



NIPPON STEEL ENGINEERING

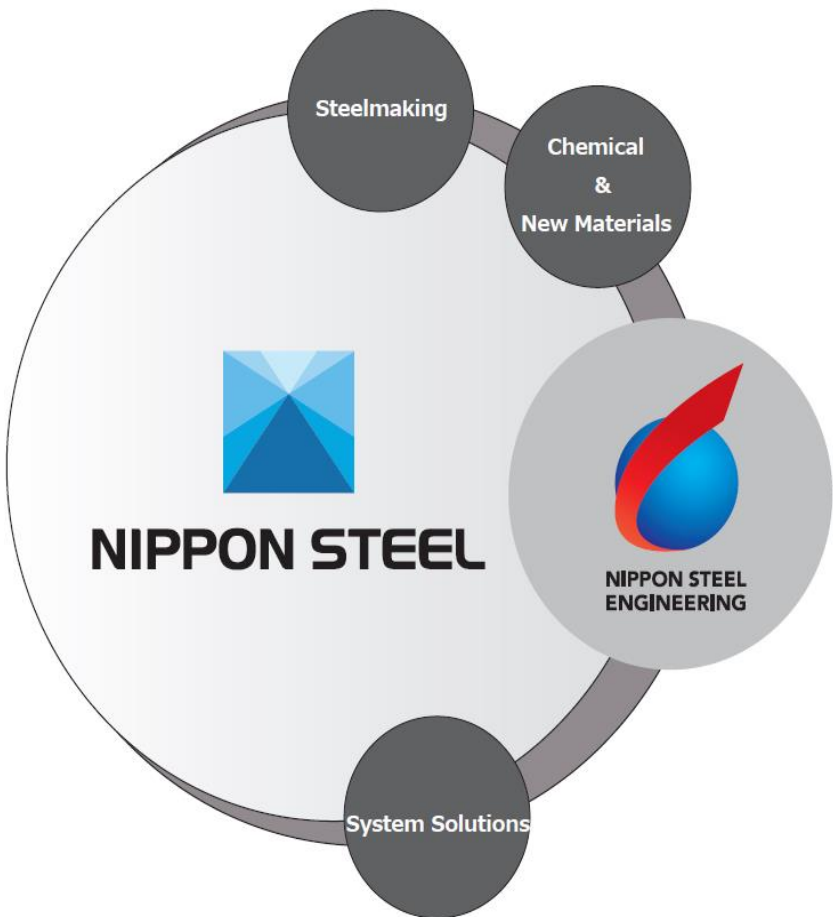
***Best Available Technologies for  
Carbon Neutrality in ASEAN Steel Industry***



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# Introduction of Nippon Steel Engineering

## Nippon Steel Engineering Co.,Ltd.



- 1  **Steel Plants**
- 2  **Waste to Energy**
- 3  **Energy Solutions**
- 4  **Marine Engineering and Construction**
- 5  **Building Construction and Steel Structures**
- 6  **Pipelines**



CDQ



ESCAP



TPH



Waste to Energy



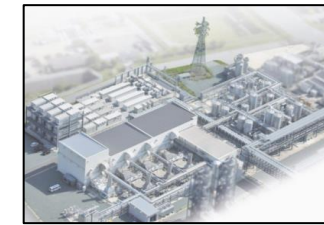
Wind Power



Biomass



WHP



On site Energy



Logistic Center



# Introduction of Nippon Steel Engineering

Field-proven products we aim to further promote

Products we aim to disseminate

## STAGE-1

### Offshore wind power plant



Abundant achievements and experience in marine engineering  
Provide integrated service from designing, manufacture, construction, operation to maintenance of offshore wind power generation facilities.

### Geothermal power plant



Domestic share: over 50% (steam production facility)  
Since 1980's, we have been working on designing, material procurement and construction of steam production facilities for geothermal power generation use. Binary power generation system has also been on sale since 2010. largest class biomass power plant in Japan (75MW) started operation in June, 2021

### Sewage sludge biomass "J-COMBI System"®



Adoption by local governments is accelerating  
Converts sewage, which has been disposed of by landfill or incinerator, into carbon-neutral coal alternative fuel by using granulation and drying process.

### Biomass power plant



We are working on construction of a large-scale wood biomass power generation plant taking advantage of the power generation engineering know-how acquired over many years in the group

### Coke dry quenching (CDQ)

A system where hot coke removed from coke ovens at a temperature of approximately 1,000° C is cooled and kept dry with inert gas and the resulting steam produced in a waste heat recovery boiler is used to generate electricity.

### Waste to energy plant

Electric power generated by residual heat of waste disposal is "local production for local consumption", which is a stable clean energy. We are contributing to the formation of a "regional circular and ecological spheres" through the supply of electricity from 35 waste to energy plants nationwide.

## STAGE-2

### Hydrogen refueling station etc.



In partnership with Air Products & Chemicals, Inc. (USA), we are working to realize a hydrogen society in Japan with highly safe field-proven technology.

