

Overview of the Financing Programme for JCM Model Projects

12th September 2019

Global Environment Centre Foundation (GEC)



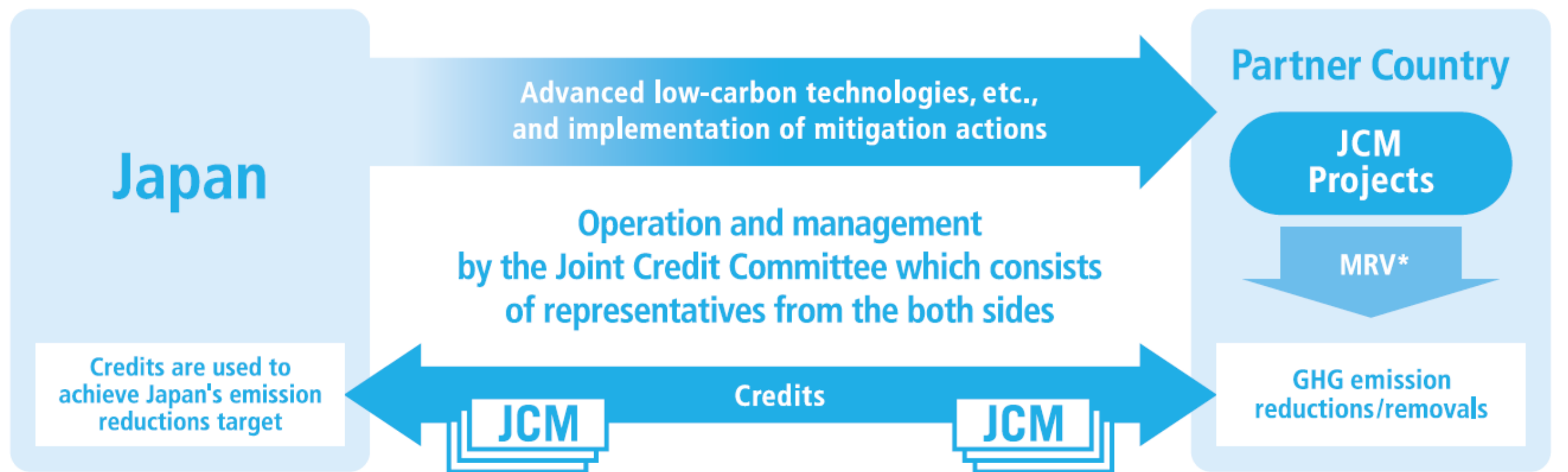
1. Basic concept of the JCM and Financing Programme
2. Guideline for Project Proposal
3. “JCM Global Match”
4. Outreach Activities of GEC

Appendix: 7 Projects in Thailand (2018 and 2019)

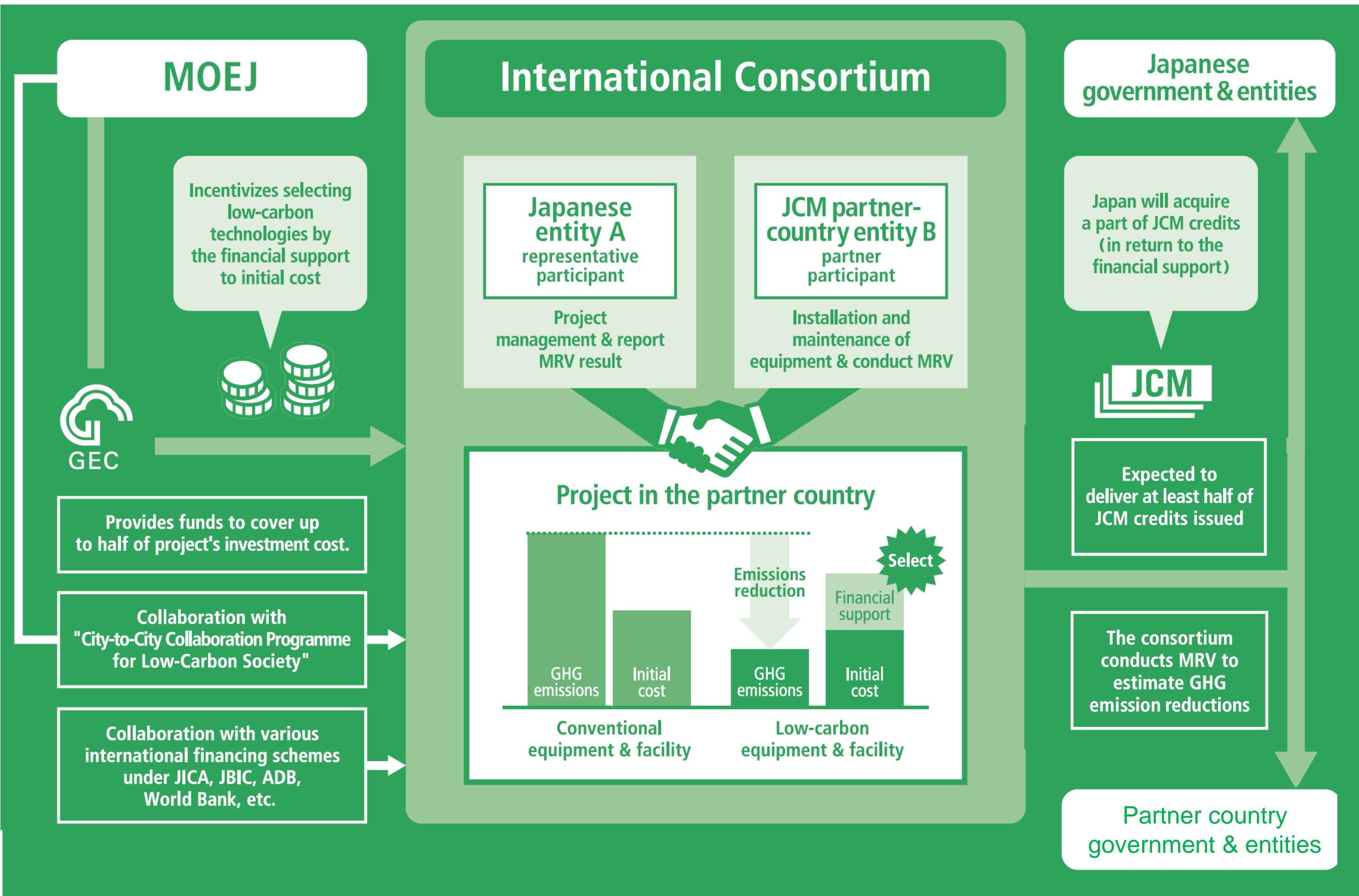
Facilitating diffusion of advanced low-carbon or decarbonizing technologies, products, system, services and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing country.

Appropriately evaluating contributions from Japan to GHG emission reductions or removals in a quantitative manner and use them to achieve Japan's emission reduction target.

