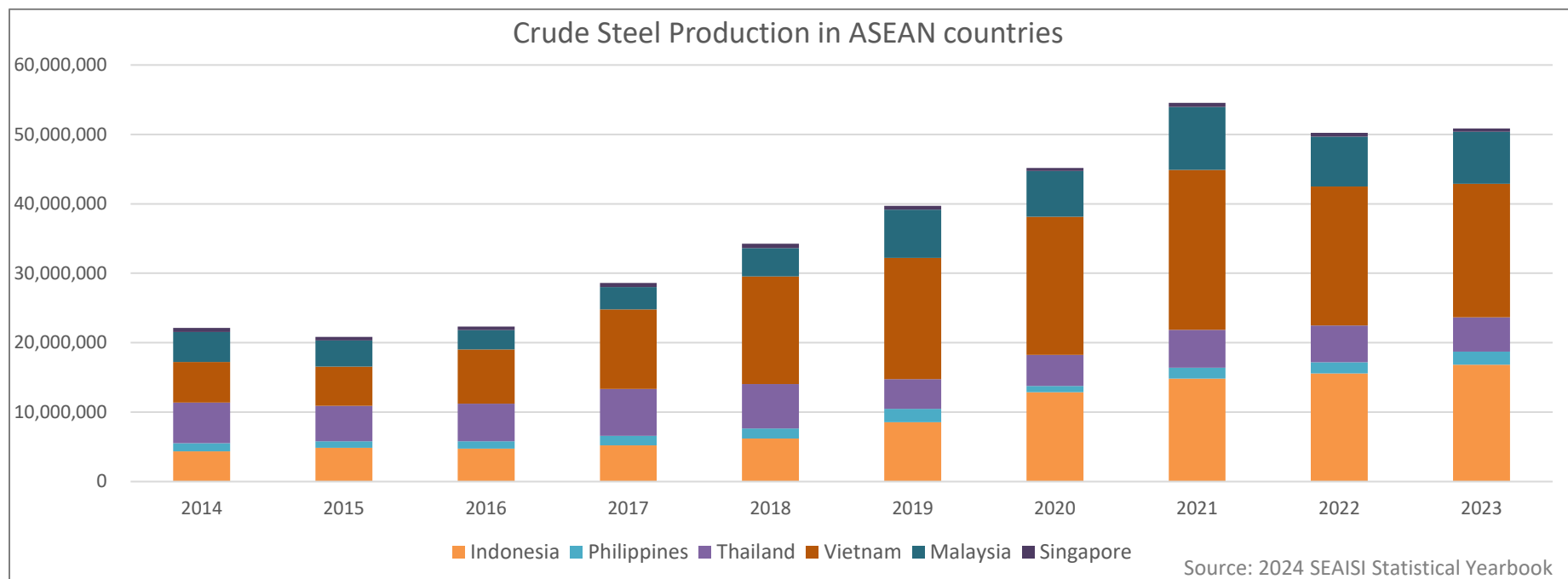
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The Committee member for
International Environmental Strategic Committee
The Japan Iron and Steel Federation