### Energy Saving CO<sub>2</sub> Absorption Process ESCAP™



Enables separation and recovery of high-purity CO<sub>2</sub> from gases including CO<sub>2</sub> with other impurities, and it can be applied to food and chemical raw material uses CO<sub>2</sub> removal in chemical processes, CCS and crude oil mining, etc.



# Introduction of NSE CN Technology



**CDQ**  
Heat Recovery System

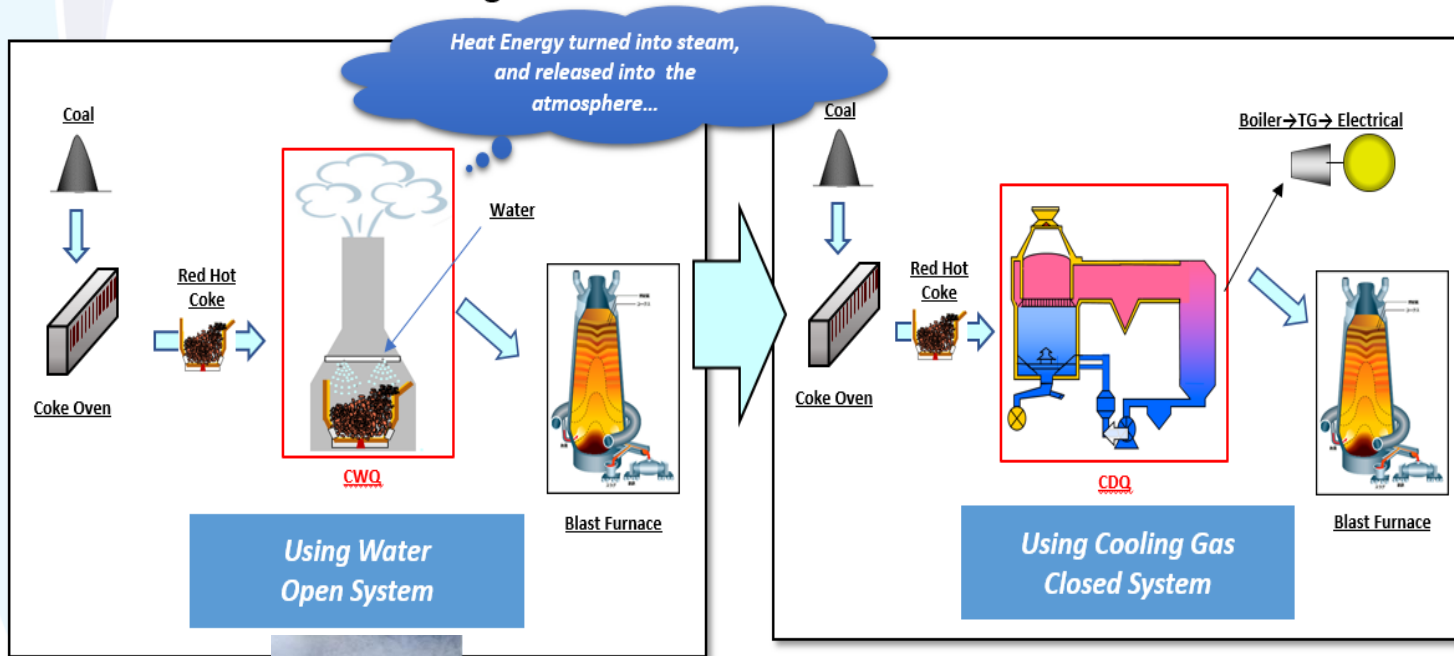


**TPH**  
Energy Saving System

