



Financing Programme for JCM Model Projects

18th February 2022

Global Environment Centre Foundation (GEC)



- 1. Overview and Recent trend of JCM Model Projects**
- 2. Projects examples that can be applied to Republic of Palau**



JCM THE JOINT CREDITING
MECHANISM **2021**
Introduction of the Joint Crediting Mechanism (JCM)
& Financing Programme for JCM Model Projects
Published in October 2021



JCM introduction leaflet (overview) (issued in October 2021)

 <https://gec.jp/jcm/publications/>

Trend

JCM is a leading scheme to achieve NDCs in cooperative ways!

Agreed on Article 6 rules!

Accelerates JCM's
global expansion



- Global Financial Institutions accelerate green investment
- Accelerate SDGs and CSR activities

FY2021 budget
USD 76 million



**FY2022 budget(draft)
USD 171 million**



**Opportunity to double JCM
business has arrived !**

How to achieve Business

The key to completing a proposal quickly and getting a large grant!

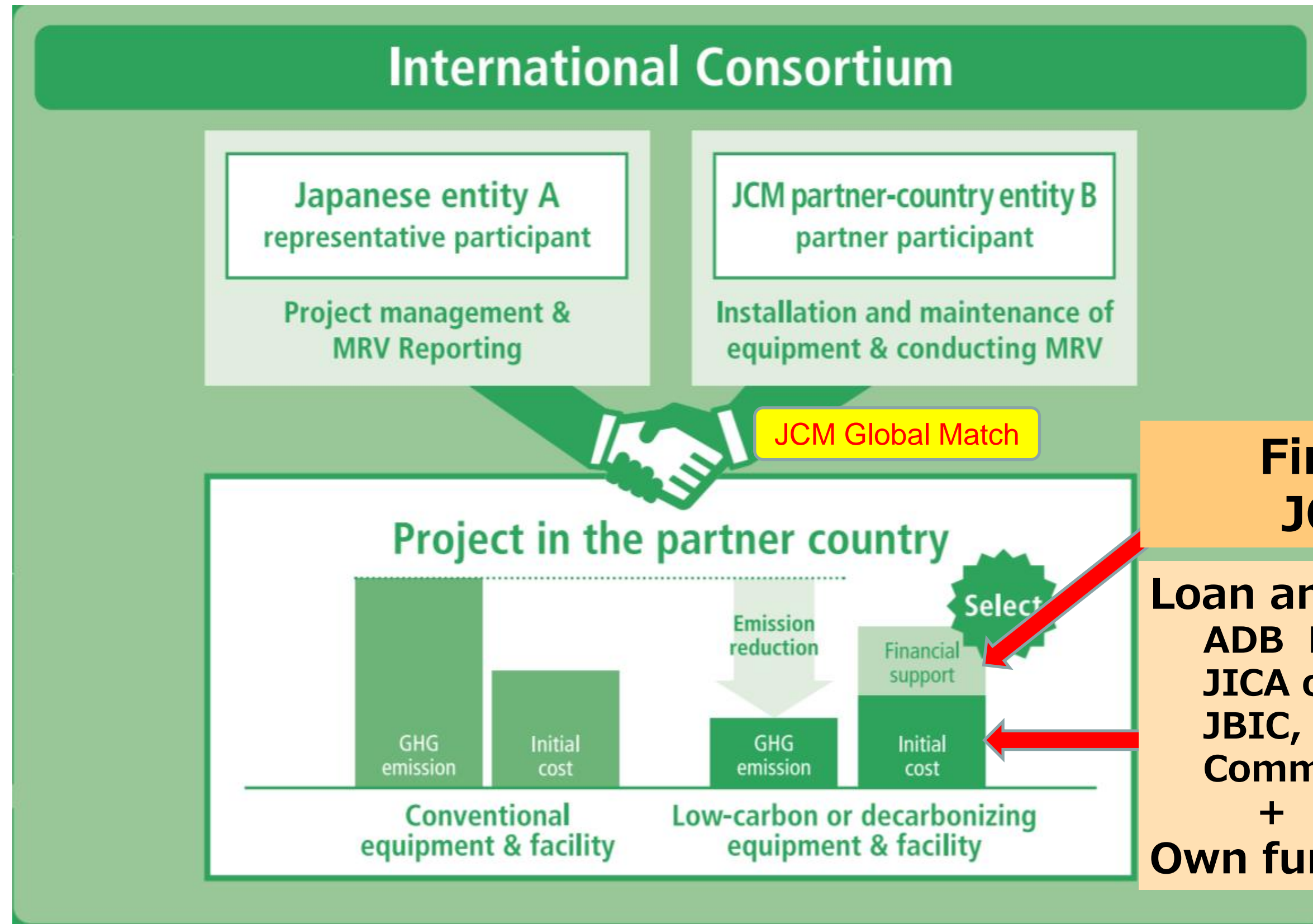
★ Feel free to use GEC's application consultation!

**You are welcome to consult with us on any advanced decarbonization
technology you need!**

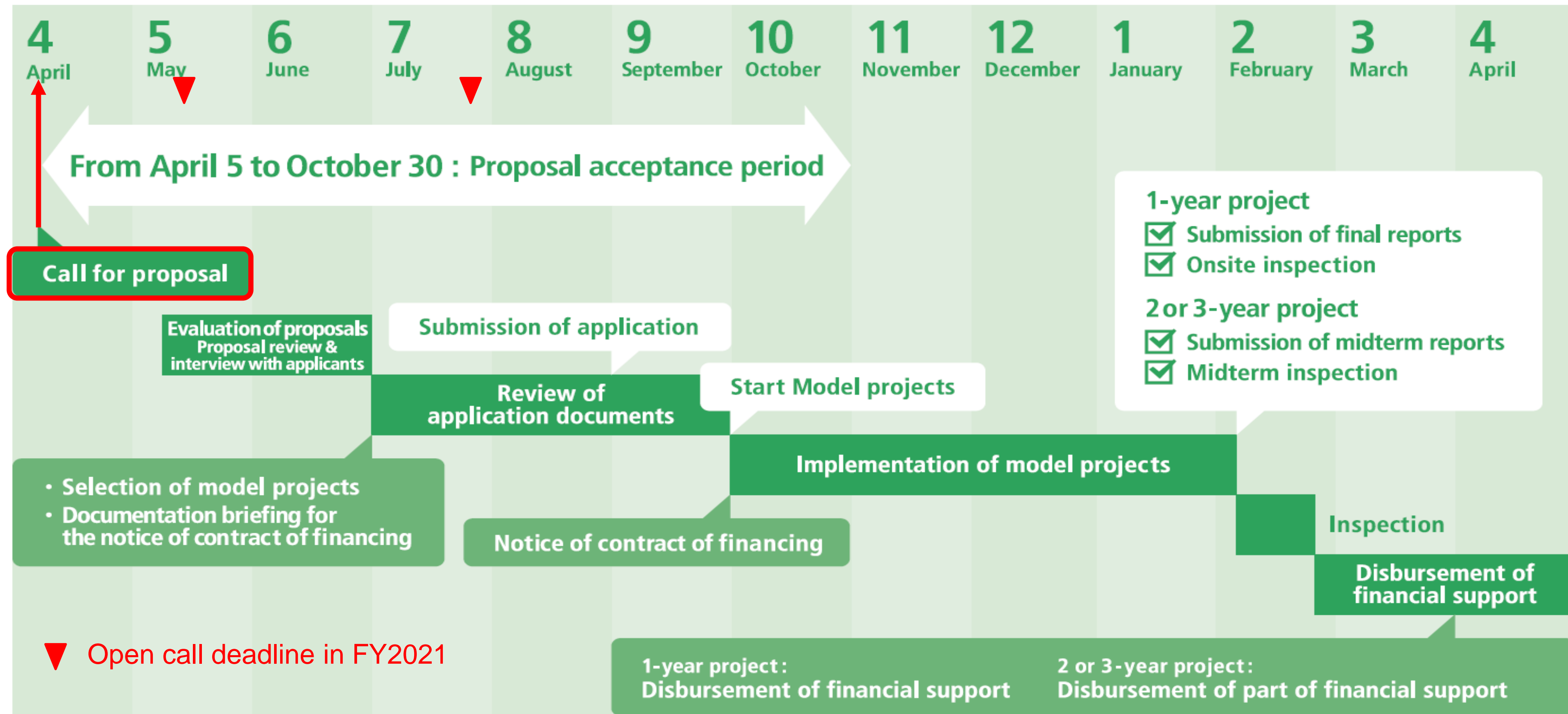


Business expanding through JCM in Palau!

Budget	<u>USD 171 million(draft) in FY2022</u>	<div>Financial support per project</div> <div>Up to Approximately ¥2billion</div>
Executing Entity	International Consortium that consists of a Japanese entity and a JCM partner-country entity(ies)	
Scope of Financing	Facilities, equipment, vehicles, etc. which reduce CO2 from fossil fuel combustion	
Requirements	<u>Start installation after the Contract of Finance is concluded and finish installation within 3 years.</u> <u>Conduct measurement, reporting and verification (MRV) of GHG emission reductions.</u>	
Maximum Percentage of Financial Support	<u>Maximum of 50% or lower</u> according to the number of already selected project(s) using a similar technology in each partner country.	
Cost-effectiveness	Cost-effectiveness of GHG emission reductions is expected to be JPY4,000/tCO2eq or lower.	



JCM Model Projects Schedule in FY2021



What kind of projects are supported by this financing programme?



- Reduce energy-related CO2 emissions with leading low carbon or decarbonizing technologies in partner countries.
- Contribute to the sustainable development in partner countries.
- Reduction of GHG emissions achieved by the projects can be quantitatively calculated and verified.
- Facilities installed by the projects do not receive any other subsidy by the Government of Japan.

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.

Categorization by applied technology type

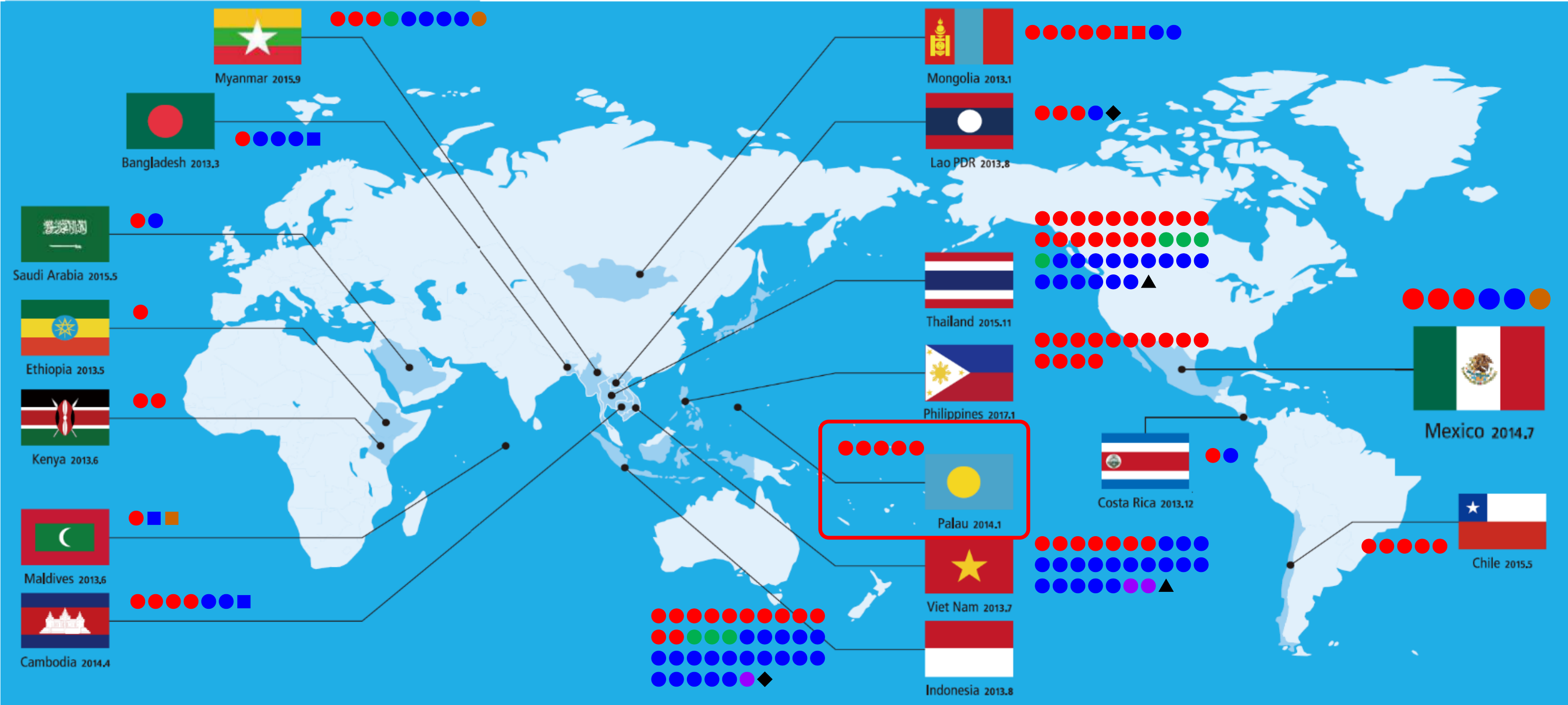
Sector	Technology	Mongolia	Bangladesh	Ethiopia	Kenya	Maldives	Viet Nam	Lao PDR	Indonesia	Costa Rica	Palau	Cambodia	Mexico	Saudi Arabia	Chile	Myanmar	Thailand	Philippines	
		MN	BD	ET	KE	MV	VN	LA	ID	CR	PW	KH	MX	SA	CL	MM	TH	PH	
1. Energy Efficiency	Air Conditioning System						4		1								1		6
	Chiller		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 Modling 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	1	6
	Biogas Power Plant																	1	1
	Biomass boiler						2										1		3
	Biogas boiler															1		1	2
3. Effective Use of Energy	Biomass Co-generation						1										1		2
	Power Generation by Waste Heat Recovery								1							1	1		3
4. Waste Handling and Disposal	Gas Co-generation								2								3		5
	Waste-to-Energy Plant															1			1
5. Transportation	Power Generation by Methane Recovery												1						1
	Digital Tachograph System						1												1
5. Transportation	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

Summary by
FY2020 projects

JCM ECO Lease Scheme

In the fiscal year 2020, “JCM Eco Lease Scheme” is newly introduced to JCM Model Project to cover leasing charges and interests. This scheme has an advantage in reducing the reporting burden of representative participants with shorter monitoring period and simple proposal document.

Representative Participant	Japanese leasing company
Amount of Financial Support	Up to JPY500 million for 3 years in principal
Percentage of Financial Support	Uniformly 10% of total leasing charges including leasing interests
Period of MRV	Equal to leasing period
Leasing Period	At least 5 years
Costs Eligible for Financing	Leasing charges of the costs of facilities/equipment and relevant lease interests
Eligible Type of Technologies	In principle, technologies with JCM methodology (ies) that have been either approved or proposed
Financial Statement for Application	Only financial statements of Representative Participant need to be submitted.



