

Financing Programme for JCM Model Projects

December 2021

Global Environment Centre Foundation (GEC)



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>



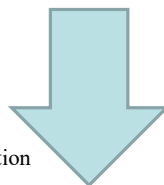
Solar power generation



Carbon capture and storage (CCS)



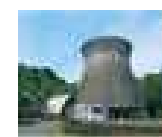
Wind power generation



Hydrogen



Waste power generation



Geothermal power generation

JCM Model Projects :

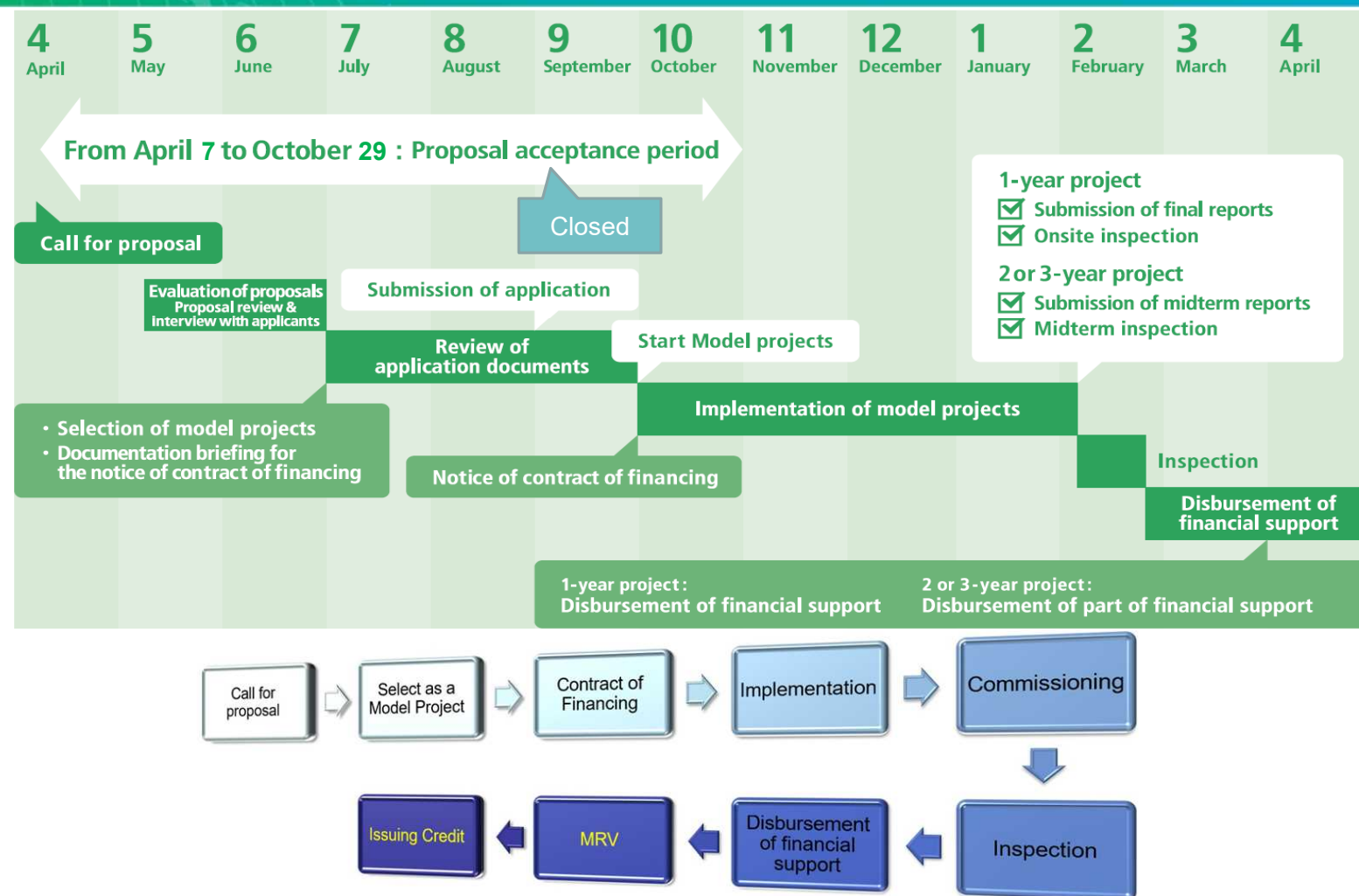
Supporting to facilitate diffusion of advanced decarbonizing technologies ,etc and infrastructure as well as implementation of mitigation actions.

Eligible Projects (Main Points)

- (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.

※ Call for Proposals for JCM Model Projects in FY2021 Guidelines 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/tCO₂equivalent