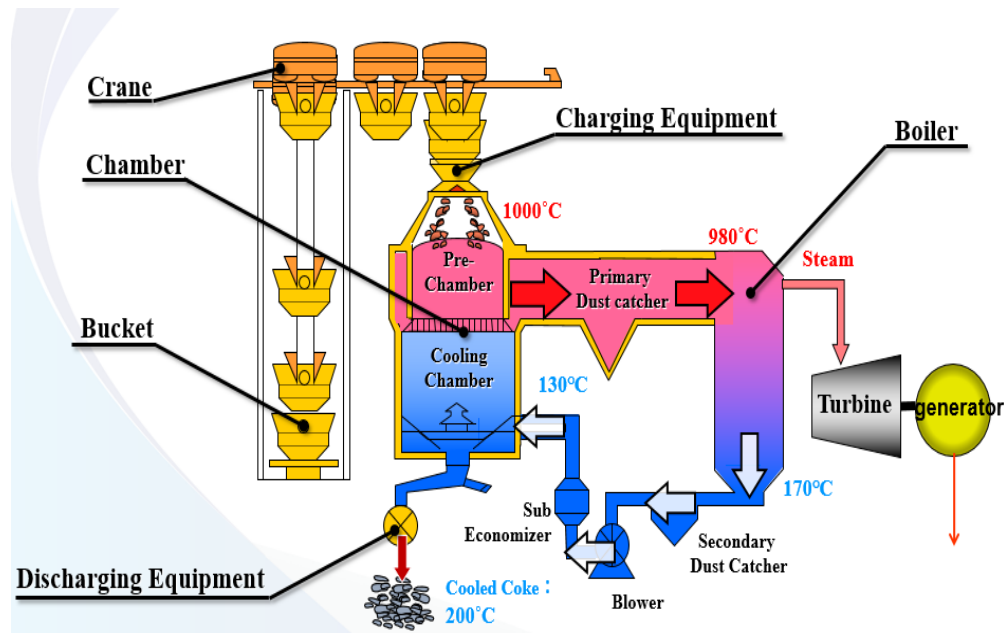


**ESCAP**  
Co2 Recovery System

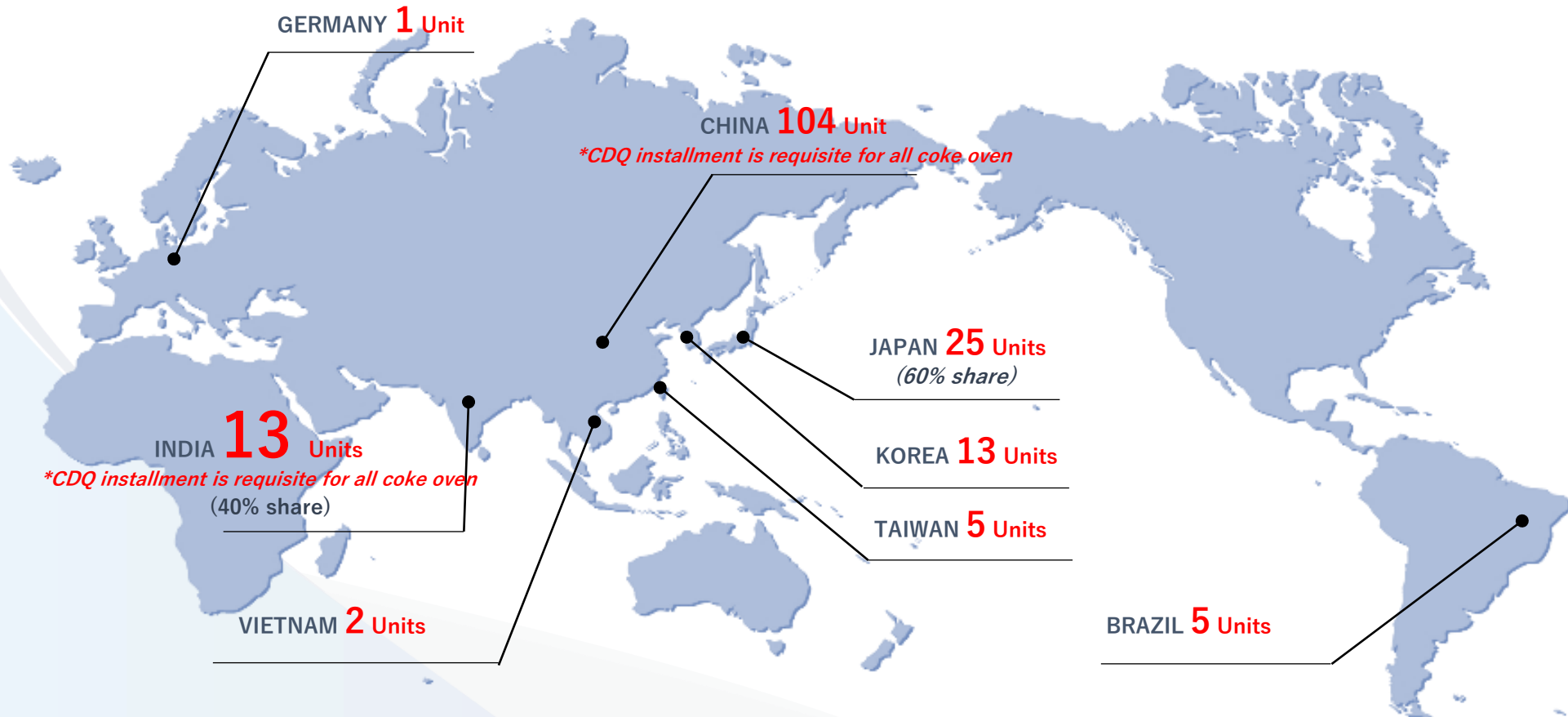
## CWQ Coke Wet Quenching



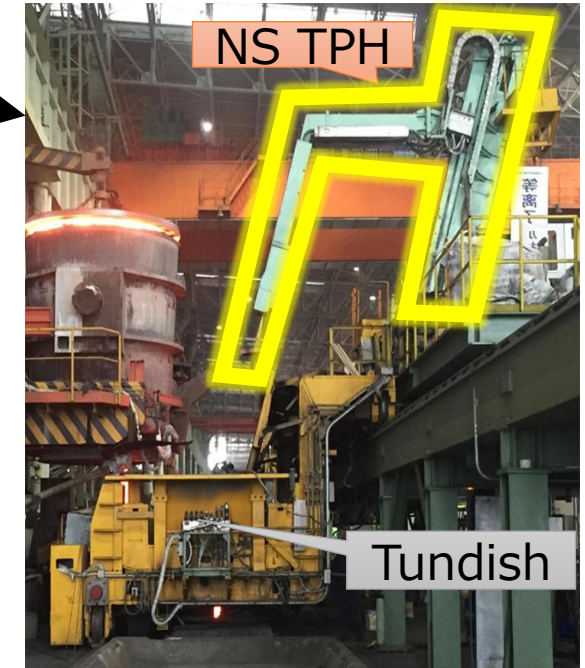
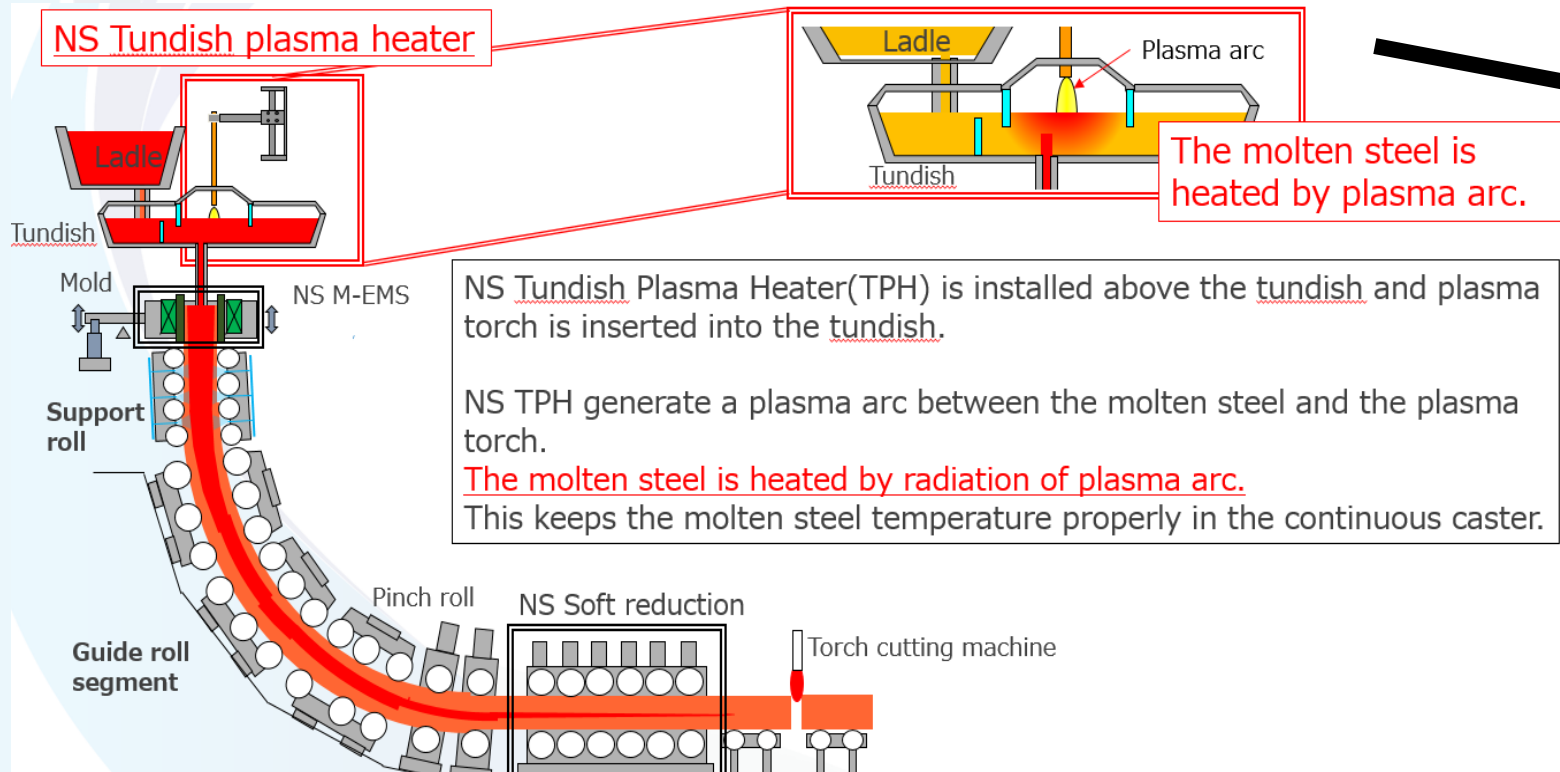
## CDQ Coke Dry Quenching



