Overview of the Financing Programme for JCM Model Projects

3th October 2019
(Ulaanbaatar in Mongolia)

Satoru TANGO

Global Environment Centre Foundation (GEC)

Agenda

1. Basic concept of the JCM and Financing Programme

2. Guideline for Project Proposal

Appendix:

- 8 Projects in Mongolia (2013 ~ 2019)
- 11 Projects in 2019 (First selection results)

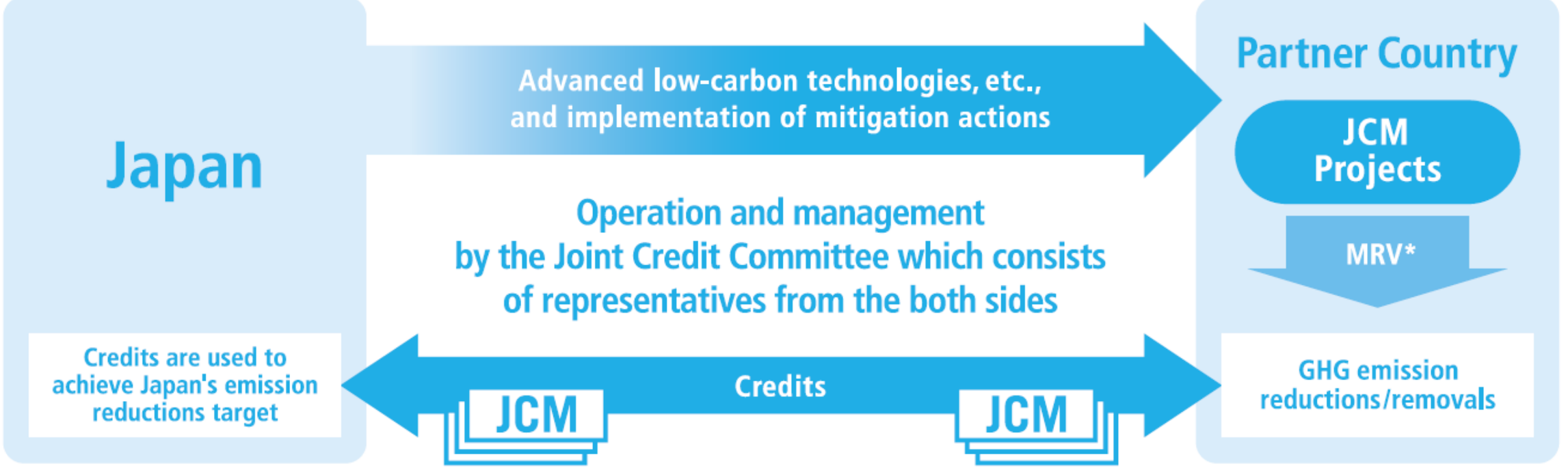
Basic concept of the JCM Model Projects

Global Environment Centre Foundation

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

Basic concept of the JCM Model Projects (2)

Global Environment Centre Foundation

MOEJ

Incentivizes selecting low-carbon technologies by the financial support to initial cost

GEC

Provides funds to cover up to half of project's investment cost.

Collaboration with "City-to-City Collaboration Programme for Low-Carbon Society"

Collaboration with various international financing schemes under JICA, JBIC, ADB, World Bank, etc.

International Consortium

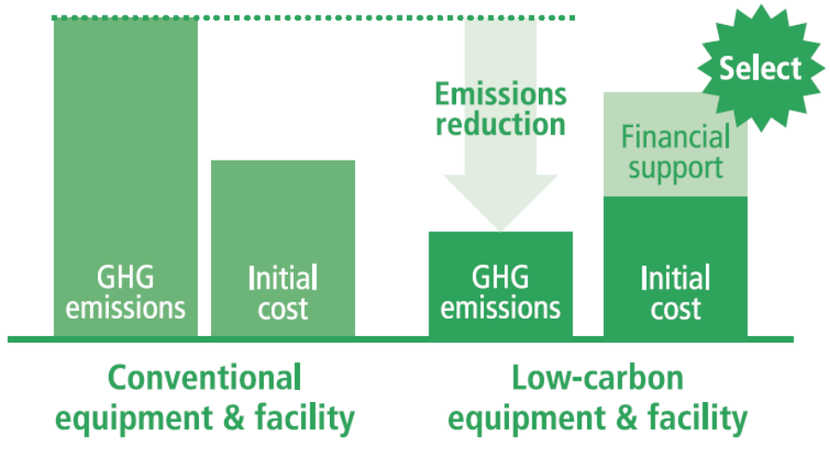
Japanese entity A
representative participant

Project management & report MRV result

JCM partner-country entity B
partner participant

Installation and maintenance of equipment & conduct MRV

Project in the partner country



Japanese government & entities

Japan will acquire a part of JCM credits (in return to the financial support)

JCM

Expected to deliver at least half of JCM credits issued

The consortium conducts MRV to estimate GHG emission reductions

Partner country government & entities

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

Global Environment Centre Foundation

Thailand:31 projects
- ○Energy Saving at Convenience Store
- ○Upgrading Air-saving Loom*
- ○Centrifugal Chiller in Tire Factory
- ○Air Conditioning System & Chiller*
- ○Ion Exchange Membrane Electrolyzer
- ○LED Lighting to Sales Stores
- ○Co-generation System
- ○2MW Solar PV
- ○Heat Recovery Heat Pump
- ○30MW Solar PV
- ○Air-conditioning Control System
- ○1MW Solar PV on Factory Rooftop*
- ○Centrifugal Chiller & Compressor*
- ○Co-generation in Motorcycle Factory
- ○Refrigeration System
- ○Chilled Water Supply System
- ○12MW Waste Heat Recovery in Cement Plant*
- ○Refrigerator and Evaporator
- ○3.4MW Solar PV*
- ○5MW Floating Solar PV
- ○Boiler System in Rubber Belt Plant
- ○Biomass Co-generation System
- ○Energy Saving Equipment in Port
- ○Co-generation in Fiber Factory
- ○25MW Solar PV in Industrial Park
- ○3.4MW Solar PV
- ○Biomass Boiler
- ○0.8MW Solar PV and Centrifugal Chiller
- ▲ Introduction of Scheme for F-gas Recovery and Destruction
- ○37MW Solar PV and Melting Furnace
- ○Heat Exchanger in Fiber Factory

Mongolia:9 projects
- ○Heat Only Boiler (HOB)**
- ○2.1MW Solar PV in Farm*
- ○10MW Solar PV*
- ○8.3MW Solar PV in Farm
- ○15MW Solar PV
- ○20MW Solar PV
- ○21MW Solar PV
- ■Upscaling Renewable Energy Sector
- ○Fuel Conversion by Introduction of LPG Boilers

Viet Nam:22 projects
- ○Digital Tachographs*
- ○Air-conditioning in Hotel*
- ○Container Formation Facility*
- ○Amorphous transformers 2*
- ○Electricity Kiln
- ○Energy saving Equipment in Lens Factory*
- ○Energy Saving Equipment in Wire Production Factory*
- ○Energy Saving Equipment in Brewery Factory
- ○Modal Shift with Reefer Container
- ▲ Collection Scheme and Dedicated System of F-gas
- ○High Efficiency Water Pumps2
- ○Amorphous transformers1*
- ○Air-conditioning in Lens Factory*
- ○320kW Solar PV in Shopping Mall*
- ○Air-conditioning Control System
- ○High Efficiency Water Pumps1*
- ○Amorphous transformers 3*
- ○Amorphous transformers 4
- ○High Efficiency Chiller
- ○Inverters for Raw Water Intake Pumps
- ○Waste to Energy Plant
- ○Biomass Boiler to Chemical Factory

Bangladesh:6 projects
- ○Centrifugal Chiller
- ○315kW PV-diesel Hybrid System*
- ○Centrifugal Chiller*
- ○Loom at Weaving Factory*
- ○50MW Solar PV Power Plant
- ■High Efficiency Transmission Line

Laos:4 projects
- ●REDD+ through controlling slush-and-burn
- ○Amorphous transformers
- ○14MW Floating Solar PV
- ○11MW Solar PV

Mexico:7 projects
- ○2.4MW Power Generation with Methane Gas Recovery System
- ○Once-through Boiler and Fuel Switching
- ○64MW Wind Farm
- ○20MW Solar PV
- ○30MW Solar PV1
- ○Energy Efficient Distillation System
- ○30MW Solar PV2

Saudi Arabia:1 project
- ○Electorolyzer in Chlorine Production Plant*

Kenya:2 projects
- ○1MW Solar PV at Salt Factory
- ○38MW Solar PV

Phillipines:11 projects
- ○15MW Hydro Power Plant
- ○4MW Hydro Power Plant
- ○1.53MW Rooftop Solar PV
- ○1MW Rooftop Solar PV
- ○1.2MW Rooftop Solar PV
- ○2.5MW Rice Husk Power Generation
- ○0.16MW Micro Hydro Power Plant
- ○4MW Solar PV
- ○19MW Hydro Power Plant
- ○18MW Solar PV
- ○Biogas Power Generation and Fuel Conversion

Myanmar:7 projects
- ○700kW Waste to Energy Plant
- ○Brewing Systems to Brewery Factory
- ○Once-through Boiler in Instant Noodle Factory
- ○1.8MW Rice Husk Power Generation
- ○Refrigeration System in Logistics Center
- ○8.8MW Waste Heat Recovery in Cement Plant
- ○Brewing Systems and Biogas Boiler to Brewery Factory

Palau:5 projects
- ○370kW Solar PV for Commercial Facilities*
- ○155kW Solar PV for School*
- ○445kW Solar PV for Commercial Facilities Ⅱ*
- ○0.4MW Solar PV for Supermarket
- ○1MW Solar PV for Supermarket

Costa Rica:2 projects
- ○5MW Solar PV
- ○Chiller and Heat Recovery System

Cambodia:5 projects
- ○LED Street Lighting
- ○Solar PV & Centrifugal Chiller
- ○200kW Solar PV at International School*
- ○Inverters for Distribution Pumps
- ■Battambang Wastewater Treatment Project

Chile:2 projects
- ○1MW Rooftop Solar PV
- ○2MW Solar PV and 4MWh Storage Battery

Maldives:2 projects
- ○186kW Solar Power on School Rooftop*
- ■Smart Micro-Grid System

Indonesia:31 projects
- ○Centrifugal Chiller at Textile Factory*
- ○Refrigerants to Cold Chain Industry**
- ○Centrifugal Chiller at Textile Factory 2*
- ○507kW Solar Power Hybrid System
- ○Centrifugal Chiller at Textile Factory 3*
- ○Upgrading to Air-saving Loom*
- ○Smart LED Street Lighting System
- ○Gas Co-generation System*
- ○1.6MW Solar PV in Jakabaring Sport City*
- ○10MW Hydro Power Plant
- ○Industrial Wastewater Treatment System
- ○Absorption Chiller
- ○High Efficiency Autoclave
- ○12MW Biomass Power Plant
- ○Energy Saving at Convenience Store*
- ○Double Bundle-type Heat Pump*
- ○30MW Waste Heat Recovery in Cement Industry*
- ○Regenerative Burners
- ○Old Corrugated Cartons Process*
- ○Centrifugal Chiller in Shopping Mall*
- ○Once-through Boiler System in Film Factory
- ○Once-through Boiler in Golf Ball Factory
- ●REDD+ through controlling slush-and burn
- ○Looms in Weaving Mill
- ○0.5MW Solar PV*
- ○10MW Hydro Power Plant
- ○CNG-Diesel Hybrid Public Bus
- ○Injection Molding Machine
- ○LED Lighting to Sales Stores
- ○Gas Co-generation system
- ○Rehabilitation of Hydro Power Plant

○ Model Project in FY 2013 (7 projects in 3 countries)
○ Model Project in FY 2014 (12 projects in 5 countries)
■ ADB Project in FY 2014 (1 project in 1 country)
○ Model Project in FY 2015 (31 projects in 9 countries)
○ Model Project in FY 2016 (35 projects in 9 countries)
● REDD+ Model Project (2 projects in 2 countries)
○ Model Project in FY 2017 (19 projects in 7 countries)
■ ADB Project in FY 2017 (1 project in 1 country)
○ Model Project in FY2018 (24 projects in 11 countries)
■ ADB Project in FY 2018 (2 projects in 2 country)
▲ F-gas Project in FY 2018 (2 projects in 2 country)
○ Model Project in FY 2019 (11 projects in 5 countries)
・ Other 1 project in Malaysia