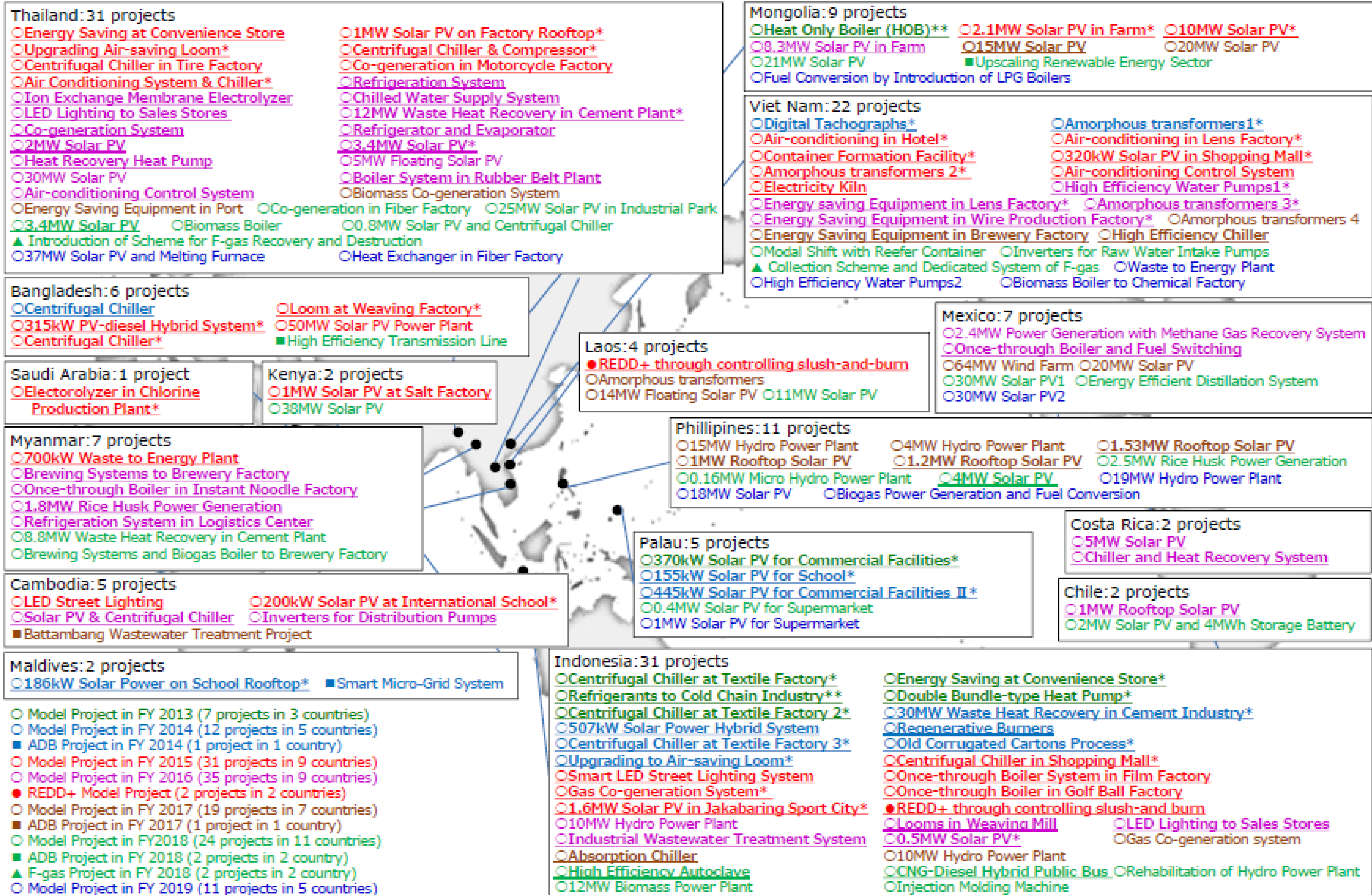
Contributing to the ultimate objective of the UNFCCC by facilitating global actions for GHG emission reductions or removals.



*measurement, reporting and verification



JCM Financing Programme (FY2013-2019), as of Sep 3, 2019



Total 147 projects in 16 partner countries

Underlined projects have started operation (93 projects)
Projects with * have been registered as JCM projects (44 projects)

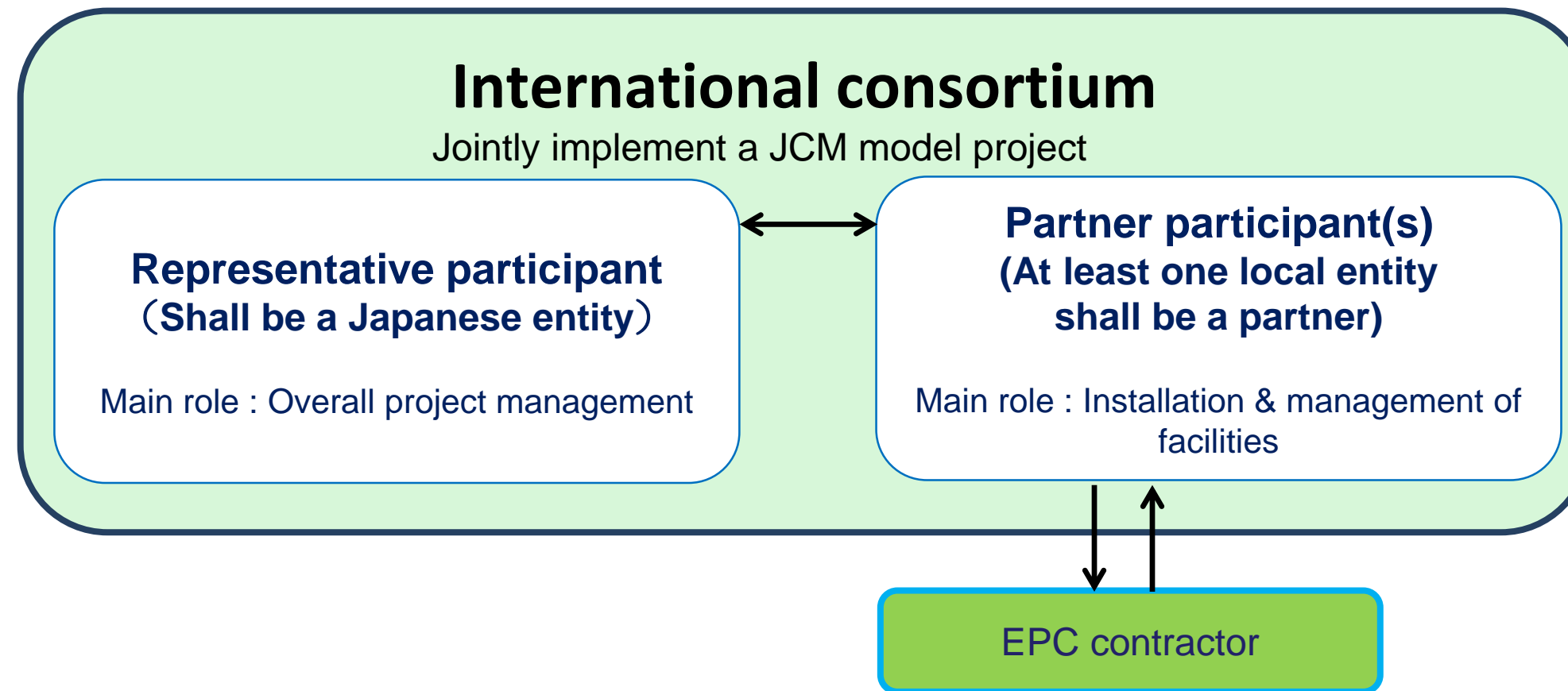
What kind of projects are supported by this financing programme?



- Reduce energy-related CO₂ emissions with leading low carbon 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.

Guideline

for Submitting
JCM model project proposal in FY2019



➤ Consortium must include both an owner and user of facility installed by the model project.

- (a) A representative participant of the model project shall be a Japanese entity of an international consortium.
- (b) A participant shall have capability for the implementation, such as technical capacity to appropriately implement the eligible project.
- (c) A participant shall have a financial basis to bear the costs necessary to appropriately implement the eligible project.
- (d) A participant shall have adequate management structures and handling capacity for accounting and other administrative work related to the eligible project;
- (e) A participant shall explain the contents, effect on GHG emission reductions, details of the cost, investment plan, etc. of the eligible project.

What kind of cost is covered & not covered by this programme?

✓ COVERED

- (a) Main construction work
- (b) Ancillary work
- (c) Machinery and appliances
- (d) Surveying and testing
- (e) Facilities/equipment (including monitoring equipment)
- (f) Administrative work; and
- (g) Other necessary costs approved by GEC