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

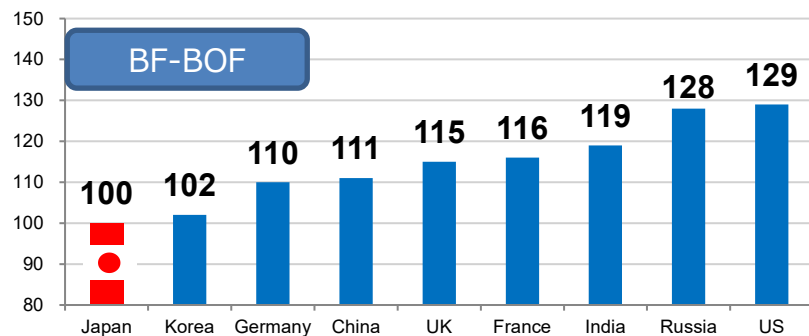


How cooperation with Japan benefits ASEAN Steel Industry

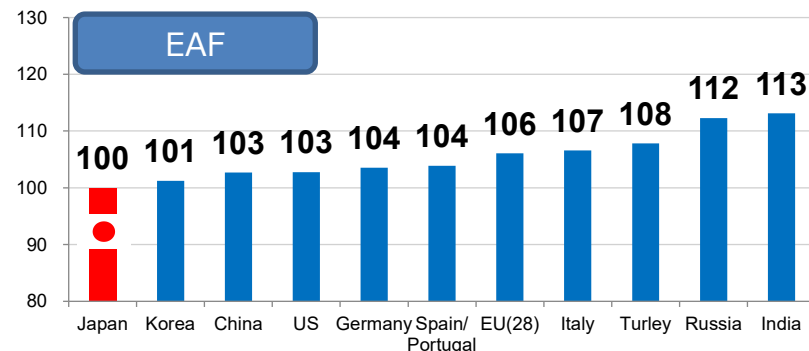
- Japan's steelmaking process is the most energy-efficient in the world by deployment of the Best Available energy-saving Technologies (BAT)
- Knowledge of the Japanese steel industry will be beneficial in promoting energy conservation in the ASEAN steel industry

Energy efficiency by country/region (2019)

Indexed as Japan 100



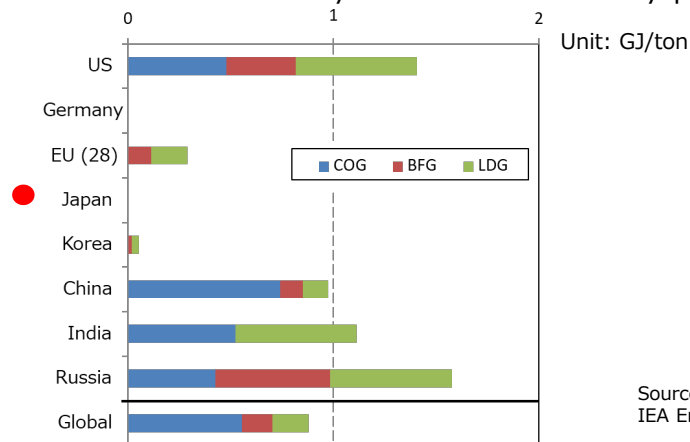
Source: RITE, "Estimation of Energy Intensity as of 2019 (Steel Sector - Blast Furnace - Basic Oxygen Steel)".



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

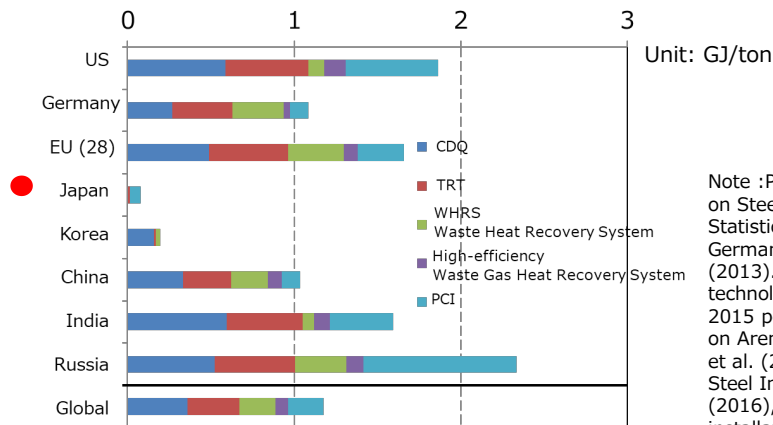
Potential of Energy Saving Technologies(2019)