Total 147 projects in 16 partner countries

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

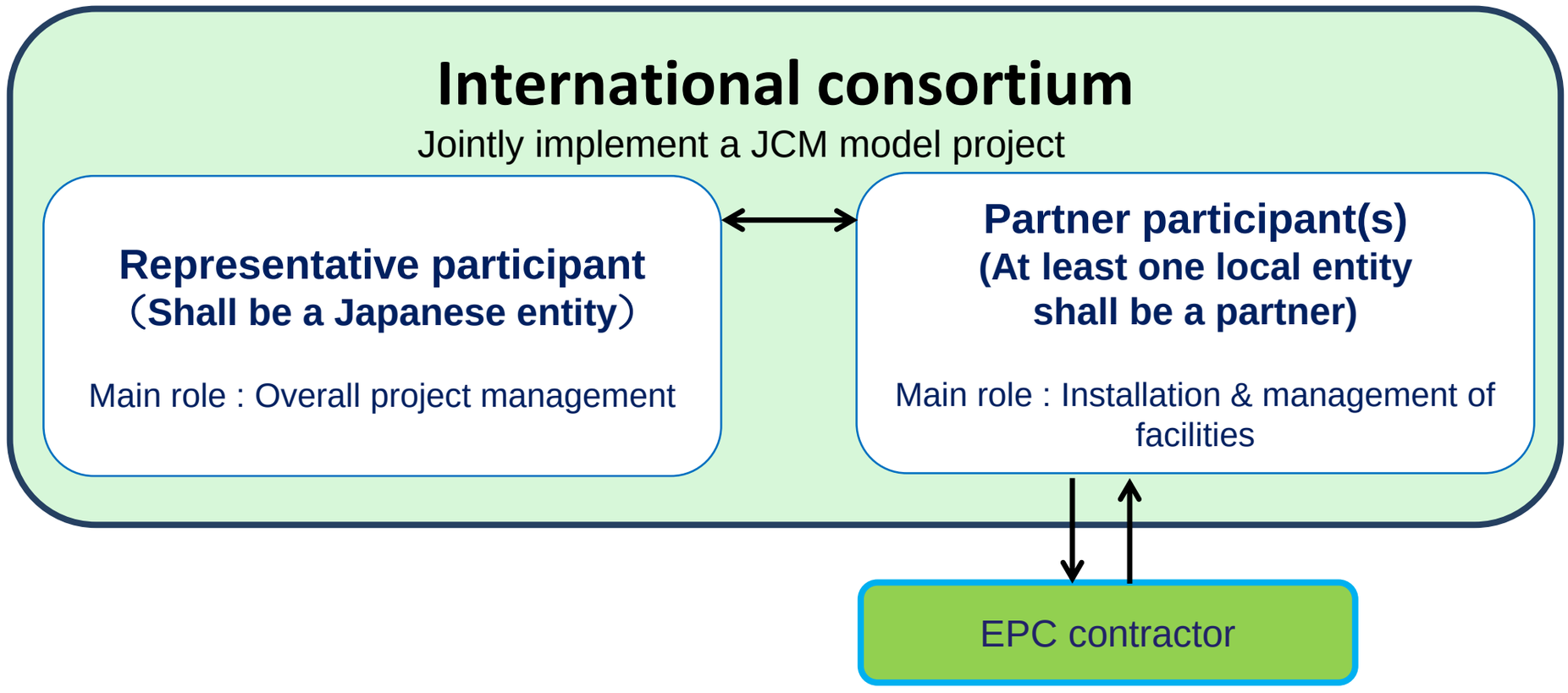
What kind of projects are supported by this financing programme?

- 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

Basic Structure of International Consortium

Global Environment Centre Foundation



- 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

$$= \frac{\text{Amount of financial support[JPY]}}{\text{Emission reductions of GHG [tCO2equivalent/y]} \times \text{legal durable years[y]}}$$

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)

Overview of JCM Model Projects in FY2019

Global Environment Centre Foundation

Budget	JPY9.9 billion (Approx. USD90million)
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.

Financial support per project

From ¥50million to ¥2billion (approx.)

Guideline for Submitting JCM model project proposal in FY2019

JCM Model Projects Schedule in FY2019

Global Environment Centre Foundation

4 April | 5 May | 6 June | 7 July | 8 August | 9 September | 10 October | 11 November | 12 December | 1 January | 2 February | 3 March | 4 April

From April 5 to November 29 : Proposal acceptance period

Call for proposal

Evaluation of proposals
Proposal Review & interview with applicants

Submission of application

Review of application documents

Start Model projects

- Selection of model projects
- documentation briefing for the notice of contract of financing

Notice of Contract of Financing

Implementation of model projects

Inspection

Disbursement of financial support

1-year project
- ☑ Submission of final reports
- ☑ Onsite inspection

2 or 3-year project
- ☑ Submission of midterm reports
- ☑ Midterm inspection

On May 14, the 1st selection starts ▶▶▶ Review

1-year project:
Disbursement of financial support
2 or 3-year project:
Disbursement of financial support (rough estimate)

Guideline for Submitting JCM model project proposal in FY2019

Categorization by Technology Type for JCM Model Projects

Global Environment Centre Foundation

New Technologies Selected in FY2018

- Autoclave
- Multi-effect Distillation System
- Injection Molding Machine
- Biogas Boiler
- Reefer Container
- CNG-Diesel Hybrid Bus

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%

	ogy	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	
	ystem	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
	hting with em	ID_AM018, KH_AM001								1			1							2
		VN_AM013						1												1
	or	TH_AM002						1										1		2
	em									1										1
	Burners	ID_AM009								1										1
	nace	VN_AM010						1												1
	Conditioning Control System							1										1		2
	Frequen erter 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
	Machines	VN_AM014						1												1
	ntry crane																	1		1
	Forklift																	1		1
	Au									1										1
	Multi-effect D on System													1						1
	Injection Modling Mach									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
	ower Plant	KE_AM003								3									3	6
	Plant													1						1
	er Plant									1							1		1	3
																		1		1
																	1			1
	eneration	ET_AM003			1													1		2
3.Effective Use of Energy	Power Generation by Waste Heat Recovery	ID_AM001, TH_AM007								1							1	1		3
	Gas Co-generation	ID_AM016, TH_AM009								2								3		5
4. Waste Handling and Disposal	Waste-to-Energy Plant	MM_AM001															1			1
	Power Generation by Methane Recovery													1						1
5. Transportation	Digital Tachograph System	VN_AM001						1												1
	CNG-Diesel Hybrid Bus									1										1
	Reefer Container							1												1
Total	Number of technology : 45	No. of Methodology : 53	7	5	1	2	1	21	3	33	3	4	5	6	1	2	10	38	8	150

Infrastructure through JCM

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

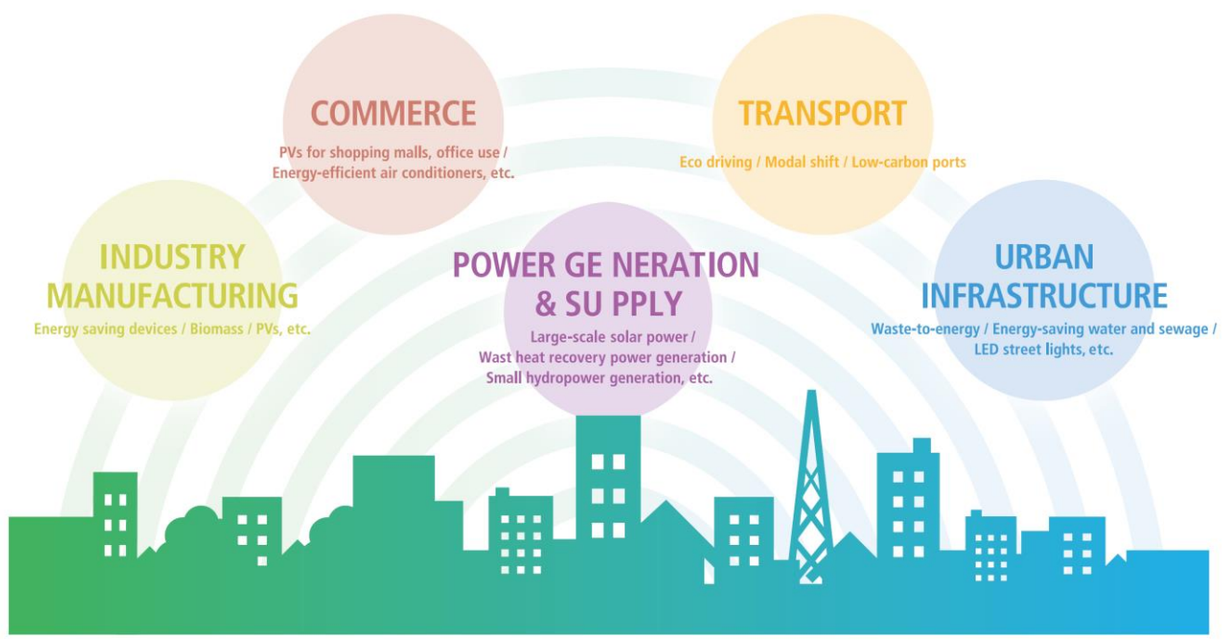
3 Palau / Pacific Consultants Co., Ltd.
Solar Power Plants for Commercial Facilities
4 Indonesia / Toyota Tsusho Corporation
Double-Bundle type Heat Pump
1 Indonesia / Hokusan Co., Ltd.
CNG-Diesel Equipment to Public Bus
2 Thailand / Yokohama Port Corporation
Energy Efficient Equipment to Bangkok Port

INDUSTRY

COMMERCE

TRANSPORT

URBAN INFRASTRUCTURE



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

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

Баярлалаа !

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List of JCM Model Projects Selected in Mongolia

Global Environment Centre Foundation

Year	Partner Country	Entity	Project Title	Sector	Expected GHG Emission Reductions（tCO2/y）
2019	Mongolia	Saisan Co.,Ltd.	Fuel Conversion by Introduction of LPG Boilers to Beverage Factory	Energy Efficiency	5,781
2018	Mongolia	Sharp Energy Solutions Corporation	21MW Solar Power Project in Bayanchandmani	Renewable Energy	27,008
2017	Mongolia	Sharp Energy Solutions Corporation	Introduction of 20MW Solar Power System in Darkhan City	Renewable Energy	22,927
2017	Mongolia	Sharp Energy Solutions Corporation	Introduction of 15MW Solar Power System near New Airport	Renewable Energy	18,438
2016	Mongolia	Farmdo Co., Ltd.	Installation of 8.3MW Solar Power Plant in Ulaanbaatar suburb Farm	Renewable Energy	9,585
2015	Mongolia	Farmdo Co., Ltd.	Installation of 2.1MW Solar Power Plant for Power Supply in Ulaanbaatar Suburb	Renewable Energy	2,424
2015	Mongolia	Sharp Energy Solutions Corporation	10MW Solar Power Project in Darkhan City	Renewable Energy	11,221
2013	Mongolia	Suuri-Keikaku Co., Ltd. .	Upgrading and Installation of Centralized Control System of High-efficiency Heat Only Boiler (HOB)	Energy Efficiency	206

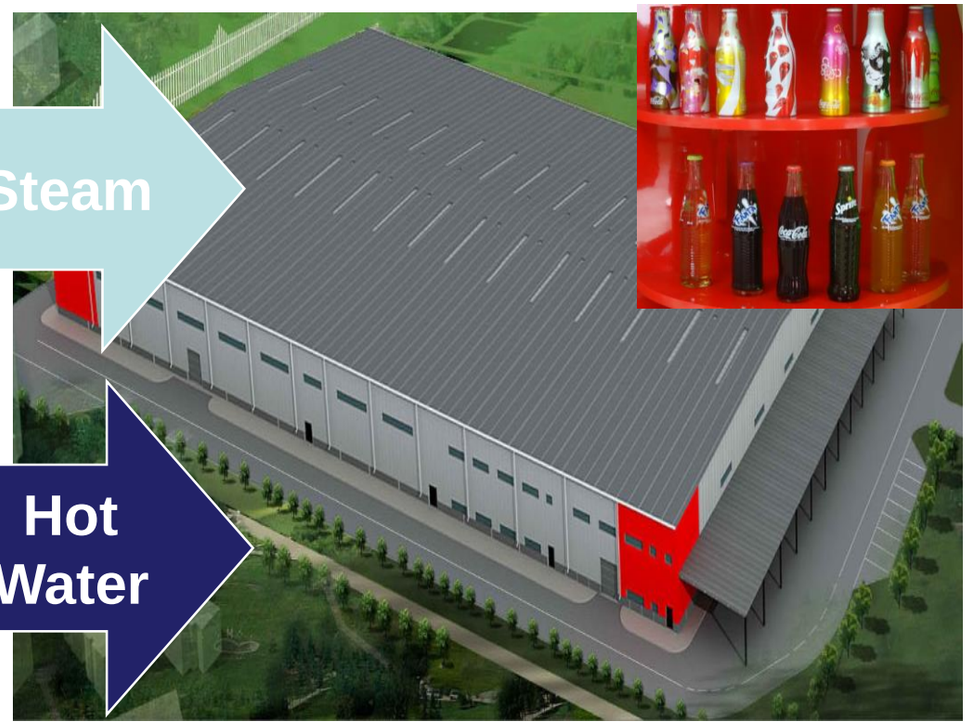
Fuel Conversion by Introduction of LPG Boilers to Beverage Factory

PP (Japan): Saisan Co., Ltd., PP (Mongolia): MCS International LLC, MCS Coca Cola LLC

Outline of GHG Mitigation Activity

LPG boilers are introduced for the purpose of mitigation of GHG emissions as well as air pollution in Ulaanbaatar City.

By introducing the most efficient and newest model of LPG once-through boilers and vacuum type water heaters, the efficiency of the system is improved with less fuel consumption.