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

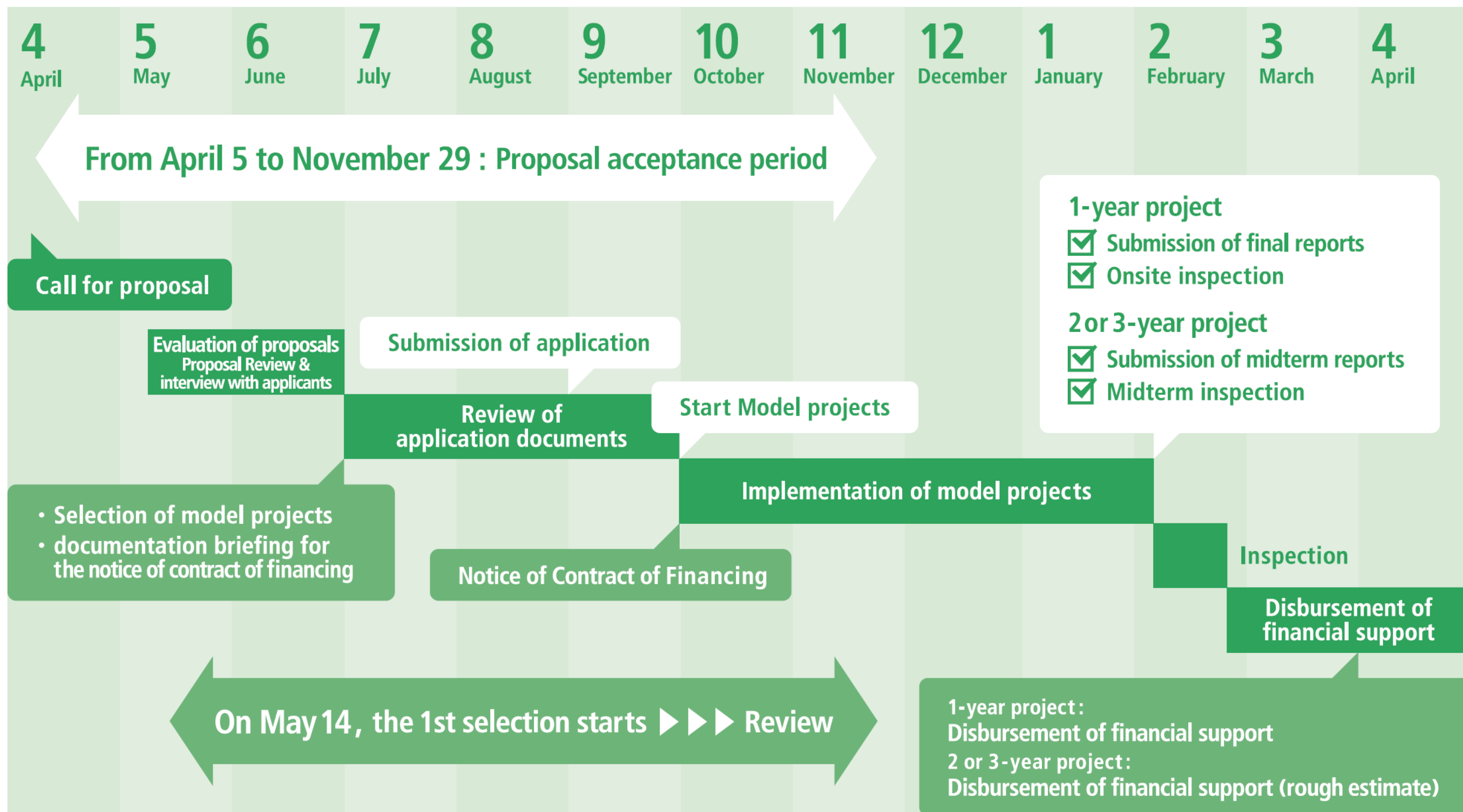
In case the number of PV JCM Model Projects by each country is 5 or more. (Mongolia and Thailand)

Budget	JPY9.9 billion (Approx. USD90million)	<div>Financial support per project</div> <div>From ¥50million to ¥2billion (approx.)</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 as well as construction cost for installing those facilities, etc.	
Eligible Projects	Start installation after the Contract of Finance is concluded and finish installation within 3 years.	
Maximum percentage of Financial Support	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.	
Cost-effectiveness	Cost-effectiveness of GHG emission reductions is expected to be JPY4,000/tCO2eq or better. ※ If the number of PV projects in a partner country is 5 or more, cost-effectiveness is expected to be JPY3,000/tCO2eq or better.	

Guideline

for Submitting
JCM model project proposal in FY2019

JCM Model Projects Schedule in FY2019



Guideline

for Submitting
JCM model project proposal in FY2019

New Technologies Selected in FY2018

Percentage of Financial Support : White 0 project = Up to 50%

Yellow 1-3 project(s) = Up to 40%

Orange more than 4 projects = Up to 30%

Technology	JCM Methodology	Mongolia	Bangladesh	Ethiopia	Kenya	Maldives	Viet Nam	Lao PDR	Indonesia	Costa Rica	Palau	Cambodia	Mexico	Saudi Arabia	Chile	Myanmar	Thailand	Philippine	Total
		MN	BD	ET	KE	MV	VN	LA	ID	CR	PW	KH	MX	SA	CL	MM	TH	PH	
System	VN_AM006, ID_AM004						2		1								1		4
Chiller	BD_AM001, VN_AM011, ID_AM002, CR_AM002, TH_AM003, TH_AM005		2				3		4	1		1					3		14
Refrigerator	ID_AM003, TH_AM008								1							2	4		7
Absorption Chiller Using Waste Heat									2								2		4
Swirling Induction Type Air-conditioning System	TH_AM006																1		1
Double Bundle-type Heat Pump	VN_AM012, ID_AM010						1		1								1		3
Fridge and Freezer Showcase	ID_AM008								1								1		2
Boiler	MN_AM002, ID_AM015	1					1		2				1			2	1		8
Water Heater Using Waste Heat	CR_AM003									1									1
Waste Heat Recovery System																2	1		3
	VN_AM005, LA_AM003						4	1											5
	ID_AM005								2								2		4
Lighting with	ID_AM018, KH_AM001								1			1							2
	VN_AM013						1												1
	TH_AM002						1										1		2
									1										1
Burners	ID_AM009								1										1
Space	VN_AM010						1												1
Conditioning Control System							1										1		2
Frequency Converter for Pump							1					1							2
Loom	BD_AM003, ID_AM011, TH_AM004		1						2								1		4
Old Corrugated Cartons Process	ID_AM012								1										1
Forming Device	VN_AM009						1												1
Chlorine	SA_AM001													1			1		2
g Machines	VN_AM014						1												1
entry crane																	1		1
Forklift																	1		1
Autoclave									1										1
Multi-effect Distillation System													1						1
Injection Molding Machine									1										1
Solar Power Plant	MN_AM003, BD_AM002, KE_AM002, MV_AM001, VN_AM007, LA_AM002, ID_AM013, CR_AM001, PW_AM001, KH_AM002, MX_AM001, CL_AM001, TH_AM001	6	2		2	1	1	2	2	1	4	2	2		1		9	4	39
Plant with Battery	ID_AM017								1						1				2
Power Plant	KE_AM003								3									3	6
Plant													1						1
er Plant									1							1		1	3
																	1		1
eneration	ET_AM003			1												1			2
Power Generation by Waste Heat Recovery	ID_AM001, TH_AM007								1							1	1		3
Gas Co-generation	ID_AM016, TH_AM009								2								3		5
Waste-to-Energy Plant	MM_AM001															1			1
Power Generation by Methane Recovery													1						1

Autoclave
Multi-effect Distillation System
Injection Molding Machine

Biogas Boiler

Reefer Container
CNG-Diesel Hybrid Bus

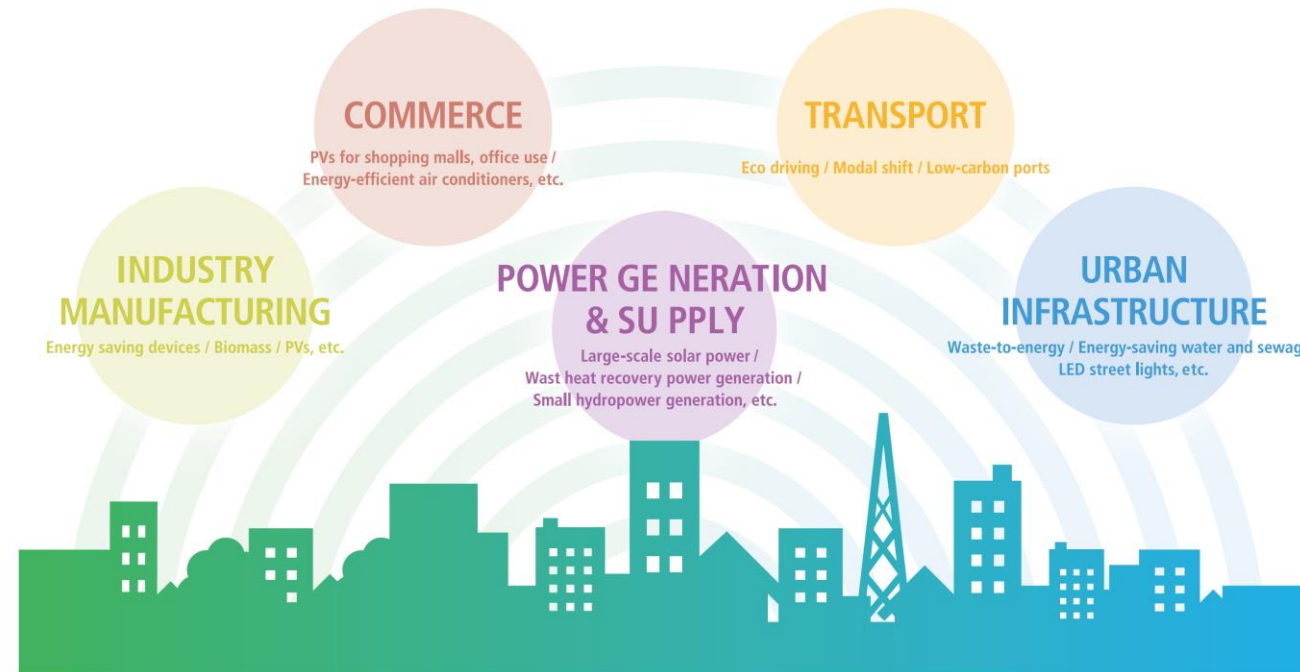
- 1 Thailand / FAST RETAILING CO., LTD.
High Efficiency LED Lighting
- 2 Cambodia / AEON MALL Co., Ltd.
Solar Power System and High Efficiency Centrifugal Chiller
- 1 Bangladesh / Ebara Refrigeration Equipment & Systems Co., Ltd.
High Efficiency Centrifugal Chiller
- 2 Mexico / Suntory Spirits Limited
Once-through Boiler and Fuel Switching



