

# *Financing Programme for JCM Model Projects*

**September 2021**

**Global Environment Centre Foundation (GEC)**



<b>Budget</b>	Approx. USD83million in total with Demonstrate Decarbonization Technology for Realizing Co-Innovation Program
<b>Executing Entity</b>	International Consortium that consists of a Japanese entity and a JCM partner-country entity(ies)
<b>Scope of Financing</b>	Facilities, equipment, vehicles, etc. which reduce CO2 from fossil fuel combustion as well as construction cost for installing those facilities, etc.
<b>Eligible Projects</b>	Start installation after the Contract of Finance is concluded and finish installation within 3 years.
<b>Maximum percentage of Financial Support</b>	Maximum of 50% and reduce the percentage according to the number of already selected project(s) using a similar technology in each partner country. ※ Number of already selected project(s) using a similar technology in each partner country : none (0) = up to 50%, up to 3 (1-3) = up to 40%, more than 3 (>3) = up to 30%. The percentage of financial support will be determined by GEC.
<b>Cost-effectiveness</b>	Cost-effectiveness of GHG emission reductions is expected to be JPY4,000/tCO2eq or better. ※ If the number of similar technological projects in a partner country is 5 or more, the cost-effectiveness is expected to be JPY3,000 or lower. If it is 10 or more, JPY2,500 or lower.

# Basic policy for JCM Model Projects in FY2021

“Strategy for Overseas Expansion in the Environmental Field”  
(decided by MOEJ, June, 2018)

“2025 Strategy for Overseas Expansion of Infrastructure Systems”  
(decided by the Economic Cooperation Infrastructure Strategy  
Council, in December, 2020)

<Project examples>



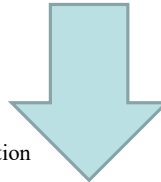
Solar power generation



Carbon capture and storage  
(CCS)



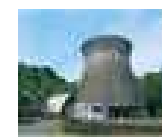
Wind power generation



Hydrogen



Waste power generation



Geothermal power generation

JCM Model Projects :

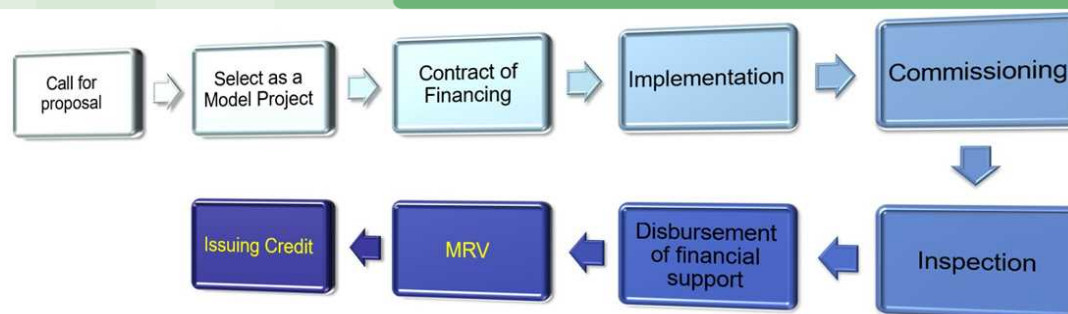
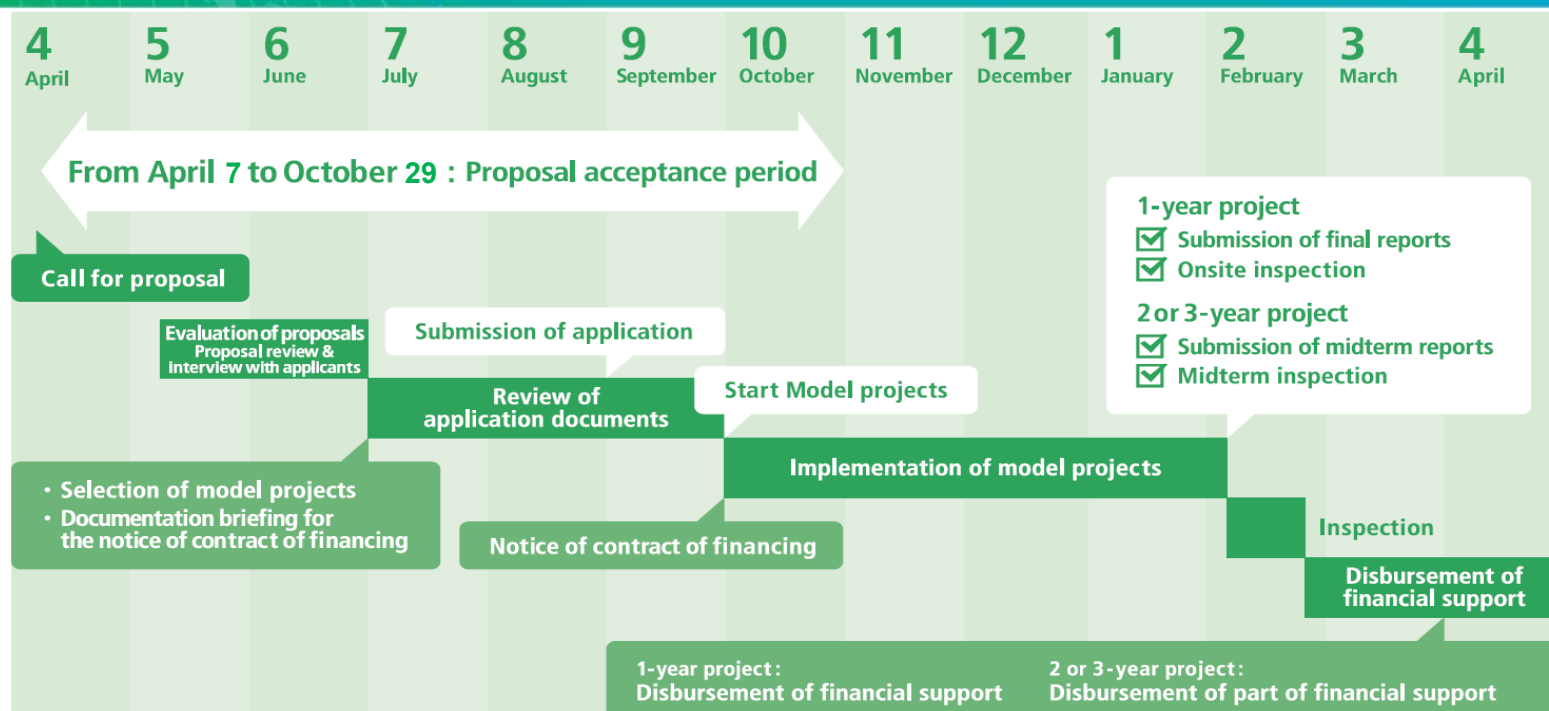
Supporting to facilitate diffusion of advanced decarbonizing technologies ,etc and infrastructure as well as implementation of mitigation actions.

## Eligible Projects

- (a) Projects that reduce energy-related CO2 emissions with leading decarbonizing technologies in developing countries, with which Japan has signed or has been consulting to sign a bilateral document on JCM, and that are expected to contribute to achieving Japan's GHG emission reduction target through the JCM;
- (b) Projects contribute to the sustainable development in partner countries. The installation and operation of the facilities/equipment shall comply with the relevant laws and regulations of the partner country and international practices and guidelines regarding the environmental protection
- (c) Reduction of GHG emissions achieved by the projects can be quantitatively calculated and verified; and
- (d) Facilities/equipment installed by the projects do not receive any other financial support by the Government of Japan.
- (e) If the technology to be adopted is a technology mentioned in Annex 3 “Conditions for Adoption by Technology” in this guideline, the technology shall meet its conditions.