【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

Collaboration

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



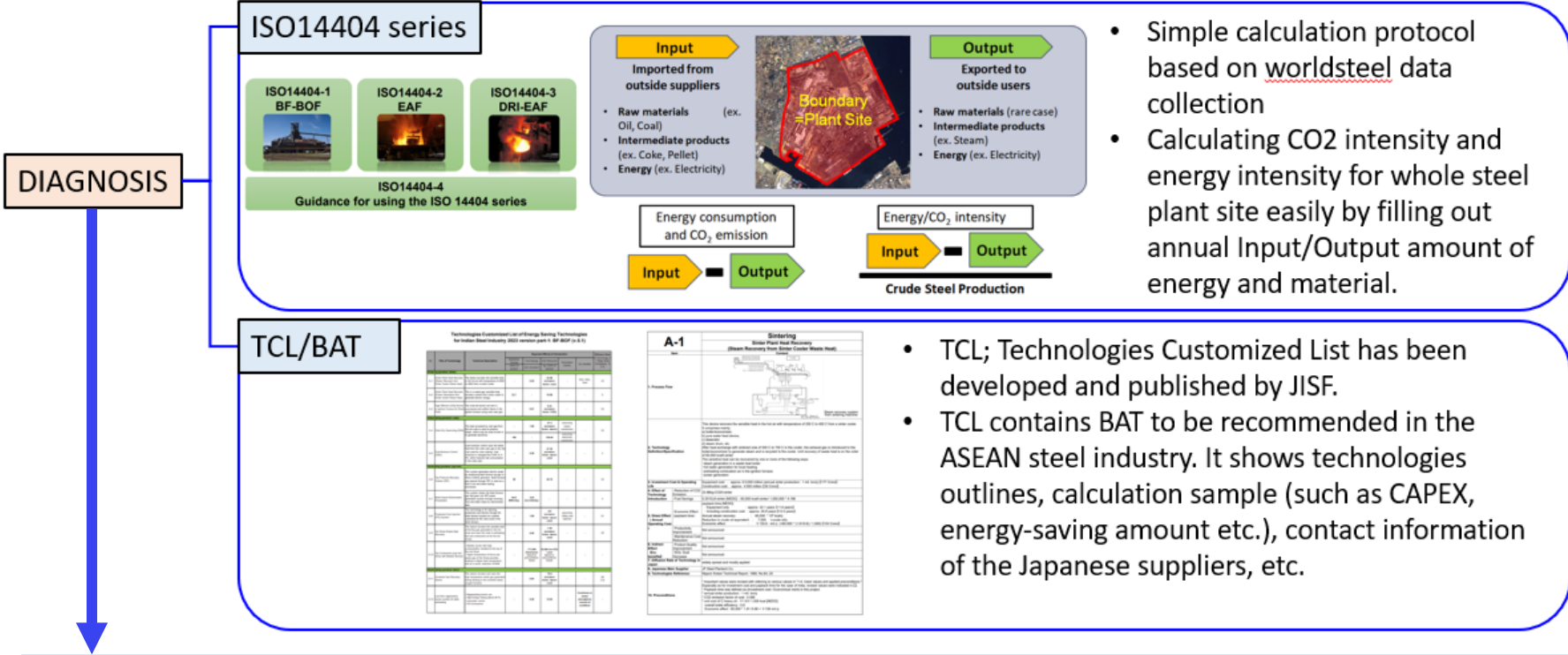
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Public and Private Collaborative Seminar



Steel Plant Diagnoses in ASEAN

- The Steel Plant Diagnosis had been done in 18 plants in ASEAN countries, and **2025** is scheduled in **November**, at a steel plant in **Vietnam**
- In the diagnosis, the Japanese expert team will utilize **ISO 14404 series & TCL (Technologies Customized List)** to provide advice to the steel plant



Outcome of the Steel Plant Diagnosis

- ✓ **Best Available Technologies especially recommended** for the diagnosed steel plant
- ✓ Data to support the steel plant to **plan and implement for energy-efficiency projects towards decarbonization**

Steel Plant Diagnoses in ASEAN

- The Steel Plant Diagnosis in 2024 **identified potential energy efficiency measures** that can be taken in a steel plant, and **CO2 reduction effect was calculated** based on certain assumptions.
- ✓ Energy efficiency measures proposed to the diagnosed steel plant

	type	Proposed energy efficiency measures	CO2 reductions*
For Upstream Process			<i>*CO2 reductions are estimated and provisional values based on assumptions.</i>
①	Revamping	Scrap Preheating	8,470 t-CO2/y
②	Revamping	PC burner for improvement of coke post combustion in EAF	1,440 t-CO2/y
③	Operational	Reduction of excess oxygen supply	3,440 t-CO2/y
④	Operational	EAF power-cut operation	970 t-CO2/y
⑤	Operational	Reduction of tapping temperature (20 degC)	730 t-CO2/y
⑥	Operational	Increase of Aluminum dross consumption	3,990 t-CO2/y
For Downstream Process			
⑦	Operational	Appropriate management of air ratio	1,200 t-CO2/y
⑧	Operational	Prevention of air invasion to upraise preheated air temperature	720 t-CO2/y
⑨	Operational	Periodical cleaning of recuperator heat exchanger	960 t-CO2/y
⑩	Revamping	Regenerative burner for walking hearth reheating furnace	5,340 t-CO2/y (incl. fuel conversion)

Total Estimated CO2 Reduction : **approx. 12,500~27,000 tCO2/y**

Technology Customized List (TCL)

TCL will be **updated in 2025**

- ✓ Listed technologies are reviewed
- ✓ Updated energy prices and CO2 emission factors for calculation of effects
- ✓ Updated supplier list

What is Technologies Customized List (TCL)?