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



INDUSTRY



Accelerating International Promotion of Infrastructure through JCM

Along with the Overseas Development Strategy (Environment) compiled by Cabinet Office, Government of Japan in June 2018, the JCM model project aims to contribute to global GHG emission reductions, through the diffusion of leading low carbon or decarbonizing technologies.

POWER GENERATION AND SUPPLY

TRANSPORT

URBAN INFRASTRUCTURE



- 3 Indonesia / Environmental Management and Technology Center
Energy Saving in Industrial Wastewater Treatment System
- 4 Myanmar / Kirin Holdings Company, Limited.
Energy Saving Brewing Systems
- 1 Thailand / TSB Co., Ltd.
Floating Solar Power System
- 2 Mexico / NTT DATA INSTITUTE OF MANAGEMENT CONSULTING, Inc.
Power Generation with Methane Gas Recovery System



- 1 Viet Nam / Yuko Keiso Co., Ltd.
Amorphous High Efficiency Transformers in power grid
- 2 Viet Nam / Yokohama Water Co., Ltd.
High Efficiency Water Pumps
- 3 Myanmar / JFE Engineering Corporation
Waste to Energy Plant in Yangon City
- 3 Myanmar / Fujita Corporation
Rice Husk Power Generation

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



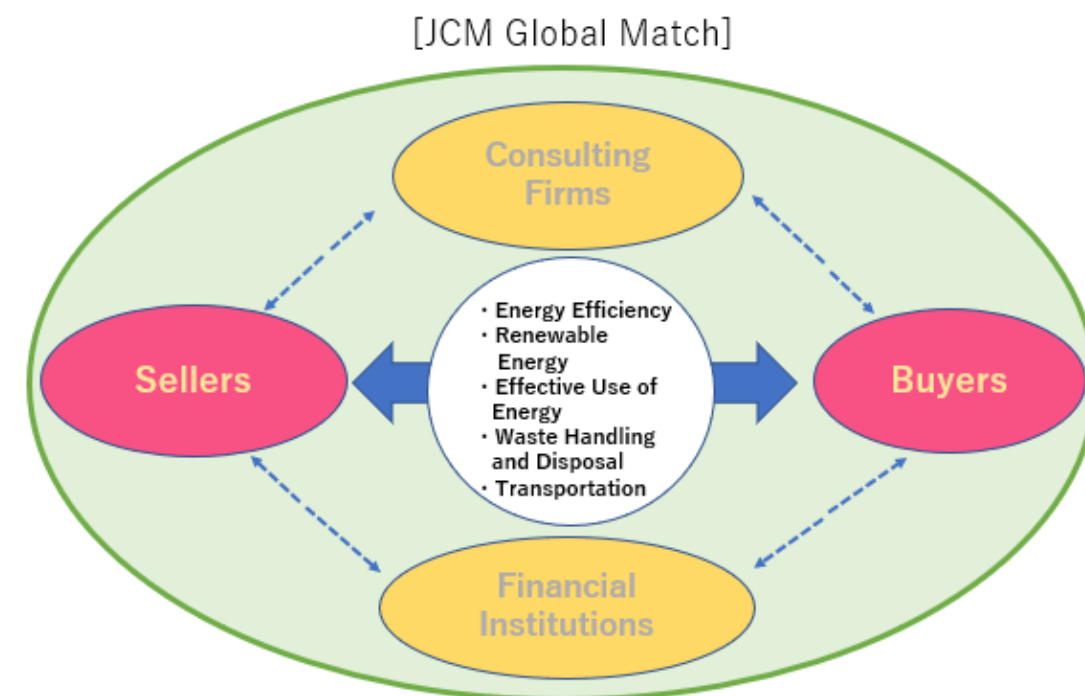
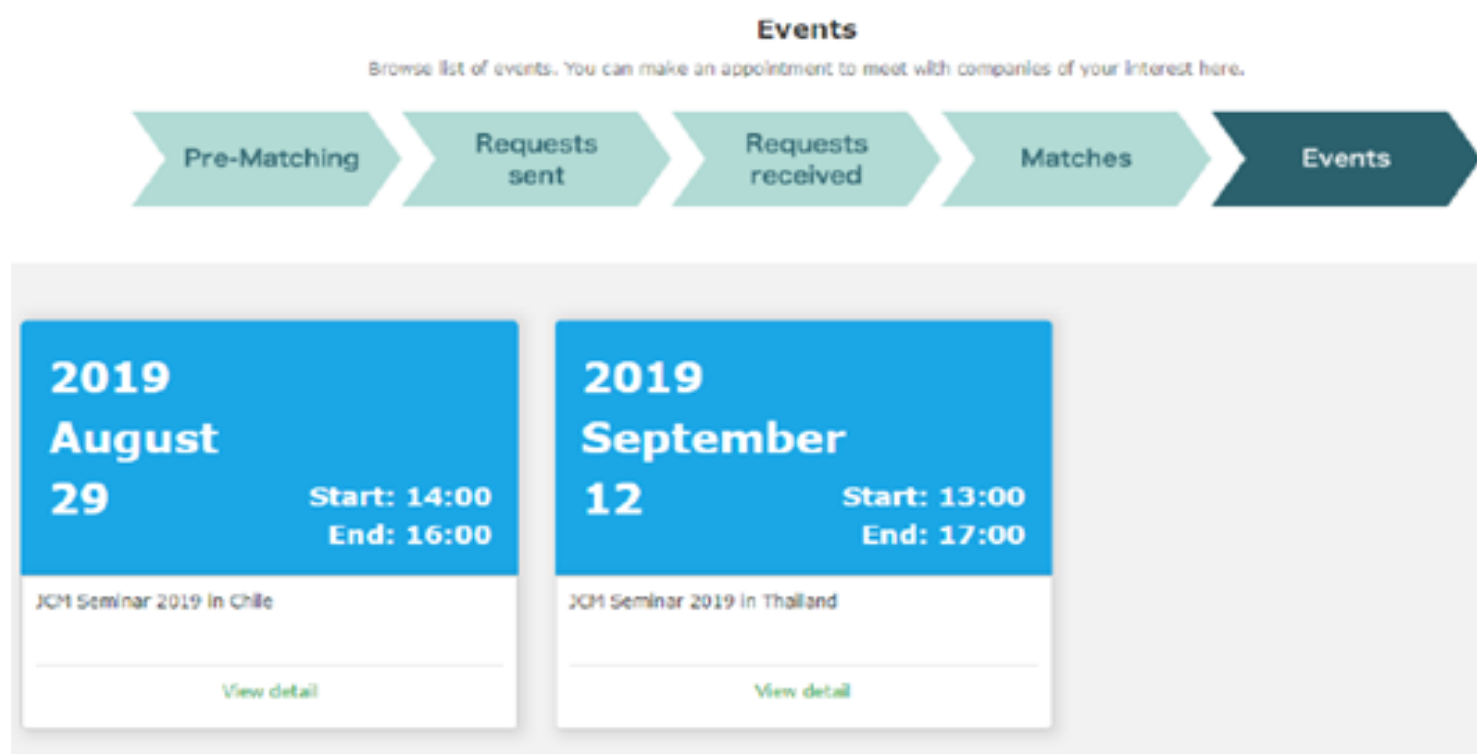
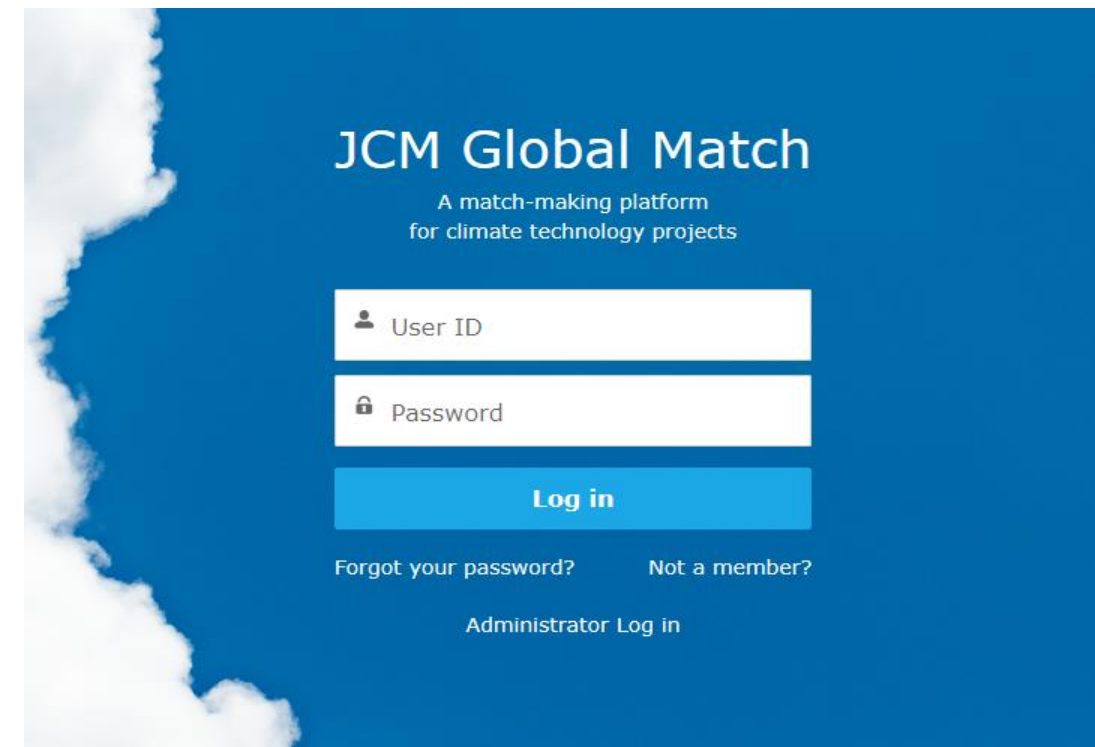
QR code to see the website