※Call for Proposals for JCM Model Projects in FY2021Guidelines for Submitting Proposals (Page3)

# JCM Model Projects Schedule in FY2021



**Guideline** for Submitting JCM model project proposal in FY2021

### What is the criteria of cost-effectiveness?

#### **JPY4,000/tCO<sub>2</sub>equivalent**

$$= \frac{\text{Amount of financial support[JPY]}}{\text{Emission reductions of GHG [tCO}_2\text{equivalent/y]} \times \text{legal durable years[y]}}$$

※ Legal durable years of the facilities is stipulated by the Japanese law, and are dependent on the industry classification.

#### **JPY3,000/tCO<sub>2</sub>equivalent**

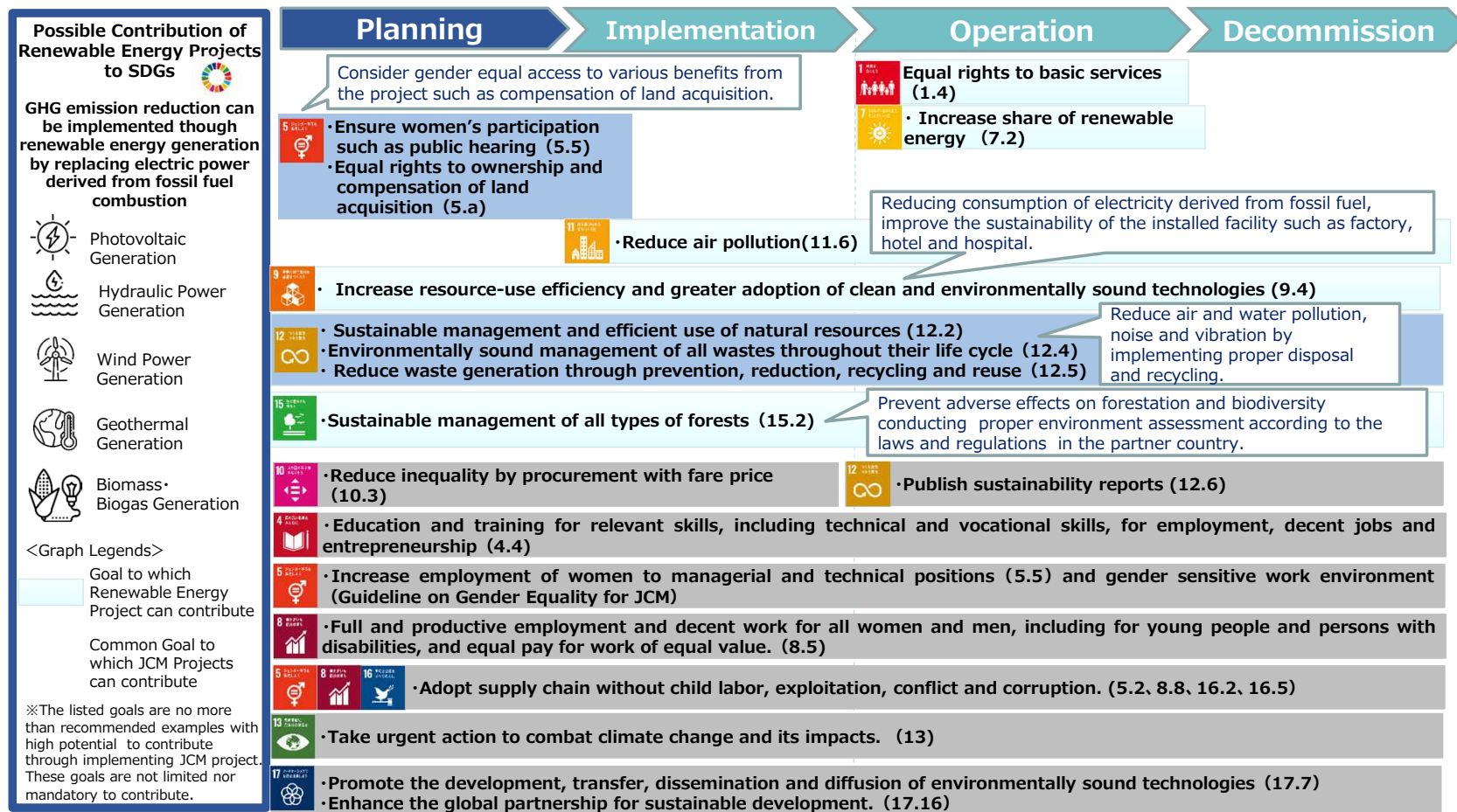
In case the number of similar technological Projects in each country is 5 to 9.

#### **JPY2,500/tCO<sub>2</sub>equivalent**

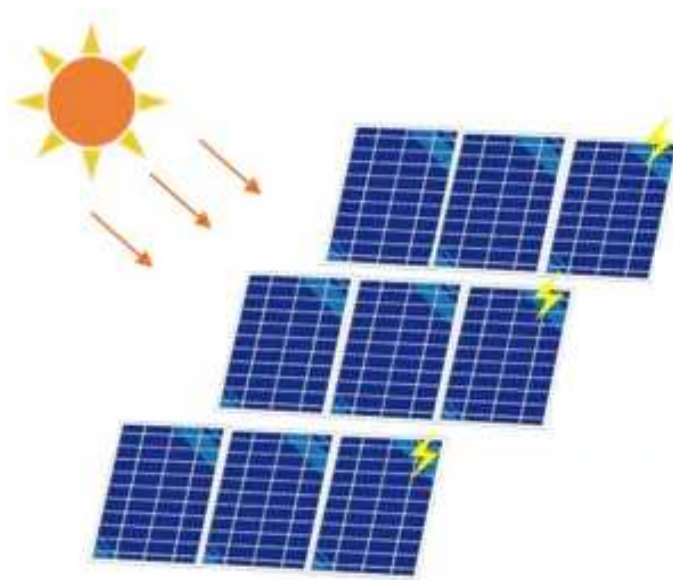
In case the number of similar technological Projects in each country is 10 or more.

Solar power projects in Thailand

Solar power projects in Mongolia, Palau and Philippine and hydropower projects in Indonesia







Photovoltaic module:  
Conversion rate of 20% or  
higher, from optical to electric  
energy

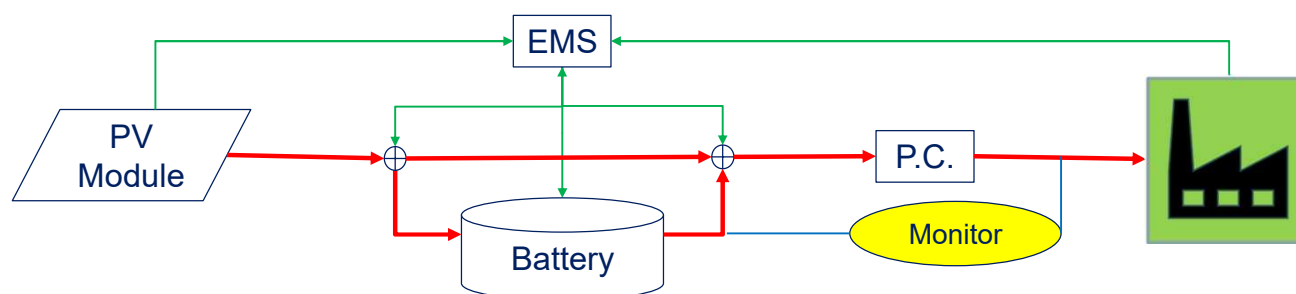
Technology	Mongolia	Bangladesh	Ethiopia	Kenya	Maldives	Viet Nam	Lao PDR	Indonesia	Costa Rica	Palau	Cambodia	Mexico	Saudi Arabia	Chile	Myanmar	Thailand	Philippines	Total
	MN	BD	ET	KE	MV	VN	LA	ID	CR	PW	KH	MX	SA	CL	MM	TH	PH	
Solar Power Plant	4	1	1	2	1	4	3	3	1	5	4	3	1	4	1	15	6	59

Photovoltaic(PV) module:

Conversion rate of 20% or higher, from optical to electric energy

Battery

- (1) Charges only the power generated by PV modules introduced, and the power supplied from the battery is measured.
- (2) Necessity
  - 1) Introduction to off-the-grid areas
  - 2) Installation of batteries is required to connect grid by laws or regulations
  - 3) For self-consumption in factories or local power supply business
    - (a) The battery should be charged and discharged every day
    - (b) The battery capacity is 20% or larger than wattage of PV module installed, and within maximum daily base chargeable amount