Expected GHG Emission Reductions

5,781 tCO_2/year

＝Reference CO_2 emissions (Ry)[tCO_2/y]
　－Project CO_2 emissions (Py) [tCO_2/y]
＝12,692 [tCO_2/y] – 6,911 [tCO_2/y]

Ry＝Reference fuel consumption (RQfy) [t/y]
　×Fuel emission factor (furf) [tCO_2/t] + Reference electricity consumption (RQey) [MWh/y]×Grid emission factor (gef) [tCO_2/MWh]
Py＝Project fuel consumption (PQfy) [t/y] ×Fuel emission factor (fupf) [tCO_2/t] +Project electricity consumption (PQey) [MWh/]×(gef) [tCO_2/MWh]

Sites of Project

Project Site
10km northeast from Chinggis Khaan International Airport

Map Data©2019 Google

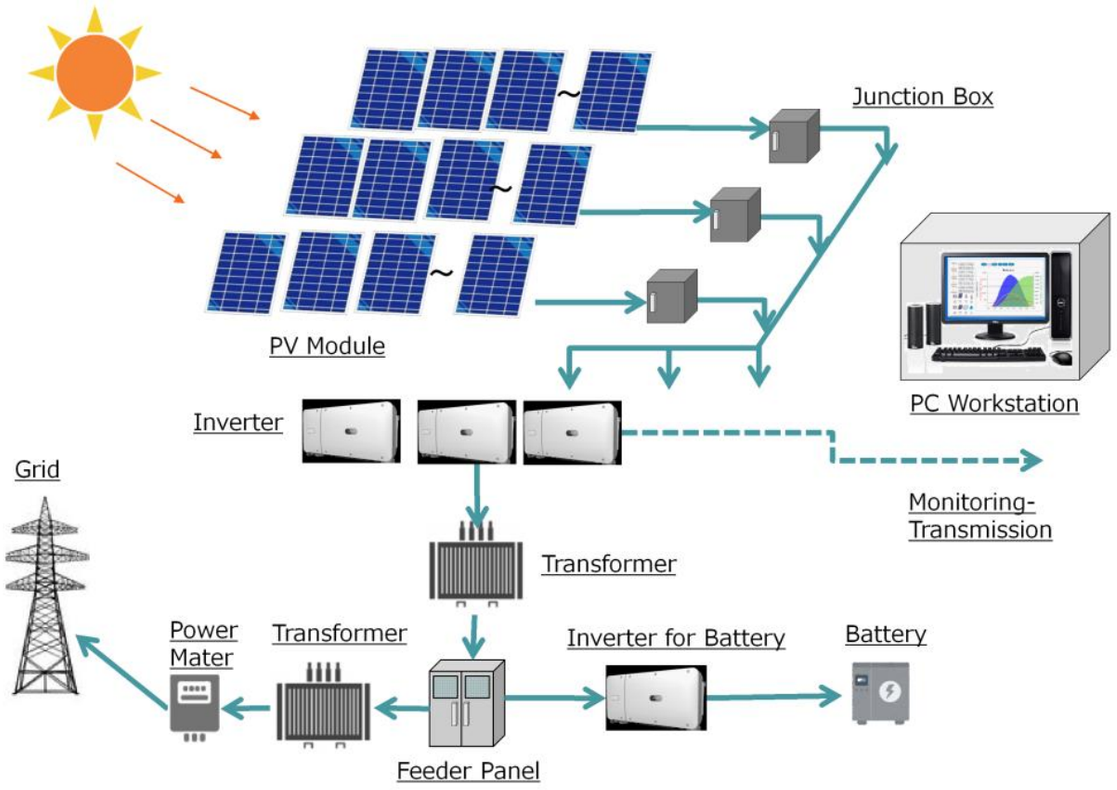
21MW Solar Power Project in Bayanchandmani

PP (Japan): Sharp Energy Solutions Corporation, PP (Mongolia): Solar Energy Chandmani LLC

Outline of GHG Mitigation Activity

Sharp Energy Solutions Corporation and Solar Energy Chandmani LLC introduce a 21MWac ground-mount solar PV system in Bayanchandmani village, Mongolia for the sale of power.

This project contributes Mongolian energy policy to increase renewables up to 30% by 2030.



Expected GHG Emission Reductions

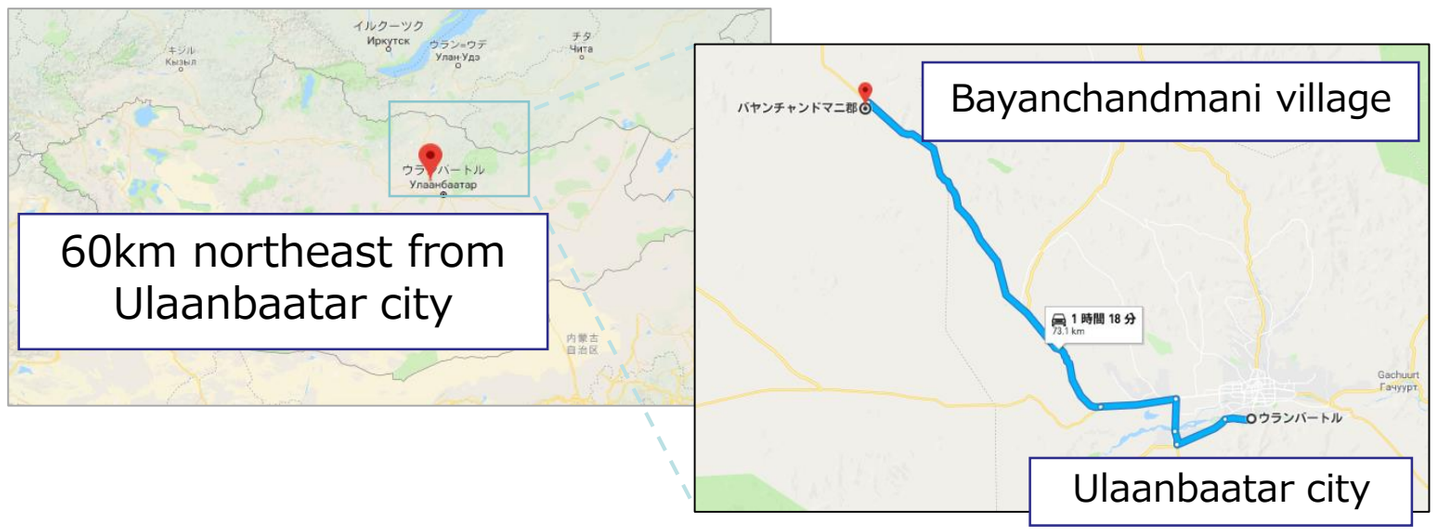
27,008 tCO_2/year

= (Reference CO_2 emissions) [tCO_2/year]
- (Project CO_2 Emission) [tCO_2/year]

= ((Reference Power consumption) [MWh/year]
- 0 [MWh/year])) × Emission Factor [tCO_2/MWh]

Sites of Project

Map Data ©2018Google



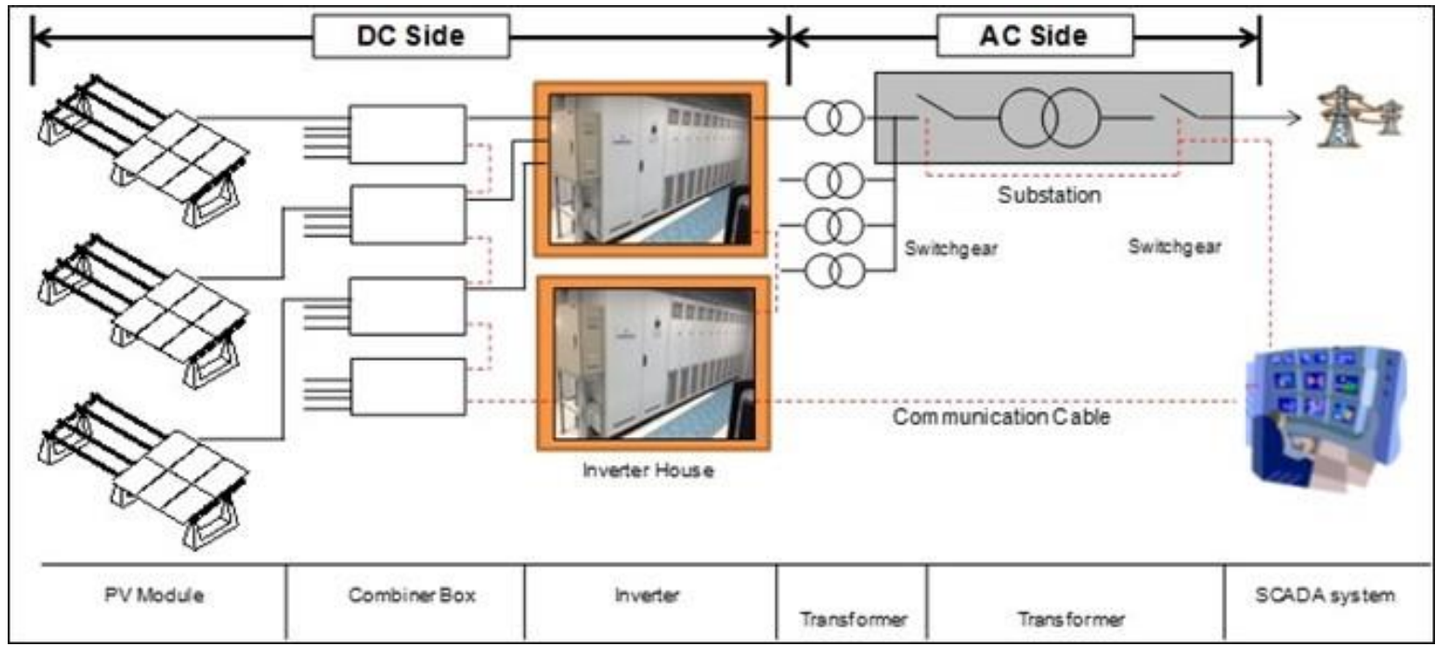
Introduction of 20MW Solar Power System in Darkhan City

PP (Japan): Sharp　Corporation, PP (Mongolia):Darkhan Selenge Electricity Distribution Network JSC

Outline of GHG Mitigation Activity

Sharp and Darkhan Selenge Electricity Distribution Network JSC construct PV plant in Darkhan City in Mongolia.

This project contributes Mongolian energy policy to increase renewables up to 30% by 2030.



Expected GHG Emission Reductions

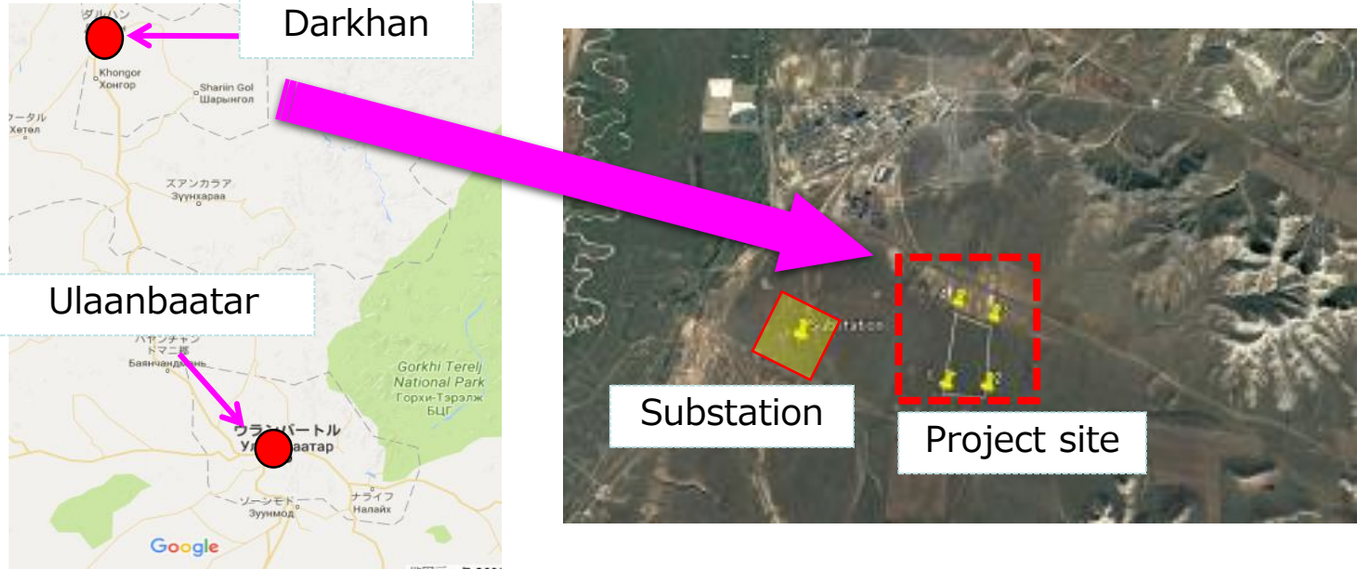
22,927 t-CO2 /year

= (Reference CO_2 emissions) [tCO_2/year]
- (Project CO_2 Emission) [tCO_2/year]

= ((Reference Power consumption) [MWh/year]
- 0 [MWh/year])) × Emission Factor [tCO_2/MWh]

Sites of Project

Map data©2017Google



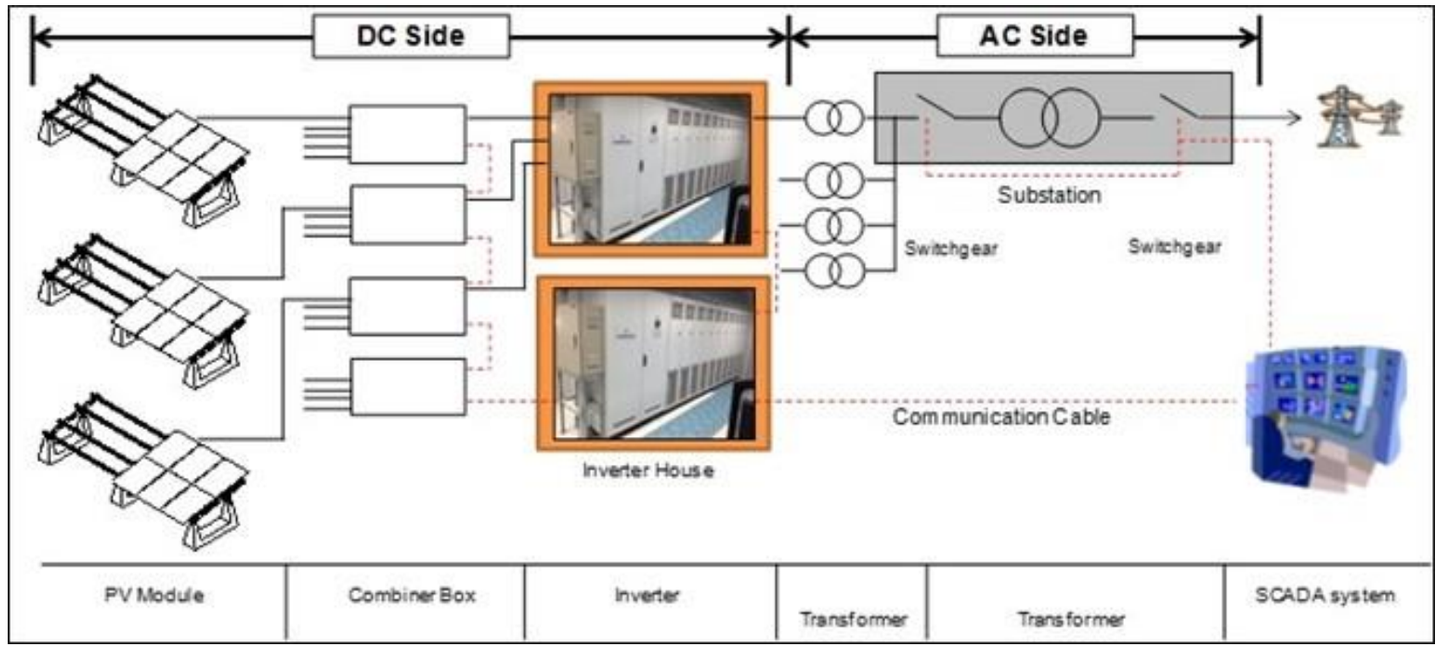
Introduction of 15MW Solar Power System near New Airport

PP (Japan): Sharp Corporation , PP (Mongolia):Tenuun Gerel Construction LLC

Outline of GHG Mitigation Activity

Sharp and Tenuun Gerel Construction LLC construct PV plant in Khushig khundii near New airport in Mongolia.