- TCL is developed by the Japan Iron and Steel Federation, as part of their Eco-solution activities.
- There are 4 versions of TCL:
 - **TCL for ASEAN Part 1: EAF**
 - **TCL for ASEAN Part 2: BF-BOF**
 - TCL for India Part 1: BF-BOF
 - TCL for India Part 2: EAF
- TCL contains technologies for:
 - 1. Energy saving**
 2. Environmental protection
 3. Recycling



What is Technologies Customized List (TCL)?

- TCL can be accessed online from:
<https://www.jisf.or.jp/en/activity/climate/Technologies/index.html>

E.g.) ASEAN Technologies Customized List version 4.0 for BF-BOF

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Technologies Customized List

Technologies Customized List of Energy Saving Technologies for ASEAN Steel Industry 2022 version part-2: BF-BOF (v.4.0)

No.	1 of Technology	2 Technical Description	3 Electricity Savings kWh/t of product	Fuel Savings GJ/t of product	Expected Effects of Introduction										Estimation Details	Co-benefits
					CO2 Reduction											
					kg CO2/t of product											
					Thailand Indonesia Vietnam Philippines Malaysia Singapore											
Sintering (product: sinter)																
A-1	Sinter Plant Heat Recovery (Steam Recovery from Sinter Cooler Waste Heat)	The device recovers the sensible heat in the hot air with temperature of 250°C to 300°C from a sinter cooler.	-	0.25	23.85 (emission factor: steam coal)						-				SOx, NOx, Dust	
A-2	Sinter Plant Heat Recovery (Power Generation from Sinter Cooler Waste Heat)	This is a waste gas sensible heat recovery system from sinter cooler to generate electric energy.	22.10	-	12.11	17.04	13.24	11.32	14.81	10.74	-		-			

1 Title of technology

2 Technical Description

3 Expected Effects of Introduction

TCL provides “expected CO2 reduction effect” of each technology.

There is also one-by-one sheet for each technology, including standard investment cost, payback time, supplier name, etc.

E.g.) ASEAN Technologies Customized List version 4.0 for BF-BOF 7

Contents of Technologies One-by-One sheet for ASEAN

List Number	A-1	Names of technology
Process Flow or Diagram		
Effect of Technology Introduction	Technology Definition/ Specification This device recovers the sensible heat in the hot air with temperature of 250°C to 300°C from a sinter cooler. It comprises mainly: 1) gas-to-gas heat exchanger 2) gas-to-water heat exchanger 3) steam generator 4) steam turbine 5) generator 6) condenser 7) cooling water pump 8) feed water pump 9) deaerator 10) hot water pump 11) hot water tank 12) hot water distribution system 13) hot water return system 14) hot water return tank 15) hot water return pump 16) hot water return distribution system 17) hot water return tank 18) hot water return pump 19) hot water return distribution system 20) hot water return tank 21) hot water return pump 22) hot water return distribution system 23) hot water return tank 24) hot water return pump 25) hot water return distribution system 26) hot water return tank 27) hot water return pump 28) hot water return distribution system 29) hot water return tank 30) hot water return pump 31) hot water return distribution system 32) hot water return tank 33) hot water return pump 34) hot water return distribution system 35) hot water return tank 36) hot water return pump 37) hot water return distribution system 38) hot water return tank 39) hot water return pump 40) hot water return distribution system 41) hot water return tank 42) hot water return pump 43) hot water return distribution system 44) hot water return tank 45) hot water return pump 46) hot water return distribution system 47) hot water return tank 48) hot water return pump 49) hot water return distribution system 50) hot water return tank 51) hot water return pump 52) hot water return distribution system 53) hot water return tank 54) hot water return pump 55) hot water return distribution system 56) hot water return tank 57) hot water return pump 58) hot water return distribution system 59) hot water return tank 60) hot water return pump 61) hot water return distribution system 62) hot water return tank 63) hot water return pump 64) hot water return distribution system 65) hot water return tank 66) hot water return pump 67) hot water return distribution system 68) hot water return tank 69) hot water return pump 70) hot water return distribution system 71) hot water return tank 72) hot water return pump 73) hot water return distribution system 74) hot water return tank 75) hot water return pump 76) hot water return distribution system 77) hot water return tank 78) hot water return pump 79) hot water return distribution system 80) hot water return tank 81) hot water return pump 82) hot water return distribution system 83) hot water return tank 84) hot water return pump 85) hot water return distribution system 86) hot water return tank 87) hot water return pump 88) hot water return distribution system 89) hot water return tank 90) hot water return pump 91) hot water return distribution system 92) hot water return tank 93) hot water return pump 94) hot water return distribution system 95) hot water return tank 96) hot water return pump 97) hot water return distribution system 98) hot water return tank 99) hot water return pump 100) hot water return distribution system The sensible heat can be recovered by one or more of the following ways: • steam generation in a waste heat boiler • hot water generation for heat heating • preheating combustion air in the gas turbine furnace • power generation Investment cost & Operating life Investment cost: approx. 1,000 million yen Operating life: approx. 20 years	
Other Information	Other Information (Supplier Name, Technical Reference, etc) Supplier Name: [Name] Technical Reference: [Reference]	