Total **192** projects / 17 countries
(● Model Project:170, ■ ADB:6, ◆ REDD+:2, ▲ F-gas:2)

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

1st Selection of Projects in FY2021

Partner Country	Entity	Project Title	Sector	Expected GHG Emission Reductions (tCO ₂ /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



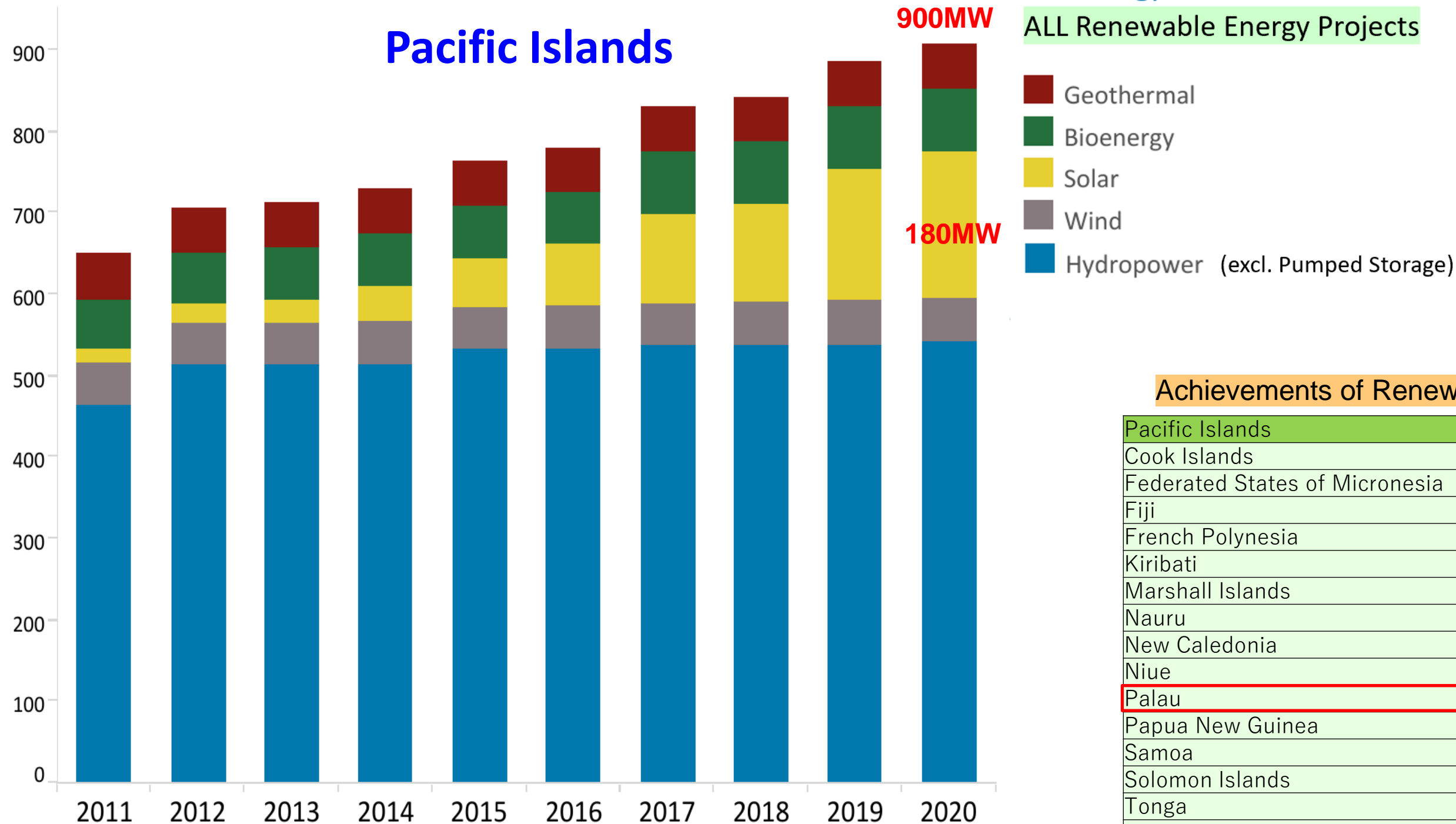
Partner Country	Entity	Project Title	Sector	GHG Emission Reductions (tCO2/y)
Vietnam	Marubeni Corporation	Introduction of 12MW Rooftop Solar Power System to Commercial and Industrial Customers	Renewable Energy	5,815
Vietnam	Osaka Gas Co., Ltd.	Introduction of 9.8MW Rooftop Solar Power System in Industrial 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

1. Overview and Recent trend of JCM Model Projects
- 2. Projects examples that can be applied to Republic of Palau**

Installed Capacity Trends

Navigate through the filters to explore trends in renewable energy

Pacific Islands



- PALM's strong political commitment
- Technology improvement and cost reduction (solar power generation and onshore wind power)
- Support for a wide range of partners

Renewable energy has become an affordable solution with limited funding and technical capabilities.

JCM can contribute to NDC in each country by utilizing various proven technologies.

Achievements of Renewable Energy Installed Capacity(MW) by 2020

Pacific Islands	Solar	Wind	Geothermal	Bioenergy	Hydro
Cook Islands	7	1			
Federated States of Micronesia	2	1			1
Fiji	10	10		43	140
French Polynesia	40	1			50
Kiribati	3				
Marshall Islands	2	1			
Nauru	2				
New Caledonia	80	37		3	80
Niue	1				
Palau	2				
Papua New Guinea	2		55	19	260
Samoa	14				
Solomon Islands	3	1		3	2
Tonga	6	6			
Tuvalu	2				
Vanuatu	5	4		3	2

※This number is for reference only and is an approximation.

Refer to the details of each projects in Appendix.

No.	Technology	Classification	NDC
A	Solar Power Generation	RE	Energy sector
-1	➤ on roof top with Bundling multiple projects		
-2	➤ with Batteries and EMS to provide a stable power supply		
-3	➤ with Blockchain Technology		
-4	➤ With farming-type solar power plant that combines agriculture		
B	Small scale of Wind Power Generation	RE	Energy sector
C	Small scale of Solar Power Generation (JCM Eco Lease Scheme)	RE	Energy sector
D	Small scale of Waste to Energy Plant	WtE	Energy sector
E	Introduction of CNG-Diesel Hybrid Public Bus	EE	Transport sector
F	High Efficiency Chiller and High Efficiency LED Lighting	EE	Energy sector
G	Energy Saving Air Conditioning System	EE	Energy sector

A-1

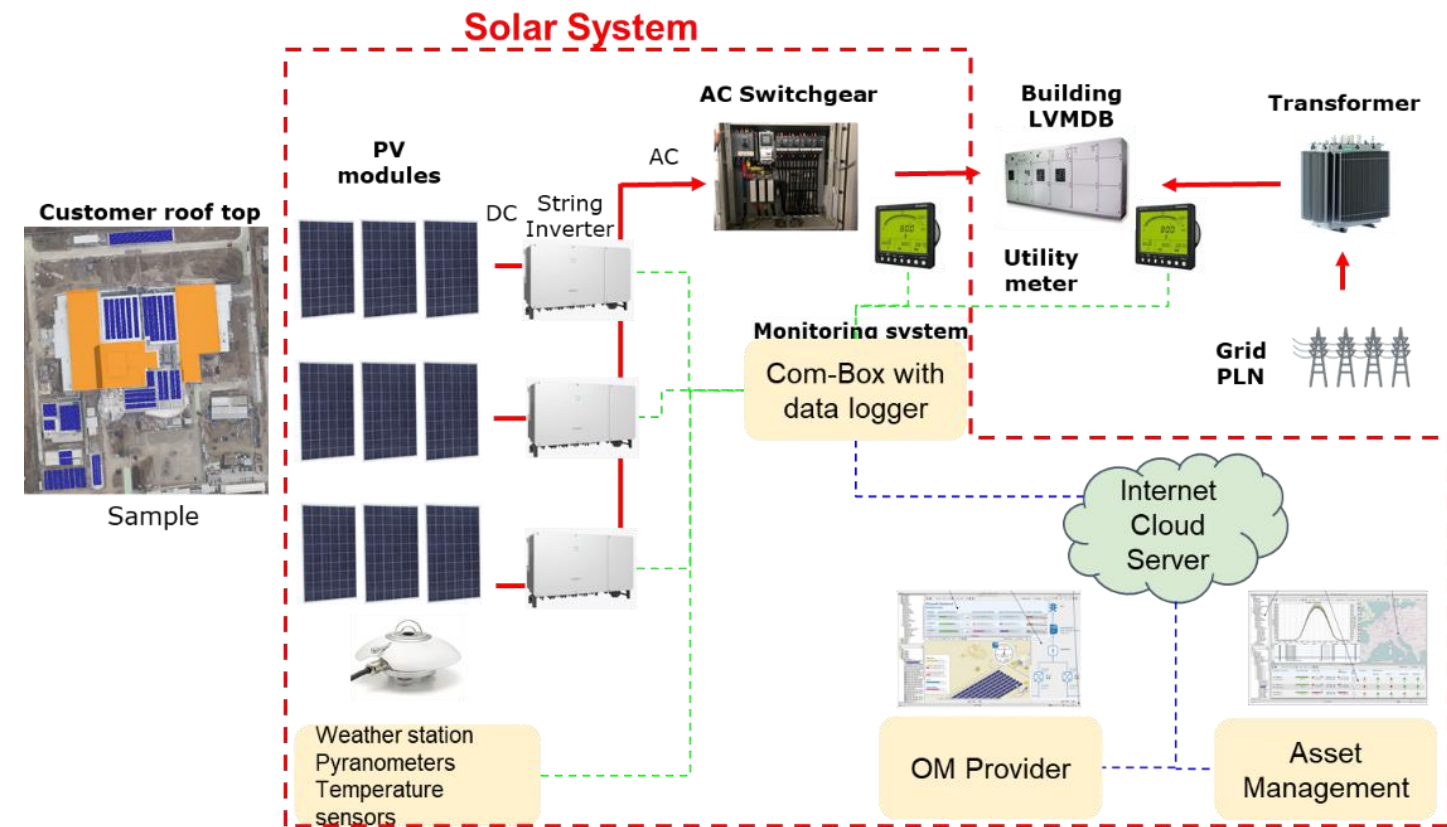
4.2MW Rooftop Solar Power Project to Pharmaceutical Factories, Vehicles Dealers, and Timber Factories

PP (Japan): Alampart Inc., Shizen Energy Inc. PP (Indonesia): PT Alam Energy Indonesia, PT ATW Alam Hijau, PT Bintang Toedjoe, PT Agung Automall, PT Sumber Graha Sejahtera

Outline of GHG Mitigation Activity

Rooftop solar power systems (total of about 4.2 MW) is installed at **two pharmaceutical factories, nine vehicles dealer showrooms and two timber factories.** The project participants are in charge of installation, management, and maintenance of the systems.

This project contributes to the achievement of Indonesia's policy for a renewable energy ratio target of 23% in 2025.

**Expected GHG Emission Reductions**

3,772 tCO₂ /year

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

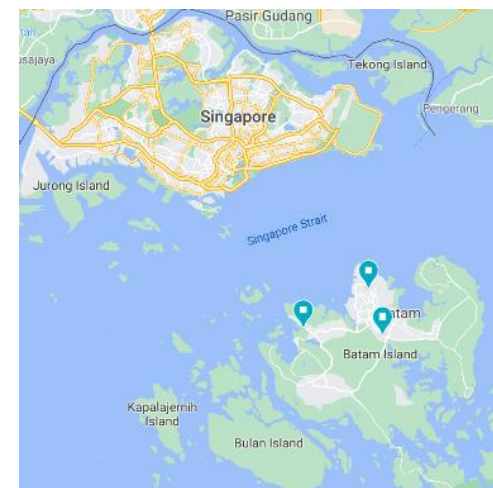
▪ Reference CO₂ emissions
= (Quantity of the electricity generated by the project) [MWh/year]

× Emission factor [tCO₂/MWh]

▪ Project CO₂ emissions
= 0 [tCO₂/year]

Site of Project

Batam : 3 sites



Jakarta : 2 sites

East Java : 2 sites

Bali : 6 sites



Map Data ©2021 Google

A-1

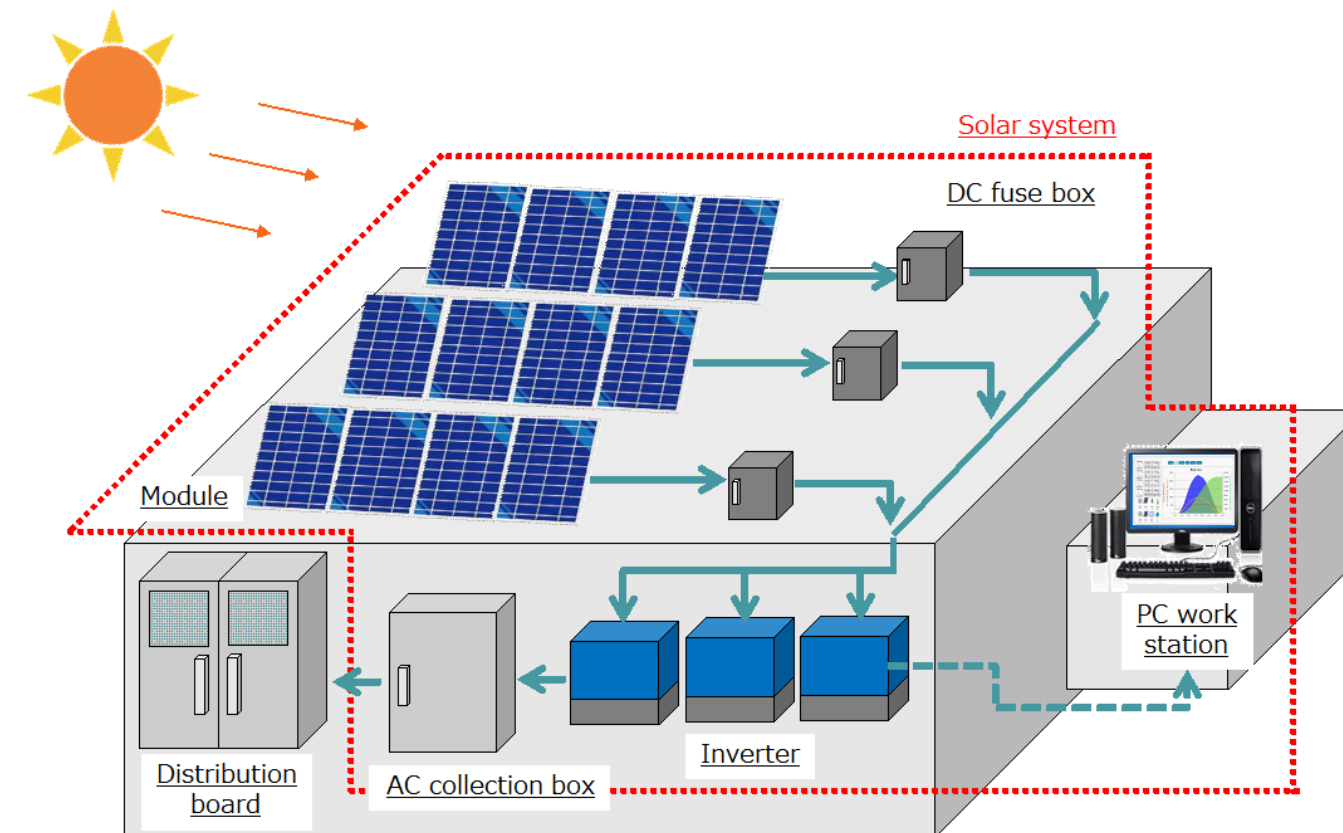
Palau/ Introduction of 1MW Solar Power System on Supermarket Rooftop

PP (Japan): Sharp Energy Solutions Corporation, PP (Palau): Surangel & Sons Company

Outline of GHG Mitigation Activity

1MW solar power system is installed on the rooftop of a new supermarket to be built in Airai State, Republic of Palau, for self-consumption purposes. This is the first introduction of a mega solar system in Palau.