This project contributes to Mongolian energy policy to increase renewables up to 30% by 2030.



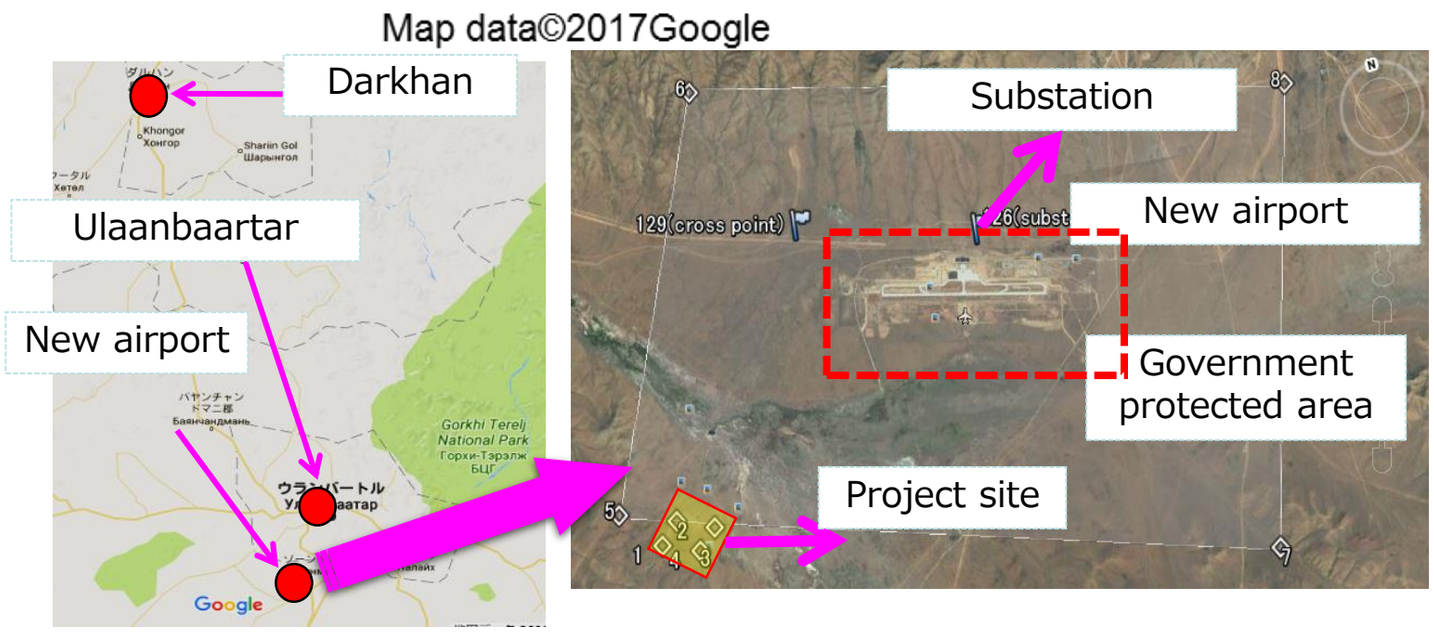
Expected GHG Emission Reductions

18,438 t-CO2 /year

= (Reference CO_2 emissions) [tCO_2/year]
- (Project CO_2 Emission) [tCO_2/year]

= ((Reference Power consumption) [MWh/year]
- 0 [MWh/year])) × Emission Factor [tCO_2/MWh]

Sites of Project



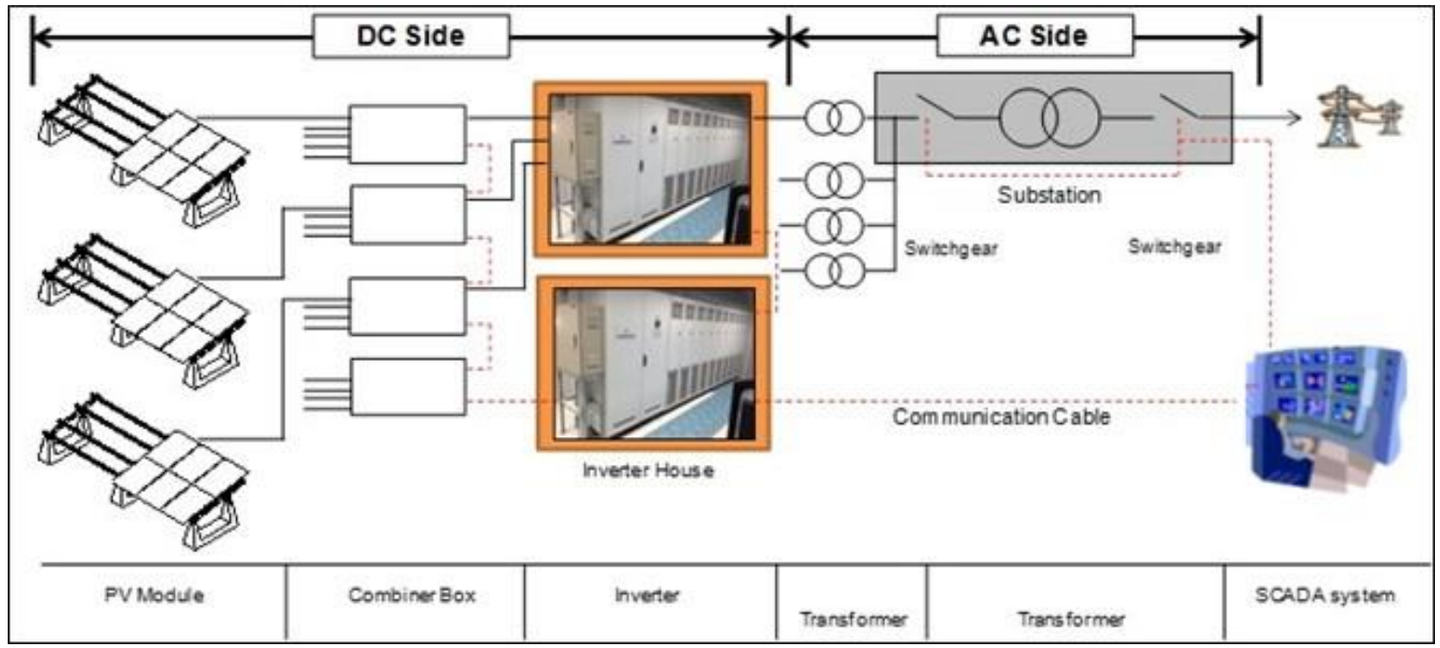
Introduction of 20MW Solar Power System in Darkhan City

PP (Japan): Sharp　Corporation, PP (Mongolia):Darkhan Selenge Electricity Distribution Network JSC

Outline of GHG Mitigation Activity

Sharp and Darkhan Selenge Electricity Distribution Network JSC construct PV plant in Darkhan City in Mongolia.

This project contributes Mongolian energy policy to increase renewables up to 30% by 2030.



Expected GHG Emission Reductions

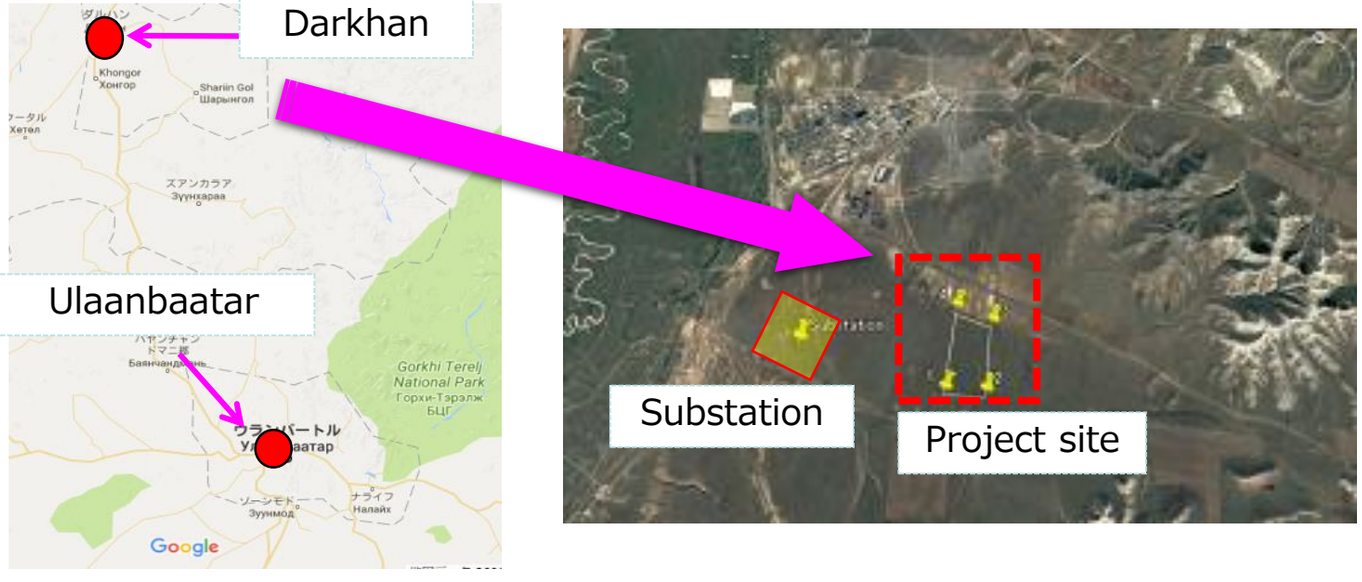
22,927 t-CO2 /year

= (Reference CO_2 emissions) [tCO_2/year]
- (Project CO_2 Emission) [tCO_2/year]

= ((Reference Power consumption) [MWh/year]
- 0 [MWh/year])) × Emission Factor [tCO_2/MWh]

Sites of Project

Map data©2017Google

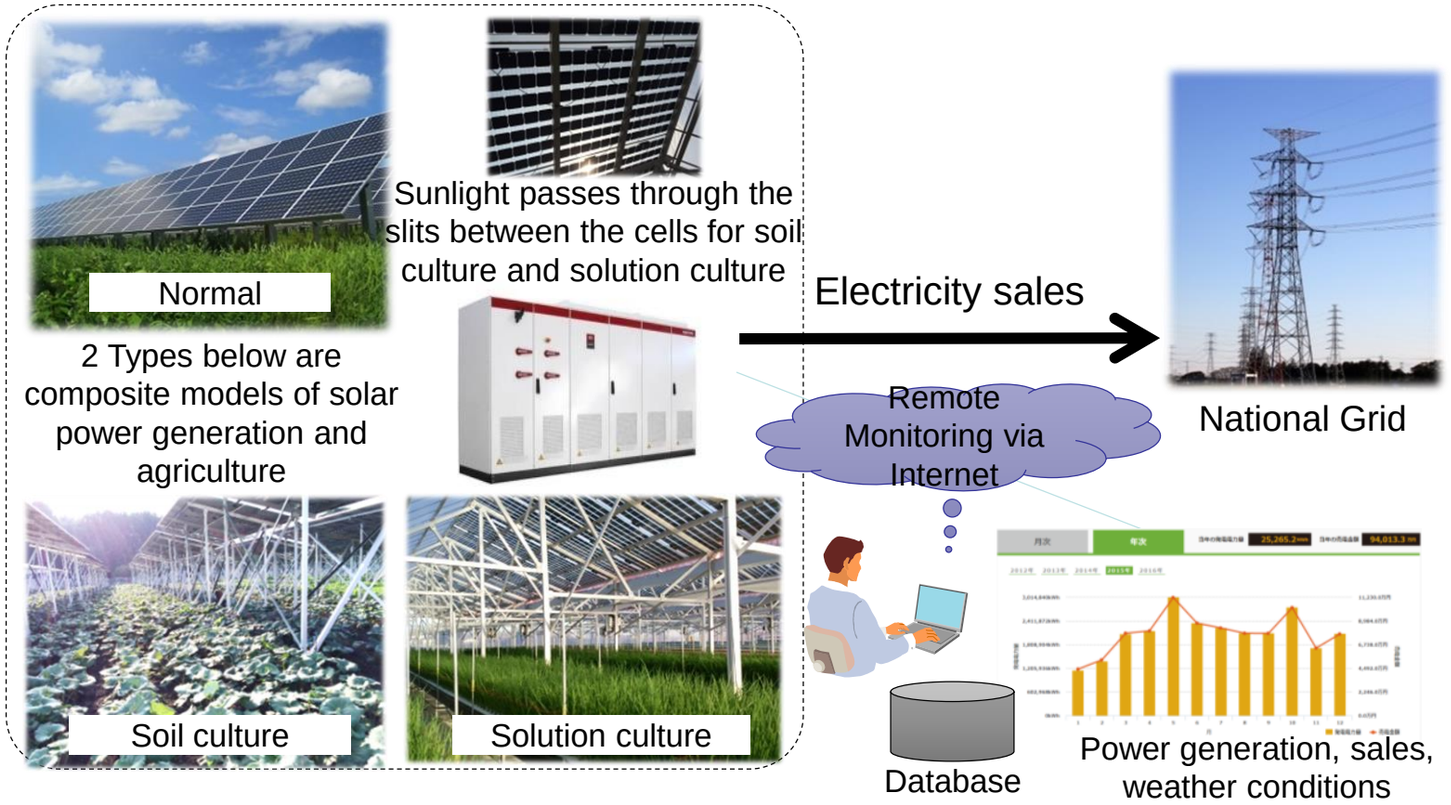


Installation of 2.1MW Solar Power Plant for Power Supply in Ulaanbaatar Suburb

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

Outline of GHG Mitigation Activity

The purpose of this project is to reduce CO_2 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