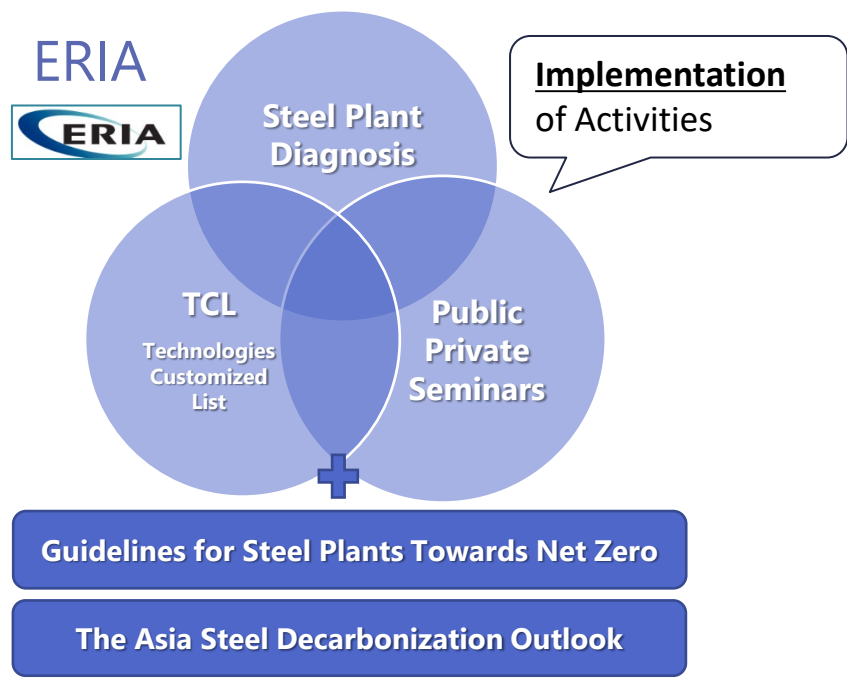
➡TCL will become an accompaniment of the “Guidelines for Steel Plants Towards Net Zero” to support steel plant’s energy-saving and decarbonization

Collaboration with ERIA

- SteelEcosol has started collaboration with ERIA since October 2024 to further extend our activities.

ERIA (Economic Research Institute for ASEAN and East Asia) is ...

International organization established by an agreement of the leaders of 16 East Asia Summit (EAS) member countries. Its main role is to **conduct research and policy analyses** to **facilitate the ASEAN Economic Community (AEC) building** and **support wider regional community building**.
(from ERIA website: <https://www.eria.org/about-us>)

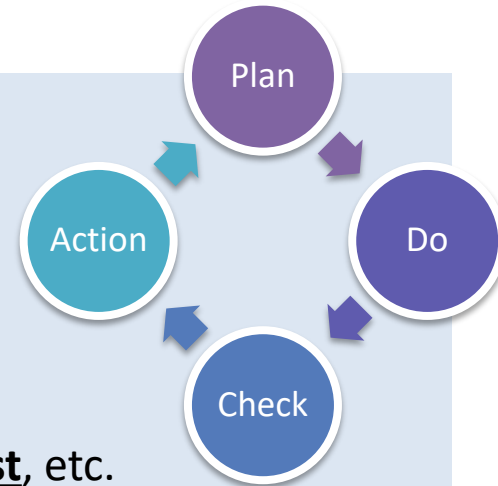


Guidelines for Steel Plants Towards Net Zero

- SteelEcosol is developing **guidelines** for conducting plan, do, check, action cycle for **energy efficiency and conservation at steel plants.**

<Features of the Guidelines>

- ✓ **Focus on energy efficiency improvements and BAT as a first step** toward a future net-zero steel industry in Asia
- ✓ **The target of the guideline are the steel companies** who wishes to actively promote energy-saving and BAT implementation
- ✓ Based on the **PDCA cycle**
- ✓ Works with tools such as **ISO 14404, Technologies Customized List**, etc.
- ✓ **Comprehensive estimation criterion** when installing energy-saving equipment.