This project contributes to the achievement of Palau's policy for a renewable energy ratio target of 45% in 2025.

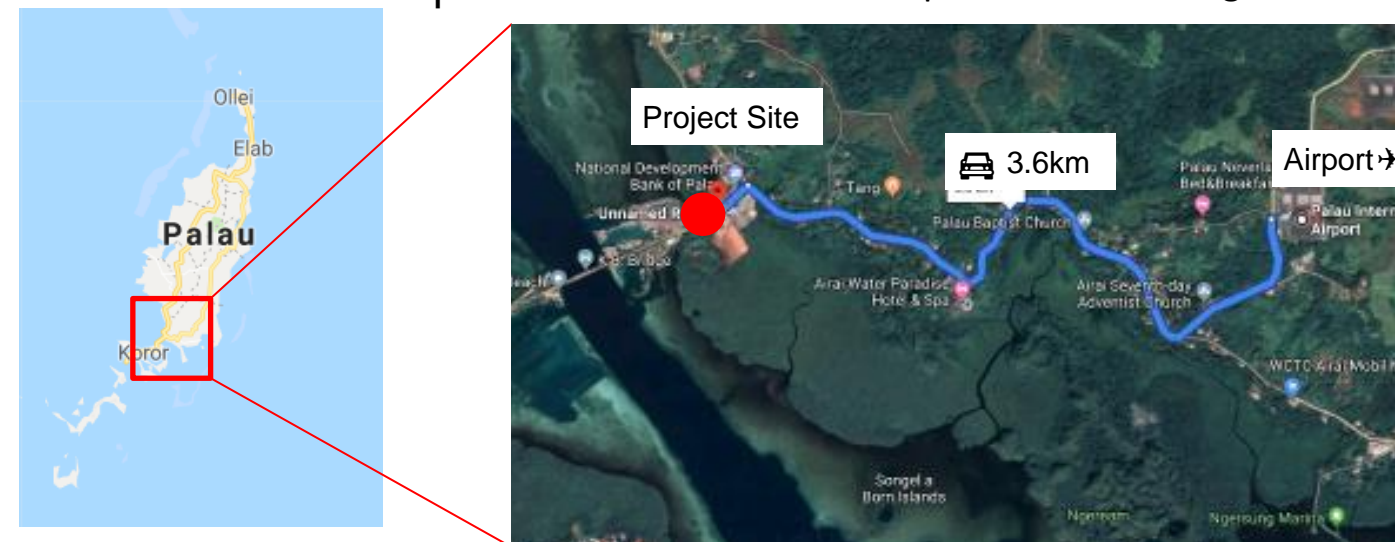
**Expected GHG Emission Reductions****843 tCO₂/year**

$$= (\text{Reference CO}_2 \text{ Emissions}) [\text{tCO}_2/\text{year}] \\ - (\text{Project CO}_2 \text{ Emissions}) [\text{tCO}_2/\text{year}]$$

$$= ((\text{Reference Power Consumption}) [\text{MWh/year}] \\ - 0 [\text{MWh/year}]) \times \text{Emission Factor} [\text{tCO}_2/\text{MWh}]$$

Site of Project

Installation Site : Approx. 4km west of Palau International airport



Development of an energy management system (EMS) to provide a stable supply of renewable energy Representative Participant: Kyudenko Corporation

A-2

Outline of project

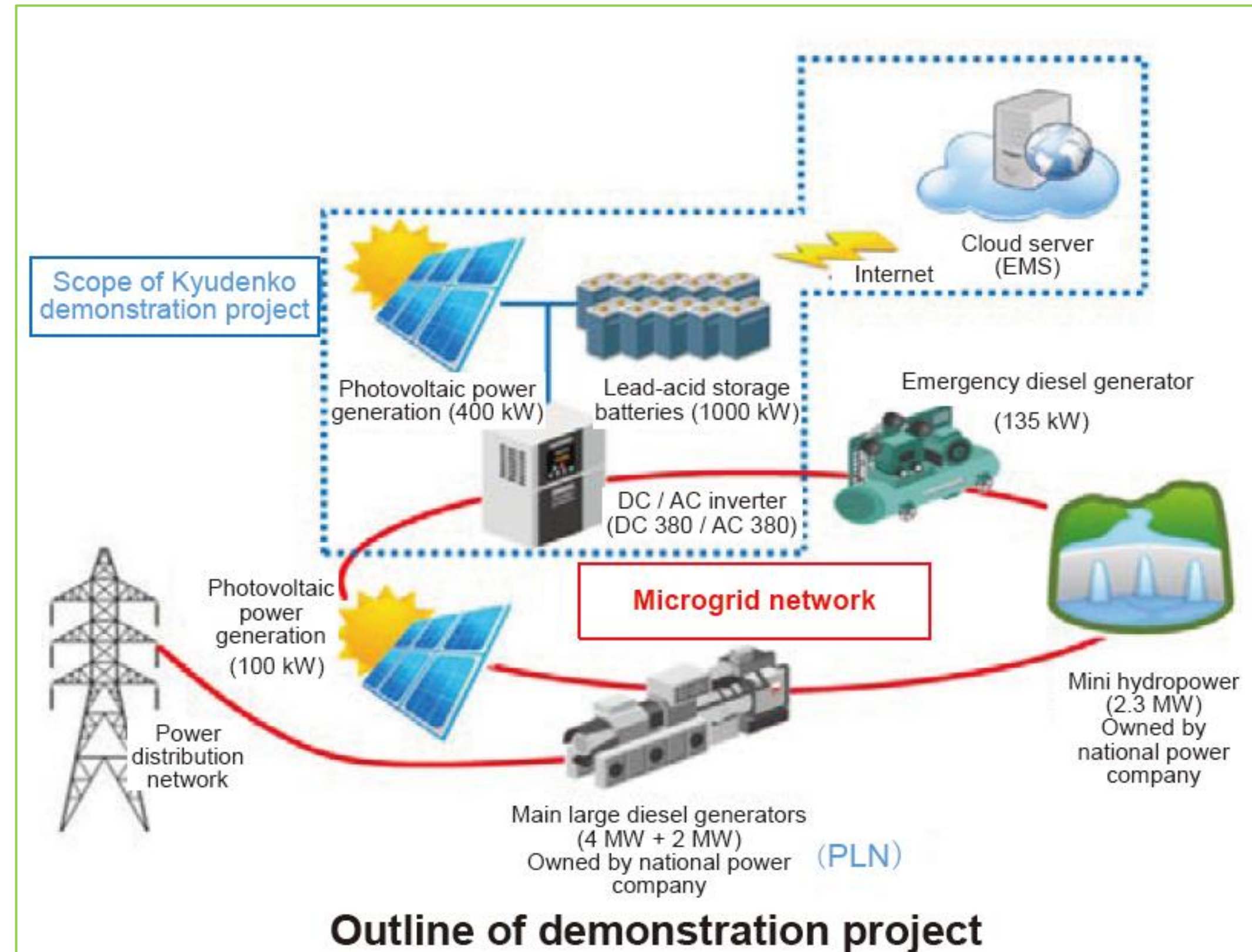
This project aims to;

- Reduce CO2 emissions by substituting renewable energy for existing diesel generators.
- Also, in collaboration with BPPT, to demonstrate EMS and storage batteries for stable power supply from various sources including renewable energy.

Region: Sumba Island



Map data ©2021 Google



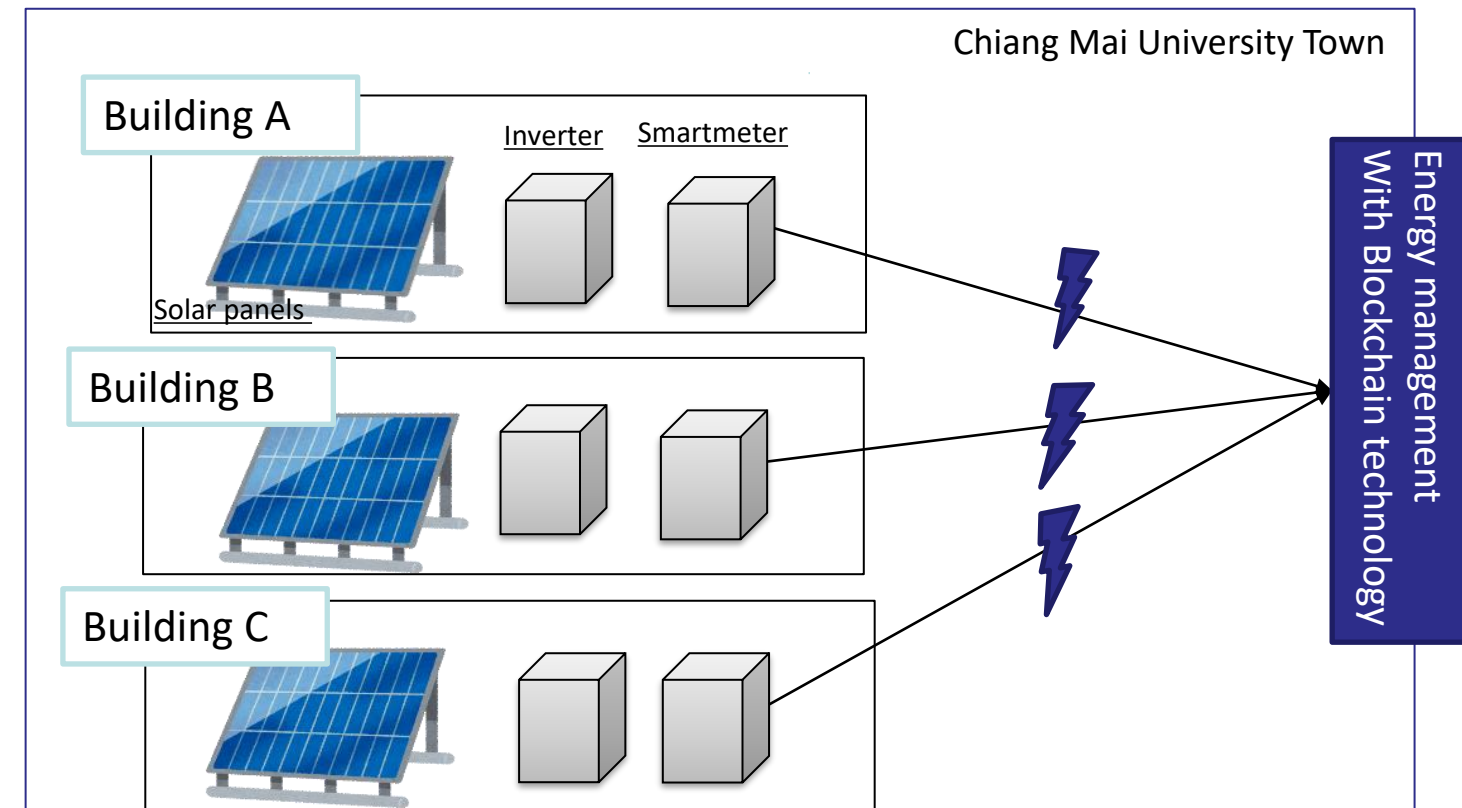
2.5MW Solar Power Project with Blockchain Technology in Chiang Mai University Town Community

PP (Japan): Inabata & Co.,Ltd , PP (Thailand): Thai Digital Energy Development Co.Ltd

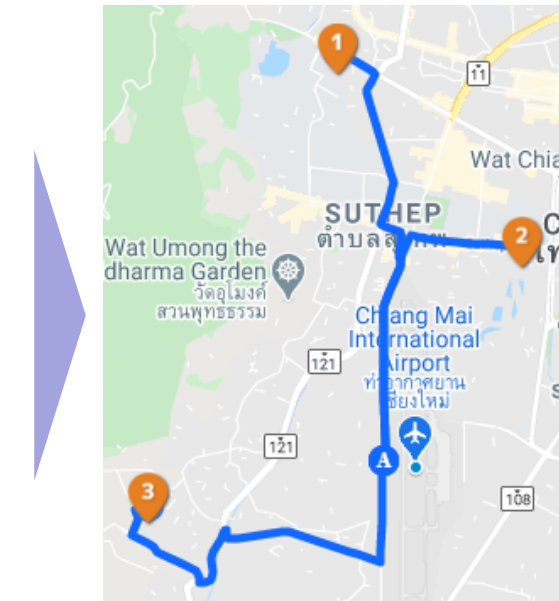
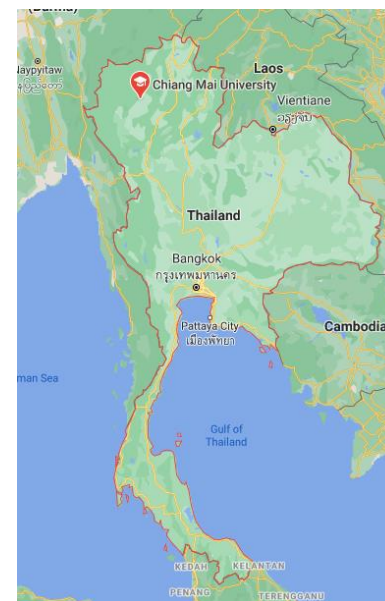
A-3**Outline of GHG Mitigation Activity**

This project introduces a 2.5 MW solar power generation system on the roofs of multiple buildings in Chiang Mai University, Thailand.

This project is operated by blockchain technology which realizes the expansion and maximum utilization of renewable energy on campus and reduces greenhouse gas (GHG) emissions by introducing renewable energy.