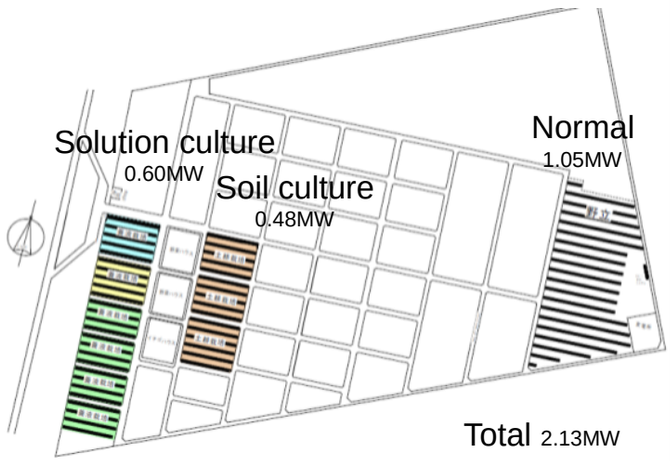
2,424 tCO_2/year

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



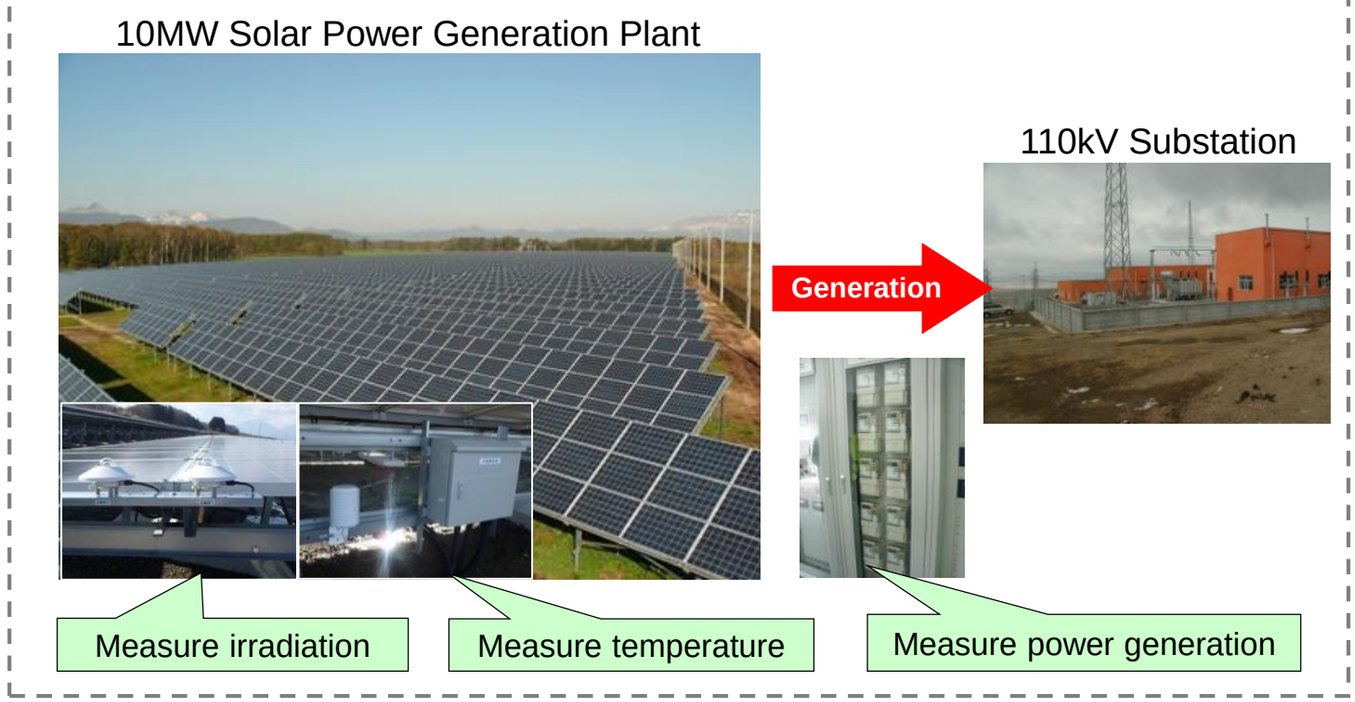
10MW Solar Power Project in Darkhan City

PP (Japan): Sharp Corporation / PP (Mongolia): Solar Power International LLC (SPI)

Outline of GHG Mitigation Activity

The project aims to reduce CO_2 emissions by constructing a 10MW Solar Power Generation Plant beside the 110kV substation in Darkhan City, which locates approximately 230 km North of the capital city Ulaanbaatar, and supplying the generated electricity through the power transmission network.

The power plant employs crystalline solar modules of maximum output of 310W per panel and module conversion efficiency of 15.9%. Approximately 32,000 numbers (72 series) of these modules and peripheral systems are installed on a land of 36 ha.



Expected GHG Emission Reductions

11,221tCO_2/year

CO_2 emission reduction
= PV generation (a)
× Reference emission factor (b)
= 14,079 MWh/year × 0.797 tCO_2/MWh

Sites of JCM Model Project

Energy Saving for Air-conditioning and Process Cooling at Textile Factory

PP(Japan) :Suuri-Keikaku / PP(Mongolia) :Anu-Service

Outline of GHG Mitigation Activity

1.This JCM model project consists of two model sites: Bornuur sum in a rural area and the 118th School in Ulaanbaatar City.
The Bornuur sum project includes the installation of heat only boilers (HOBs) as well as pipe laying work, electrical construction and boiler building construction. This project alters the current heat supply system in Bornuur sum of individual building-based heating, under which low efficiency HOBs and stoves are used. The centralized control system of high-efficiency HOBs is installed in this project
2.The other project is the replacement of low-efficiency, old-type boilers with the latest high-efficiency model boilers at the 118th School in Ulaanbaatar City. This project also leads to the reduction of coal consumption to mitigate CO_2 emissions as well as air pollutants.




Expected GHG Emission Reductions

298 tCO2/year

Sites of JCM Model Project

Bornuur sum & Ulaanbaatar City, Mongolia

List of JCM Model Projects Selected in 2019

Global Environment Centre Foundation

Results of first selection. Second selection is now under evaluating.

Year	Partner Country	Entity	Project Title	Sector	Expected GHG Emission Reductions（tCO2/y）
2019	Mongolia	Saisan Co.,Ltd.	Fuel Conversion by Introduction of LPG Boilers to Beverage Factory	Energy Efficiency	5,781
2019	Thailand	Toyota Motor Corporation	Introduction of 37 MW Solar Power System and High Efficiency Melting Furnace in Vehicle & Engine Factory	Energy Efficiency 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	359
2019	Philippines	ITOCHU Corporation	Biogas Power Generation and Fuel Conversion Project in Pineapple Canneries	Renewable Energy	52,156
2019	Philippines	Tokyo Century Corporation	18MW Solar Power Project in Collaboration with Power-supply Company	Renewable Energy	11,743
2019	Philippines	Voith Fuji Hydro K.K.	19 MW Mini Hydro Power Plant Project in Isabela Province	Renewable Energy	46,836
2019	Vietnam	DAIICHI JITSUGYO CO., LTD.	Introduction of Biomass Boiler to Chemical Factory	Renewable Energy	16,882
2019	Vietnam	Yokohama Water Co., Ltd.	Energy Saving by Introduction of High Efficiency Water Pumps in Hue City	Energy Efficiency	4,060
2019	Vietnam	Hitachi Zosen Corporation	Waste to Energy Project in Hanoi City	Waste Handling and Disposal	119,870
2019	Mexico	Sharp Energy Solutions Corporation	30MW Solar Power Project in La Paz city	Renewable Energy	36,724
2019	Palau	Sharp Energy Solutions Corporation	Introduction of 1MW Solar Power System on Supermarket Rooftop	Renewable Energy	842

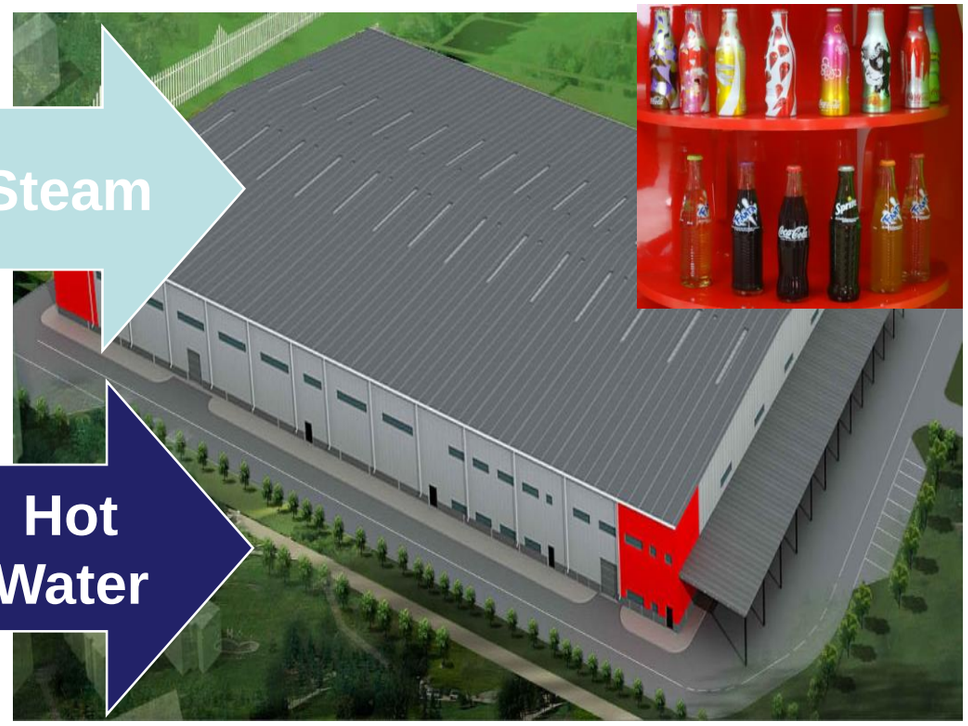
Fuel Conversion by Introduction of LPG Boilers to Beverage Factory

PP (Japan): Saisan Co., Ltd., PP (Mongolia): MCS International LLC, MCS Coca Cola LLC

Outline of GHG Mitigation Activity

LPG boilers are introduced for the purpose of mitigation of GHG emissions as well as air pollution in Ulaanbaatar City.

By introducing the most efficient and newest model of LPG once-through boilers and vacuum type water heaters, the efficiency of the system is improved with less fuel consumption.



Expected GHG Emission Reductions

5,781 tCO_2/year

＝Reference CO_2 emissions (Ry)[tCO_2/y]
　－Project CO_2 emissions (Py) [tCO_2/y]
＝12,692 [tCO_2/y] – 6,911 [tCO_2/y]

Ry＝Reference fuel consumption (RQfy) [t/y]
　×Fuel emission factor (furf) [tCO_2/t] + Reference electricity consumption (RQey) [MWh/y]×Grid emission factor (gef) [tCO_2/MWh]
Py＝Project fuel consumption (PQfy) [t/y] ×Fuel emission factor (fupf) [tCO_2/t] +Project electricity consumption (PQey) [MWh/]×(gef) [tCO_2/MWh]

Sites of Project

Project Site
10km northeast from Chinggis Khaan International Airport

Map Data©2019 Google

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 CO_2 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.

CO_2 emissions are also reduced by replacing the existing melting furnace in STM with a high efficient medium-frequency induction melting furnace.