# 1<sup>st</sup> Selection of Projects in FY2021

Partner Country	Entity	Project Title	Sector	Expected GHG Emission Reductions (tCO <sub>2</sub> /y)
Vietnam	JFE Engineering Corporation	Waste to Energy project in Bac Ninh Province	Waste handling and disposal	41,805
Vietnam	Electric Power Development Co., Ltd.	10MW Rice Husk Power Plant Project in Hau Giang Province	Renewable Energy	22,315
Vietnam	Sharp Energy Solution Corporation	Introduction of 9MW Rooftop Solar Power System to Factories	Renewable Energy	3,618
Vietnam	ENDO Lighting Corporation	Introduction of High Efficiency LED Lighting with Dimming and Tunable Function to Office Building in Ho Chi Minh City	Energy Efficiency Improvement	196
Indonesia	Sumitomo Forestry Co., Ltd.	Introduction of 3.3MW Rooftop Solar Power System in Woodworking Factories	Renewable Energy	2,396
Indonesia	FUMAKILLA LIMITED	Introduction of High-Efficiency Thermal Oil Heater System in Chemical Factory	Energy Efficiency Improvement	1,942
Mexico	Sharp Energy Solution Corporation	20MW Solar Power Project in Guanajuato	Renewable Energy	20,023
Thailand	Osaka Gas Co., Ltd.	Introduction of High Efficiency Once Through Boiler to Garment Factory	Energy Efficiency Improvement	2,665
Thailand	NIPPON STEEL ENGINEERING CO., LTD.	Installation of High Efficient Chiller System and PV System for On-Site Energy Supply in Motorcycle Factory	Energy Efficiency Improvement/ Renewable Energy	1,144
Philippines	MITSUI & CO., LTD.	60MW Solar Power Project in Cordon, Isabela	Renewable Energy	44,860
Philippines	Mizuho-Toshiba Leasing Company Ltd.	Tanawon 20MW Flash Geothermal Power Plant Project	Renewable Energy	38,312

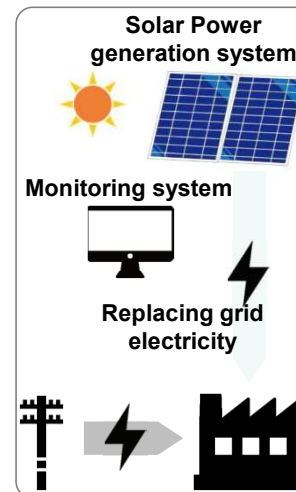
## Introduction of 3.3MW Rooftop Solar Power System in Woodworking Factories

PP (Japan): Sumitomo Forestry Co., Ltd., PP (Indonesia): PT. AST INDONESIA

### Outline of GHG Mitigation Activity

A total of 3.3MW of roof-mounted captive solar power generation system is installed at two woodworking factories located in an industrial park in the suburbs of Semarang city. The generated electricity replaces a portion of grid electricity to reduce greenhouse gas (GHG) emissions.

The project is being implemented as part of the Sumitomo Forestry Group's efforts to reduce GHG emissions based on SBT (Science Based Targets) and to introduce renewable energy in line with the RE100 target. It also contributes to the achievement of country's renewable energy introduction target of 23% by 2025.



### Expected GHG Emission Reductions

**2,396 tCO<sub>2</sub>/year**

= (Reference CO<sub>2</sub> emissions)  
- (Project CO<sub>2</sub> emissions)

• Reference CO<sub>2</sub> emissions  
= (Quantity of the electricity generated by the project) [MWh/year]

× Emission factor [tCO<sub>2</sub>/MWh]

• Project CO<sub>2</sub> emissions  
= 0 [tCO<sub>2</sub>/year]

### Sites of Project



## Introduction of High-Efficiency Thermal Oil Heater System in Chemical Factory

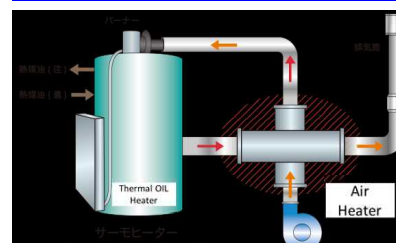
PP (Japan): FUMAKILLA LIMITED, PP (Indonesia): PT FUMAKILLA NOMOS

### Outline of GHG Mitigation Activity

For the purpose of the contribution to the global environment, the operation of the existing coal-fired thermal oil heater is stopped, and the amount of greenhouse gas (GHG) emissions can be reduced by installing the new high-efficiency natural gas-fired thermal oil heater.

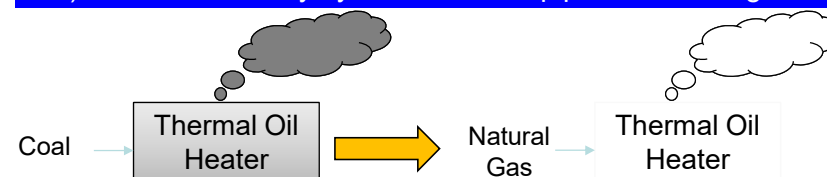
By replacing the coal-fired system with the natural gas-fired system, concerns about the corrosion of pre air heater will be diminished, and the equipment is also expected to be used with high efficiency in the long run.

#### 1) Efficiency improvement by installing pre air heater



Heater efficiency is expected to be improved by 12% by installing pre air heater and to reduce more GHG emissions.

#### 2) More eco-friendly by conversion to pipeline natural gas



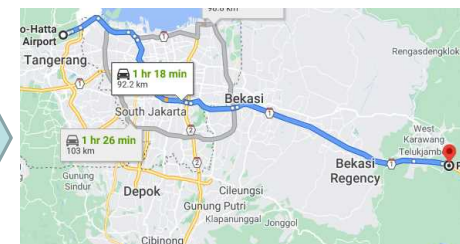
### Expected GHG Emission Reductions

**1,942 tCO<sub>2</sub> /year**

$$= [(Reference \text{ fuel consumption}) - (Project \text{ fuel consumption})] \times \text{Emission factor (EF)}$$

### Sites of Project

Approximately 100km southeast of Soekarno-Hatta International Airport



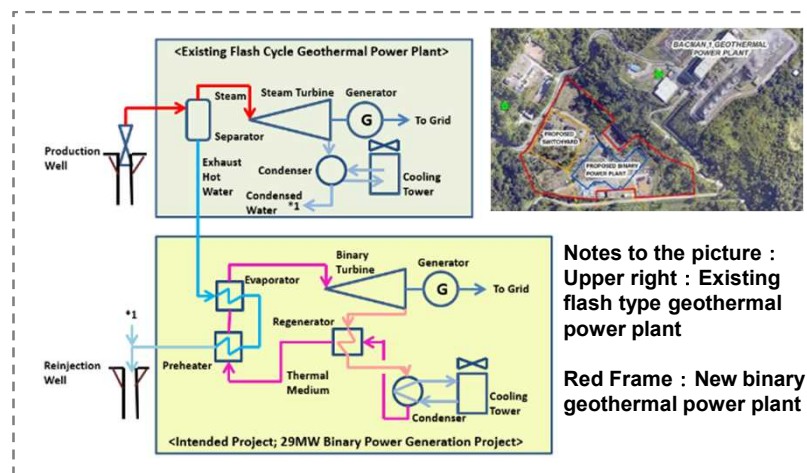
Map data©2021Google

## 29MW Binary Power Generation Project at Palayan Geothermal Power Plant

PP (Japan): Mitsubishi Heavy Industries, Ltd. PP (Philippines): Bac Man Geothermal Inc.