So far Nippon Steel Engineering supplied **168 units** of CDQ all over the World

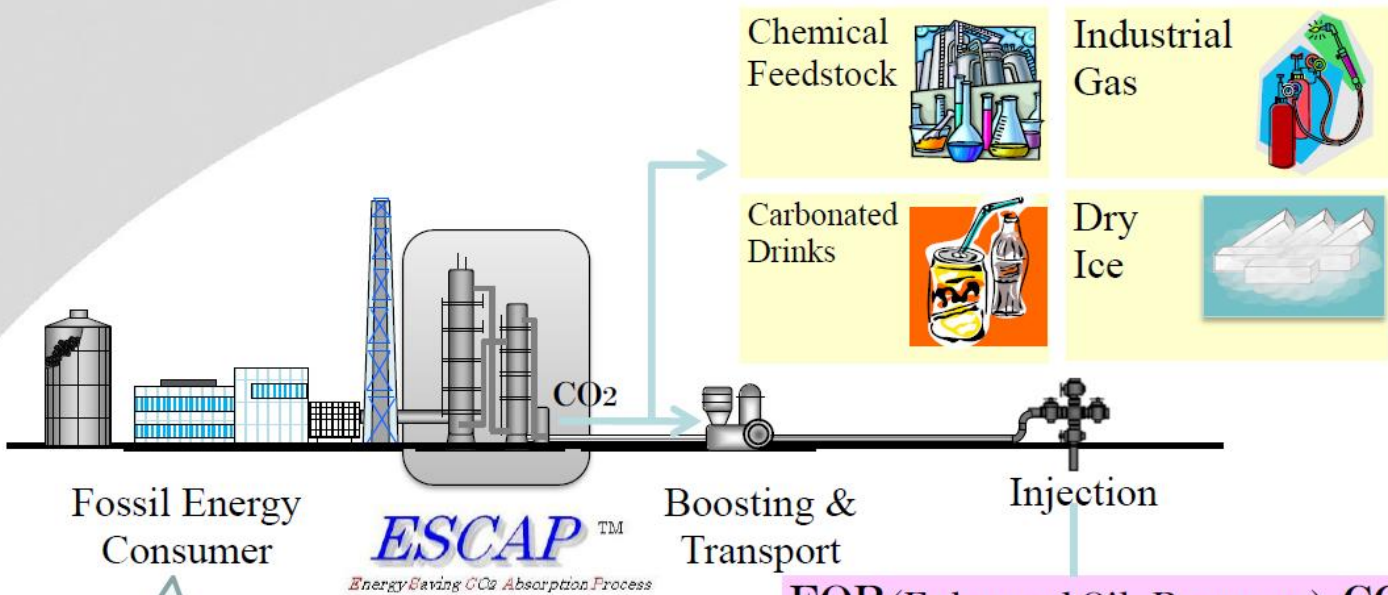


## TPH “Enhance Quality of Steel & Energy Saving”





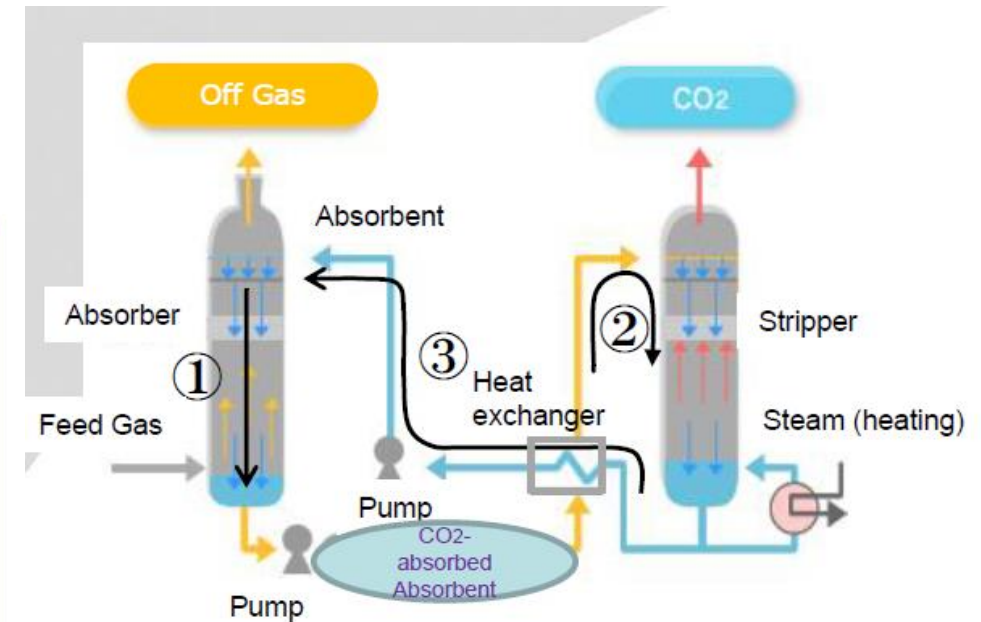
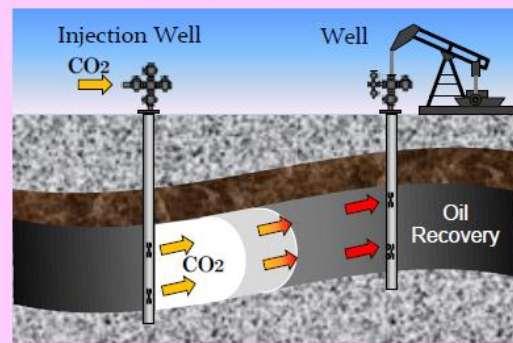
## ESCAP "High purity CO2 Recovery from Waste Gas"



### Typical CO2 Sources

- Thermal Power Plant
- Refinery
- Steelworks

### EOR (Enhanced Oil Recovery), CCS



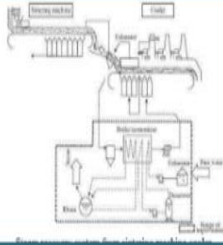
## What is Technologies Customized List (TCL)?