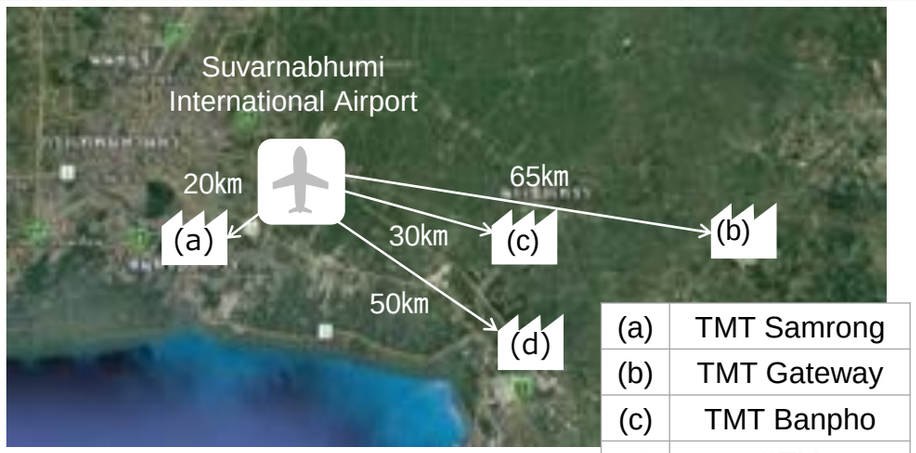
Expected GHG Emission Reductions

19,483 tCO_2/year

Solar system：16,858 tCO_2/year
= ((Reference Power Consumption) [MWh/year]
- 0 [MWh/year]) × Emission Factor [tCO_2/MWh]

High efficiency melting furnace：2,625 tCO_2/year
= (Reference CO_2 Emissions) [tCO_2/year]
- (Project CO_2 Emissions) [tCO_2/year]

Sites of Project



(a)	TMT Samrong
(b)	TMT Gateway
(c)	TMT Banpho
(d)	STM

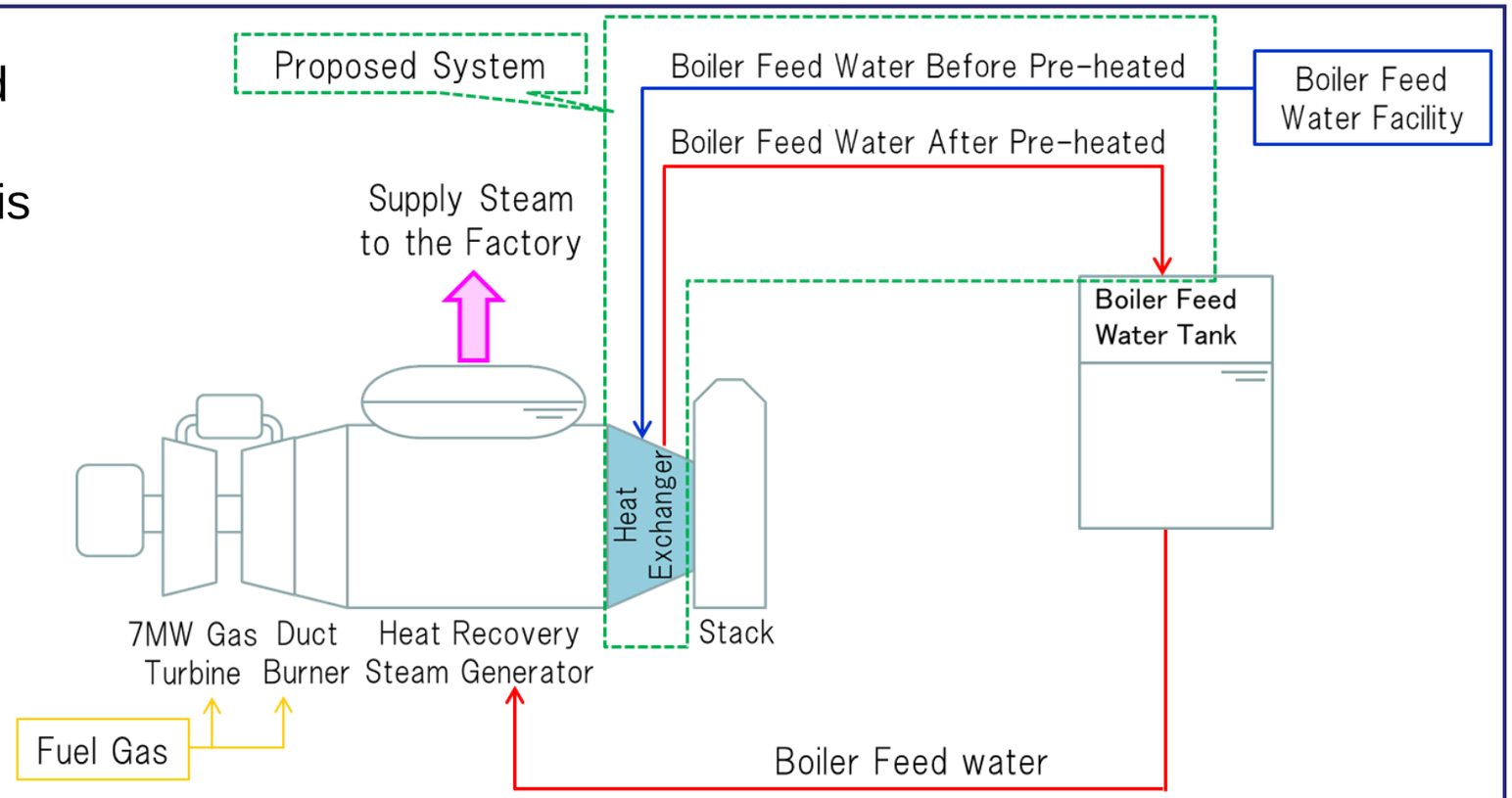
Efficiency Improvement of Co-generation System by Installation of Heat Exchanger in Fiber Factory

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 degrees Celsius.



Expected GHG Emission Reductions

359tCO$_2$/year

GHG Emission Reductions =
Reference CO_2 Emission - Project CO_2 Emission

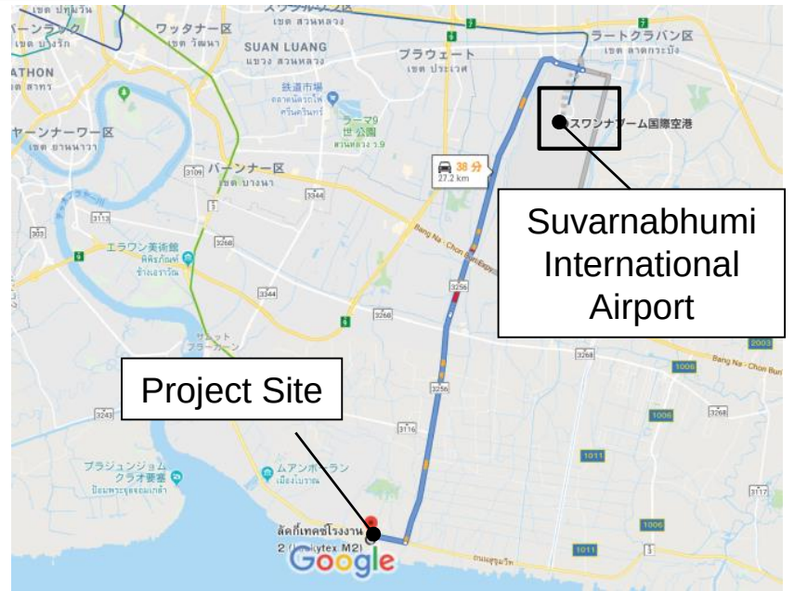
Reference CO_2 Emission = [(BFW* temp. after heat recovery)−(BFW temp. before heat recovery)]×(BFW amount) x (Specific heat of water) / (Boiler efficiency) x (CO_2 emission coefficient of fuel)

Project CO_2 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.



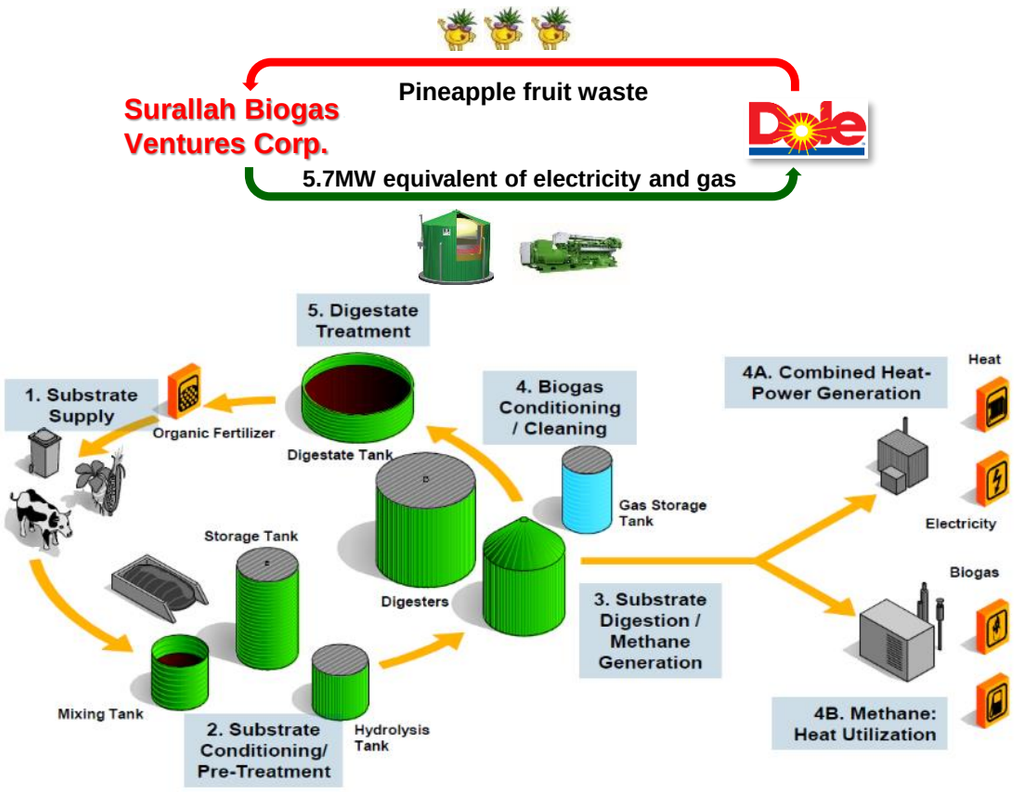
Biogas Power Generation and Fuel Conversion Project in Pineapple Canneries

PP (Japan): ITOCHU Corporation
PP (Philippines): METPower Venture Partners Holdings, Inc.; Surallah Biogas Ventures Corporation

Outline of GHG Mitigation Activity

In this project, biogas derived from pineapple residue is utilized as fuel for gas engines and boilers to generate power and steam at the two pineapple canning factories (Surallah and Polomolok) of Dole Philippines, Inc.

This project aims to produce renewable energy by utilizing the pineapple waste which has been discarded. It contributes to reducing greenhouse gases emissions as well as lowering electricity cost for Dole Philippines, Inc.



Expected GHG Emission Reduction

52,156 tCO_2/year

Power Generation : 2,640 tCO_2/year (Surallah)
9,241 tCO_2/year (Polomolok)

= ((Reference Power Consumption) [MWh/year]
- 0 [MWh/year]) × Emission Factor [tCO_2/MWh]

Boilers : 14,571 tCO_2/year (Surallah)
25,704 tCO_2/year (Polomolok)

= (Reference CO_2 Emissions) [tCO_2/year]
- (Project CO_2 Emissions) [tCO_2/year]

Project Sites

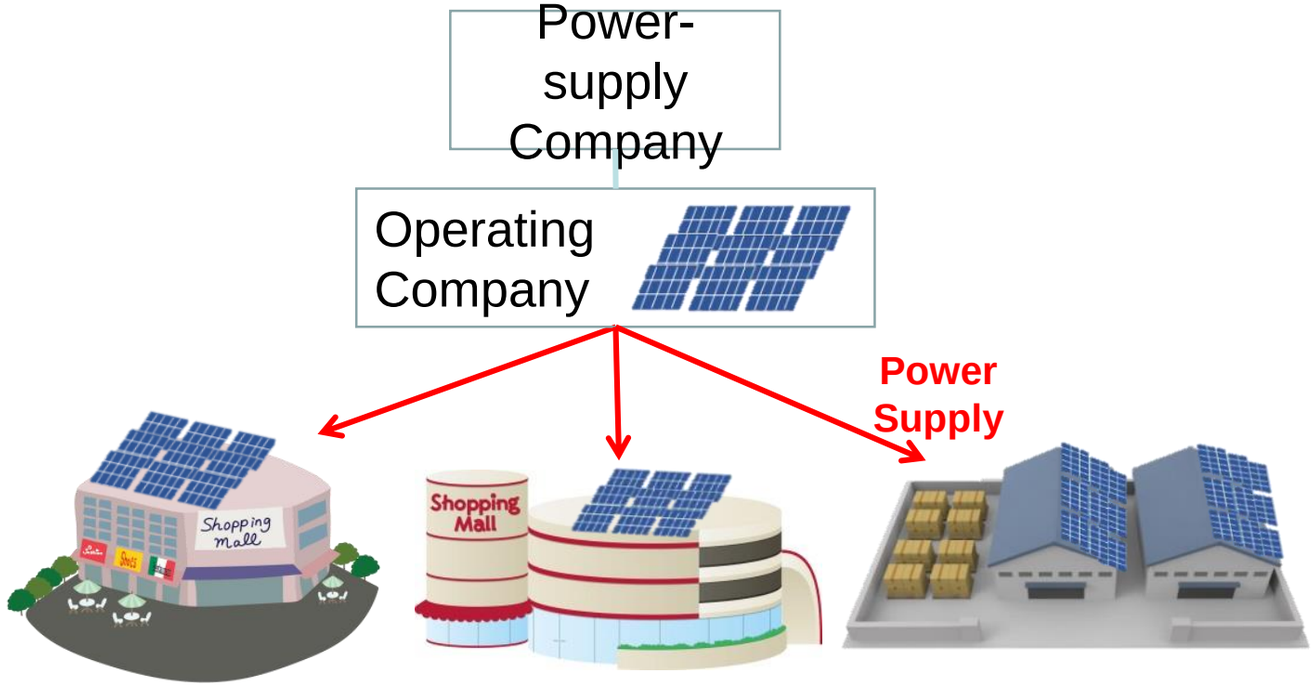
18MW Solar Power Project in Collaboration with Power-supply Company

PP (Japan): Tokyo Century Corporation , PP (Philippines): MSpectrum, Inc.

Outline of GHG Mitigation Activity

This project introduces 18MW Solar System in collaboration with Power-supply company to its clients' rooftops of shopping malls and factories.

Reduction of GHG emission is made by replacing a portion of conventional fossil fuel electricity to renewable energy.