**Expected GHG Emission Reductions****1,041 tCO₂/year**

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

Sites of Project

Distance from Chiang Mai International airport

Zone 1:
7 km (NW)

Zone 2:
4 km (NE)

Zone 3:
5 km (SW)

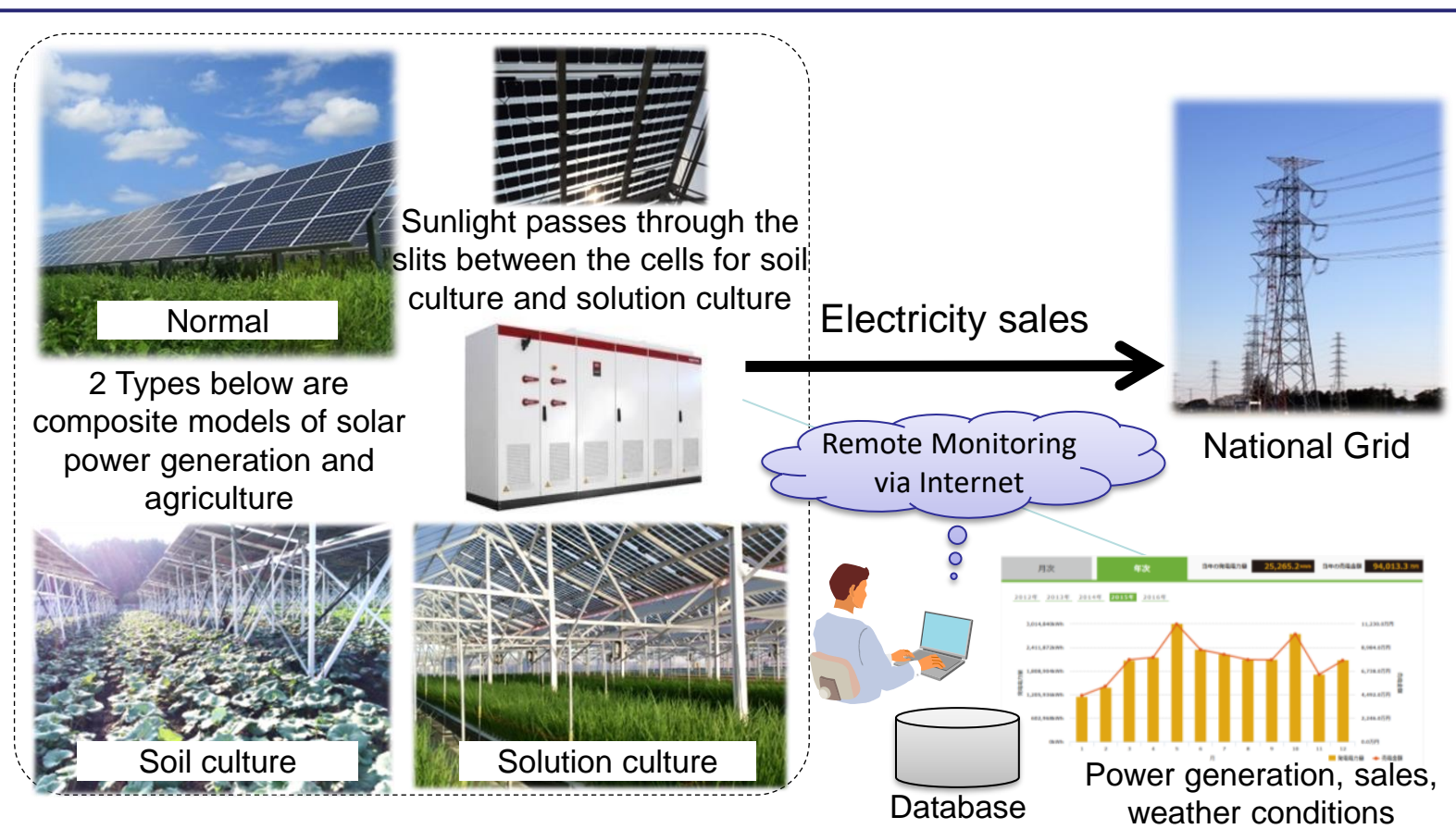
Map data©2020 Google

Installation of 2.1MW Solar Power Plant for Power Supply in Ulaanbaatar Suburb (Farming-type)

PP (Japan): Farmdo Co., Ltd. / PP (Mongolia): Everyday Farm LLC, Bridge LLC

A-4**Outline of GHG Mitigation Activity**

The purpose of this project is to reduce CO₂ emission, mitigate air pollution and stabilize power supply in Mongolia by installing 2.1MW scale solar power plants in the suburbs of Ulaanbaatar. This power plants can replace some part of power generation by coal-fired thermal power. Moreover, lots of achievements in daily life, mitigating air pollution, resolving power shortage, food supplying, etc., can be expected by synergy of agricultural and solar power generation technology.

**Expected GHG Emission Reductions****2,424 tCO₂/year**

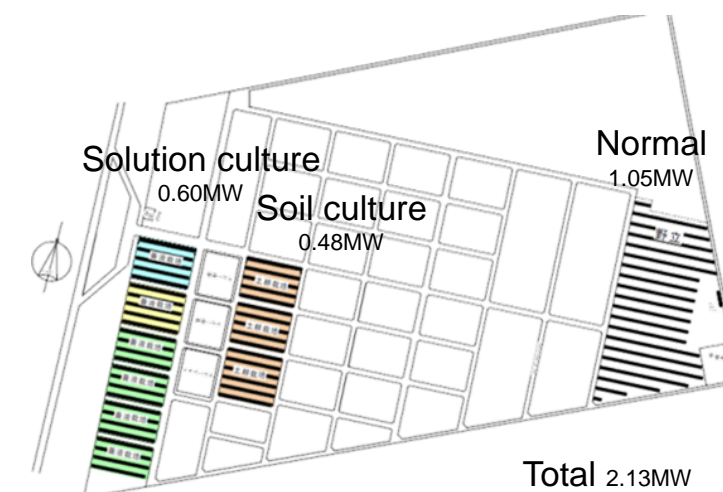
= Project Electricity Generation (EG)
x Emission Factor (EF)
= Power Generation Capacity [kW]
x Annual Operating Rate [%]
x 24 hours x 365 days x EF

Site of JCM Model Project

Monnaran Farm (24ha), District of Songinokhairkhan



Project site situated in the farm Everyday Farm owns is located 37km northwest of Ulaanbaatar city center.



B

33MW Wind Power Project in Caraga Region, Mindanao

PP (Japan): CHODAI Co., Ltd, Shizen Energy Inc.

PP (Philippines): Equi-Parco Construction Company, Equi-Parco Holdings Corporation, Caraga Wind Energy Corporation

Outline of GHG Mitigation Activity

This project installs wind power generation facilities with a capacity of 33 MW (4.2 MW wind turbine x 8 towers) in Agusan del Norte, Caraga Region, Mindanao.

Generated power is sold to power grid and reduces greenhouse gas (GHG) emissions by replacing grid electricity. Stable supply of wind power from these facilities also helps to develop sustainable economy in Mindanao.

Wind turbines

Concept image



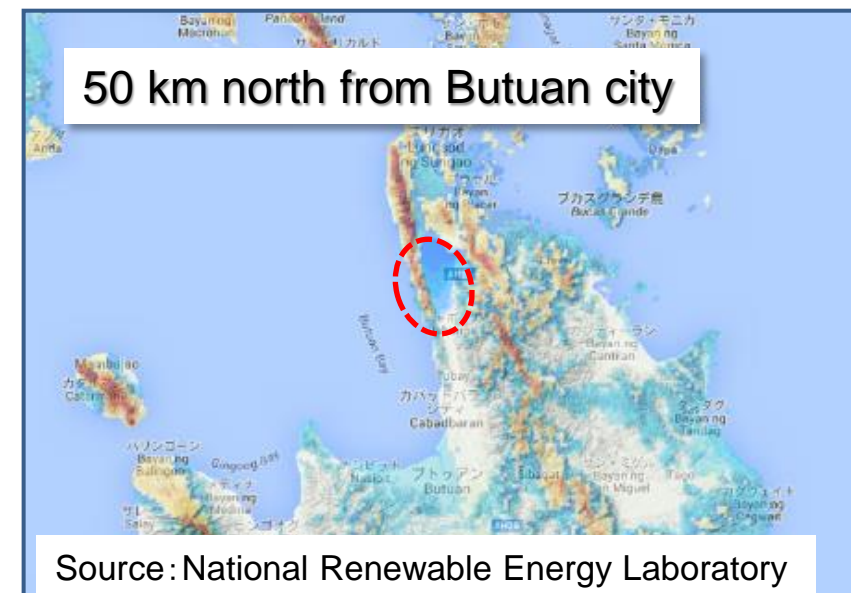
©2019Google

Expected GHG Emission Reductions**35,350 tCO₂/year**= (Reference CO₂ emissions) [tCO₂/year]- (Project CO₂ Emission) [tCO₂/year]

= ((Reference Power consumption) [MWh/year]

- 0 [MWh/year])) × Emission Factor [tCO₂/MWh]**Sites of Project**

50 km north from Butuan city



Source: National Renewable Energy Laboratory



Source: Wikipedia

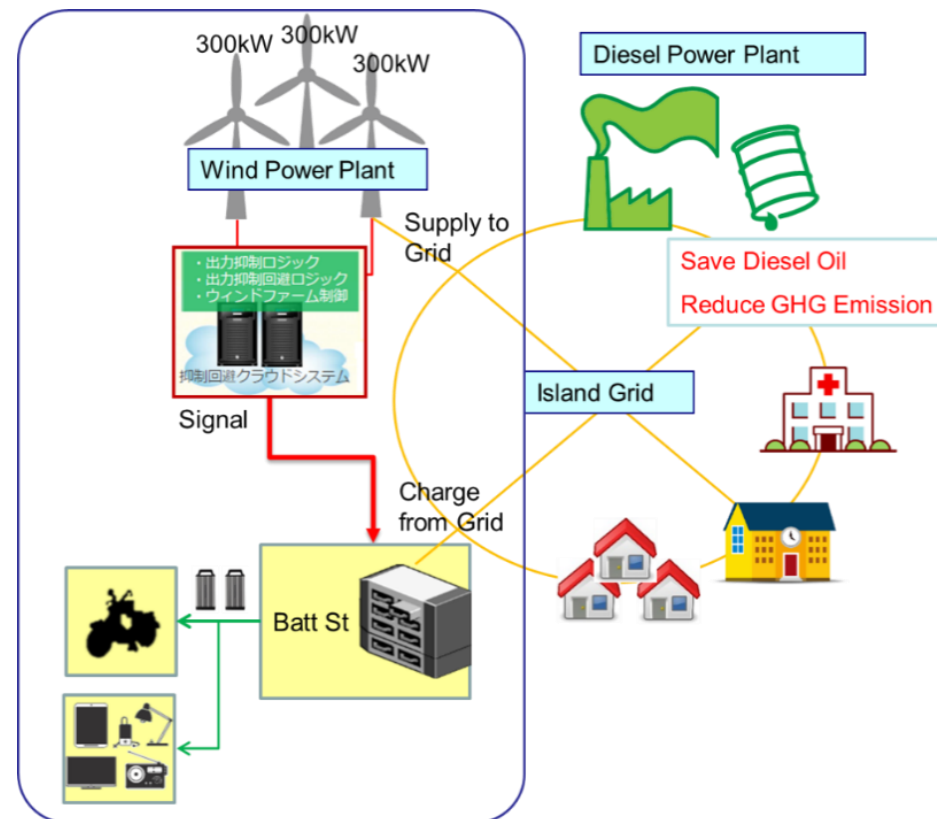
Small scale of Wind Power Generation (Not JCM project but possible)

B

KOMAIHALTEC's 300kW Wind Turbine



- Blade Length: 16m
- Nacelle
- weighs under 18t
- Tower Height: 41.5m
(4 blocks: each weighs under 10t)
- Rated Capacity: 300kW
- Survival wind speed:
91.26m/s for Typhoon Model
- Cut-in wind speed: 3m/s
- Cut-out wind speed: 25m/s



A 300kW medium-scale wind power generator suitable for islands and a battery charging station, and the control system will utilize the surplus electricity of the wind turbine to charge the battery. Furthermore, by using the charged battery for EV motorcycles, a further CO2 reduction effect will be created.

Referred to Komaihaltec and Honda project on Financing Program to Demonstrate Decarbonization Technology for Realizing Co-Innovation

PROGRESSIVE ENERGY's 245kW Wind Turbine



Tiltable Wind-Generated Electricity System

The tiltable system enables us to perform maintenance on the ground and largely reduce maintenance cost and stop time for windmills. In addition, we can protect windmills from typhoons by fixing them to the ground.

5 units installed in the Kingdom of Tonga in 2019 realized with PALM7



Groundbreaking ceremony



5 Launch scenery

Referred to Progressive Energy Co.

C

Introduction of 0.13MW Solar Power System to Auto Parts Factory (JCM Eco Lease Scheme)

(Japan): Tokyo Century Corporation, (Thailand): NICHIAS (THAILAND) CO.Ltd., TISCO Tokyo Leasing CO., Ltd.

Outline of GHG Mitigation Activity

Installing 0.13MW solar power generation system on the roof of the factory for self-consumption by utilizing JCM Eco Lease Scheme. Around 60% of the factory's electricity consumption will be covered by solar power generation.

By combining financing programme and leasing, JCM Eco Lease Scheme reduces the initial cost and contributes to greenhouse gas (GHG) emissions reduction. This is the first JCM Eco Lease project in Thailand.



<NICHIAS (THAILAND) CO.Ltd. Factory>

Map Data ©2021 Google
<Project Site>

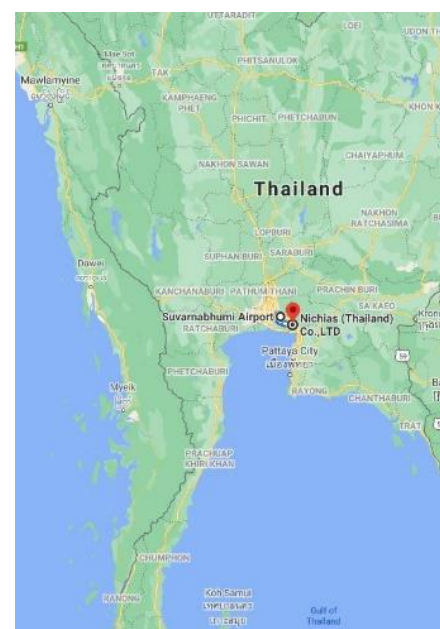
Expected GHG Emission Reductions

$$52 \text{ tCO}_2/\text{年}$$

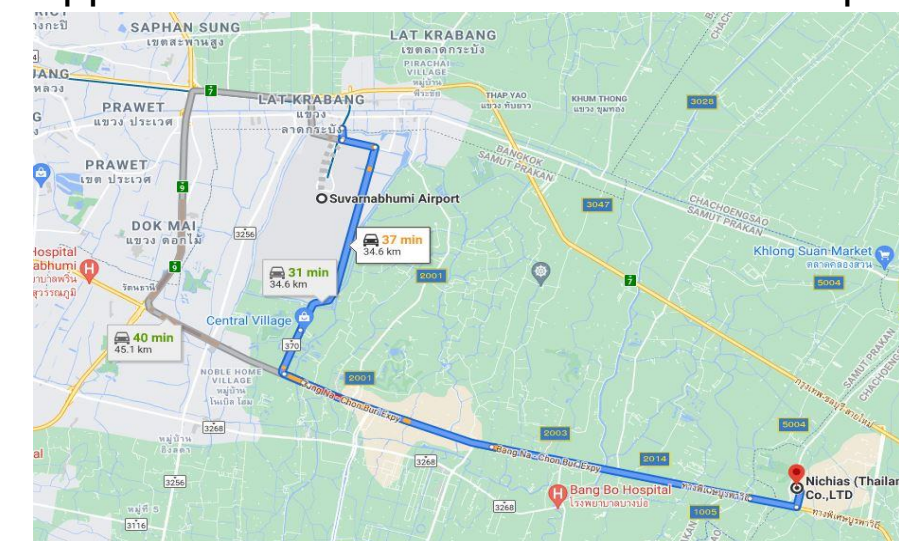
$$= (\text{Reference CO}_2 \text{ emissions}) \\ - (\text{Project CO}_2 \text{ emissions})$$

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

Sites of Project



Approx. 35km east of Suvarnabhumi airport



Map Data ©2021 Google

C

Introduction of 1.3MW Solar Power System to Food Factory (JCM Eco Lease Scheme)

PP (Japan): Tokyo Century Corporation, PP (Thailand): PRIMAHAM FOODS (THAILAND) CO.,LTD, TISCO Tokyo Leasing Co., Ltd.