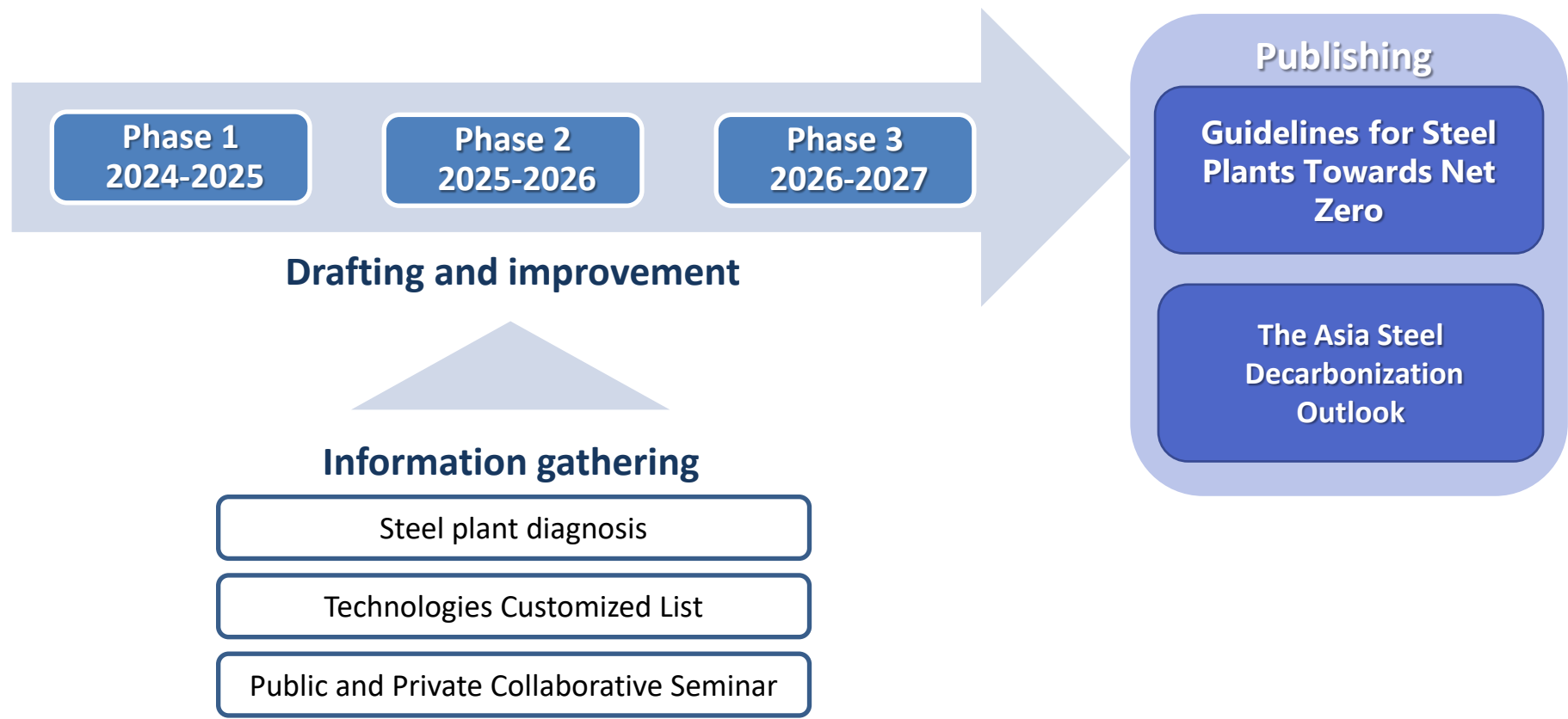


<Benefits of the Guidelines for the Steel Companies>

- ✓ The guideline can be used to help **plan and act on energy-saving efforts for long-term decarbonization**

Future Activities of SteelEcosol

- Collaboration with ERIA is a 3-year project, and we plan to publish the “Guidelines” and the “Outlook” in the future.



SteelEcosol will deepen the efforts to reduce energy consumption and CO2 emissions in the steel industry

Thank you!