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

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

JPY3,000/tCO₂equivalent

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

JPY2,500/tCO₂equivalent

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

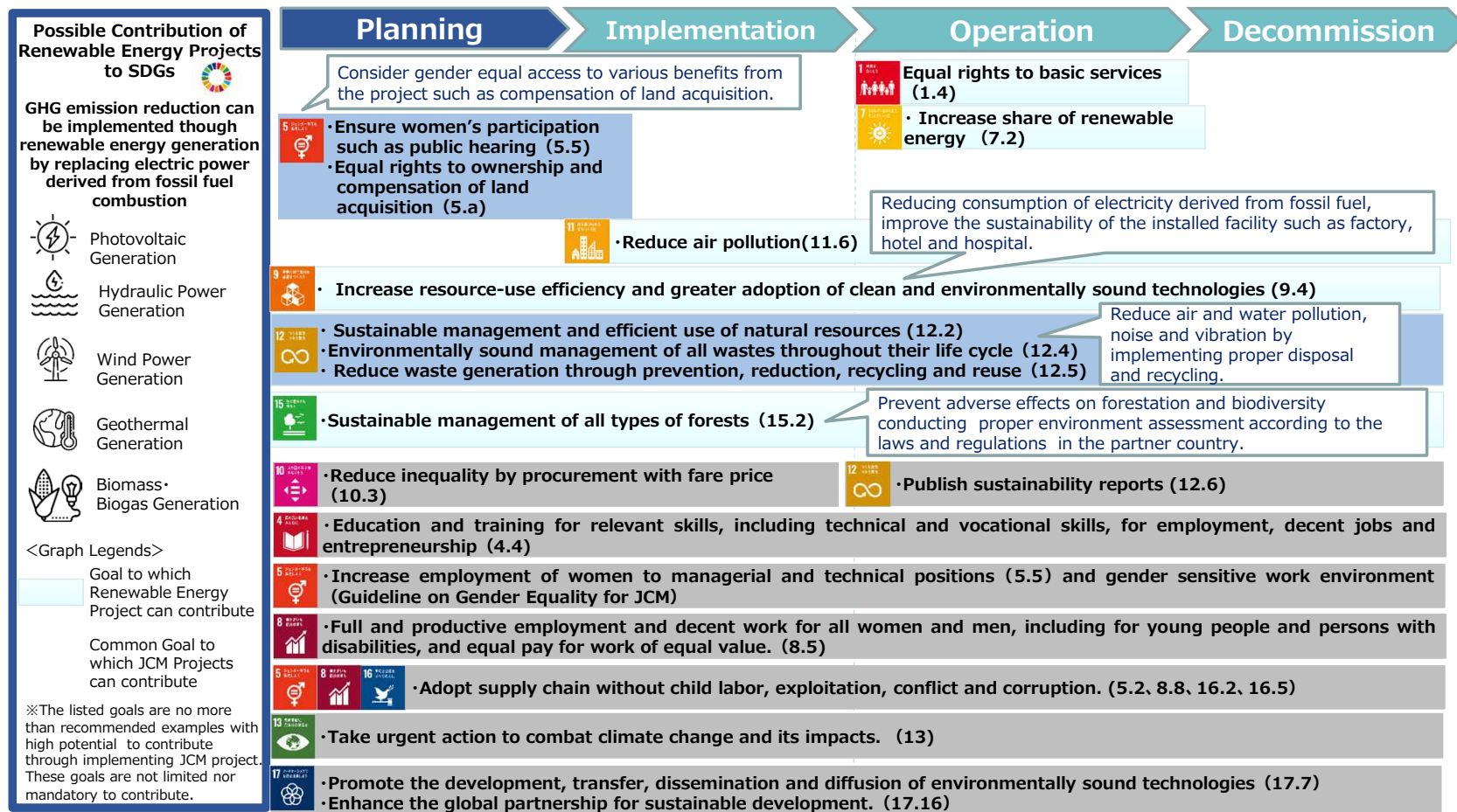
Solar power projects in Thailand

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

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		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
	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%



1st Selection of Projects in FY2021



Global Environment Centre Foundation

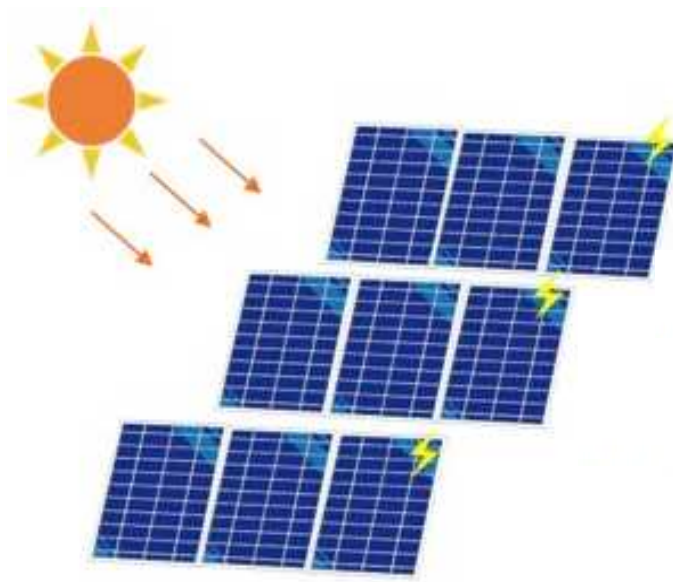
Partner Country	Entity	Project Title	Sector	Expected GHG Emission Reductions (tCO2/y)
Vietnam	JFE Engineering Corporation	Waste to Energy project in Bac Ninh Province	Waste handling and disposal	41,805
Vietnam	Sharp Energy Solution Corporation	Introduction of 9MW Rooftop Solar Power System to Factories	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
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

2nd Selection of Projects in FY2021



Global Environment Centre Foundation

Partner Country	Entity	Project Title	Sector	GHG Emission Reductions (tCO2/y)
Vietnam	Marubeni Corporation	Introduction of 12MW Rooftop Solar Power System to Commercial and Industrial Customers	Renewable Energy	5,815
Vietnam	Osaka Gas Co., Ltd.	Introduction of 9.8MW Rooftop Solar Power System in Industrial Park	Renewable Energy	4,254
Vietnam	Asian Gateway Corporation	Introduction of 5.8MW Rooftop Solar Power System to Beverage Factory	Renewable Energy	2,531
Vietnam	The Kansai Electric Power Company, Incorporated	Introduction of 2.5MW Rooftop Solar Power System to Food Factory and Garment Factory	Renewable Energy	982
Vietnam	Tokyu Corporation	Introduction of High Efficiency Chiller and High Efficiency LED Lighting with Dimming Function to Shopping Center	Energy Efficiency Improvement	726
Lao PDR	Liberal Solution Co., Ltd.	19MW Solar Power Project in Xiangkhouang Province	Renewable Energy	7,861
Indonesia	WWS-JAPAN Co.	6MW Mini Hydro Power Plant Project in Besay River, Lampung Province	Renewable Energy	20,307
Indonesia	WWS-JAPAN Co.	2.3 MW Mini Hydro Power Plant Project in Melesom River, Lampung Province	Renewable Energy	6,787
Indonesia	Otsuka Pharmaceutical Factory, Inc.	Energy Saving by Introducing High Efficiency Autoclave to Infusion Manufacturing Factory 2	Energy Efficiency Improvement	8,796
Chile	Eurus Energy Holdings Corporation	9MW Solar Power Project in Casablanca, Valparaiso Region	Renewable Energy	8,527
Chile	Eurus Energy Holdings Corporation	9MW Solar Power Project in Yungay, Biobio Region	Renewable Energy	8,476
Chile	FARMLAND Co., Ltd.	3MW Solar Power Project Utilizing Farmland in Maule Region	Renewable Energy	2,489
Thailand	Kanematsu KGK Corp.	35MW Solar Power and Storage Battery Project in Suphanburi Province	Renewable Energy	13,197
Thailand	Sharp Energy Solution Corporation	Introduction of 23MW Rooftop Solar Power System to Tire Factories	Renewable Energy	8,928
Thailand	The Kansai Electric Power Company, Incorporated	Introduction of High Efficiency Boiler, High Efficiency Chiller, and Solar PV System to Textile Factory and Food Factory	Energy Efficiency Improvement/ Renewable Energy	1,885
Thailand	The Kansai Electric Power Company, Incorporated	Introduction of 2MW Rooftop Solar Power System to Non-ferrous Metal Factory	Renewable Energy	945
Thailand	Tokyo Century Corporation	Introduction of 1.85MW Solar Power System to Food Factories (JCM Eco Lease Scheme)	Renewable Energy	858
Thailand	Tokyo Century Corporation	Introduction of 0.13MW Solar Power System to Auto Parts Factory (JCM Eco Lease Scheme)	Renewable Energy	52
Philippines	Oriental Consultants Co., Ltd.	Introduction of Energy Saving Air Conditioning System to Quezon City Hall Compound	Energy Efficiency Improvement	780