### Outline of GHG Mitigation Activity

This project introduces a new 29 MW binary geothermal power plant with the Organic Rankine Cycle (ORC) system to the existing 120MW flash type geothermal power plant owned and operated by Bac-Man Geothermal Inc. The power plant is located at Palayan area of southern part of the Luzon island. This binary geothermal power plant effectively utilizes exhaust hot water of low enthalpy from the existing flash geothermal power plant without producing hazardous gasses. This project replaces the grid power produced by fossil fuel with renewable energy and reduces greenhouse gas (GHG) emissions.



### Expected GHG Emission Reductions

**72,200 tCO<sub>2</sub>/Year**

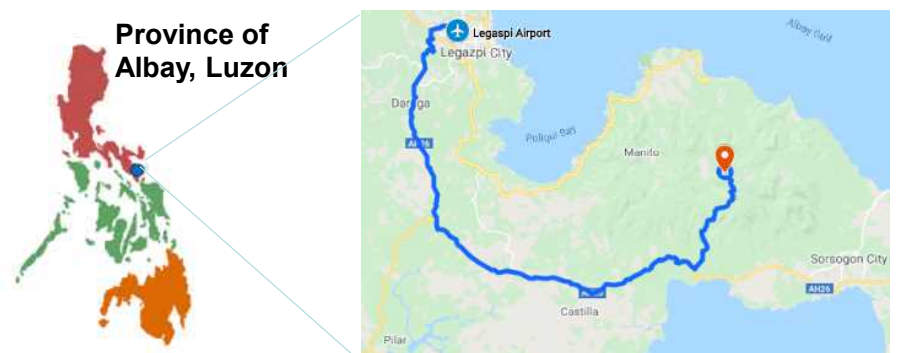
= (Reference CO<sub>2</sub> emissions)  
 - (Project CO<sub>2</sub> emissions)

• Reference CO<sub>2</sub> emissions  
 = (Quantity of the electricity generated by the project) [MWh/year]

× Emission factor [tCO<sub>2</sub>/MWh]

• Project CO<sub>2</sub> emissions  
 = 0 [tCO<sub>2</sub>/year]

### Sites of Project



## Tanawon 20MW Flash Geothermal Power Plant Project

PP (Japan): Mizuho-Toshiba Leasing Company, Limited, PP (Philippines): Bac-Man Geothermal Inc.

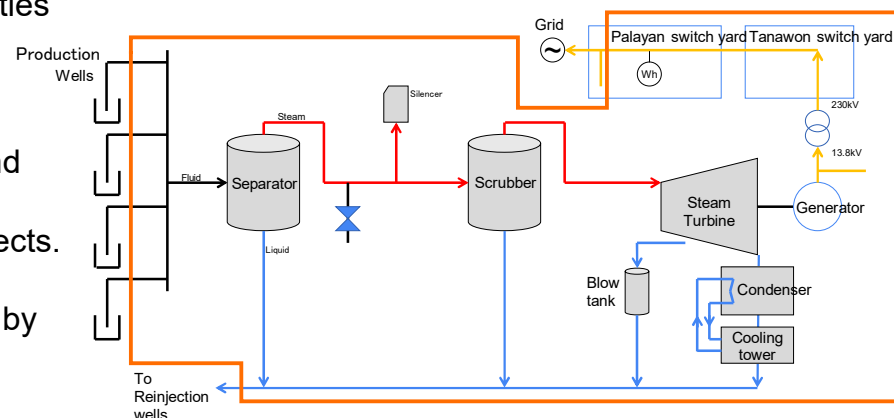
### Outline of GHG Mitigation Activity

This project introduces a new 20 MW Flash Geothermal power plant system and new facilities for connection to the grid at Tanawon area of southern part of the Luzon island.

This Flash Geothermal power plant is small and easy to install, making it suitable for relatively small-scale geothermal power generation projects.

This project replaces the grid power produced by fossil fuel with renewable energy and reduces greenhouse gas (GHG) emissions.

### Intended Project: 20MW Flash Geothermal Power Plant



### Expected GHG Emission Reductions

**38,312tCO<sub>2</sub>/year**

= (Reference CO<sub>2</sub> emissions)

– (Project CO<sub>2</sub> emissions)

• Reference CO<sub>2</sub> emissions

= Quantity of the electricity

transmission by the project [MWh/year]

× Emission factor [tCO<sub>2</sub>/MWh]

• Project CO<sub>2</sub> emissions

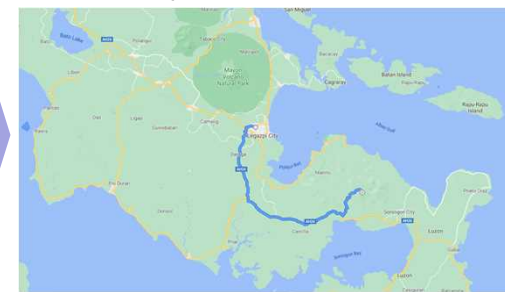
= Quantity of GHG(CO<sub>2</sub>, CH<sub>4</sub>) in Non

Condensable Gas of Steam from the well.

### Sites of Project



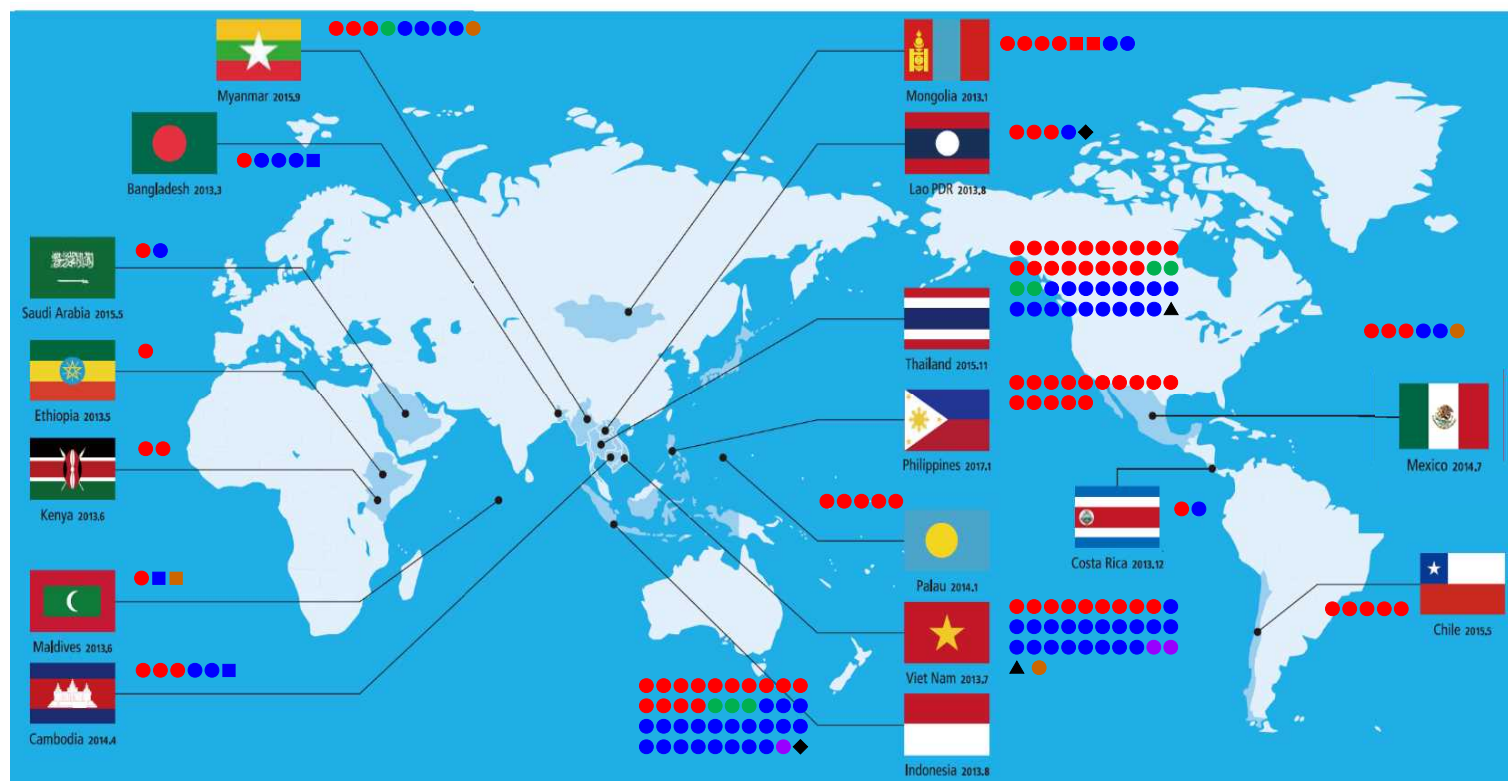
54km Southeast of the Legazpi City Domestic Airport