Outline of GHG Mitigation Activity

A Solar Power System is installed to the Japanese food factory by utilizing JCM Eco Lease Scheme. A total capacity of 1.3MW solar power system is installed on both rooftop of the factory and the carport beside the factory.

By combining financing programme and leasing, JCM Eco Lease Scheme reduces the initial cost and contributes to greenhouse gas (GHG) emissions reduction. This is the first JCM Eco Lease project in Thailand.



Solar Panels will be installed on both rooftop of the factory and the carport beside the factory.



Map Data©2021Google



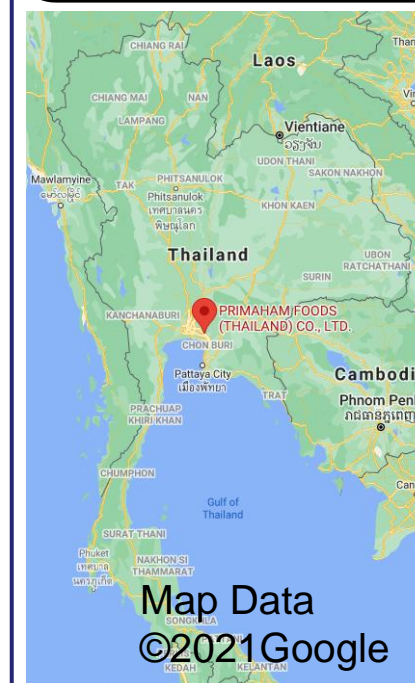
PRIMAHAM FOODS (THAILAND) CO.,LTD

Expected GHG Emission Reductions

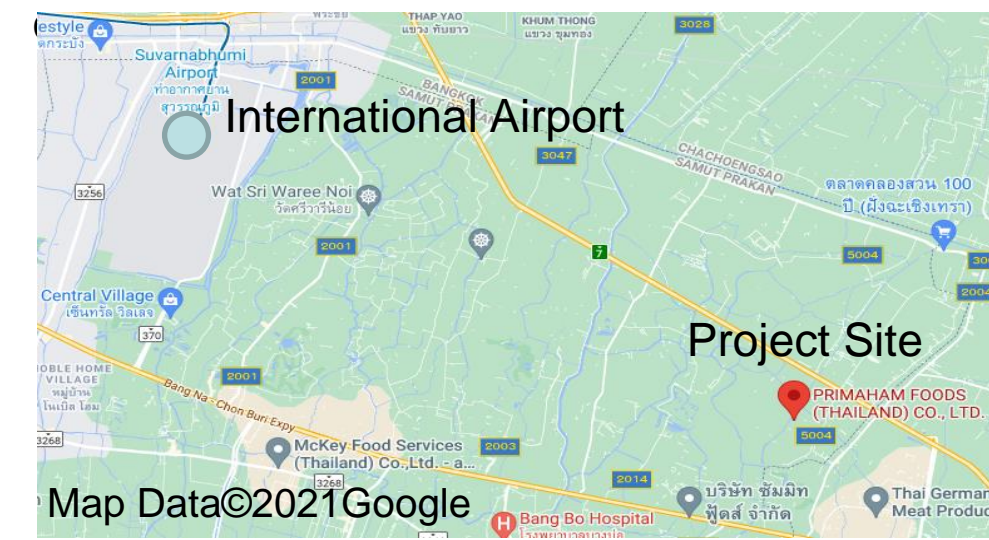
603 tCO2/year

= (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 ProjectMap Data
©2021Google

Project Site: Approximate 40km southeast from Suvarnabhumi International Airport by



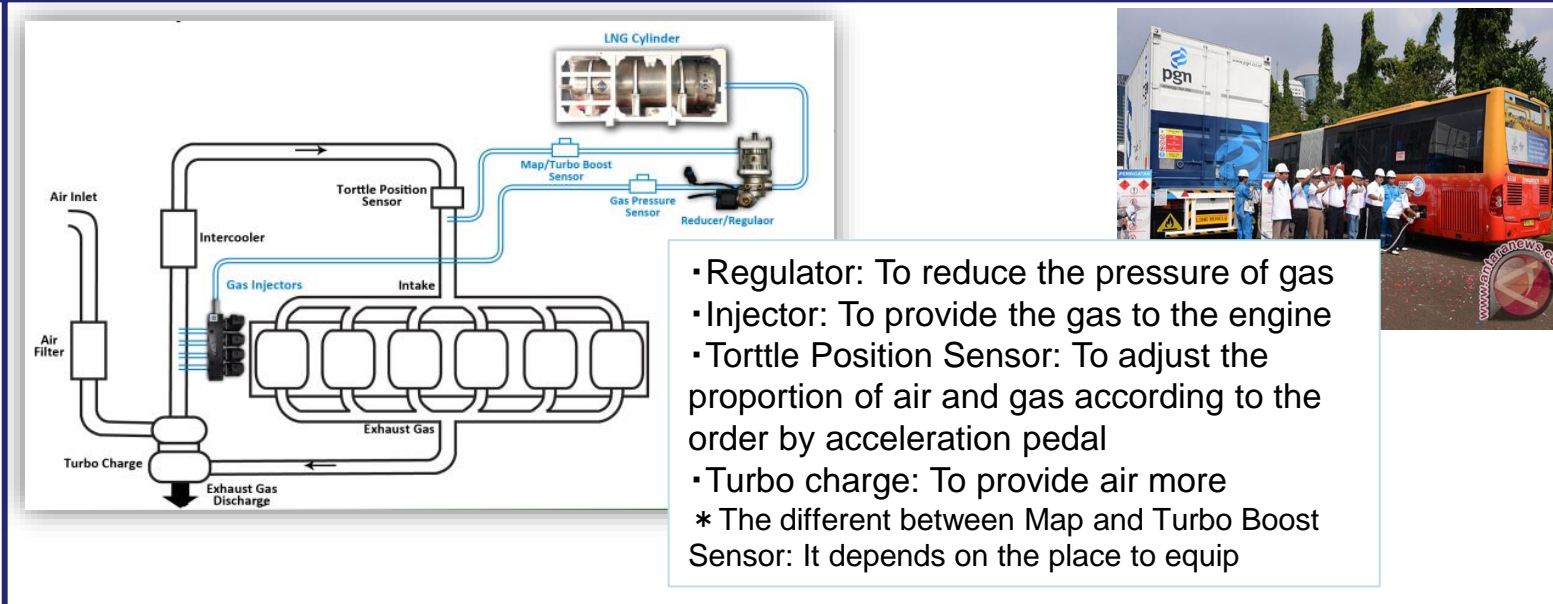
Map Data©2021Google

Introduction of CNG-Diesel Hybrid Equipment to Public Bus in Semarang

PP from Japan: Hokusan Co.,Ltd. / PP from Indonesia: BLU UPTD Trans Semarang

Outline of GHG Mitigation Activity

Toyama City has concluded a cooperation agreement between Semarang City to realize low carbon society under inter-city cooperation. Based on the cooperation agreement, this project aims to reduce GHG emissions through fuel switch from diesel to CNG. In the project, 72 diesel buses owned by Trans Semarang, including 25 large-sized buses and 47 mid-sized buses, are retrofitted from diesel engine to hybrid engine with CNG system available. These buses are considered more cost-effective through fuel switching.



Sites of Project



Expected GHG emission reduction

2,667 tCO₂/year

$$\begin{aligned} & \leftarrow \text{Reference GHG emission} - \text{Project GHG emission} \\ & = \text{Reference fuel consumption} \times \text{Fuel-based emission factor} - \\ & \text{Project fuel consumption} \times \text{Fuel-based emission factor} \end{aligned}$$

Reference fuel consumption

= Diesel fuel consumption based for bus operation x emission factor of Diesel fuel

Project fuel consumption

$$= \text{CNG fuel consumption for bus operation} \times \text{emission factor of CNG} + \text{Diesel fuel consumption for bus operation} \times \text{emission factor of Diesel fuel}$$

E

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

E

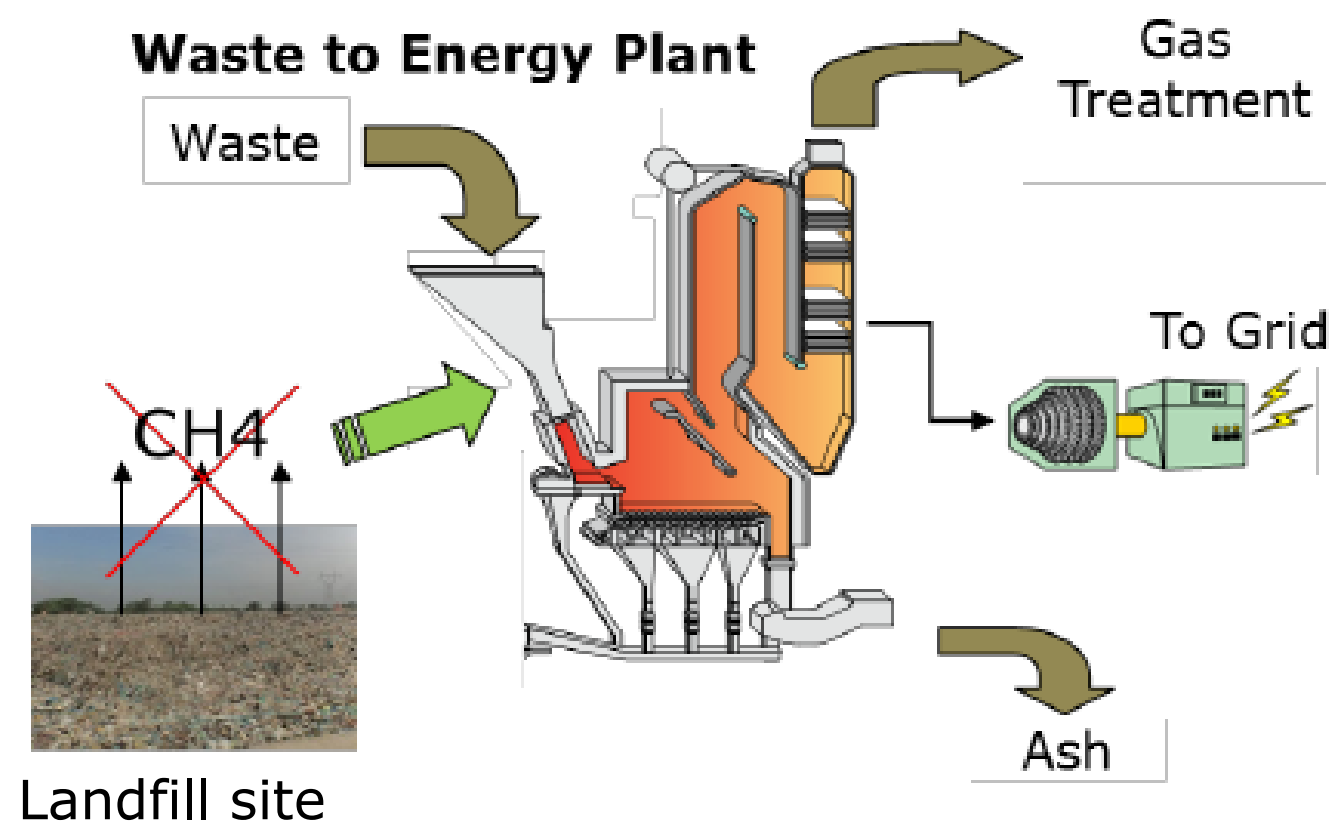
Introduction of **Waste to Energy** Plant in Yangon City

PP(Japan): JFE Engineering Corporation / PP(Myanmar): Yangon City Development Committee

Outline of GHG Mitigation Activity

The objective of this project is to build and operate a waste-to-energy plant that (1) generates electricity, some of which will be supplied to a power company, resulting in reduction of fossil fuel consumption at the power plant, (2) mitigates electricity shortage, (3) reduces CH₄ emissions from landfill disposal, and (4) improvement of waste management in Yangon City.

This is a pilot project conducted by Yangon City for promotion of waste-to-energy, with relatively small capacity (60t of waste per day).



Expected GHG Emission Reductions

4,125tCO₂/year

*Average of emission reductions from 2017 to 2030

Sites of JCM Model Project



Near Hlawga Lake, 35km north from central area of Yangon City

F

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

©OpenStreetMap contributors

F

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

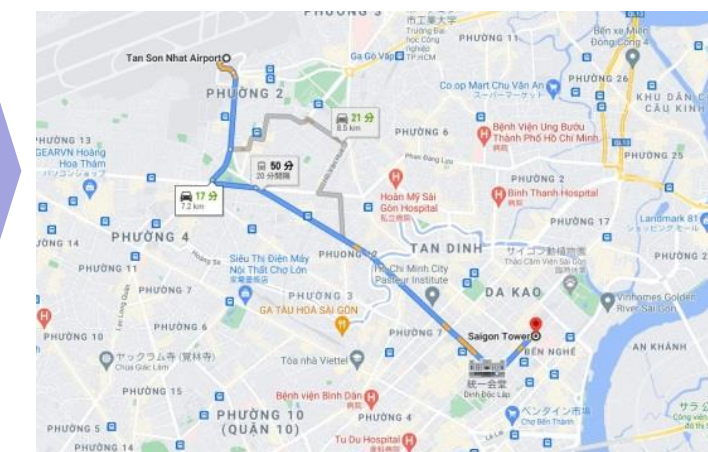
$$= [(\text{Reference power consumptions}) - (\text{Project power consumptions})] \times \text{Emission factor (EF)}$$