- ◆ TCL is developed as one of **Eco-solution** activities
- ◆ There are TCL for India and ASEAN
- ◆ TCL contains technologies for
  1. Energy saving
  2. Environmental protection
  3. Recycling

**suitable** to steel mills of the target country or region with the **BF-BOF and Electric Arc Furnace**
- ◆ Offer information on CO<sub>2</sub> reduction effect and payback time for the target country and region

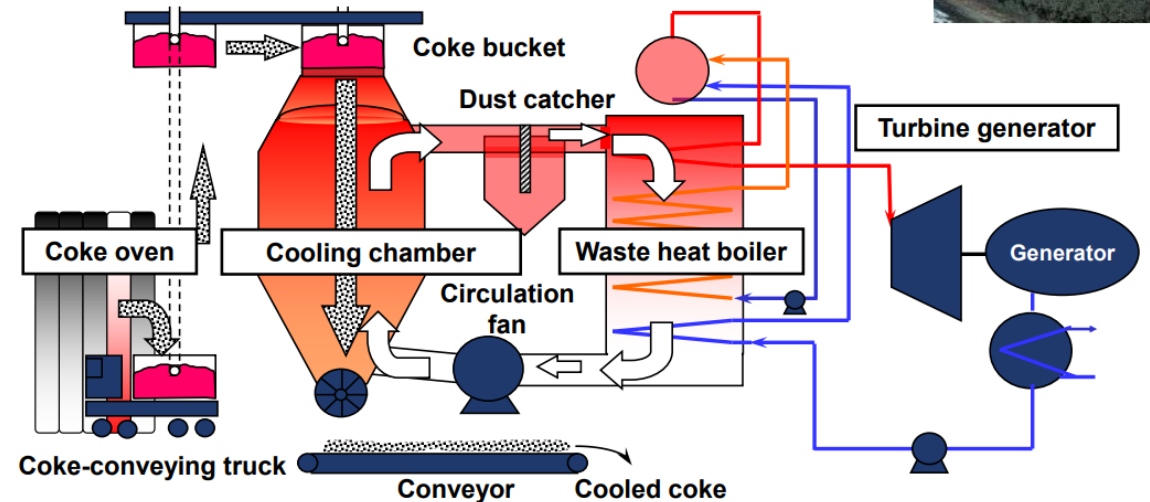


# TCL Technologies Customized List

List Number	A-1	Names of technology
Process Flow or Diagram		
Technology Definition/Specification	<p>This device recovers the sensible heat in the hot air with temperature of 250 C to 450 C from a sinter cooler. Its composition mainly:</p> <ul style="list-style-type: none"> <li>a) boiler/economizer,</li> <li>b) pre-heat boiler,</li> <li>c) dustcatcher,</li> <li>d) steam boiler.</li> </ul> <p>After heat boiler/economizer, the order of 60,000 kcal/h-steam.</p> <p>The sensible heat can be recovered by one or more of the following ways:</p> <ul style="list-style-type: none"> <li>* steam generation in a waste heat boiler</li> <li>* hot water generation for local heating</li> <li>* preheating combustion air in the ignition furnace</li> <li>* power generation</li> </ul>	Investment cost & Operating life
Effect of Technology Introduction	<p>Investment Cost &amp; Operating Life</p> <p>Investment cost: approx. ¥500 million</p> <p>Operating life: approx. 22.1 years</p> <p>Annual steam recovery: 60,000 t/yr</p> <p>Reduction in crude oil equivalent: 7,500 t-crude oil/yr</p> <p>Economic effect: ¥135.8 mil./yr (60,000 * 1.81/0.8) / 1,000</p>	
Other Information (Supplier Name, Technical Reference, etc)	<p>Equipment only: approx. 22.1 years</p> <p>Including construction cost: approx. 25.8 years</p> <p>Annual steam recovery: 60,000 t/yr</p> <p>Reduction in crude oil equivalent: 7,500 t-crude oil/yr</p> <p>Economic effect: ¥135.8 mil./yr (60,000 * 1.81/0.8) / 1,000</p>	
Preconditions	<p>* Payback time was defined as (investment cost / economical merit) in this project.</p> <p>* annual sinter production: 1 mil. ton/yr</p> <p>* CO2 emission factor of coal: 0.095</p> <p>* unit cost of C heavy oil: ¥1.81/1,000 kcal [NEDO]</p> <p>overall boiler efficiency: 0.8</p> <p>Economic effect: 60,000 * 1.81/0.8 = ¥136 mil./yr</p> <p>* Refer to <a href="http://aisa.nacfi.com/techinfo/aisa/aisa/aisa2ad.aux">http://aisa.nacfi.com/techinfo/aisa/aisa/aisa2ad.aux</a> and <a href="http://www.aisa.co.jp/outline/100107259.pdf">http://www.aisa.co.jp/outline/100107259.pdf</a></p>	