Replacing to renewable energy from conventional electricity

Expected GHG Emission Reductions

11,743 tCO_2/year

= (Reference CO_2 emissions) [tCO_2/year]
- (Project CO_2 emissions) [tCO_2/year]

= ((Reference power consumption) [MWh/year]
- 0 [MWh/year]) × Emission factor [tCO_2/MWh]

Sites of Project

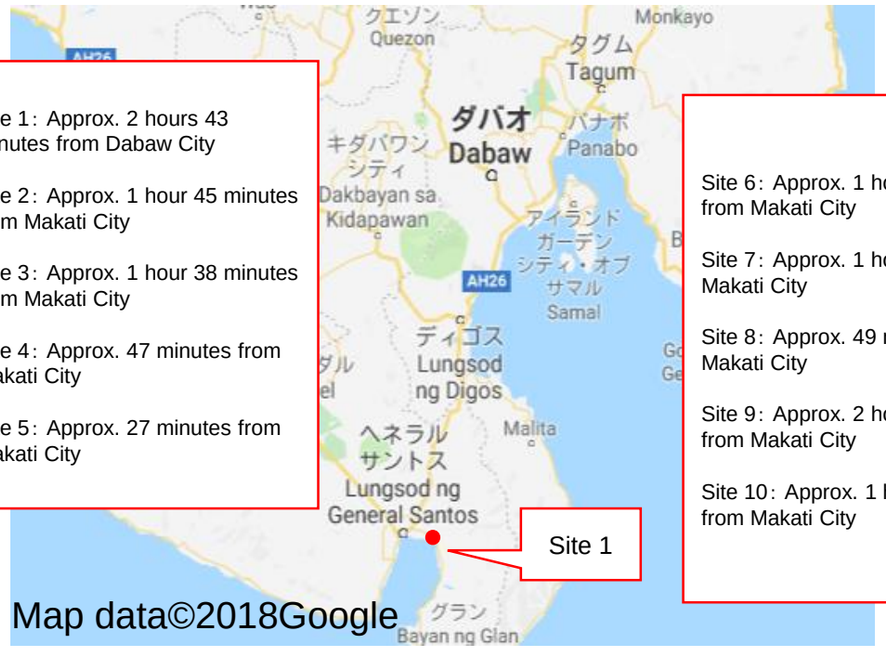
Site 1: Approx. 2 hours 43 minutes from Dabaw City

Site 2: Approx. 1 hour 45 minutes from Makati City

Site 3: Approx. 1 hour 38 minutes from Makati City

Site 4: Approx. 47 minutes from Makati City

Site 5: Approx. 27 minutes from Makati City



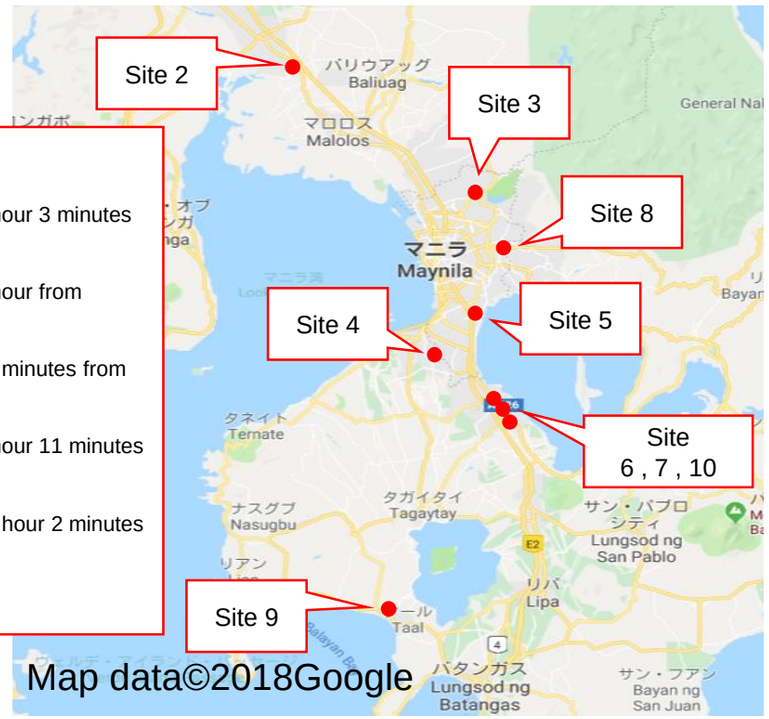
Site 6: Approx. 1 hour 3 minutes from Makati City

Site 7: Approx. 1 hour from Makati City

Site 8: Approx. 49 minutes from Makati City

Site 9: Approx. 2 hour 11 minutes from Makati City

Site 10: Approx. 1 hour 2 minutes from Makati City



19 MW Mini Hydro Power Plant Project in Isabela Province

PP (Japan): Voith Fuji Hydro K.K., PP (Philippines): Isabela Power Corporation

Outline of GHG Mitigation Activity

This project introduces turbine, generator, control system and auxiliary equipment at IPC1(19MW) hydro power plant located in Pinacauan de Ilaguen river, Isabela Province, Philippine. Machines can keep high efficiency even in variable head and variable loading condition, by adopting Kaplan turbine provided by Voith Hydro with the abundant experiences and latest technologies.
This project is expected to have 95GWh generation capacity annually.

＜Kaplan Turbine to be installed＞

Expected GHG Emission Reductions

46,836 tCO_2/year

= (Reference CO_2 Emissions) [tCO_2/year] - (Project CO_2 Emissions) [tCO_2/year]

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

Sites of Project

IPC1 Power plant is located approx. 30km to the east from Tuguegarao Airport, the northern part of Luzon.

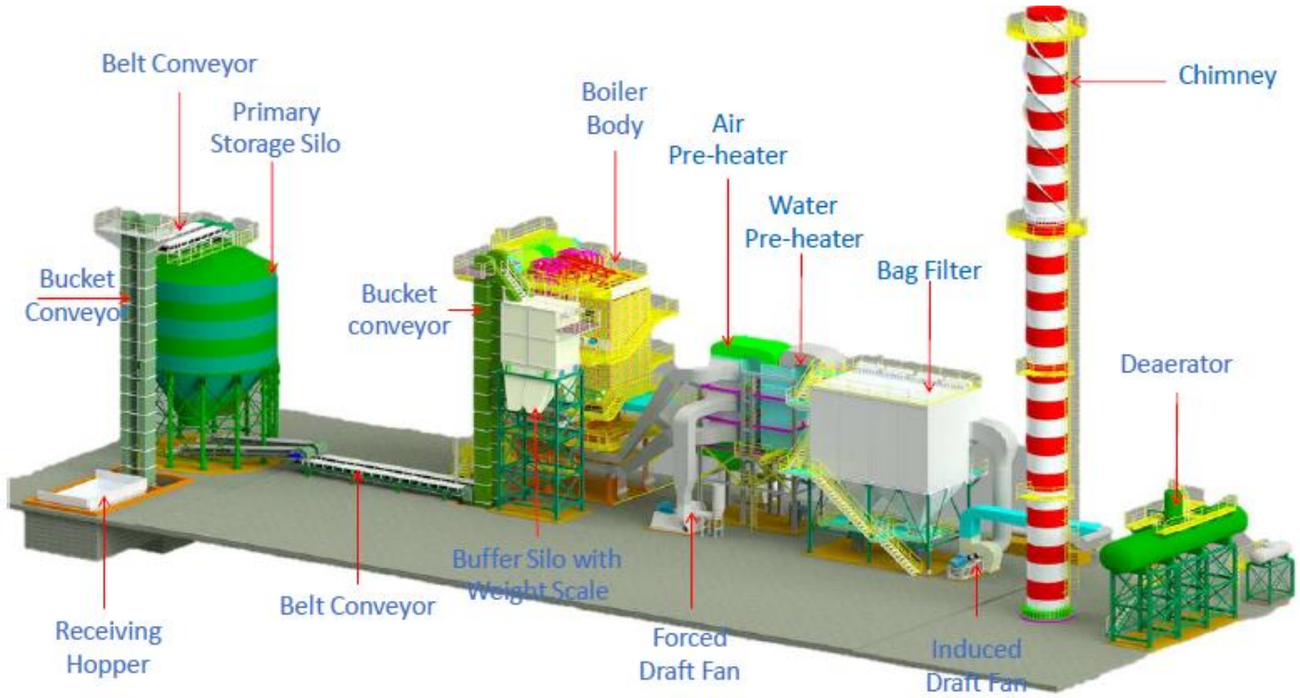
Introduction of Biomass Boiler to Chemical Factory

PP (Japan): Daiichi Jitsugyo Co., Ltd., PP (Vietnam): THUAN HAI CORPORATION

Outline of GHG Mitigation Activity

Daiichi Jitsugyo Co., Ltd. and THUAN HAI CORPORATION jointly introduce biomass (Rice husk) -fueled steam boilers to supply steam to a chemical factory located in Phu My 3 Specialized Industrial Park in Ba Ria Vung Tau Province.

The project contributes to the achievement of the country's Vision by 2030 and Green Growth Strategy through achieving decarbonization by introducing biomass-fueled steam boilers instead of fossil fuel-fired boilers.



Expected GHG Emission Reductions

16,882 tCO_2 /year

= Reference CO_2 emission－Project CO_2 emission

- Reference CO_2 emission
  = Fuel consumption by reference boiler [ton/year]
  x Emission Factor [tCO_2/ton]
- Project CO_2 emission
  = 0 [tCO_2/year]

Sites of Project

Energy Saving by Introduction of High Efficiency Water Pumps in Hue City

PP (Japan): Yokohama Water Co., Ltd. , PP (Vietnam): THUA THIEN HUE WATER SUPPLY JOINT STOCK COMPANY

Outline of GHG Mitigation Activity

High efficiency water pumps with inverter control are installed in a new water treatment plant and two existing water treatment plants owned by THUA THIEN HUE WATER SUPPLY JOINT STOCK COMPANY (HueWACO).

To perform with high efficiency, the pumps are customized to specific conditions and requirements of the recipient plants.

Moreover, highly efficient operation is possible by adjusting the rotational speed of the motor according to the change in flow rate using an inverter.

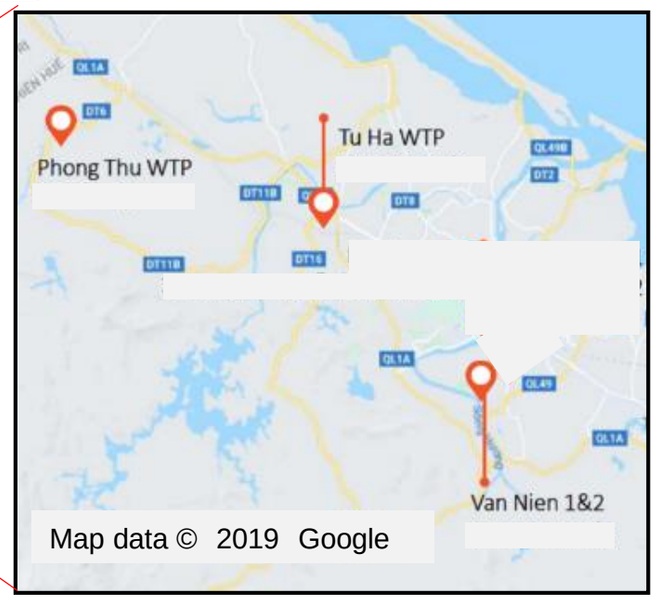
Tu Ha WTP Water distribution pump (Existing pump)

Expected GHG Emission Reductions

4,060 tCO_2/year

＝ [(Reference Power Consumptions) – (Project Power Consumptions)] x Emission Factor (EF)

Sites of Project



Waste to Energy Project in Hanoi City

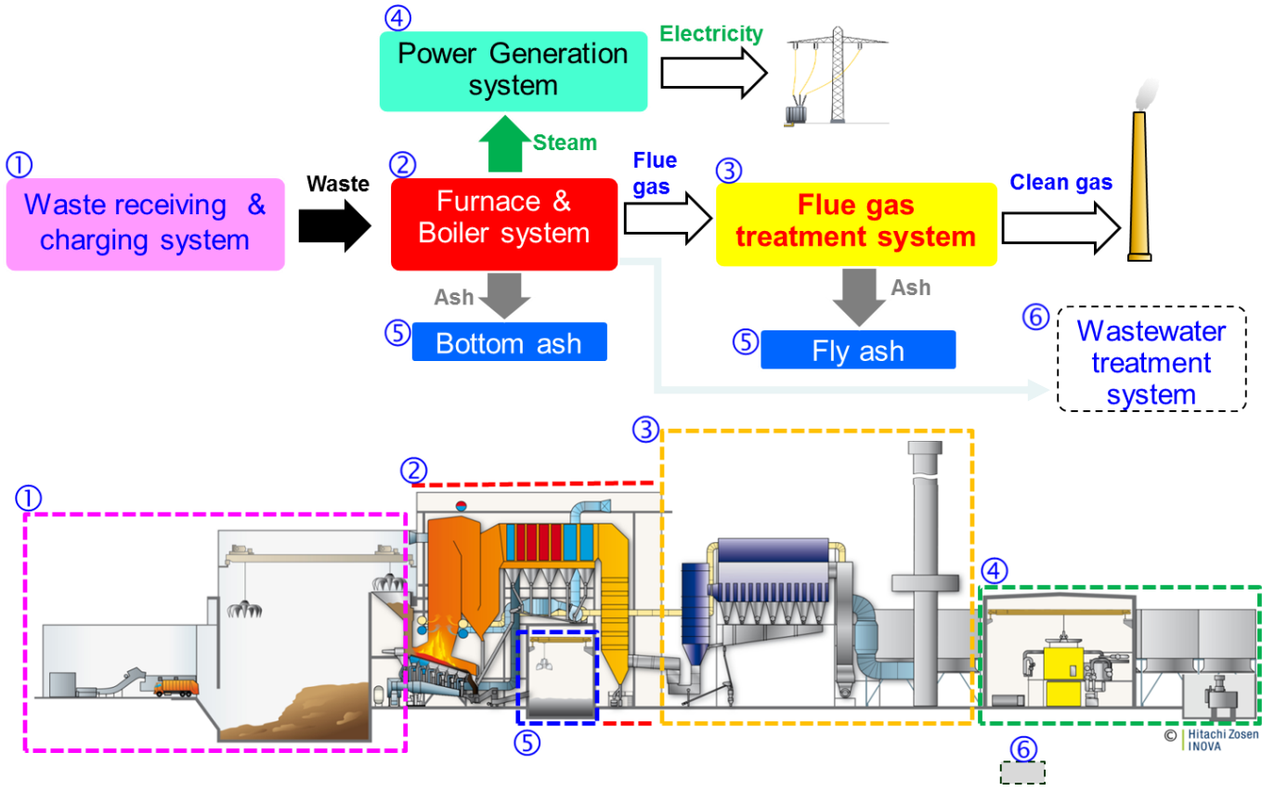
PP (Japan):Hitachi Zosen Corporation
PP (Vietnam): (SPC)T&T – HITZ ENVIRONMENT & ENERGY COMPANY LIMITED / T&T Group Joint Stock Company

Outline of GHG Mitigation Activity

The objective of this project is to build and operate Waste to Energy plant for municipal solid waste from Hanoi City in the Xuan Son Waste treatment area in the northwestern part of Hanoi, Vietnam. Hitachi Zosen and T&T Group established SPC, which is responsible for the implementation of this project.