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

G

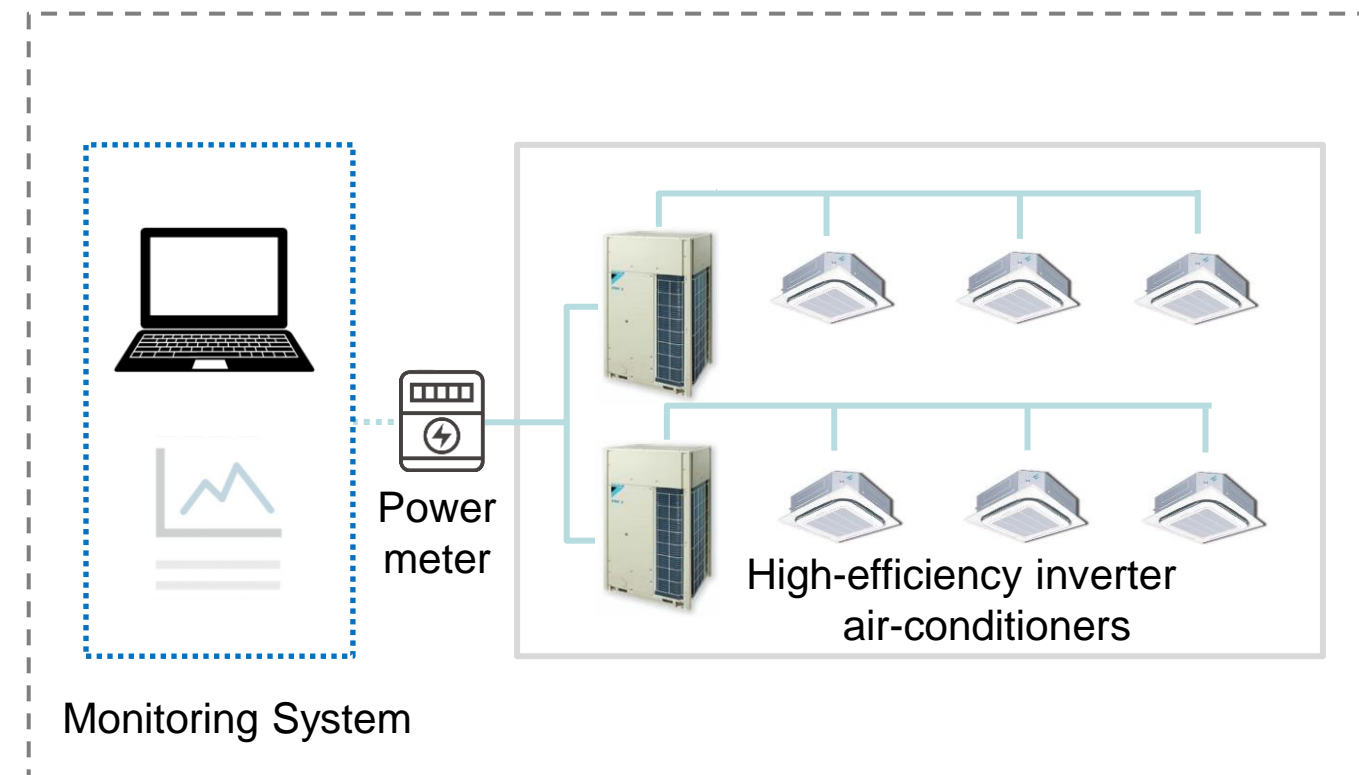
Introduction of **Energy Saving Air Conditioning** System to Quezon City Hall Compound

PP (Japan): Oriental Consultants Co., Ltd., PP (Philippines): Quezon City Government, LBP Leasing and Finance Corporation

Outline of GHG Mitigation Activity

This project aims to contribute to the reduction of greenhouse gas (GHG) emissions by introducing approx. 440-unit of high-efficiency inverter air-conditioners to Quezon City Hall Compound.

The project will contribute to the country's goal of reducing GHG emissions by approximately 70% by 2030 compared to the 2000-2030 Business as Usual (BAU) scenario.



Expected GHG Emission Reductions

780 tCO₂/year

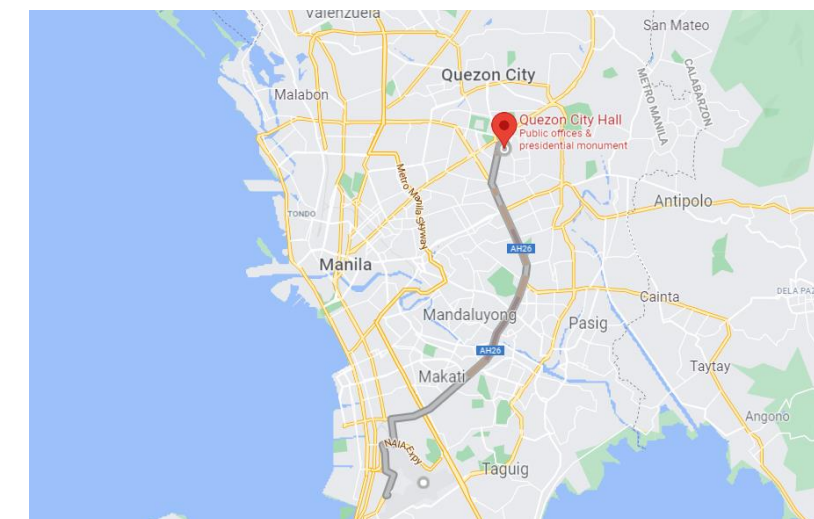
= (Reference CO₂ emissions)
- (Project CO₂ emissions)

- Reference CO₂ emissions
= (Electricity consumption calculated by COP of reference air-conditioner) [MWh/year]
x Emission factor [tCO₂/MWh]
- Project CO₂ emissions
= (Electricity consumption calculated by COP of project air-conditioner) [MWh/year]
x Emission factor [tCO₂/MWh]

Sites of Project



Approx. 20km North of Manila International Airport



Map Data ©2021 Google

■ GEC's Website on JCM

<http://gec.jp/jcm/>

■ GEC's JCM Twitter

https://twitter.com/GEC_JCM_Info

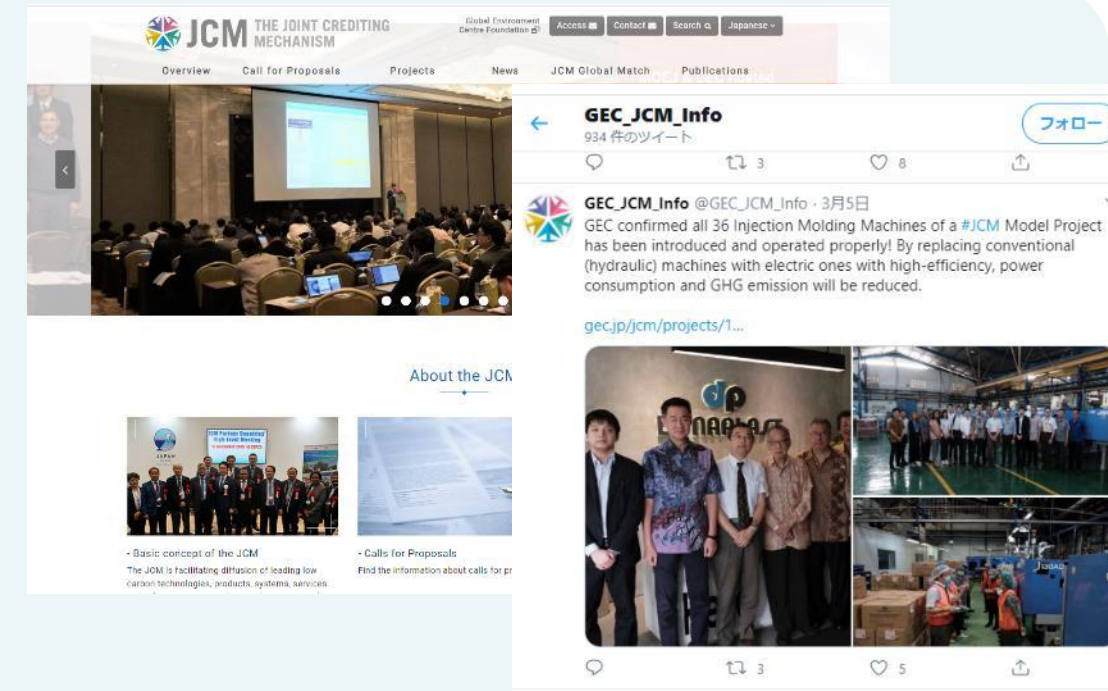
■ JCM Booklet

<http://gec.jp/jcm/jp/publications/>

■ Business matching site

"JCM Global Match"

<https://gec.force.com/JCMGlobalMatch/>



JCM Global Match is an effective tool to connect entities who are interested in the JCM financing programme.



Seller -offers decarbonizing facilities



Buyer -acquires decarbonizing facilities



Consultant -familiar with JCM



Financier -supports remaining cost of ...

Consultation by GEC

GEC provides application consultation in order to assist project formation for entities interested in JCM Model Project. Please feel free to contact us. Please send an e-mail to jcm-info@gec.jp. Subject of e-mail should be "Consultation on application for JCM Model Project (Your company name)".



Suitable for Getting advice on your proposal at various phases.

■ Contact:

Satoru Tango, Norio Takeyama

Global Environment Centre Foundation (GEC) Tokyo Office

E-mail : jcm-info@gec.jp

※Currently, due to COVID-19, we are partially doing telework, and provide application consultation at web conference. Please send an e-mail to contact us.

Me Sulang !
ありがとうございました。

Global Environment Centre Foundation(GEC) Tokyo Office

3rd Floor, Hongo Ozeki Bldg 3-19-4, Hongo, Bunkyo-ku,
Tokyo 113-0033, JAPAN

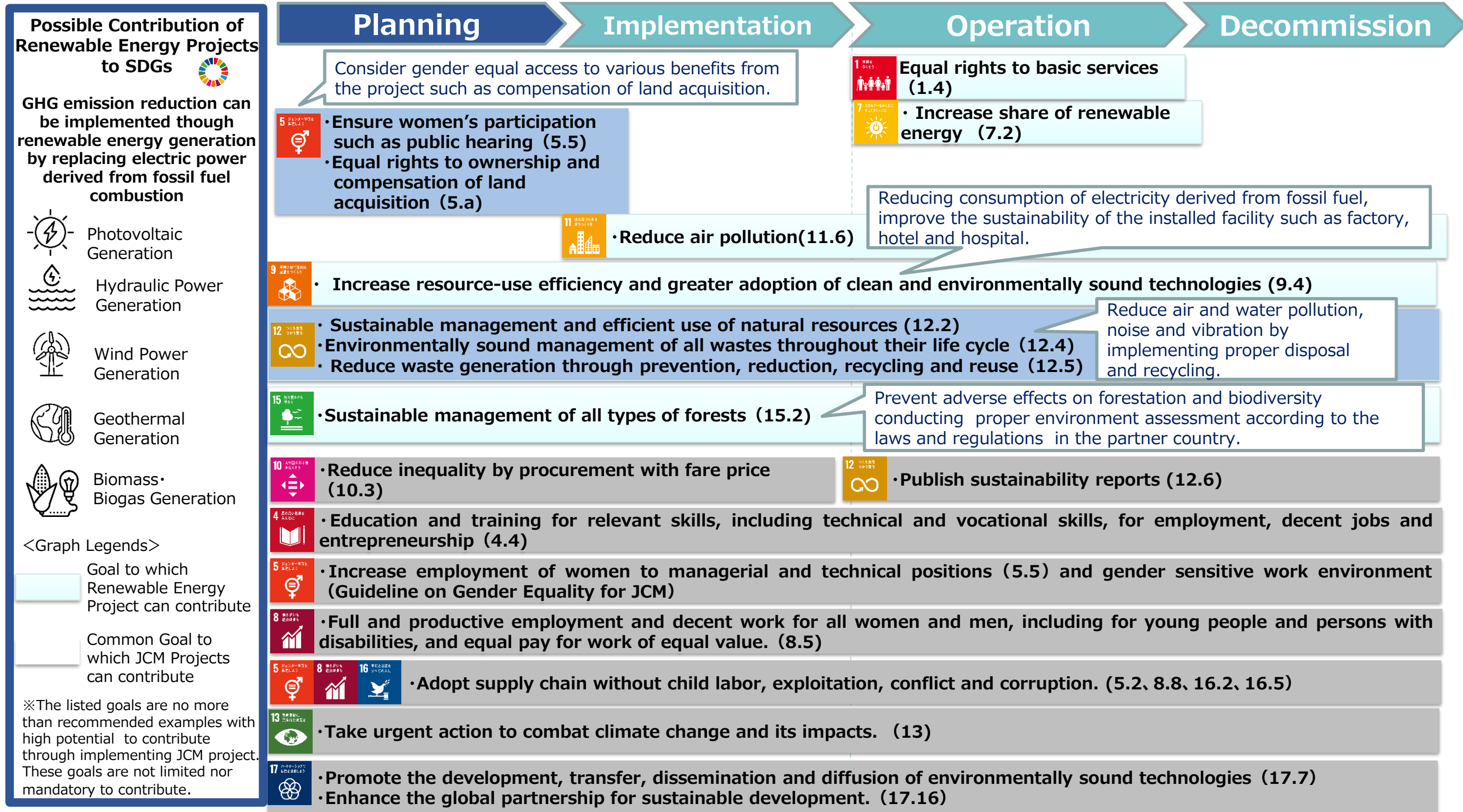
Phone : +81-3-6801-8773 / FAX : +81-3-6801-8861

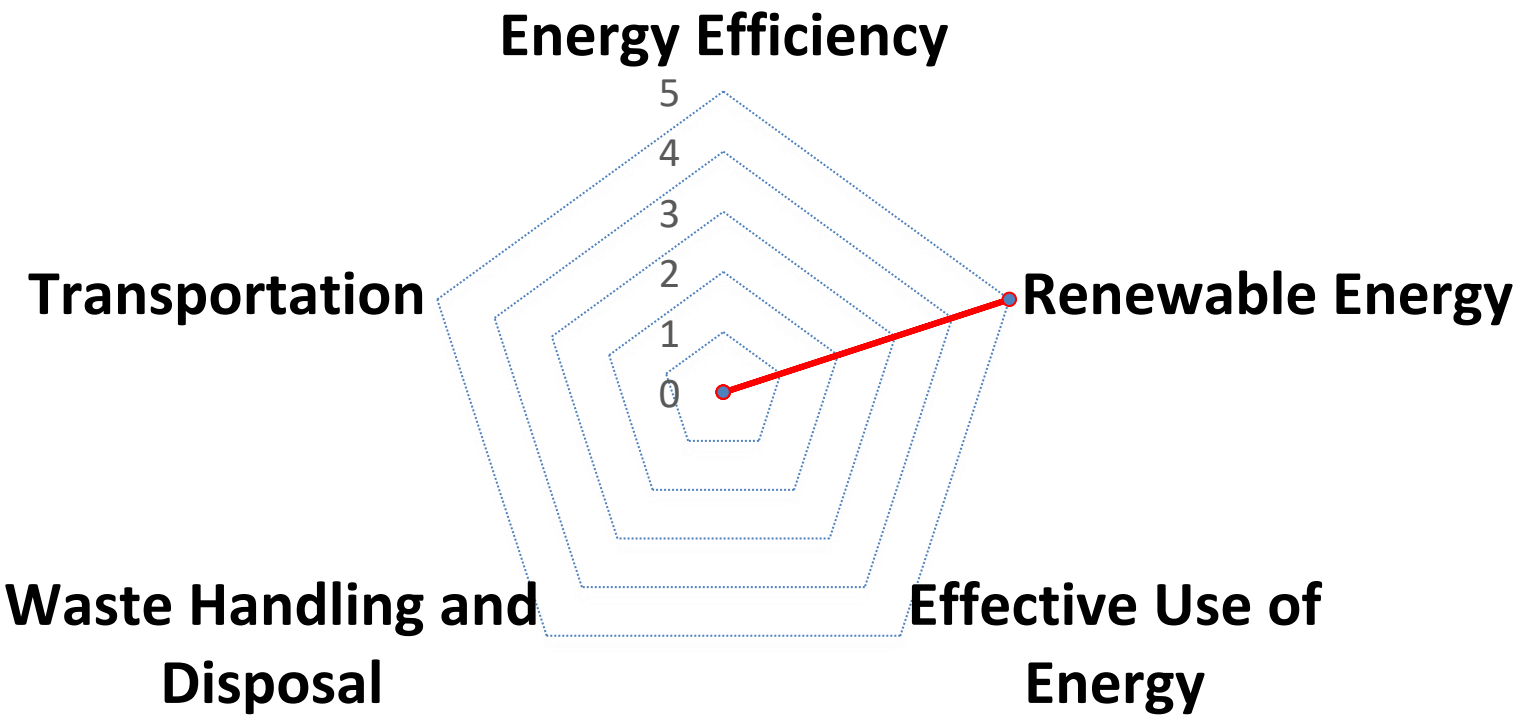
E-mail : jcm-info@gec.jp

URL : <http://gec.jp/>



Appendix





Year	Entity	Project Title	Sector	Expected GHG Emission Reductions (tCO ₂ /y)
2013	Pacific Consultants Co., Ltd.	Small Scale Solar Power Plants for Commercial Facilities in Island States	Renewable Energy	259
2014	Pacific Consultants Co., Ltd.	Small-Scale Solar Power Plants for Commercial Facilities Project II	Renewable Energy	320
2014	Pacific Consultants Co., Ltd.	Solar PV System for Schools Project	Renewable Energy	111
2018	Sharp Energy Solutions Corporation	Introduction of 0.4MW Rooftop Solar Power System in Supermarket	Renewable Energy	284
2019	Sharp Energy Solutions Corporation	Introduction of 1MW Solar Power System on Supermarket Rooftop	Renewable Energy	843