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

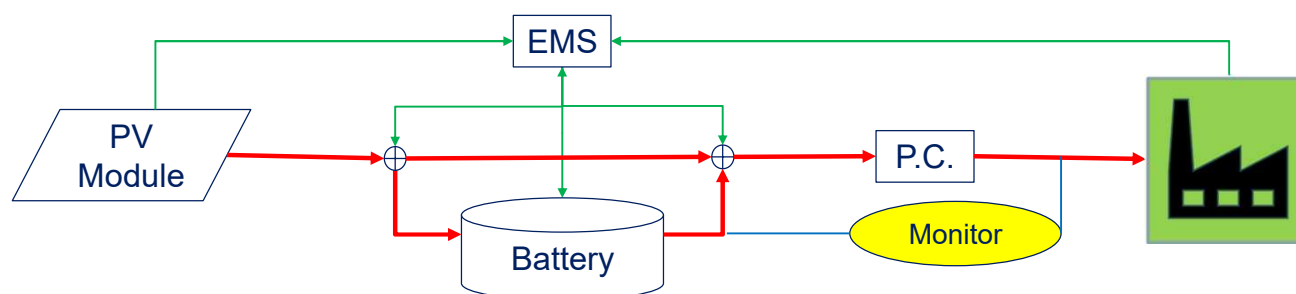
Technology	Mongolia	Bangladesh	Ethiopia	Kenya	Maldives	Viet Nam	Lao PDR	Indonesia	Costa Rica	Palau	Cambodia	Mexico	Saudi Arabia	Chile	Myanmar	Thailand	Philippines	Total
	MN	BD	ET	KE	MV	VN	LA	ID	CR	PW	KH	MX	SA	CL	MM	TH	PH	
Solar Power Plant	4	1	1	2	1	4	3	3	1	5	4	3	1	4	1	15	6	59

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



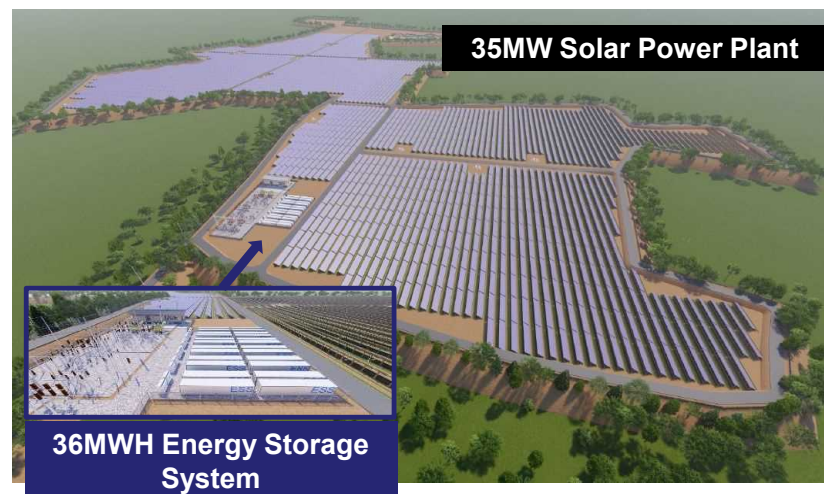
JCM Model Project (FY2021) in Thailand

35MW Solar Power and Storage Battery Project in Suphanburi Province

PP (Japan): Kanematsu KGK Corp. PP (Thailand): Blue Solar Co., Ltd., Blue Solar Farm 2 Co., Ltd.

Outline of GHG Mitigation Activity

This project installs 35MW solar power system and 36MWH energy storage system in Suphanburi province. The electricity generated by solar power plant is supplied to the grid. In daytime, surplus power is charged into the energy storage system, and charged power is supplied to the grid during evening time. The project contributes to Thailand's target to reduce greenhouse gas (GHG) emissions by shifting power resource to renewable energy from fossil fuel.



Expected GHG Emission Reductions

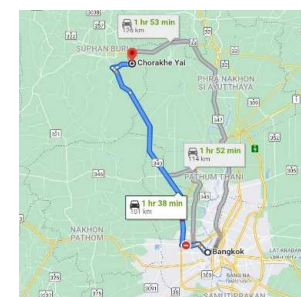
13,197tCO₂/year

= (Reference CO₂ emissions)
- (Project CO₂ emissions)

- Reference CO₂ emissions
= (Quantity of the electricity generated by the project) [MWh/year]
× Emission factor [tCO₂/MWh]
- Project CO₂ emissions
= 0 [tCO₂/year]

Sites of Project

Approx. 100km northwest from Bangkok city



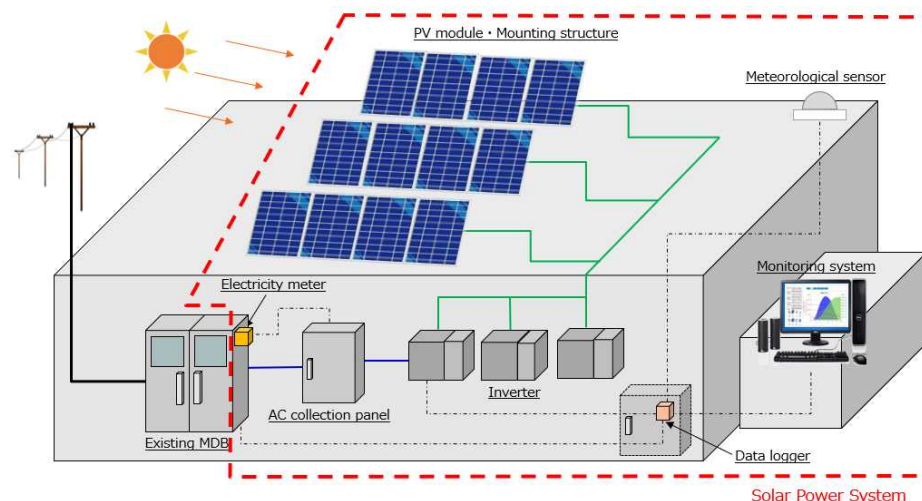
Map Data ©2021 Google

Introduction of 9MW Rooftop Solar Power System to Factories

PP (Japan): Sharp Energy Solutions Corporation, PP (Vietnam): I RENEWABLE ENERGY VIETNAM CO., LTD.

Outline of GHG Mitigation Activity

The project participant installs, owns and operates the solar power system (total approx. 9MW) on factories and supplies the generated electricity to the factory owners. The factory owners can replace a portion of electricity consumption with electricity from renewable energy without self-investment and reduce greenhouse gas (GHG) emissions. This project contributes to Vietnam's achievement of the total installed capacity for solar power systems.



Expected GHG Emission Reductions

3,618 tCO₂/year

= (Reference CO₂ emissions)
- (Project CO₂ emissions)

- Reference CO₂ emissions
= (Quantity of the electricity generated by the project) [MWh/year]
× Emission factor [tCO₂/MWh]
- Project CO₂ emissions
= 0 [tCO₂/year]

Sites of Project



Map Data ©2021

Google

North (Hanoi, Bac Ninh, Ha Nam):

From Noi Bai Airport

- ① 30km to the south
- ② 40km to the southeast
- ③ 75km to the south

South (Ba Ria - Vung Tau, Ho Chi Minh):

From Tan Son Nhat Airport

- ④ 60km to the southeast
- ⑤ 15km to the southeast

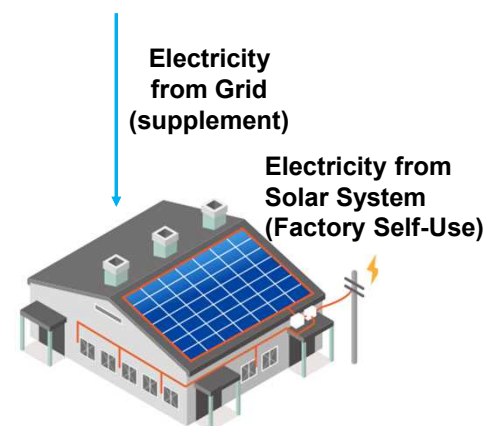
Introduction of 12MW Rooftop Solar Power System to Commercial and Industrial Customers

PP (Japan): Marubeni Corporation, PP (Vietnam) : Marubeni Green Power Vietnam

Outline of GHG Mitigation Activity

This project is to introduce a total of 12MW solar power system on the roofs of multiple commercial and industrial customers. The generated electricity is supplied to the customers.