Under the contract with the Hanoi People's Committee, 1,000tons per day of municipal solid waste generated from Hanoi city is incinerated at this plant. The waste heat will be used for power generation. Generated power will be used for internal consumption and the rest of power will be supplied to the state-owned power company EVN.

As a result, it reduces fossil fuel consumption and CH4 emissions from landfill disposal.



Expected GHG Emission Reductions

119,870tCO$_2$eq/year

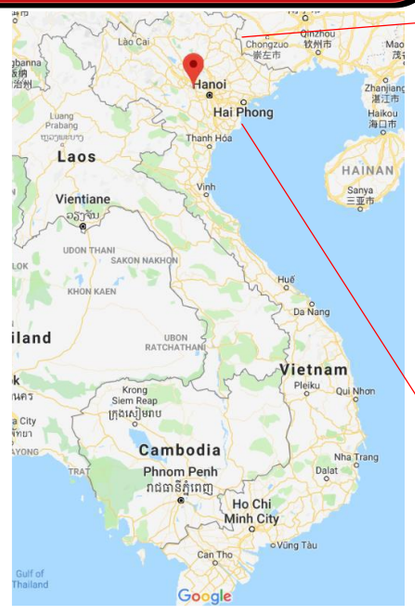
=(Reference GHG Emissions for 15 years - Project GHG Emissions for 15 years) / 15 years

=(3,393,355tCO$_2$eq – 1,595,288tCO$_2$eq) /15 years

Sites of Project

Xuan Son Waste treatment area, Ba Vi district, Hanoi
(About 80km west from Noi Bai Airport)

Total area of the site is 4.06 ha.



Map Data ©2019 Google

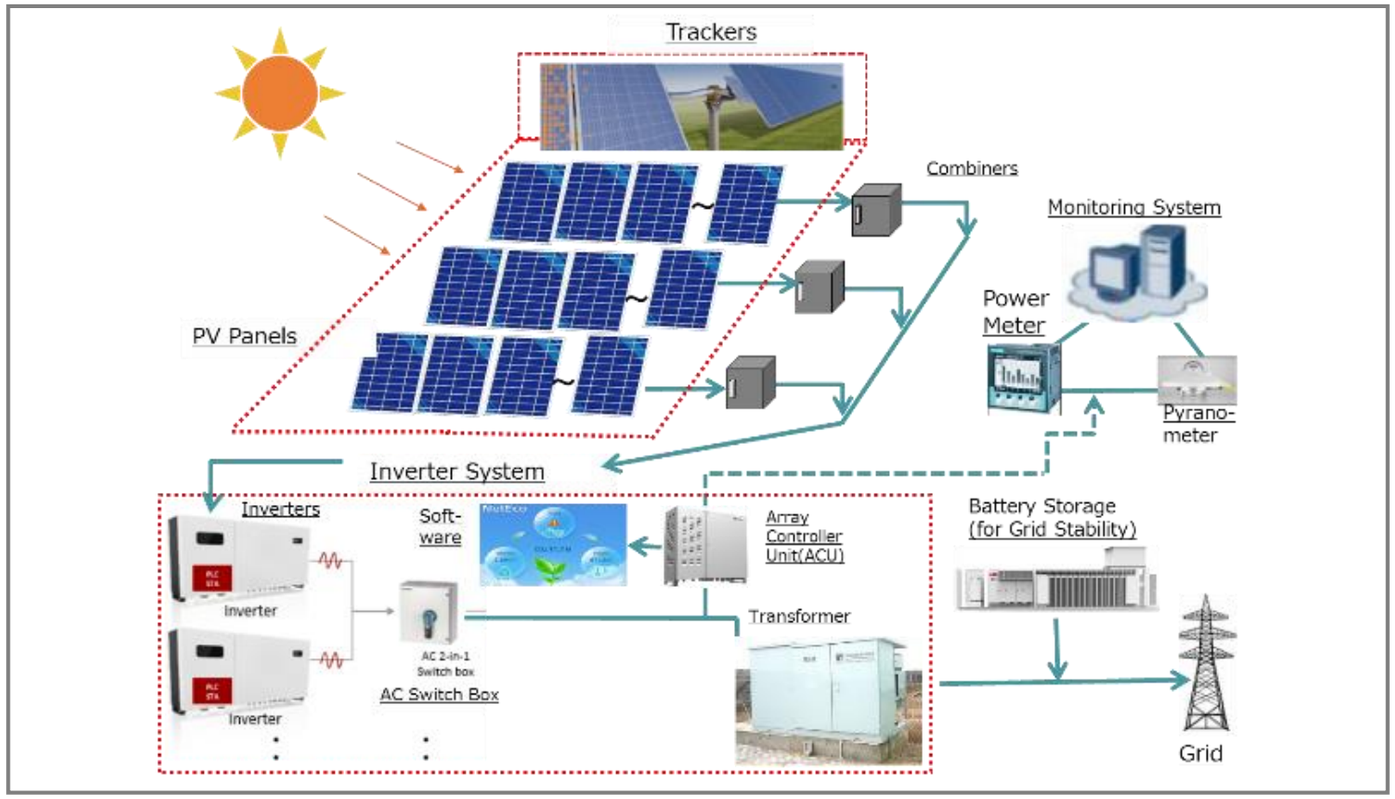
30MW Solar Power Project in La Paz city

PP (Japan): Sharp Energy Solutions Corporation , PP (Mexico): Prana Power SAPI de CV, Saferay Solar SAPI de CV

Outline of GHG Mitigation Activity

A 30MW ground-mount solar PV system is installed in Baja California Sur, Mexico, to sell power through the grid. To maximize the power generation, solar trackers are used.

This project contributes to the achievement of Mexico's policy for a Clean Energy ratio target of 35% by 2024.



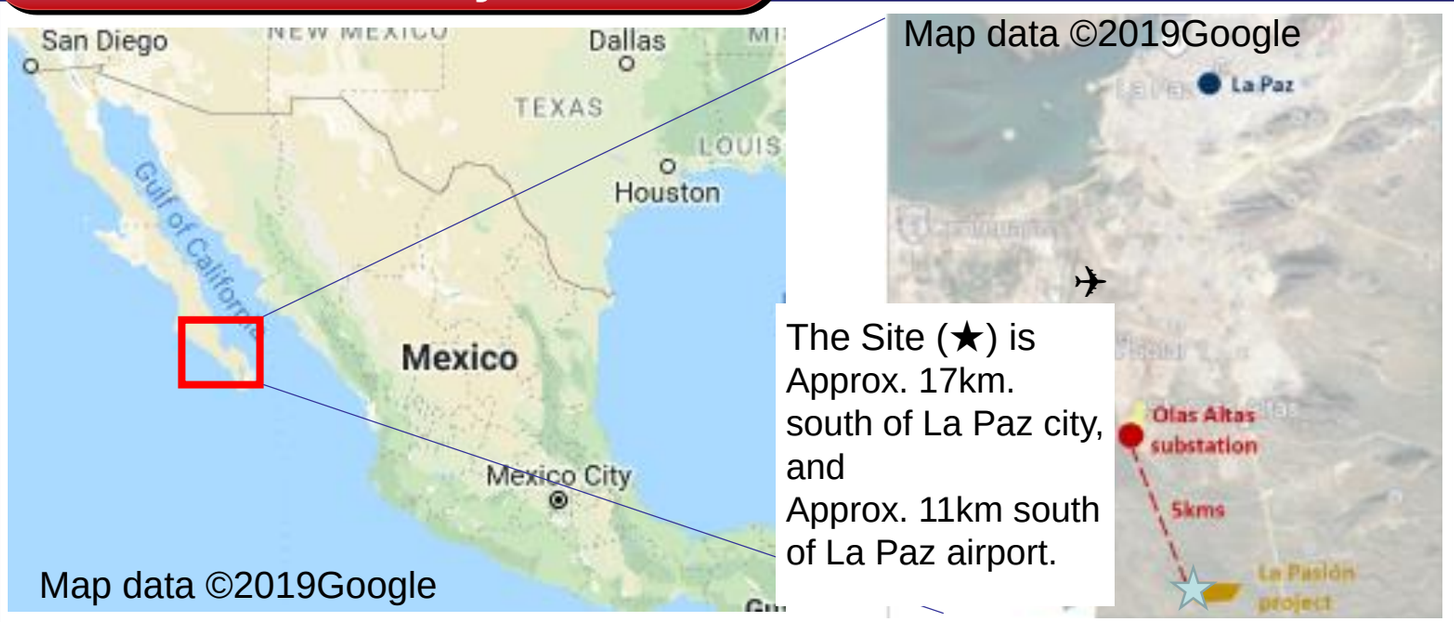
Expected GHG Emission Reductions

36,724 tCO_2/year

= (Reference CO_2 emissions) [tCO_2/year]
- (Project CO_2 emissions) [tCO_2/year]

= ((Reference power consumption) [MWh/year]
- 0 [MWh/year]) × Emission factor [tCO_2/MWh]

Site of Project



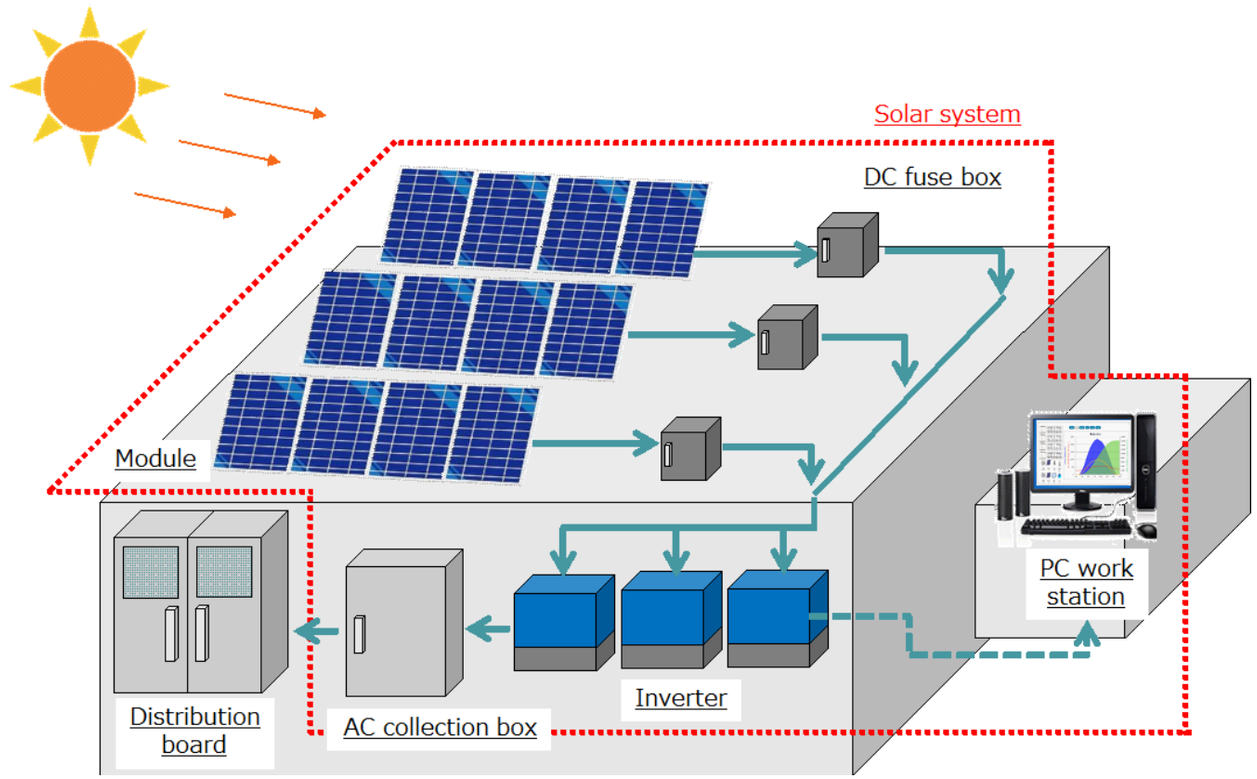
Palau/ Introduction of 1MW Solar Power System on Supermarket Rooftop

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

842 tCO_2/year

= (Reference CO_2 Emissions) [tCO_2/year]
- (Project CO_2 Emissions) [tCO_2/year]

= ((Reference Power Consumption) [MWh/year]
- 0 [MWh/year]) × Emission Factor [tCO_2/MWh]

Site of Project

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

Map Data ©2019Google