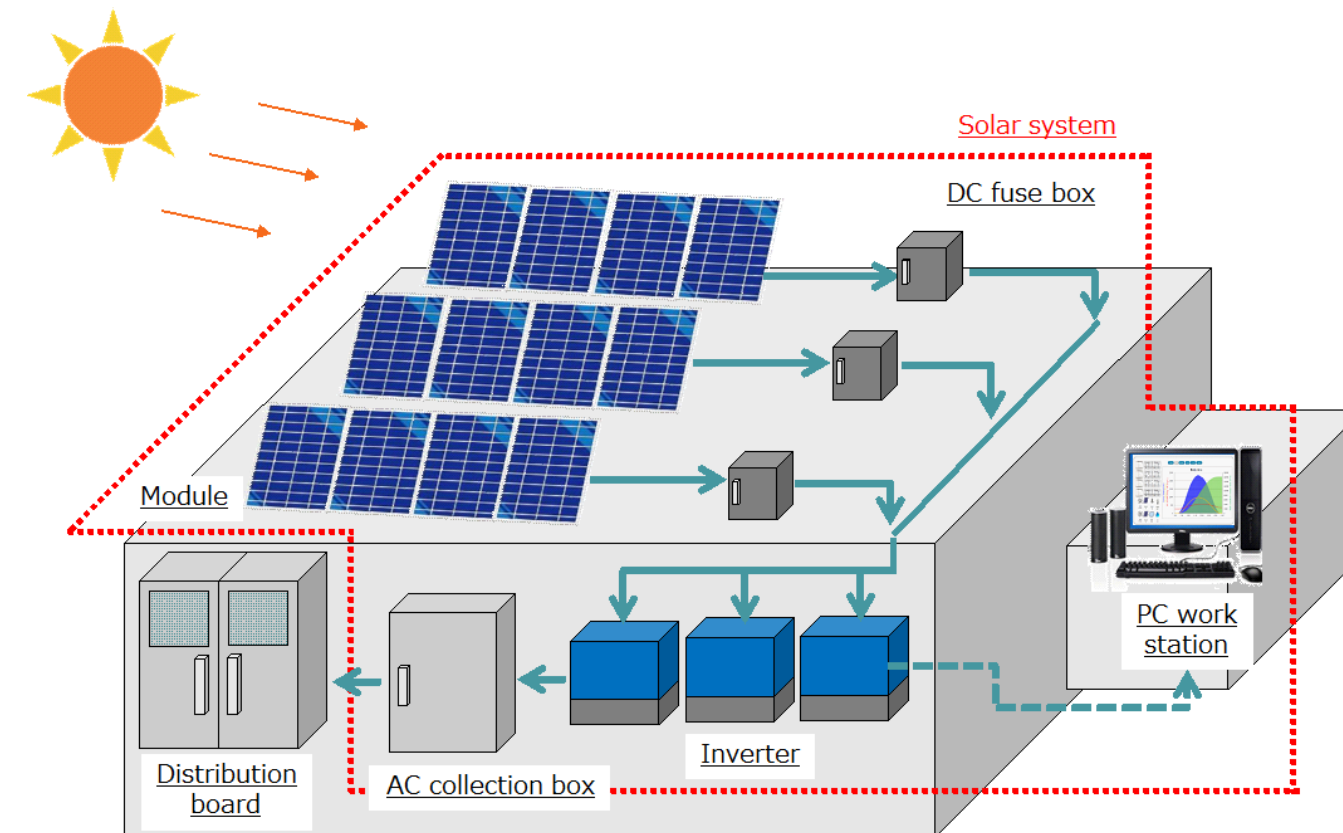
Palau/ Introduction of 1MW Solar Power System on Supermarket Rooftop

PP (Japan): Sharp Energy Solutions Corporation, PP (Palau): Surangel & Sons Company

Outline of GHG Mitigation Activity

1MW solar power system is installed on the rooftop of a new supermarket to be built in Airai State, Republic of Palau, for self-consumption purposes. This is the first introduction of a mega solar system in Palau.

This project contributes to the achievement of Palau's policy for a renewable energy ratio target of 45% in 2025.

**Expected GHG Emission Reductions**

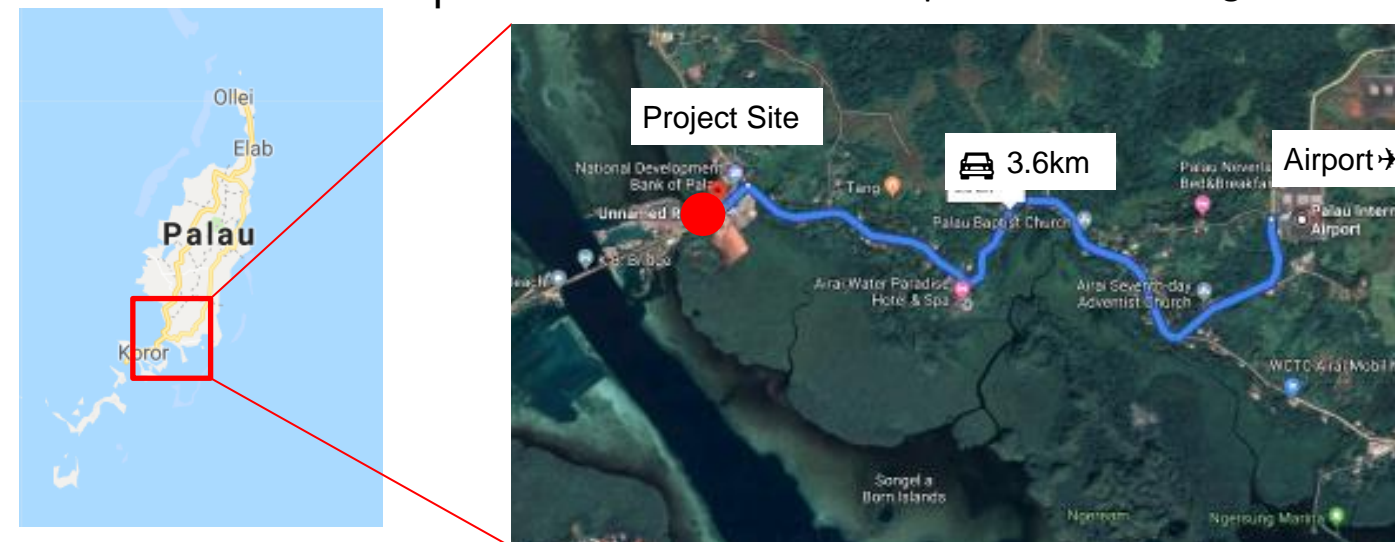
843 tCO₂/year

$$= (\text{Reference CO}_2 \text{ Emissions}) [\text{tCO}_2/\text{year}] \\ - (\text{Project CO}_2 \text{ Emissions}) [\text{tCO}_2/\text{year}]$$

$$= ((\text{Reference Power Consumption}) [\text{MWh/year}] \\ - 0 [\text{MWh/year}]) \times \text{Emission Factor} [\text{tCO}_2/\text{MWh}]$$

Site of Project

Installation Site : Approx. 4km west of Palau International airport

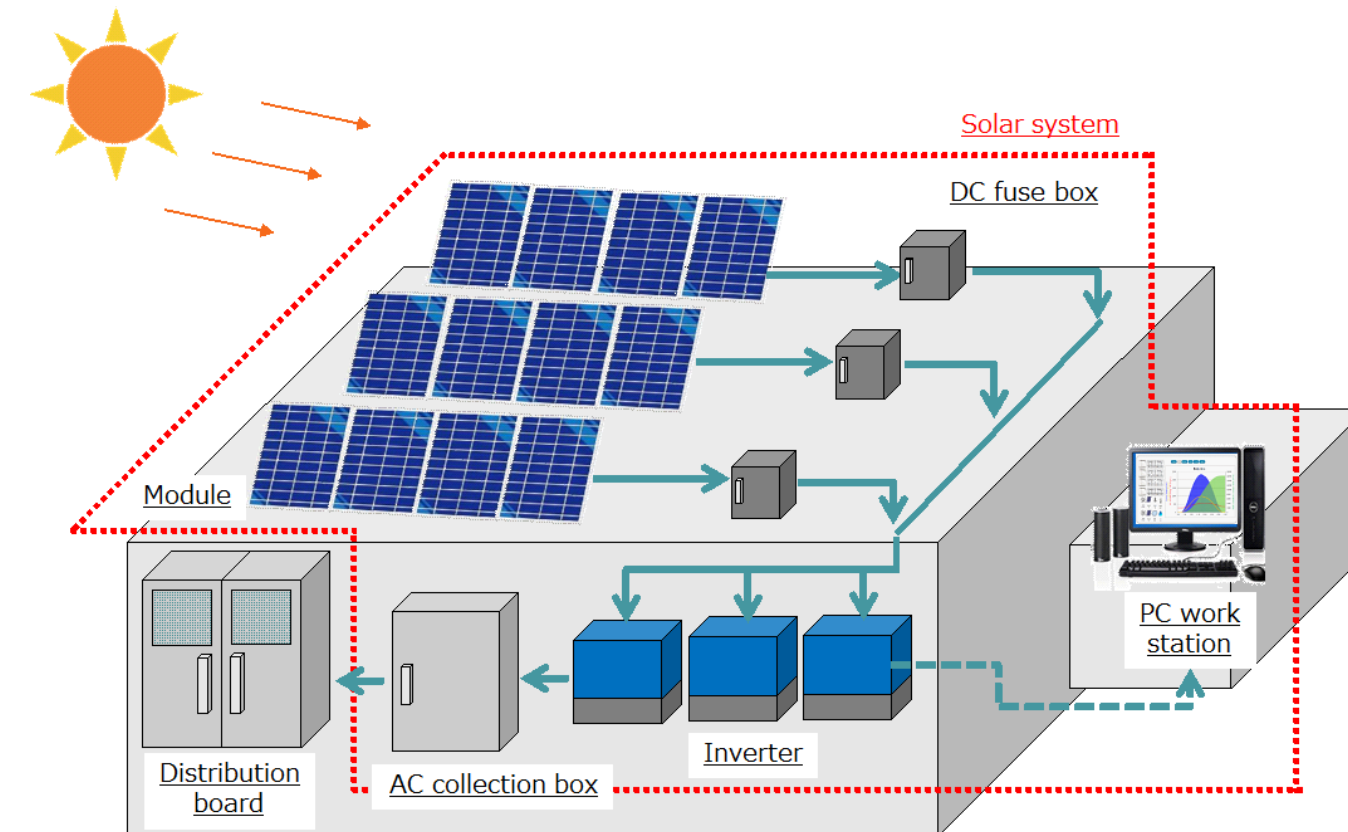


Introduction of 0.4MW Rooftop Solar Power System in Supermarket

PP (Japan): Sharp Energy Solutions Corporation PP (Palau): Western Caroline Trading Company, Inc. (WCTC)

Outline of GHG Mitigation Activity

Sharp and Western Caroline Trading Company, Inc. (WCTC) introduce a approx. 0.4MW rooftop PV system in Koror, Palau, for the self-consumption. This project contributes to Palau's renewable energy policies and the increase of renewable energy source in Palau.



Expected GHG Emission Reductions

284 tCO₂/year

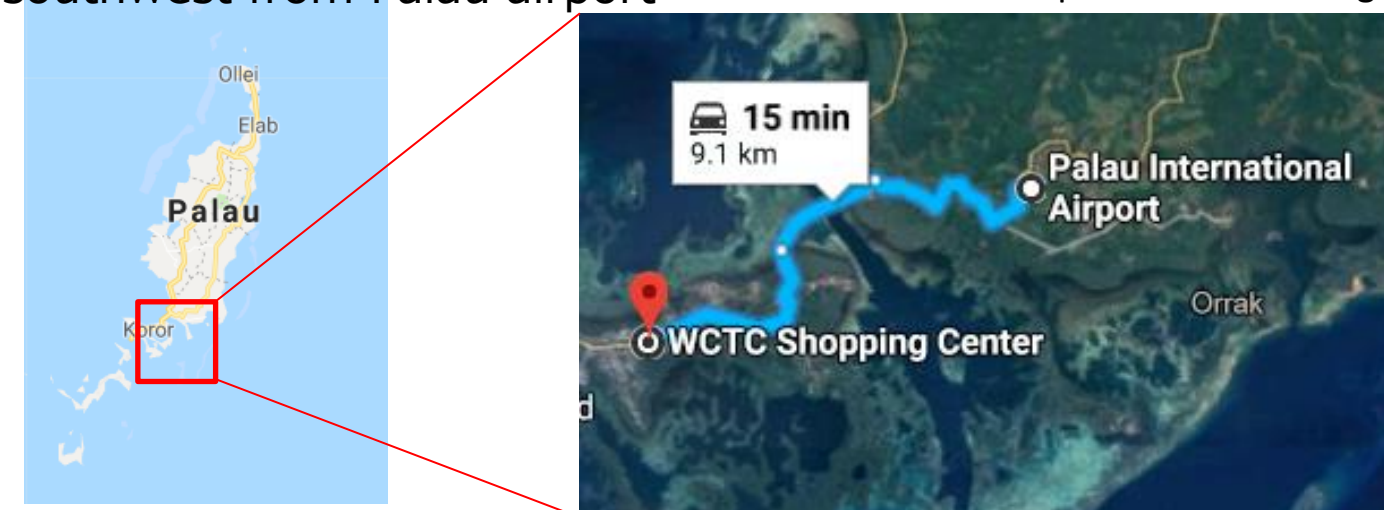
$$= (\text{Reference CO}_2 \text{ emissions}) [\text{tCO}_2/\text{year}] \\ - (\text{Project CO}_2 \text{ Emission}) [\text{tCO}_2/\text{year}]$$

$$= ((\text{Reference Power consumption}) [\text{MWh/year}] \\ - 0 [\text{MWh/year}]) \times \text{Emission Factor} [\text{tCO}_2/\text{MWh}]$$

Sites of Project

Installation Site : Supermarket in Koror City, Palau
5km southwest from Palau airport