The project reduces greenhouse gas (GHG) emissions by partially substituting the electricity from grid with clean electricity from the solar systems.



Expected GHG Emission Reductions

5,815 tCO₂/year

- = (Reference CO₂ emissions)
- (Project CO₂ emissions)
- Reference CO₂ emissions
= (Quantity of the electricity generated by the project) [MWh/year]
× Emission factor [tCO₂/MWh]
- Project CO₂ emissions
= 0 [tCO₂/year]

Sites of Project



Multiple project sites in North, Central and South of Vietnam.

Map Data ©2021 Google

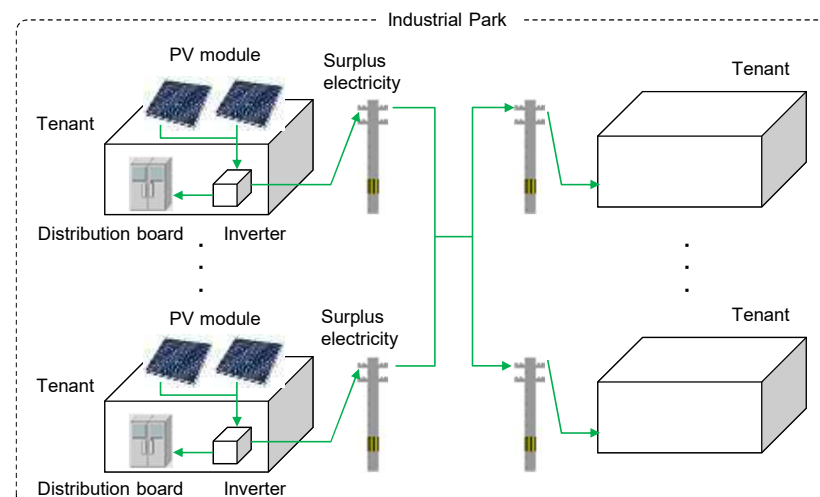
Introduction of 9.8 MW Rooftop Solar Power System in Industrial Park

PP (Japan): Osaka Gas Co., Ltd., PP (Vietnam): SOL Energy Co., Ltd.

Outline of GHG Mitigation Activity

9.8 MW solar power system is introduced on the rooftops of 8 tenants in Long Duc Industrial Park (LDIP) in Dong Nai province. The generated electricity is self-consumed by each tenant and surplus electricity is supplied to the LDIP management. The generated electricity is fully utilized, which reduces GHG emission.

This project contributes to the Power Development Plan 8 which plans to expand with spread of renewable energy in Vietnam.



Expected GHG Emission Reductions

4,254 tCO₂ /year

= (Reference CO₂ emissions)
- (Project CO₂ emissions)

• Reference CO₂ emissions
= (Quantity of the electricity generated by the project)
[MWh/year]

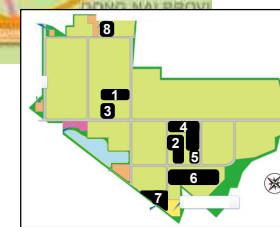
× Emission factor [tCO₂/MWh]

• Project CO₂ emissions
= 0 [tCO₂/year]

Sites of Project



Approx. 32km east of Tan Son Nhat International airport

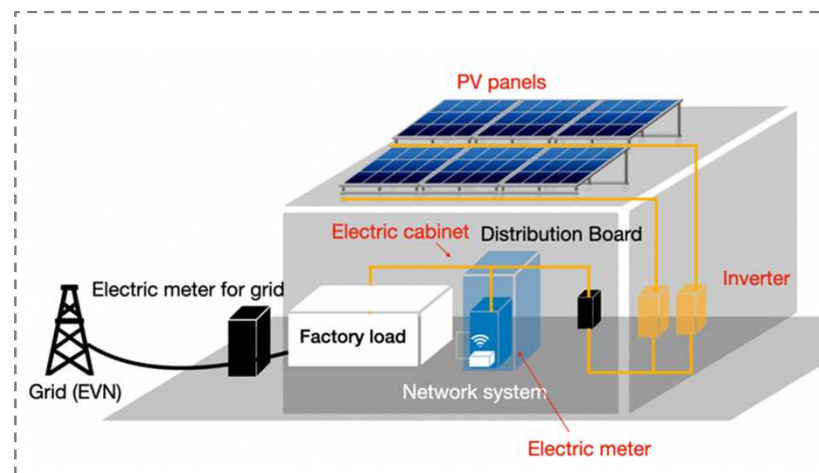


Introduction of 5.8MW Rooftop Solar Power System to Beverage Factory

PP (Japan) : Asian Gateway Corporation, PP (Vietnam): VES Joint Stock Company

Outline of GHG Mitigation Activity

At the beverage factory located in Binh Duong Province, a roof-mounted solar power generation system (5.8MW) is installed. All the electricity generated is sold to the beverage factory which replaces grid power and reduces greenhouse gas (GHG) emissions.



Expected GHG Emission Reductions

2,531tCO₂/year

= (Reference CO₂ emissions)
- (Project CO₂ emissions)

• Reference CO₂ emissions
= (Quantity of the electricity generated by the project) [MWh/year]

× Emission factor [tCO₂/MWh]

• Project CO₂ emissions
= 0 [tCO₂/year]

Sites of Project

The project site is located about 15 km northeast from the Tan Son Nhat International Airport.



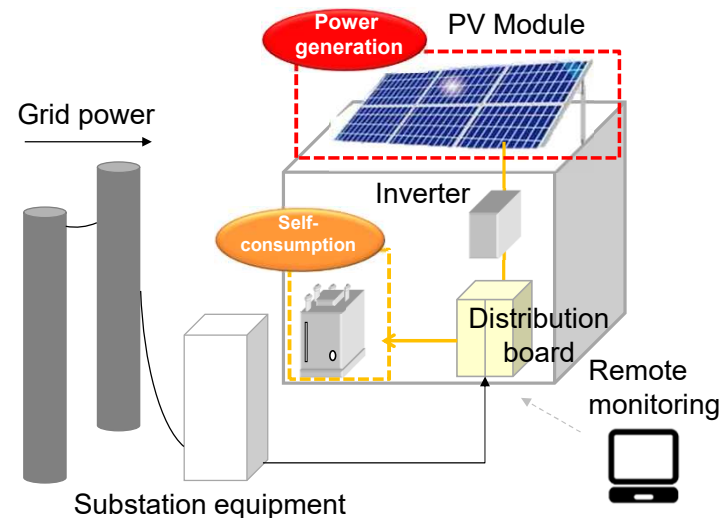
Map Data ©2021 Google



Introduction of 2.5MW Rooftop Solar Power System to Food Factory and Garment Factory
 PP (Japan): The Kansai Electric Power Co.,Inc., PP (Vietnam): Kansai Energy Solutions (Vietnam) Co., Ltd.