Map data ©2021 Google



# Project Map of JCM Financing Programme : as of June 29, 2021

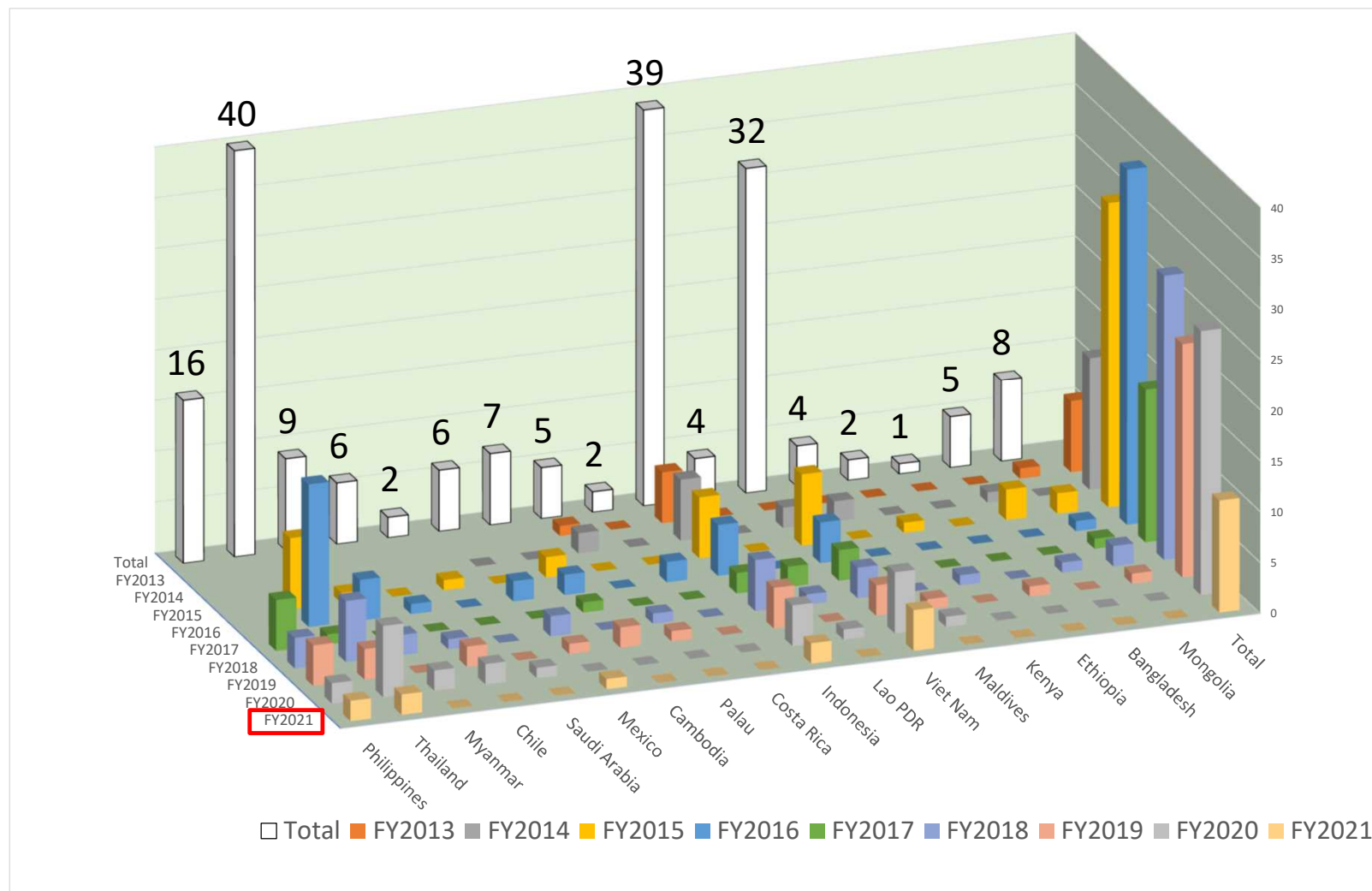


Total 186 projects / 17 countries

(● Model Project:177, ■ ADB:5, ◆ REDD+:2, ▲ F-gas:2)

- Renewable Energy
- Effective Use of Energy
- Energy Efficiency Improvement
- Transport
- Waste Handling and Disposal