◆Objectives

- To facilitate project formation of the JCM
- To provide means to find project partners

◆Features

- Automated match-making website
- Web-based registration for future meetings
- Supported by financial institutions and consulting firms



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.



Outreach Activities of GEC

- GEC website on JCM
<http://gec.jp/jcm/>
- GEC's JCM Twitter
https://twitter.com/GEC_JCM_Info
- JCM Seminar

ขอบคุณ !

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List of JCM Model Projects Selected in 2018 - 2019



Year	Partner Country	Entity	Project Title	Sector	Expected GHG Emission Reductions (tCO2/y)
2018	Thailand	The Kansai Electric Power Company, Incorporated	Introduction of Gas Co-generation System and Absorption Chiller to Fiber Factory	Energy Efficiency Improvement/ Effective Use of Energy	17,851
2018	Thailand	Tokyo Century Corporation	25MW Rooftop and Floating Solar Power Project in Industrial Park	Renewable Energy	10,678
2018	Thailand	Toyota Motor Corporation	Introduction of 3.4 MW Rooftop Solar Power System in Technical Center and Office Buildings	Renewable Energy	1,617
2018	Thailand	TEPIA Corporation Japan Co.,Ltd.	Introduction of Biomass Boiler to Cooking Oil Factory	Renewable Energy	29,759
2018	Thailand	Kanematsu KGK Corp.	Introduction of 0.8MW Solar Power System and High Efficiency Refrigerator to Food Factory	Energy Efficiency Improvement/ Renewable Energy	489
2019	Thailand	Toyota Motor Corporation	Introduction of 37 MW Solar Power System and High Efficiency Melting Furnace in Vehicle & Engine Factory	Energy Efficiency Improvement/ Renewable Energy	19,483
2019	Thailand	NIPPON STEEL ENGINEERING CO., LTD.	Efficiency Improvement of Co-generation System by Installation of Heat Exchanger in Fiber Factory	Energy Efficiency Improvement	359

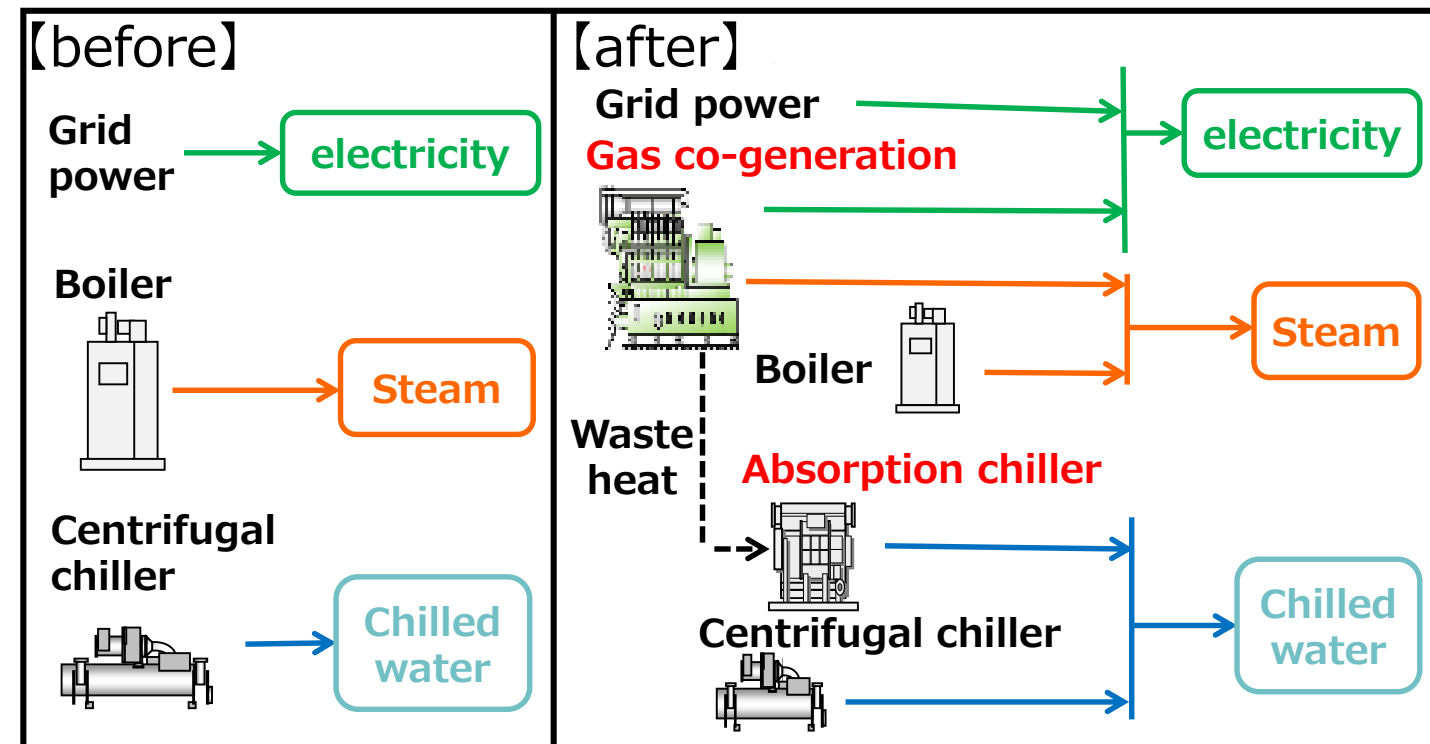
Introduction of Gas Co-generation System and Absorption Chiller to Fiber Factory

PP (Japan): Kansai Electric Power Co., Inc., PP (Thailand): Kansai Energy Solutions (Thailand) Co., Ltd

Outline of GHG Mitigation Activity

This project reduces CO₂ emissions by introducing gas co-generation system (5 MW class x 2set) and absorption chiller (800 USRT class) to fiber factory.