Outline of GHG Mitigation Activity

Solar Power System (total of about 2.5 MW) is installed on the rooftops of food factory and garment factory, and all the generated power is consumed by each factory.
 By replacing a part of the grid electricity with solar power, the greenhouse gas (GHG) emissions are reduced.



Expected GHG Emission Reductions

982 tCO₂ /year

= (Reference CO₂ emissions)
 - (Project CO₂ emissions)

• Reference CO₂ emissions
 = (Quantity of the electricity generated by the project) [MWh/year]

× Emission factor [tCO₂/MWh]

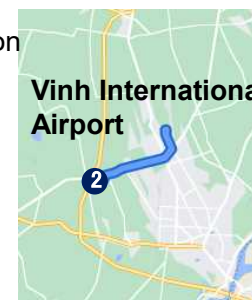
• Project CO₂ emissions
 = 0 [tCO₂/year]

Sites of Project



Map Data ©2021 Google

① Approx. 15km north of Tan Son Nhat International Airport



② Approx. 6km south-west of Vinh International Airport

JCM Model Project (FY2021) in Vietnam

Waste to Energy project in Bac Ninh Province

PP (Japan): JFE Engineering Corporation , PP (Vietnam): T&J Green Energy Company Limited

Outline of GHG Mitigation Activity

In this project, a waste-to-energy plant is introduced in Bac Ninh province. This plant incinerates and generates electricity from 230 tons/day of municipal solid waste, which has been disposed of as landfill. The plant also incinerates and generates electricity from 120 tons/day of municipal solid waste and 150 tons/day of industrial solid waste, which were previously incinerated.

This scheme enables the proper waste treatment and the supply of electricity without the use of fossil fuels. It also reduces methane emissions from landfill sites and greenhouse gas (GHG) emissions by replacing grid electricity.



Waste to Energy Incinerator
(Grate)
Manufactured by Standard-
Kessel Baumgarte (Germany)

Processing Volume:
500t/day

(Municipal solid waste
350t/day and industrial
solid waste 150t/day)

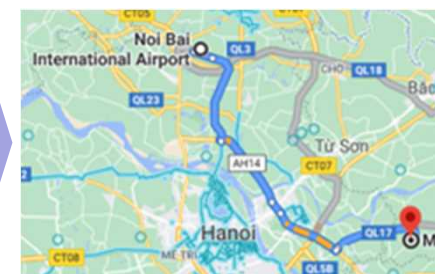
Expected GHG Emission Reductions

41,804tCO₂/year

=Reference GHG Emissions
– Project GHG Emissions

Sites of Project

Project site:
Bac Ninh
Province
(Approx.-30km
east of Hanoi
City)
Approx. 50km
southeast of
Noi Bai Airport



Map data©2021Google

JCM Model Project (FY2021) in Vietnam

Introduction of High Efficiency LED Lighting with Dimming and Tunable Function to Office Building in Ho Chi Minh City

PP (Japan): ENDO Lighting Corporation, PP (Vietnam): Daibiru Saigon Tower Co., Ltd.

Outline of GHG Mitigation Activity

This project reduces energy consumption and greenhouse gas (GHG) emissions by using high-efficiency dimmable/tunable LED lighting in existing office buildings in Ho Chi Minh City.

They are top-class high-efficiency LED lighting fixtures in Japan. In addition, by using a wireless control system, more energy-saving effects are achieved by an auto-dimming function, which also improves the office environment.



Expected GHG Emission Reductions

197 t-CO₂/year

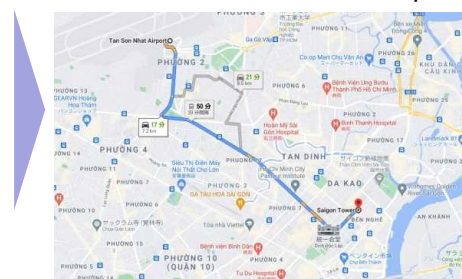
$$= [(Reference\ power\ consumptions) - (Project\ power\ consumptions)] \times Emission\ factor\ (EF)$$

Sites of Project

The office buildings are located along the Le Duan street, which is prime location lined with A grade offices in Ho Chi Minh City.



About 8km south east from Tan Son Nhat International airport



Map data©2021 Google

Introduction of High Efficiency Chiller and High Efficiency LED Lighting with Dimming Function to Shopping Center PP (Japan): Tokyu Corporation, PP (Vietnam): BECAMEX TOKYU CO., LTD.

Outline of GHG Mitigation Activity

This project introduces “High Efficiency Chiller” and “High Efficiency LED Lighting with Dimming Function” to “SORA gardens SC”, a new shopping center in the “TOKYU GARDEN CITY” area in Binh Duong Province. The project leads to reducing energy consumption and greenhouse gas (GHG) emissions as the chillers are high-efficient and equipped with inverters, and LED lighting dim down 70% of light.



High Efficiency Chiller
3 units



High Efficiency LED
Lighting with Dimming
Function: 710 units



Expected GHG Emission Reductions

726 tCO₂/year

① High Efficiency Chiller
[(Reference power consumptions)
– (Project power consumptions)]
x Emission factor (EF)= 636 [tCO₂/year]

② LED Lighting
[(Reference power consumptions)
– (Project power consumptions)]
x Emission factor (EF)= 90 [tCO₂/year]