# Project by Year and Country

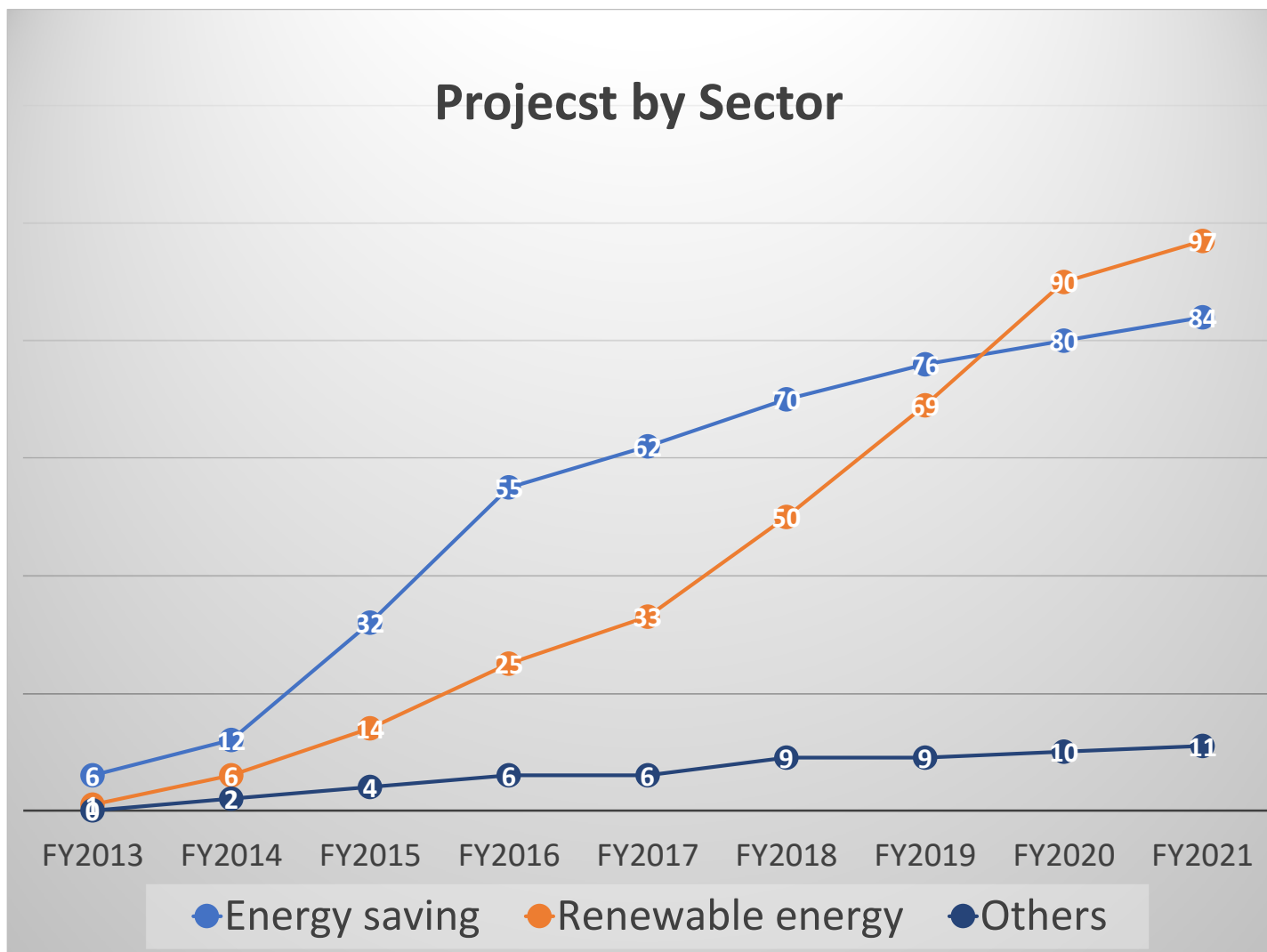




# Categorization by applied technology type

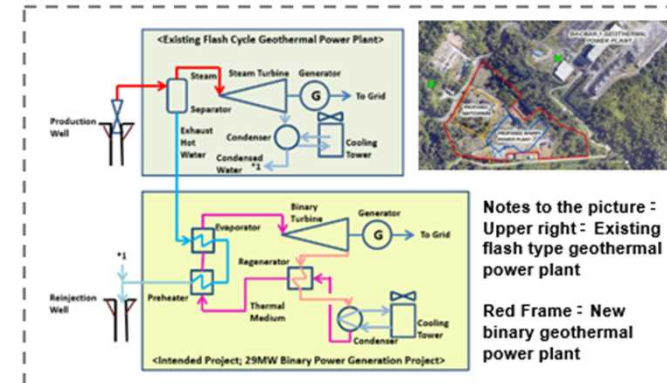
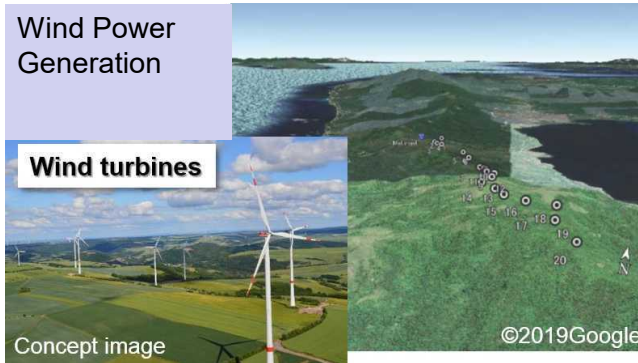
Sector	Technology	Mongolia MN	Bangladesh BD	Ethiopia ET	Kenya KE	Maldives MV	Viet Nam VN	Lao PDR LA	Indonesia ID	Costa Rica CR	Palau PW	Cambodia KH	Mexico MX	Saudi Arabia SA	Chile CL	Myanmar MM	Thailand TH	Philippines PH	
1. Energy Efficiency	Air Conditioning System						4		1								1		6
	Chiller		2				4		4	1		1				1	4		17
	Refrigerator								1							2	4		7
	Absorption Chiller Using Waste Heat								2								2		4
	Swirling Induction Type Air-conditioning System																1		1
	Air Conditioning System with Total Heat Exchanger															1			1
	Fridge and Freezer Showcase								1								1		2
	Boiler	2					2		3				1			2	1		11
	Double Bundle-type Heat Pump						1		1								1		3
	Water Heater Using Waste Heat									1						1			2
	Waste Heat Recovery System															2	1		3
	Heat Exchanger																1		1
	Transformer						4	1											5
	LED Lighting								2								1		3
	LED Street Lighting with Dimming System								1			1							2
	Pump						1												1
	Air Compressor						1										1		2
	Aeration System								1										1
	Regenerative Burners								1										1
	Gas Fired Furnace						1												1
	Gas Fired Melting Furnace																1		1
	Air Conditioning Control System						1										1		2
	Frequency Inverter for Pump						1					1							2
	Ventilation Control System															1			1
	Loom		1						2								1		4
	Old Corrugated Cartons Process								1										1
	Battery Case Forming Device						1												1
	Electrolyzer in Chlorine Production													1			1		2
	Wire Stranding Machines						1												1
	Autoclave								1										1
	Multi-effect Distillation System												1						1
	Injection Molding Machine								1										1
2. Renewable Energy	Solar Power Plant	4	1	1	2	1	4	3	3	1	5	4	3	1	4	1	15	6	59
	Solar Power Plant with Battery								1										1
	Small Hydropower Plant								8									3	11
	Wind Power Plant								1									1	1
	Geothermal Power Plant																	1	1
	Biomass Power Plant								1			1			1	1	1		6
	Biogas Power Plant																	1	1
	Biogas boiler						2										1		3
	Biogas boiler															1		1	2
	Biomass Co-generation						1										1		2
3. Effective Use of Energy	Power Generation by Waste Heat Recovery								1							1	1		3
	Gas Co-generation								2								3		5
4. Waste Handling and Disposal	Waste-to-Energy Plant															1			1
	Power Generation by Methane Recovery												1						1
5. Transportation	Digital Tachograph System						1												1
	CNG-Diesel Hybrid Bus								1										1
	Reefer Container						1												1
Total	Number of technology : 51	6	4	1	2	1	31	4	40	3	5	8	6	2	5	15	45	14	192

White 0 project = Up to 50%      Yellow 1-3 project(s) = Up to 40%      Orange more than 4 projects = Up to 30%