## (Reference) Coke Dry Quenching (CDQ)

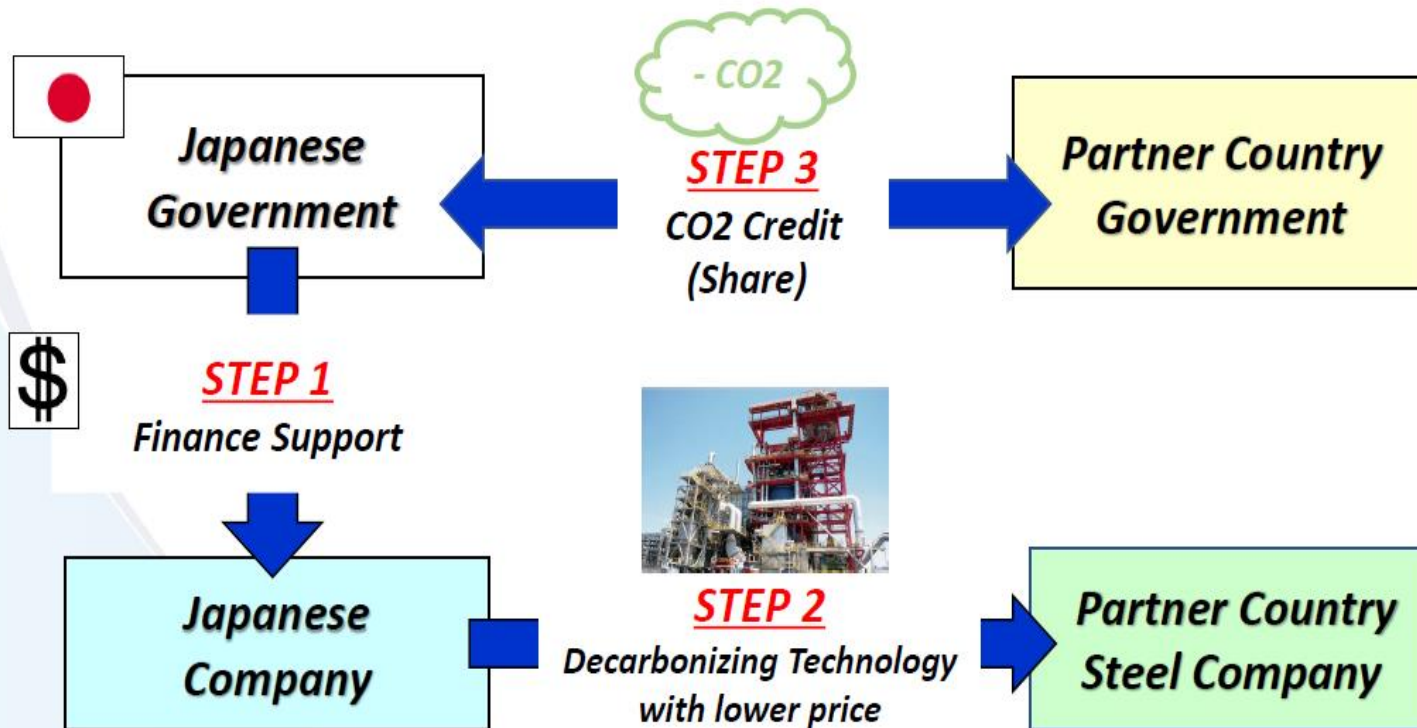
- Instead of water used conventionally, this equipment uses inert gas to quench the hot coke and, at the same time, recovers the sensible heat in the shape of steam which is utilized for generating power. In addition to the waste heat recovery, the equipment contributes to the improvement of coke quality, the reduction of environmental pollution and the improvement of energy efficiency.
- This equipment has been installed at all the working coke ovens of steel manufacturers in Japan and also expanded all over the world.