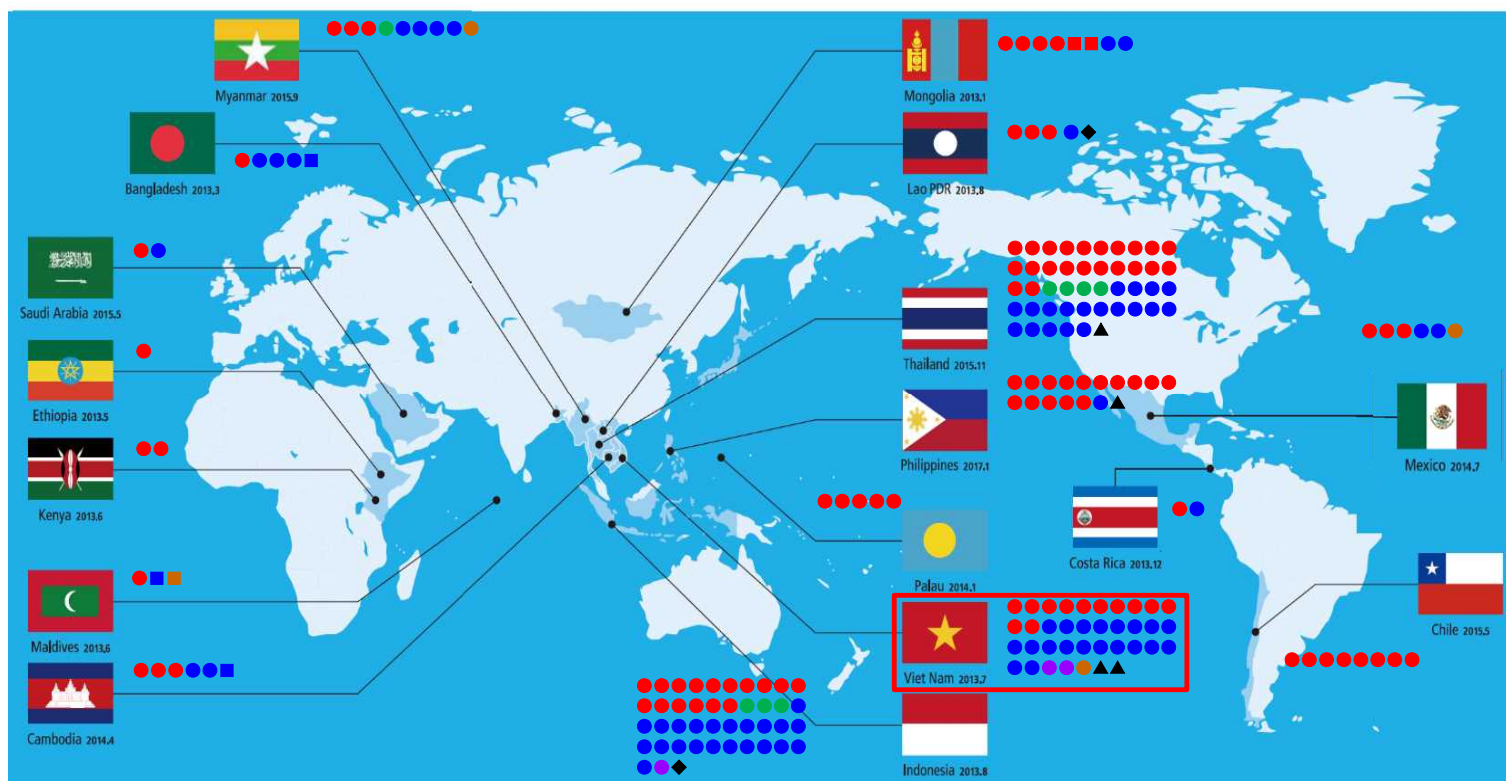
Sites of Project



Approx. 30km north of
Ho Chi Minh City

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Project Map of JCM Financing Programme : as of September 27, 2021