Wind Power Generation

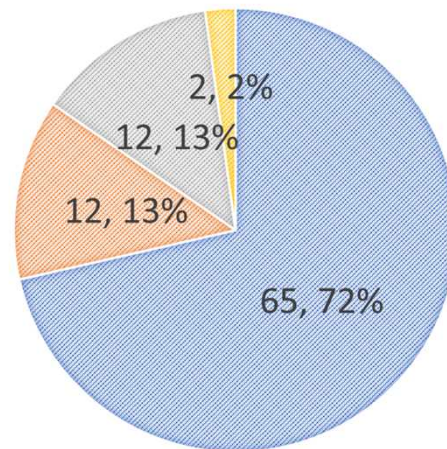
Wind turbines



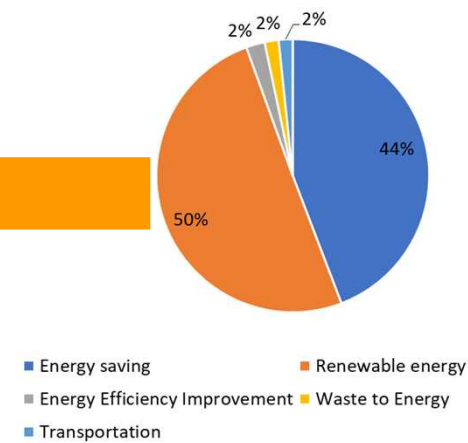
Geothermal Power Plant

## RENEWABLE ENERGY SECTOR

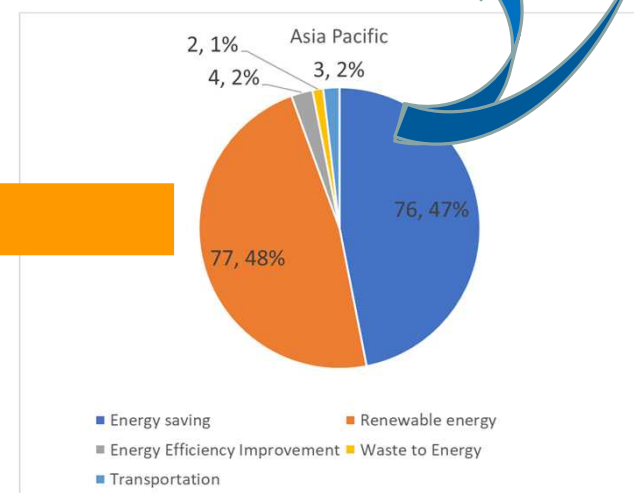
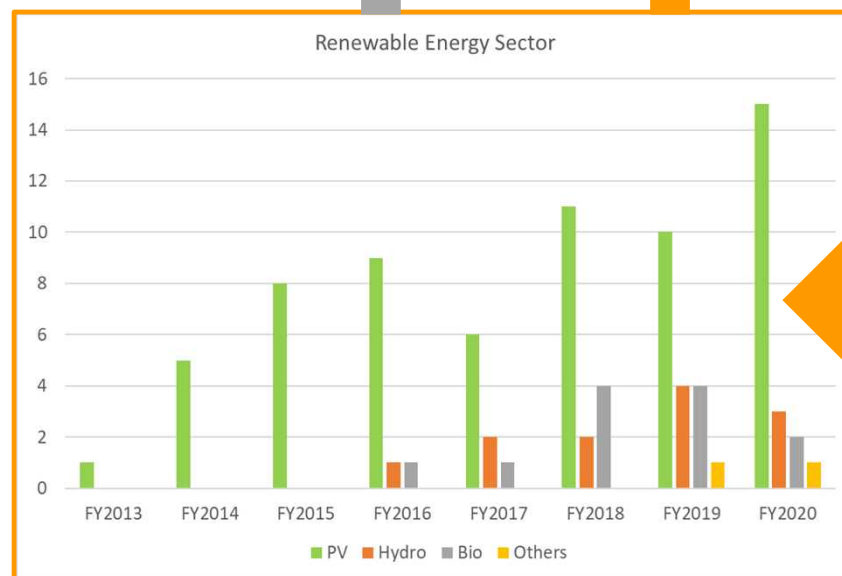
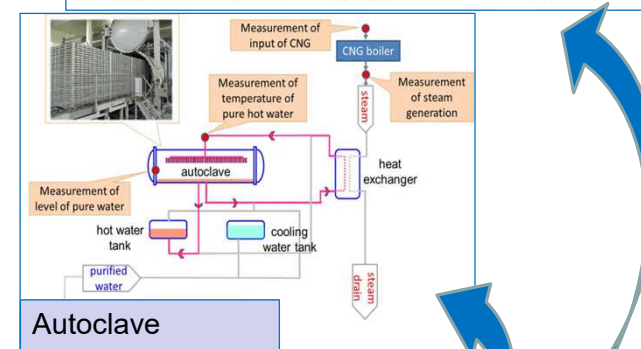
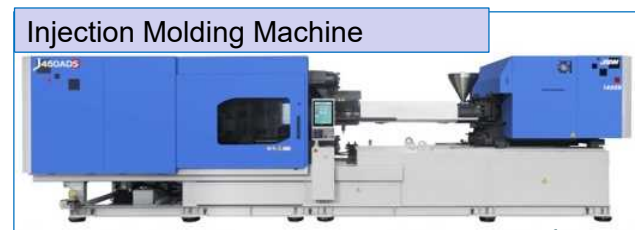
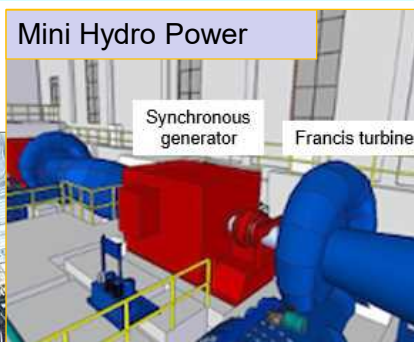
PV Hydro Bio Others

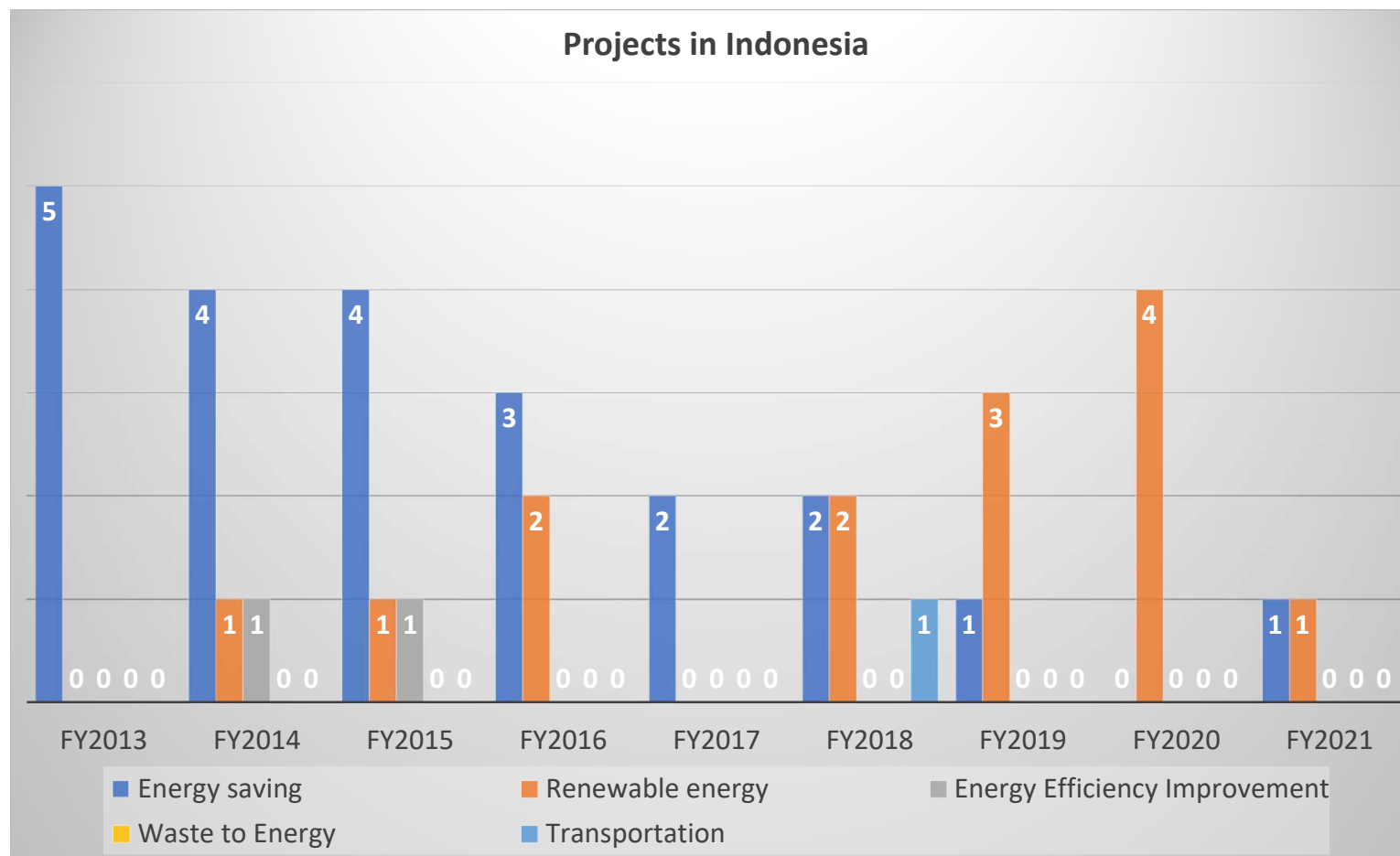


## 17 Partner Countries



# JCM Projects in Asia Pacific







# Infrastructure through JCM

- 1 Thailand / EAST RETAILING CO., LTD.  
High Efficiency LED Lighting
- 2 Cambodia / Aeon Mall Co., Ltd.  
Solar Power System and High Efficiency Centrifugal Chiller
- 3 Bangladesh / Space Refrigeration Equipment & Systems Co., Ltd.  
High Efficiency Centrifugal Chiller
- 4 Mexico / Sunkery Sports Limited  
Once-through Roller and Fuel Switching