Map Data ©2018Google



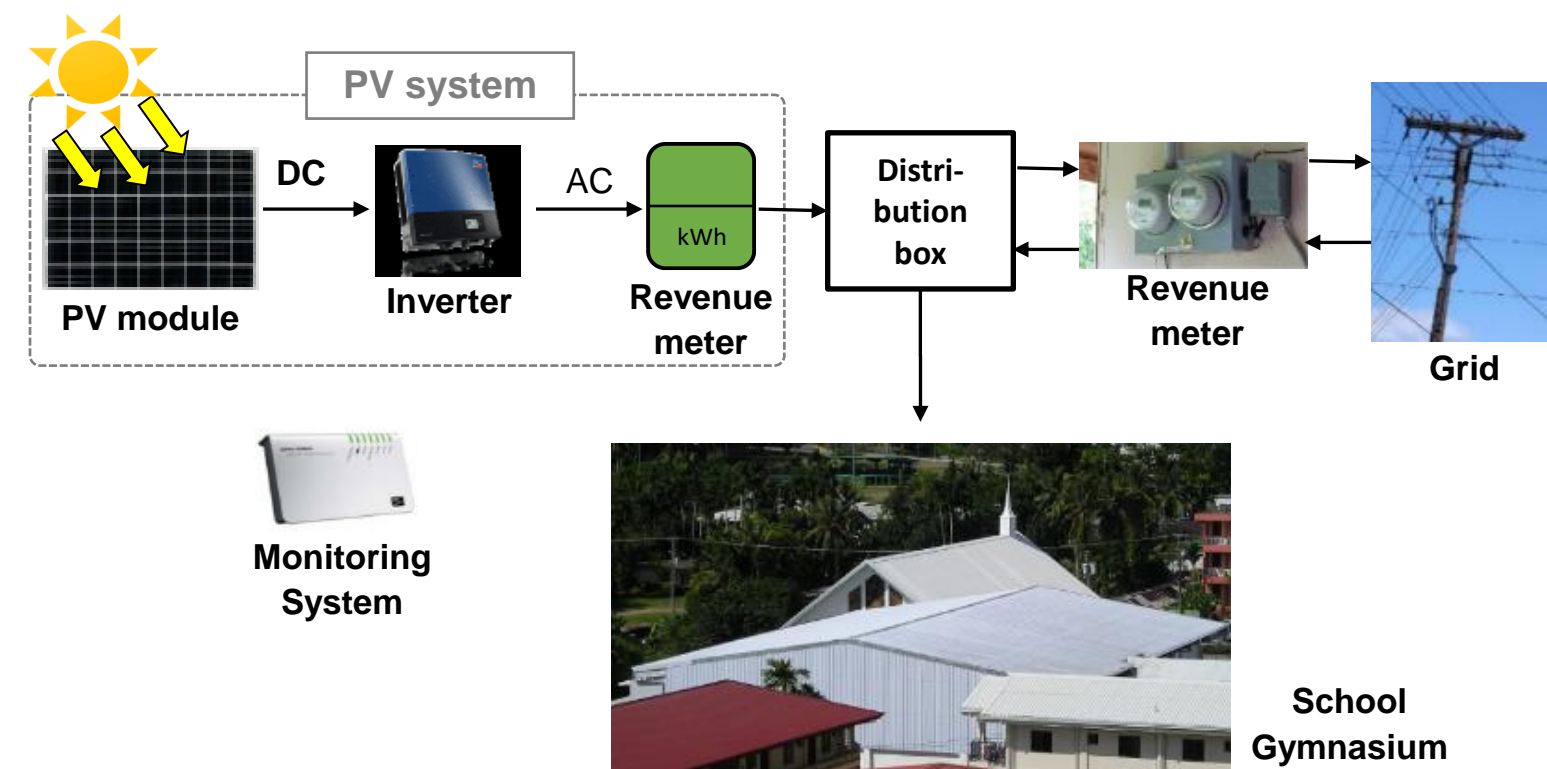
Solar PV System for Schools Project

PP (Japan) : Pacific Consultants Co., Ltd., InterAct Inc.

PP (Palau) : Palau Adventist Schools

Overview of GHG emissions reductions project

A grid-connected solar PV system will be installed at two sites. Palau Seventh-Day Adventist Elementary School (Site A) and Palau Mission Academy (Site B) shall have a 51.675kW and 103.350 kW system respectively. The generated power will mainly be self-consumed. On school holidays, the power will be fed into the grid using the net-metering scheme. A remote monitoring system to monitor the performance of the system will also be installed.



Estimated GHG emissions reductions

111 tCO₂/year

CO₂ emission reduction

= PV generation (a) × Reference emission factor (b)

= 209.36 MWh/year × 0.533 tCO₂/MWh

Financing Programme Project site



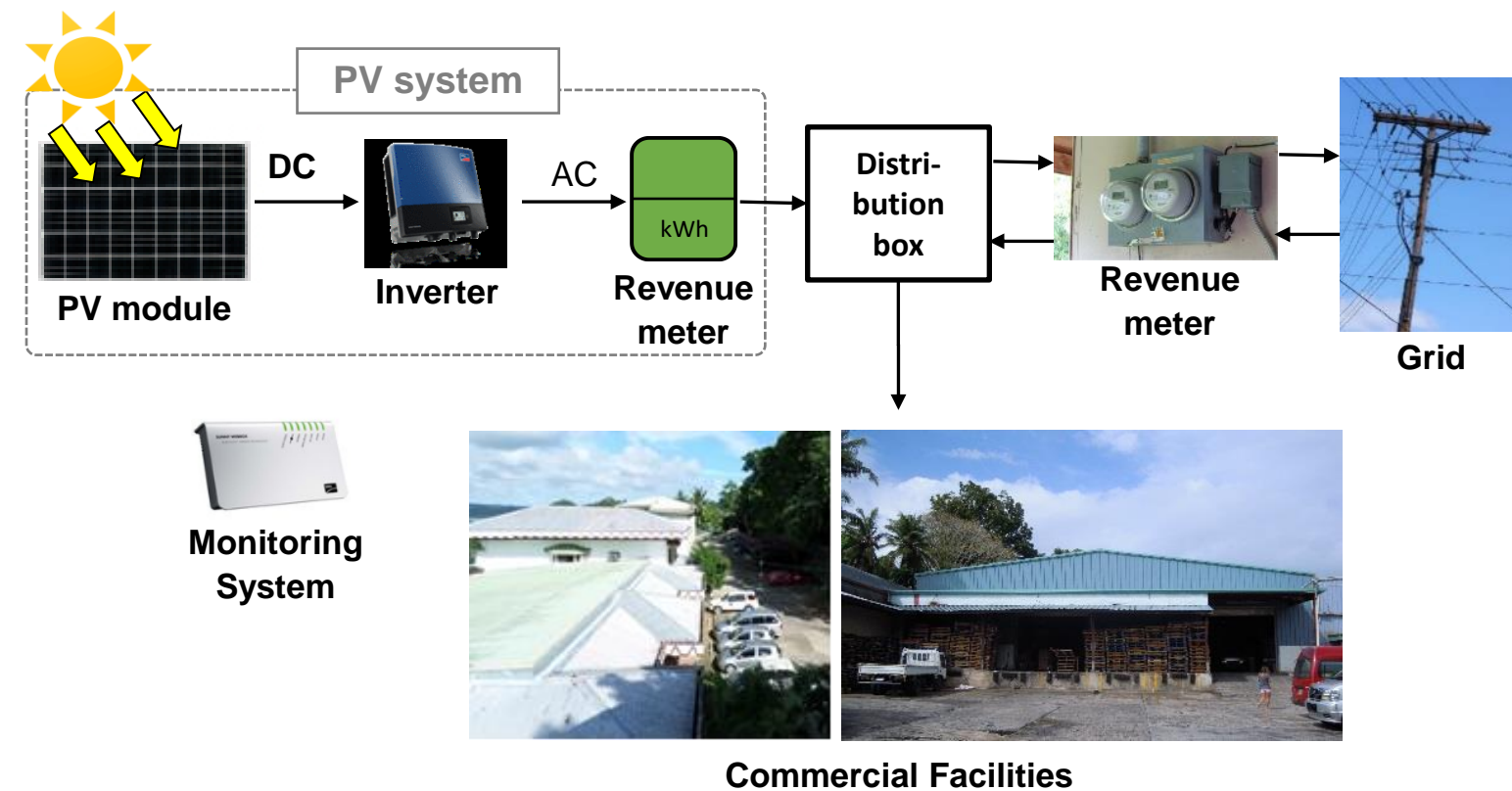
Small-Scale Solar Power Plants for Commercial Facilities Project II

PP (Japan): Pacific Consultants Co., Ltd., / InterAct Inc.

PP (Palau): Western Caroline Trading Company / NECO Yamaha Corporation / Palau Investment and Development Company

Overview of GHG emissions reductions project

A grid-connected solar PV system will be installed at three sites. Western Caroline Trading Company, NECO Yamaha Corporation and Palau Investment and Development Company shall install a 263.64 kW, 80.03 kW and 101.92 kW system respectively. The generated power will normally be self-consumed. On non-business days, the power will be fed into the grid using the net-metering scheme. A remote monitoring system to monitor the performance of the solar PV system will also be installed.

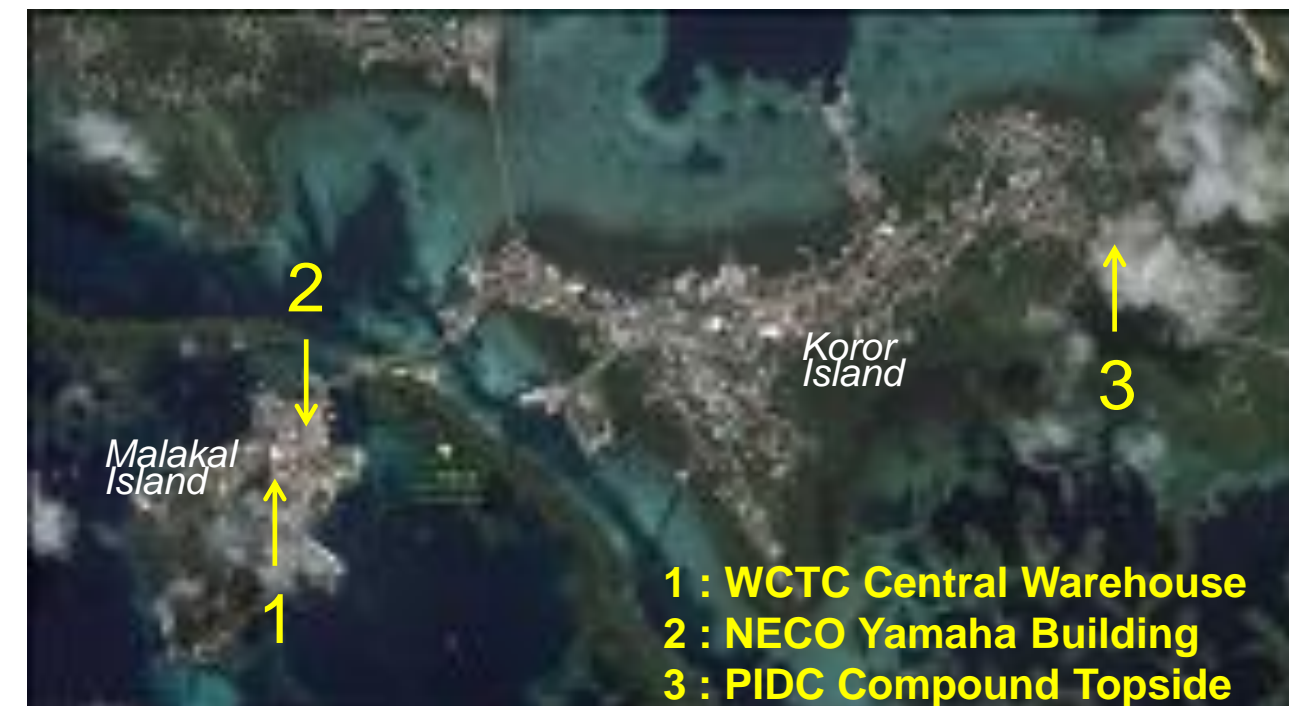


Estimated GHG emissions reductions

320 tCO₂/year

CO₂ emission reduction
 = PV generation (a) × Reference emission factor (b)
 = 601.77 MWh/year × 0.533 tCO₂/MWh

Financing Programme Project site



1 : WCTC Central Warehouse
 2 : NECO Yamaha Building
 3 : PIDC Compound Topside

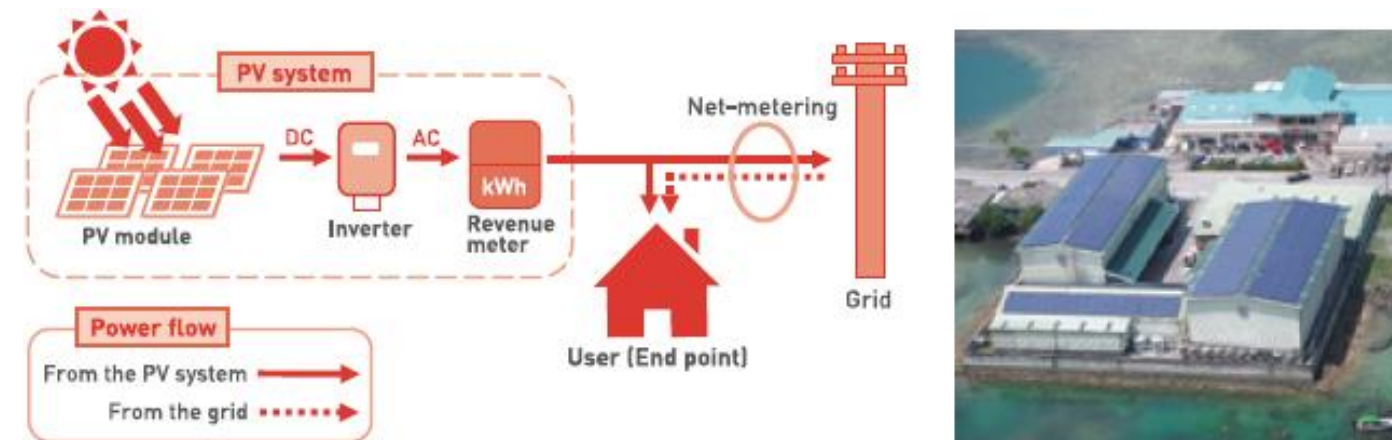
Small Scale Solar Power Plants for Commercial Facilities in Island States

PP (Japan): Pacific Consultants Co., Ltd., InterAct Inc.

PP(Palau) : Western Caroline Trading Company / Surangel and Sons Company / Melekau Environmental Consulting.

Outline of GHG Mitigation Activity

A grid-connected photovoltaic (PV) system is installed on the rooftops of commercial facilities (220.5kW on a warehouse in Subproject 1 and 150kW on a supercenter building in Subproject 2). This project uses high quality PV modules of a Japanese manufacturer and general-purpose inverters with easy maintenance suitable for small-scale applications. The power generated by the PV system is normally consumed in-house. When there is a surplus, it is supplied to grid. Taking into account the recent large typhoons, PV modules with strong wind resistance are introduced.



Expected GHG Reductions

259 tCO₂/year

Sites of JCM Model Project



Koror State, Palau