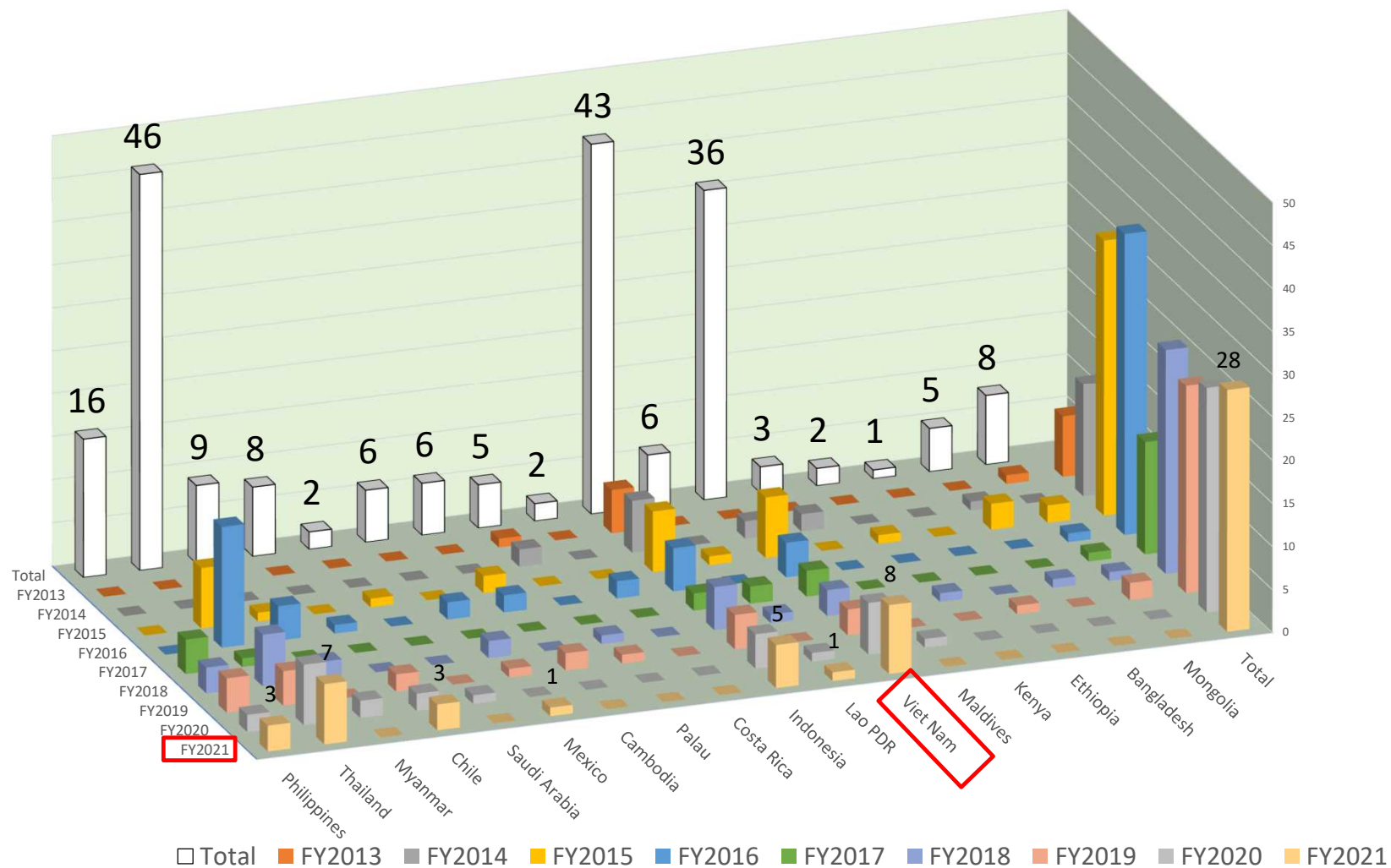


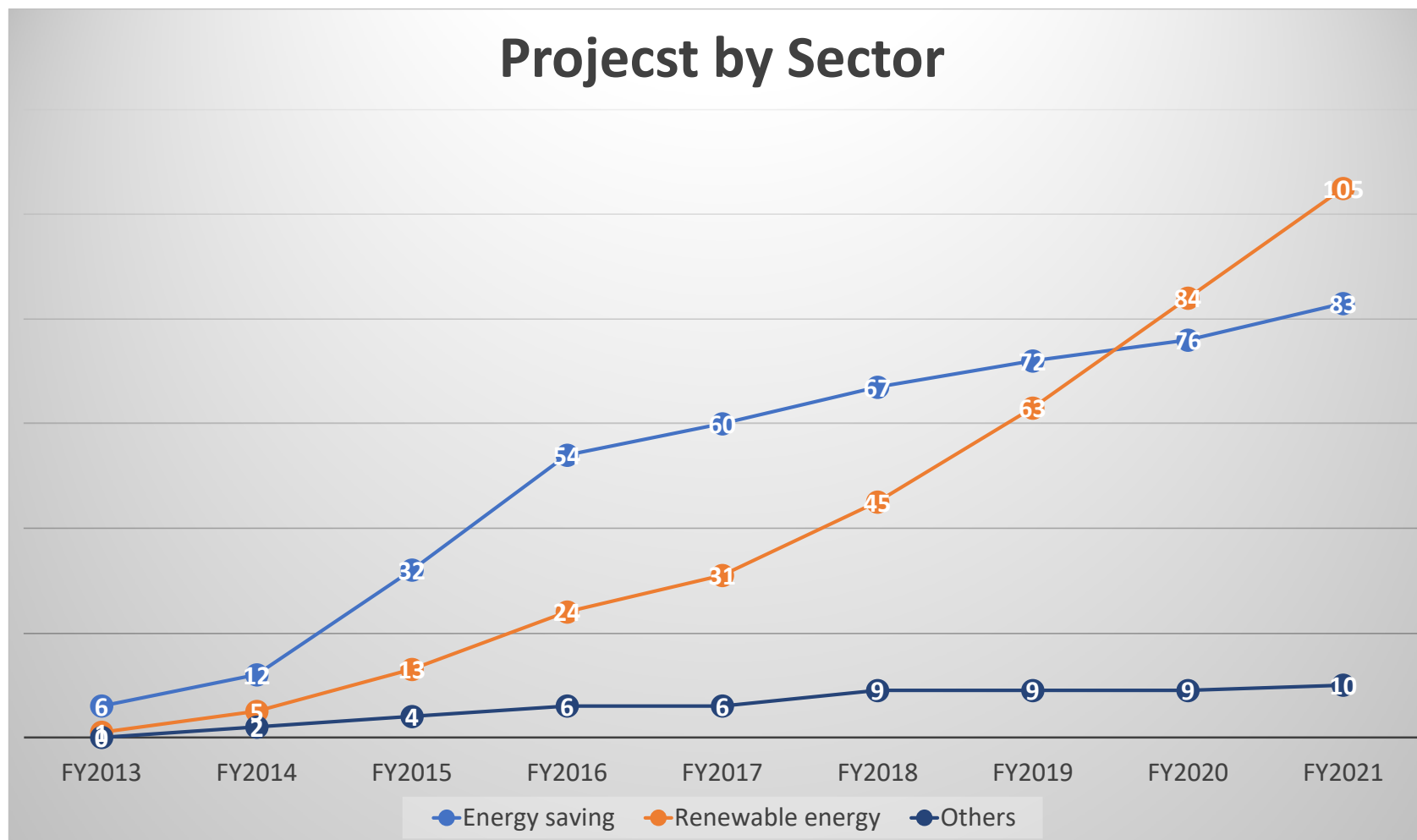
Total 205 projects / 17 countries

(● Model Project:194, ■ ADB:5, ◆ REDD+:2, ▲ F-gas:4)