These gas co-generation system and absorption chiller contribute to energy saving and cost reduction, and can improve reliability for power supply.



Expected GHG Emission Reductions

17,851 t CO₂ / year

= ①Reference emissions – ②Project emissions

①Reference emissions = (Project electricity supply × CO₂ emission factor of the grid) + (Project heat supply ÷ efficiency of reference boiler × CO₂ emission factor of natural gas) + (Project removed heat ÷ COP of reference centrifugal chiller × CO₂ emission factor of the grid)

②Project emissions = Project fuel consumption × CO₂ emission factor of natural gas

Sites of Project

Bangpa-in Industrial Estate, Bangpa-in, Ayutthaya 13160, Thailand

60km north from Bangkok



25MW Rooftop and Floating Solar Power Project in Industrial Park

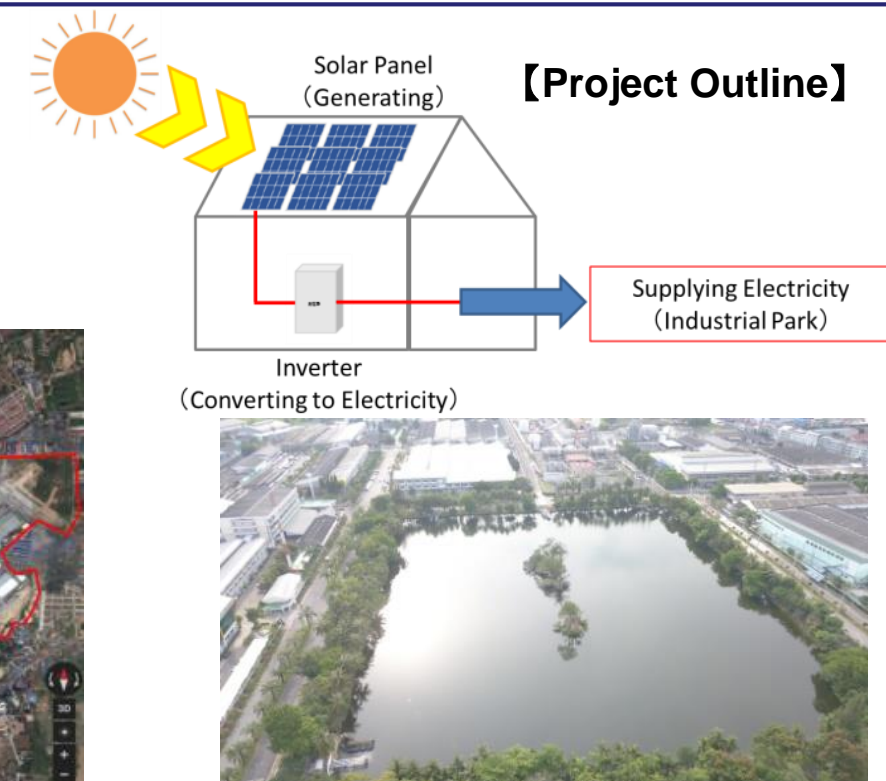
PP (Japan): Tokyo Century Corporation, PP (Thailand): Tisco Tokyo Leasing Co., Ltd., Impact Solar Limited

Outline of GHG Mitigation Activity

This project is to install PV systems by lease financing on the rooftops of the factories and the reservoir in an industrial park operated by a conglomerate in Thailand. The project will consequently contribute to GHG reduction by the use of renewable energy sources.



【Industrial Park】



【Reservoir】

Expected GHG Emission Reductions

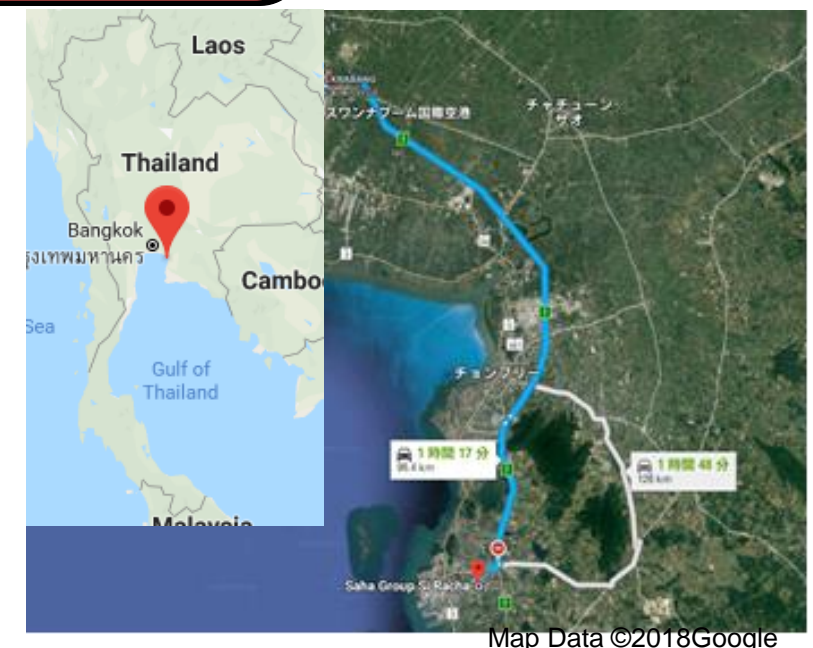
10,678 tCO2/年

= (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

▪ Approx. 100km from Suvarnabhumi International Airport.



Introduction of 3.4 MW Rooftop Solar Power System in Technical Center and Office Buildings

PP (Japan) : Toyota Motor Corporation , PP (Thailand): Toyota Daihatsu Engineering & Manufacturing Co., Ltd.

Outline of GHG Mitigation Activity

This project aims the reduction of CO₂ emission by installing 3.4 MW solar power system on the rooftop of the technical center and office building of Toyota Daihatsu Engineering & Manufacturing Co., Ltd. located in Samutprakarn in eastern Bangkok.

Electricity generated by solar power system is consumed in-house and replaces part of grid electricity consumption.



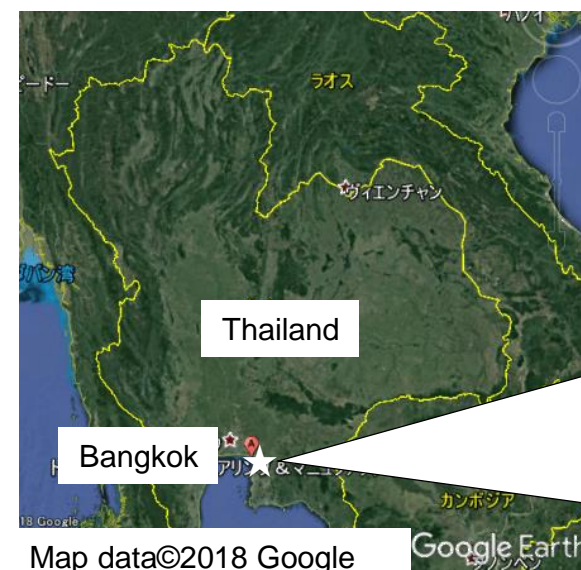
Expected GHG Emission Reductions

1,617 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



Approx. 45 km east from Bangkok central



Introduction of Biomass Boiler to Cooking Oil Factory

PP (Japan): Tepia Corporation Japan Co., Ltd. PP (Thailand): Thanakorn Vegetable Oil Products Co., Ltd.