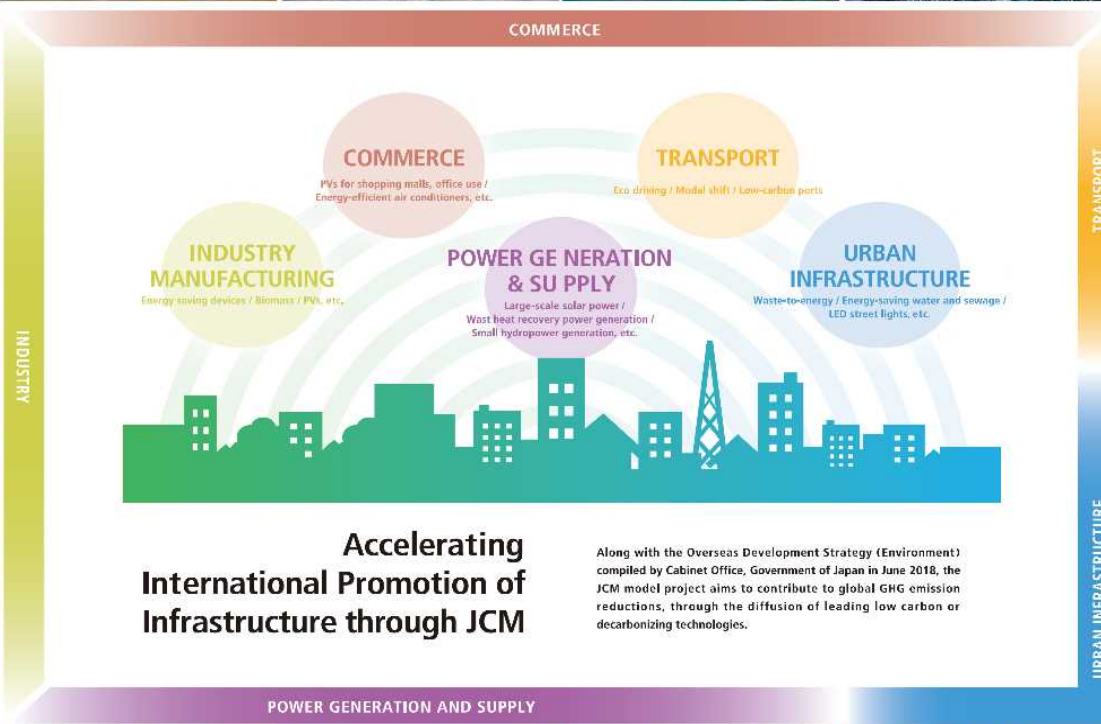
- 1 Palau / Pacific Consultants Co., Ltd.  
Solar Power Plants for Commercial Facilities
- 2 Indonesia / Toyota Tsusho Corporation  
Double-Bundle type Heat Pump
- 3 Indonesia / Hoshino Co., Ltd.  
Chlorine Gas Equipment for Public Bus
- 4 Thailand / Yokohama Port Corporation  
Energy Efficient equipment for Bangkok Port



- 1 Indonesia / Environmental Management and Technology Center  
Energy saving in Industrial Wastewater Treatment System
- 2 Myanmar / Kiri Holdings Company, Limited  
Energy Saving Drilling Systems
- 3 Thailand / TSC Co., Ltd.  
Floating Solar Power System
- 4 Myanmar / DATA RESILIENCE MANAGEMENT CONSULTING, INC.  
Power generation with Methane Gas Recovery System



- 1 Viet Nam / Yuke Kasei Co., Ltd.  
Amorphous High Efficiency Transformers in power grid
- 2 Viet Nam / Yokohama Water Co., Ltd.  
High Efficiency Water Pumps
- 3 Myanmar / JTC Engineering Corporation  
Waste to Energy Plant in Yangon City
- 4 Myanmar / Kujiko Corporation  
Rice Husk Power Generation



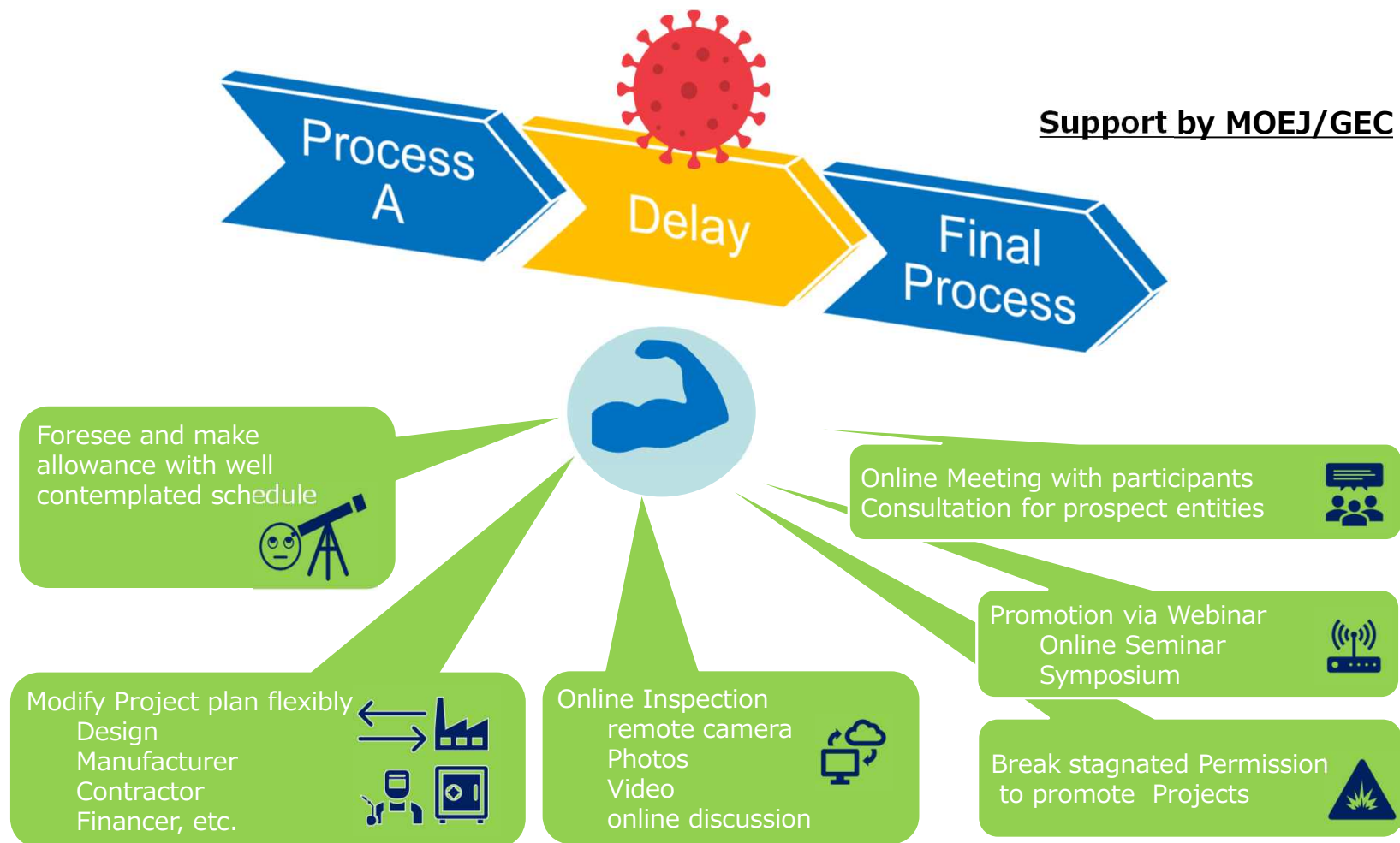
## Impact on Projects

- Government services stall, licenses and permits delay
- Design work delay / supply delay due to suspension of factory operation
- Installation work delay due to difficulty in securing labor for construction / engineers unable to enter the project site.
- Deterioration of cash flow of the project partner / reduction of investment budget, difficulty in raising funds
- Suspension of banking operations (delay on loan contracts, remittances)
- Reassessment of the project feasibility / change or reduction of project plan (especially in tourism and transportation)

## Impact on Operation for JCM Model Projects

- Restricted face to face meeting:
  - Evaluation interviews
  - Meeting with participants
  - Consultation for prospect entities





# Terima kasih!

# ありがとうございました。

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