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

Project by Year and Country

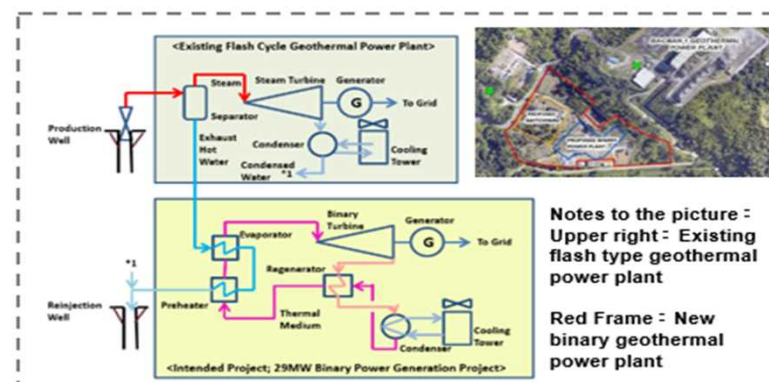




Wind Power Generation

Wind turbines

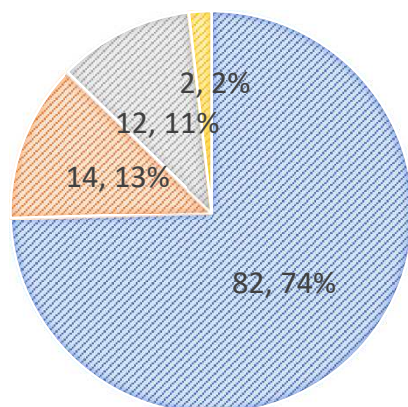
Concept image



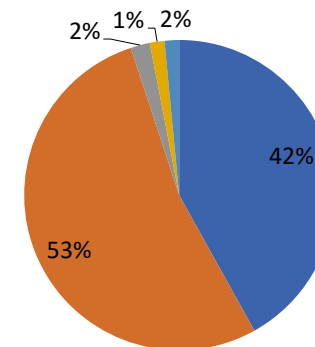
Geothermal Power Plant

RENEWABLE ENERGY SECTOR

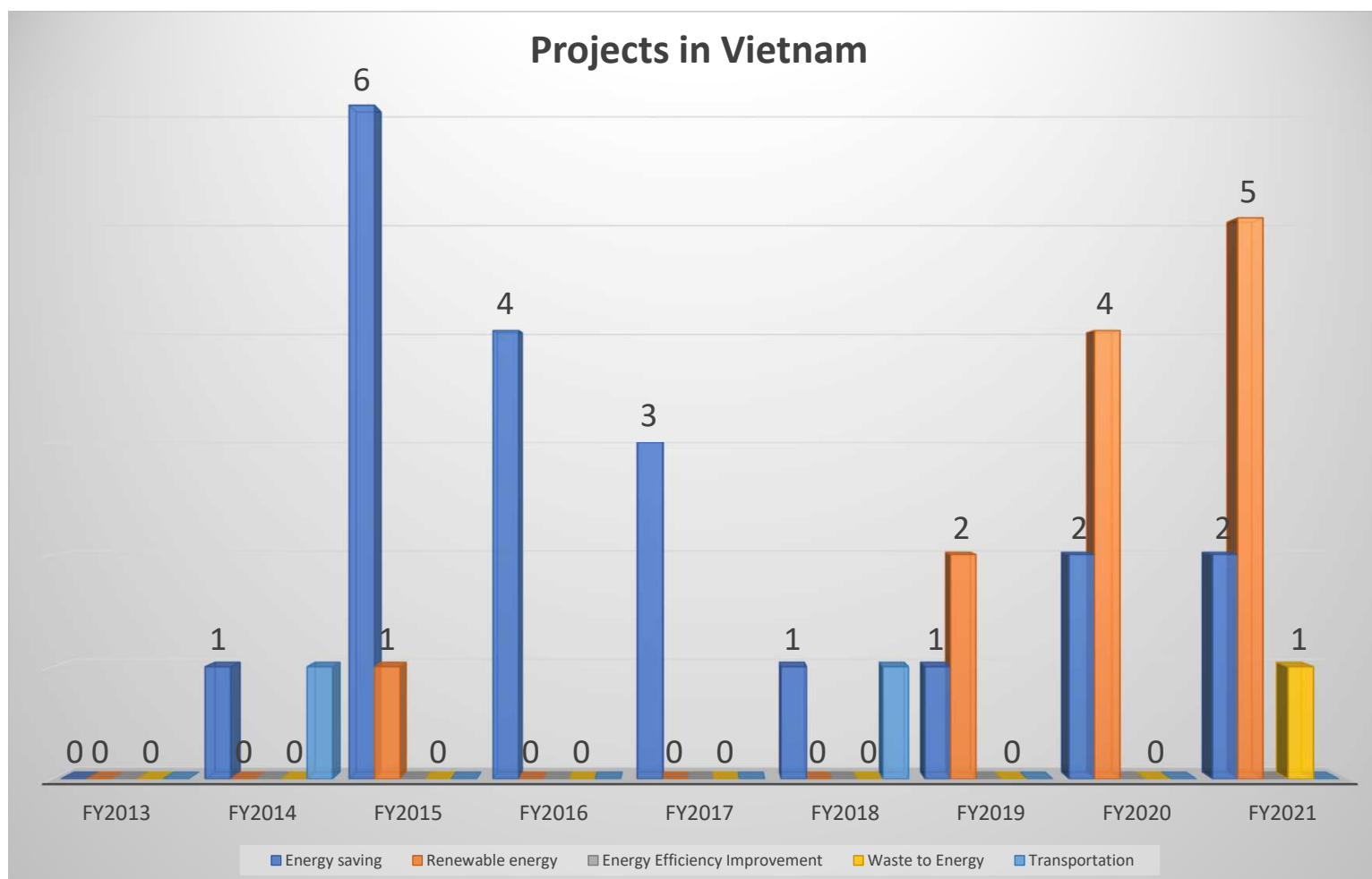
PV Hydro Bio Others



17 Partner Countries



Energy saving
Energy Efficiency Improvement
Transportation
Others
Renewable energy
Waste to Energy
Total



Infrastructure through JCM

Energy Efficiency



LPG Boilers(Mongolia)/
Salsan Co.,Ltd.



Raw Water Intake Pumps(Viet Nam)/
Yokohama Water Co., Ltd.



Amorphous Transformers(Viet Nam)/
Yuko Keiso Co., Ltd.



Chiller and Heat Recovery System(Costa Rica)/
NTT Data Institute Consulting Inc.

Energy Efficiency



Energy Efficient Distillation System(Mexico)/
Suntory Spirits Ltd.



Once-through Boiler(Myanmar)/
Acecook Co., Ltd.

Effective Use of Energy



Co-generation Plant(Thailand)/
Nippon Steel Engineering Co., Ltd.



Gas Co-generation system(Indonesia)/
Toyota Tsusho Corporation

Renewable Energy



Wind Power Generation(Philippines)/
Chodai Co., Ltd.



Binary Geothermal Power Generation(Philippines)/
Mitsubishi Heavy Industries Ltd.



Solar Power(Viet Nam)/
Kanematsu KGK Corp.



Solar Power(Lao PDR)/
Sharp Energy Solutions Corporation

Renewable Energy



Biomass Boiler(Thailand)/
Fuji Foods Corporation

Waste Handling and Disposal



Power Generation with Methane Gas Recovery System(Mexico)/
NTT Data Institute Consulting Inc.

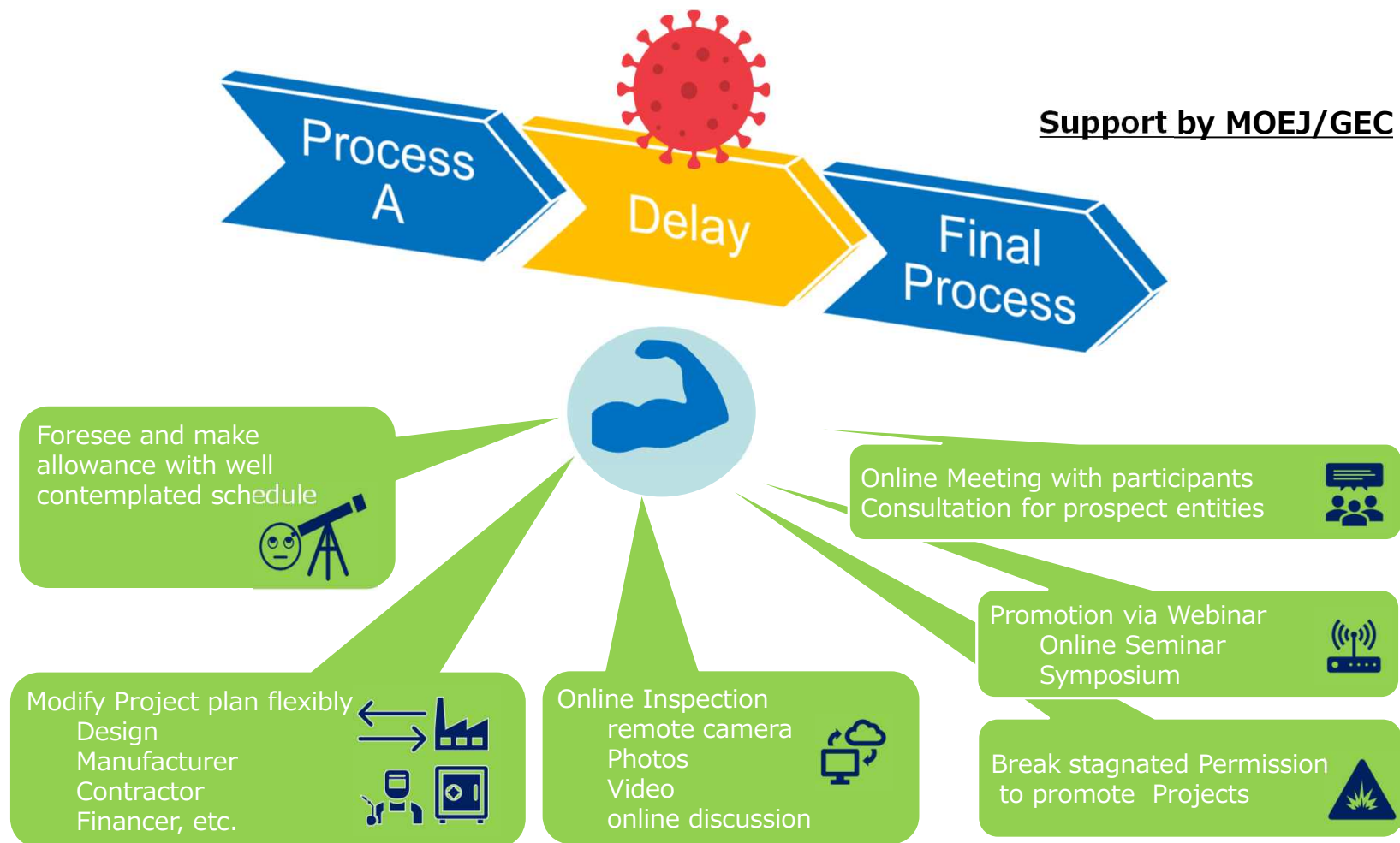


Waste to Energy Plant(Myanmar)/
JFE Engineering Corporation

Transportation



CNG-Diesel Hybrid Public Bus(Indonesia)/
Hokusan Co., Ltd.



Xin cảm ơn ありがとうございました。

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