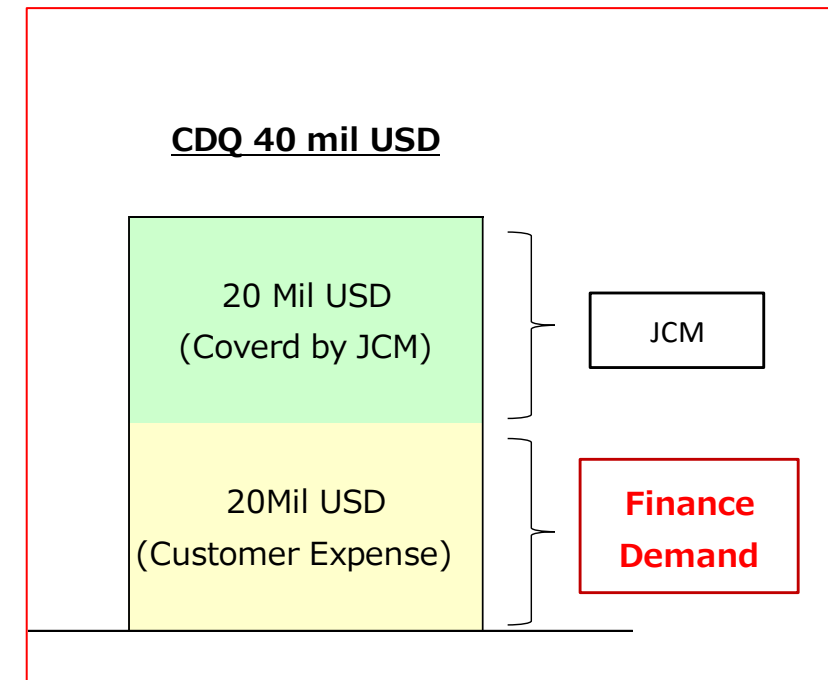


# JCM Finance Program

## JCM Finance Program



## JCM + Finance (Example Idea)



# JCM Finance Program


## 28 Countries



# JCM Finance Program

## Overview of Japan's support for the JCM partner countries

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	Programme	Type of support
Ministry of the Environment	Finance Programme for JCM Model Projects*	Subsidy
	Finance Programme for F-gas Recovery and Destruction Model Projects*	Subsidy
	Japan Fund for the JCM (JF JCM) - managed by ADB	Grant
	JCM support programme by UNIDO*	Grant for projects, technical cooperation
 Ministry of Economy, Trade and Industry	Project development/capacity building/MRV support	Technical cooperation
	JCM Feasibility Study	Technical cooperation
	JCM Demonstration Programme	Government-commissioned project
Ministry of Agriculture, Forestry and Fisheries	Development of MRV for JCM projects in Agriculture -implemented by ADB	Technical cooperation
	Field studies for JCM REDD+	Government-commissioned project

### NSE Activity

**METI (Ministry of Economy, Trade and Industry)**

**2021 : CDQ F/S for SEA**

**2022 : TPH F/S for SEA**

**2023 : Metallic Burner F/S for India under MRI**



# JCM Finance Program

## METI's support for the JCM partner countries

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- METI supports the introduction of **advanced decarbonizing technologies through Demonstration Projects** which contribute to the decarbonization of the JCM partner countries.
- The project cost burdened by Japanese side is **100% supported by Japanese government (METI/NEDO).**

### Examples of past projects



Optimization in petroleum refining plant, Yokogawa Electric Corp. Indonesia



Energy-saving of mobile communications base transceiver stations, KDDI Corp. Indonesia

Total: 11 projects in 6 countries (As of July 2023)

### JCM Feasibility Study by METI



#### Scope:

- Consider basic elements of the demonstration (technology, project site, stakeholders, etc.)
- Establish the basis of JCM methodology for quantification of the GHG emission reduction
- Study the possibility of dissemination of the introduced technology
- Project cost: 15 million JPY (approx.116 thousand USD) per study

**Project period:** Up to 1 year

Assumed technical areas: Energy efficiency with IoT, EMS, Renewable energy, CCS/CCUS, Hydrogen/Ammonia, etc.

### JCM Demonstration Program by NEDO (\*)

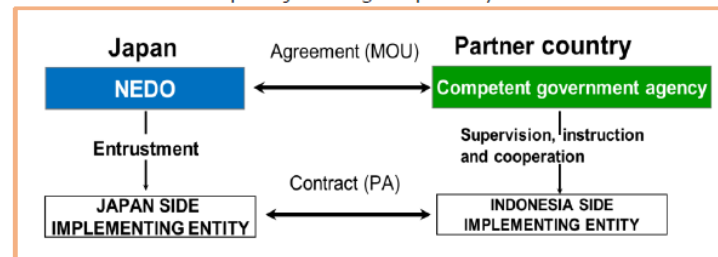


#### Scope:

Demonstrate and verify the effectiveness of advanced decarbonizing technology:

- Introduction of relevant facilities and systems, and conduct demonstration
- Quantification of GHG emission reduction effectiveness
- JCM procedure toward issuance of JCM credits
- Budget for FY 2023: 1.1 billion JPY (approx. 8.5million USD)

**Project period:** Pre-demonstration stage: up to 1 year  
 Demonstration stage: up to 3 year  
 Follow-Up Project stage: up to 2 year



\* NEDO = New Energy and Industrial Technology Development Organization



## NSE Activity

## JCM Demonstration Program by NEDO

## TPH Indonesian Customer



Company Profile Movie

<https://www.eng.nipponsteel.com/english/whoweare/overview/>