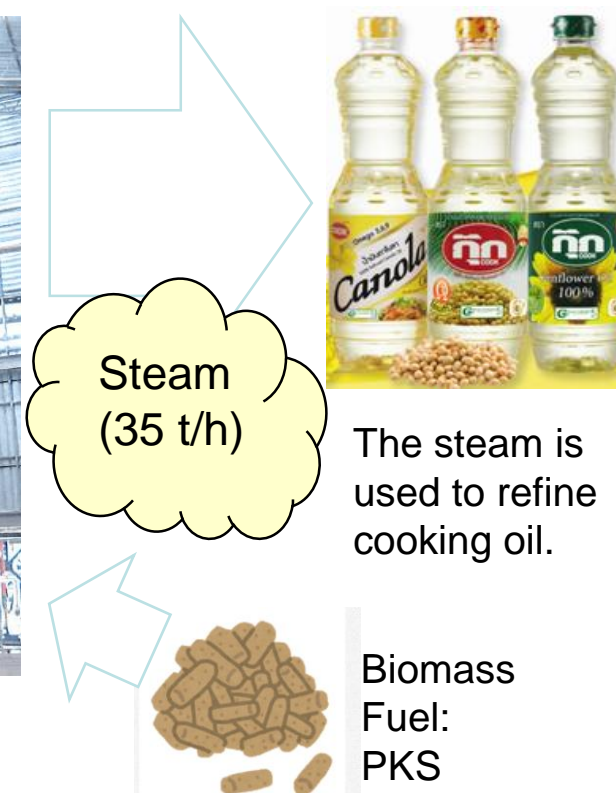
Outline of GHG Mitigation Activity

A biomass boiler with the steam production capacity of 35 tons per hour is installed to a cooking oil factory in Samut Prakan Province. The steam is used in the oil production process.

Palm Kernel Shell (PKS) is used as its biomass fuel, and PKS is procured from multiple suppliers so as to secure the stability of steam production.



Multi Fuel Biomass Boiler
(Water Tube-Fire Tube Combination Boiler
with Step Grate)



Expected GHG Emission Reductions

29,759 tCO₂/year

= Reference CO₂ emissions (Ry) [tCO₂/year]

- Project CO₂ Emission (Py) [tCO₂/year]

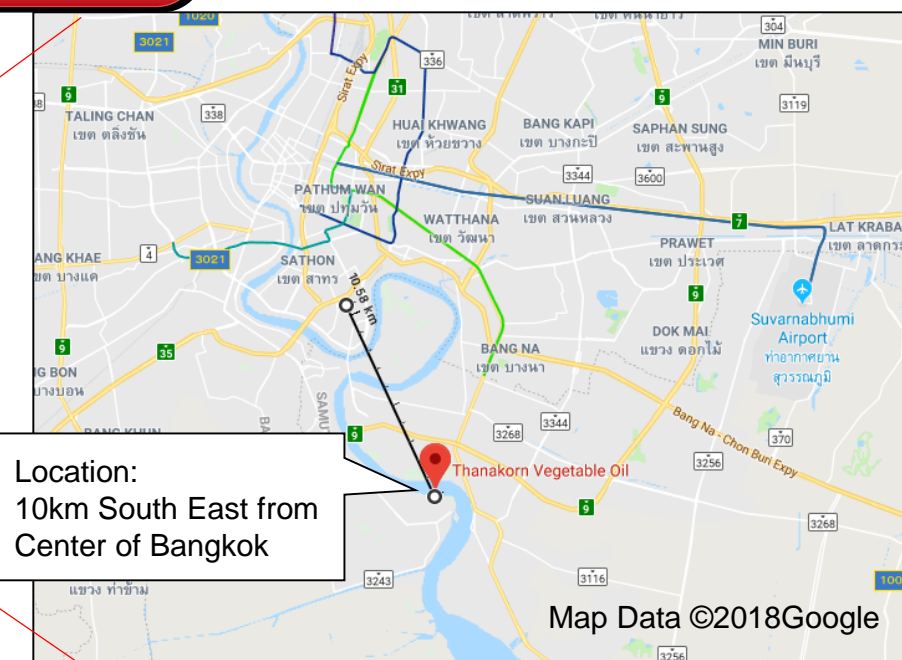
Ry = Reference fuel consumption (RQfy) [t/year]

* Emission Factor (furf) [tCO₂/t] + Reference Power consumption (Rqey) [MWh/year] * Emission Factor (gef) [tCO₂/MWh]

Py = Project fuel consumption (PQfy) [t/year]

* Emission Factor (fupf) [tCO₂/t] + Project Power consumption (Pqey) [MWh/year] * Emission Factor (gef) [tCO₂/MWh]

Sites of Project



Location:
10km South East from
Center of Bangkok

Map Data ©2018Google

Introduction of 0.8MW Solar Power System and High Efficiency Refrigerator to Food Factory
 PP (Japan): Kanematsu KGK Corp, PP (Thailand): THAI DELMAR CO.,LTD

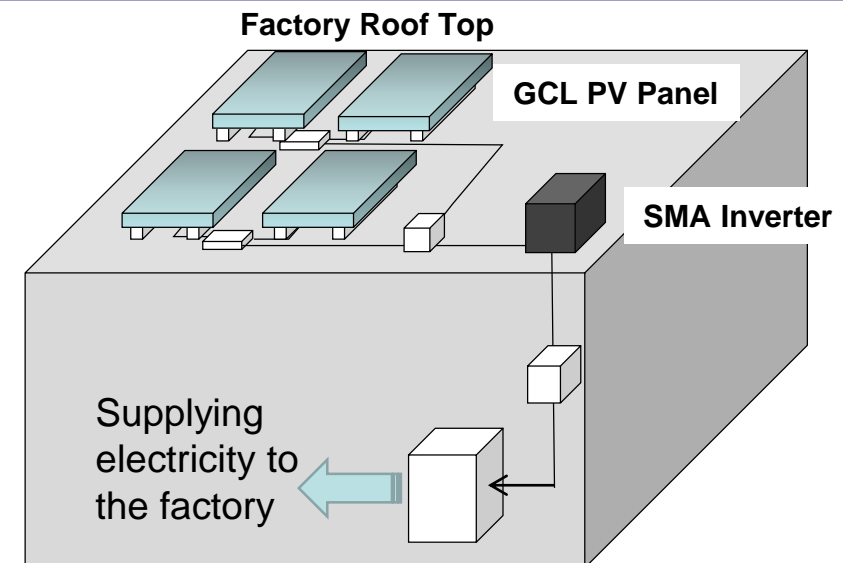
Outline of GHG Mitigation Activity

THAI DELMAR CO.,LTD constructs their new food factory in the Asia Industrial Estate in Thailand.

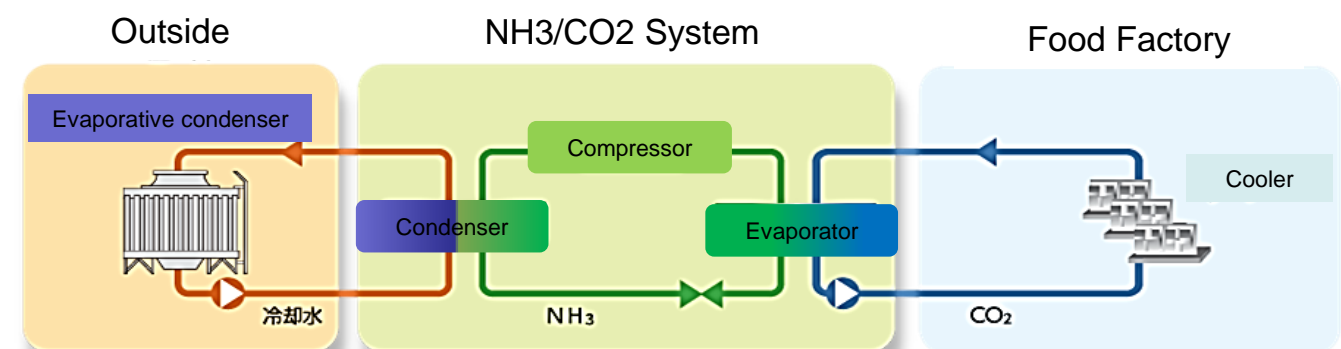
By installing a 0.8MW Solar Power System, this project reduces grid power consumption and CO₂ emission.

By installing a high efficiency refrigerator using NH₃ as primary and CO₂ as secondary refrigerant, this project reduces power consumption and CO₂ emission.

Solar Power System



High Efficiency Refrigerator (Manufactured by MAYEKAWA MFG. Co., Ltd.)



Expected GHG Emission Reductions

489 t-CO₂ /year

Solar Power: 349t-CO₂/year

= ((Reference Power consumption) [MWh/year]
 - 0 [MWh/year]) × Emission Factor [tCO₂/MWh]

High Efficiency Refrigerator: 132t-CO₂/year

= (Reference CO₂ emissions) [tCO₂/year]
 - (Project CO₂ Emission) [tCO₂/year]

Sites of Project



Map Data ©2019Google

Introduction of 37 MW Solar Power System and High Efficiency Melting Furnace in Vehicle & Engine Factory

PP(Japan) Toyota Motor Corporation,

PP(Thailand) Toyota Motor Thailand Co., Ltd. , Siam Toyota Manufacturing co., Ltd. , Toyota Daihatsu Engineering & Manufacturing Co., Ltd.

Outline of GHG Mitigation Activity

This project aims the reduction of CO₂ emission by installing 37 MW solar power system on the rooftop of the vehicle factory of Toyota Motor Thailand Co., Ltd. (TMT) located in Samutprakarn & Chachoengsao and engine factory of Siam Toyota Manufacturing co., Ltd. (STM) located in Chonburi in eastern Bangkok. Electricity generated by solar power system is consumed in-house and replaces part of grid electricity consumption.

CO₂ emissions are also reduced by replacing the existing melting furnace in STM with a high efficient medium-frequency induction melting furnace.



Expected GHG Emission Reductions

19,483 tCO₂/year

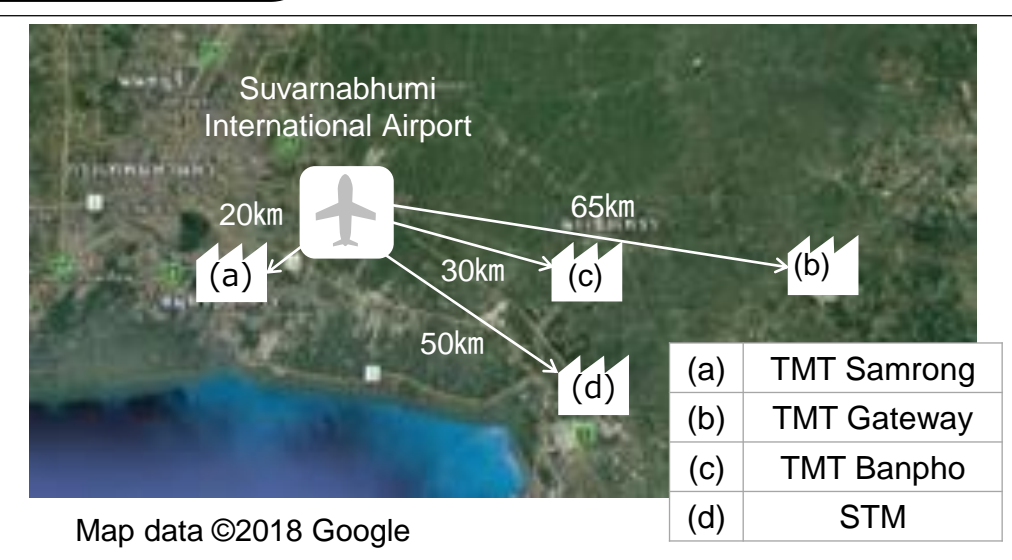
Solar system: 16,858 tCO₂/year

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

High efficiency melting furnace: 2,625 tCO₂/year

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

Sites of Project



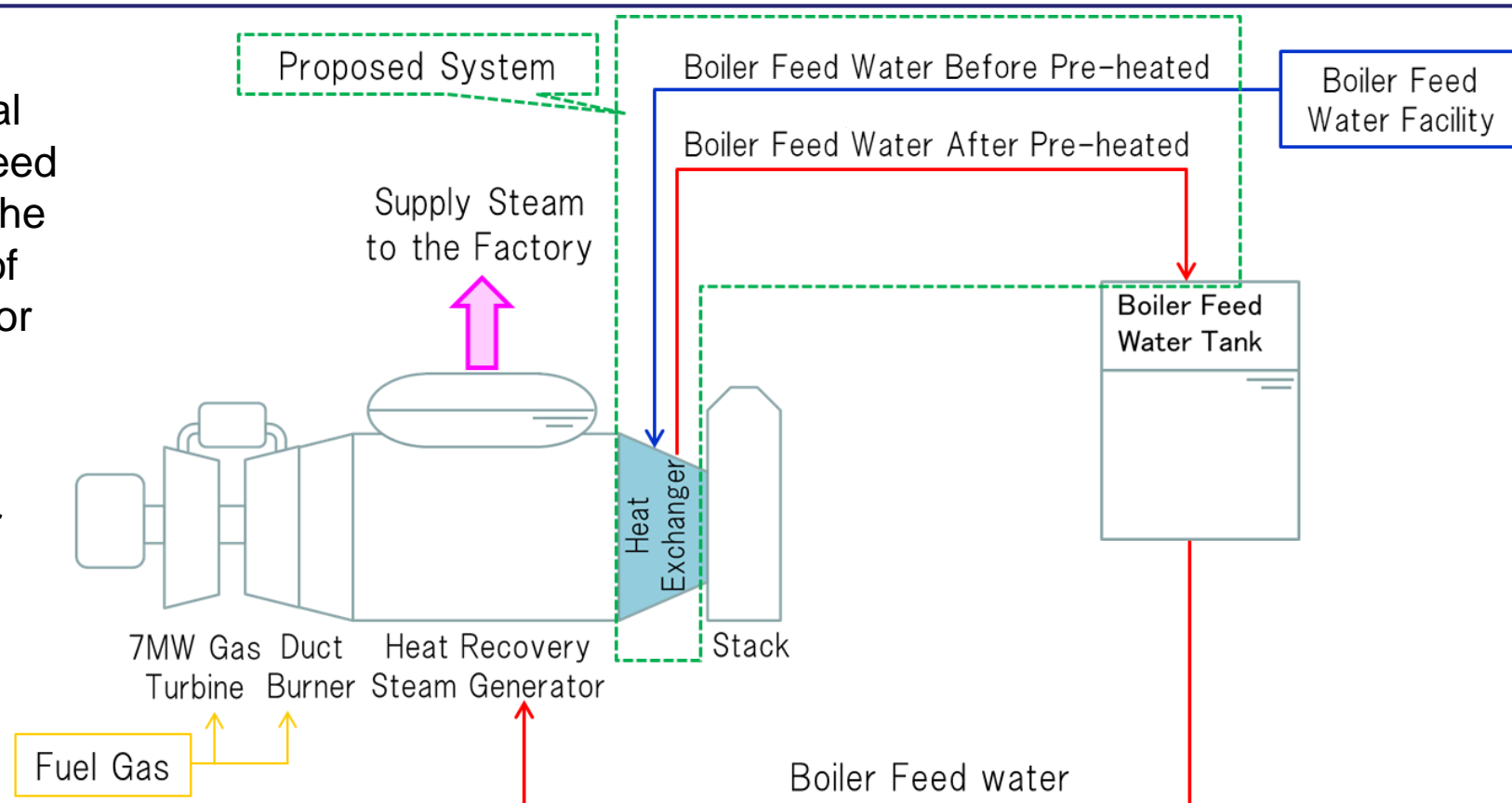
Efficiency Improvement of Co-generation System by Installation of Heat Exchanger in Fiber Factory

PP (Japan): Nippon Steel Engineering Co., Ltd., PP (Thailand): NS-OG Energy Solutions (Thailand) Ltd.

Outline of GHG Mitigation Activity

This project aims to efficiently utilize unused thermal energy of the co-generation system to heat boiler feed water. A heat exchanger is additionally installed to the existing co-generation system which is composed of 7MW gas turbine and heat recovery steam generator equipped with duct burner.

Natural gas fuel used for duct burner is reduced by approx. 4%, by increasing the temperature of boiler feed water by approx. 20 degree Celsius.



Expected GHG Emission Reductions

359tCO₂/year

GHG Emission Reductions =
Reference CO₂ Emission - Project CO₂ Emission

Reference CO₂ Emission = [(BFW* temp. after heat recovery) - (BFW temp. before heat recovery)] × (BFW amount) × (Specific heat of water) / (Boiler efficiency) × (CO₂ emission coefficient of fuel)

Project CO₂ Emission = 0

*BFW: Boiler Feed Water

Project site

- Project site is located in Samutprakan province, adjacent to Bangkok.
- Project site is located 30 km south from Suvarnabhumi International Airport.

