Recent Development of The Joint Crediting Mechanism (JCM)

April 2019 Ministry of the Environment, Japan

The Joint Crediting Mechanism

- Facilitating diffusion of leading low carbon technologies through contributions from Japan and evaluating realized GHG emission reductions or removals in a quantitative manner to use them for achieving Japan's emission reduction target.
- > Japan will address the high initial cost barrier of introducing advanced low-carbon technologies in the Partner countries (17 countries) through the JCM (GoJ implements several supporting schemes)



Waste heat recovery in Cement Industry, JFE engineering, Indonesia



Eco-driving with Digital Tachographs, NITTSU, Vietnam



Energy saving at convenience stores, Panasonic, Indonesia



High efficiency airconditioning and process cooling, Ebara refrigeration equipment & systems, Indonesia



High-efficiency Heat only Boilers, Suuri-Keikaku, Mongolia



Upgrading air-saving loom at textile factory, TORAY etc., Indonesia, Thai, Bangladesh



Installing solar PV system, PCKK, Palau Maldives



Amorphous transformers in power distribution, Hitachi Materials, Vietnam



Co-generation system at factory, Toyota, Nippon Steel & Sumikin Engineering, Indonesia, Thai



High efficiency airconditioning system, Hitachi, Daikin, Vietnam



Solar PV System at Salt Factory, PCKK, Kenya



Waste to Energy Plant, JFE engineering, Myanmar



High efficient refrigerator, Mayekawa MFG. Indonesia

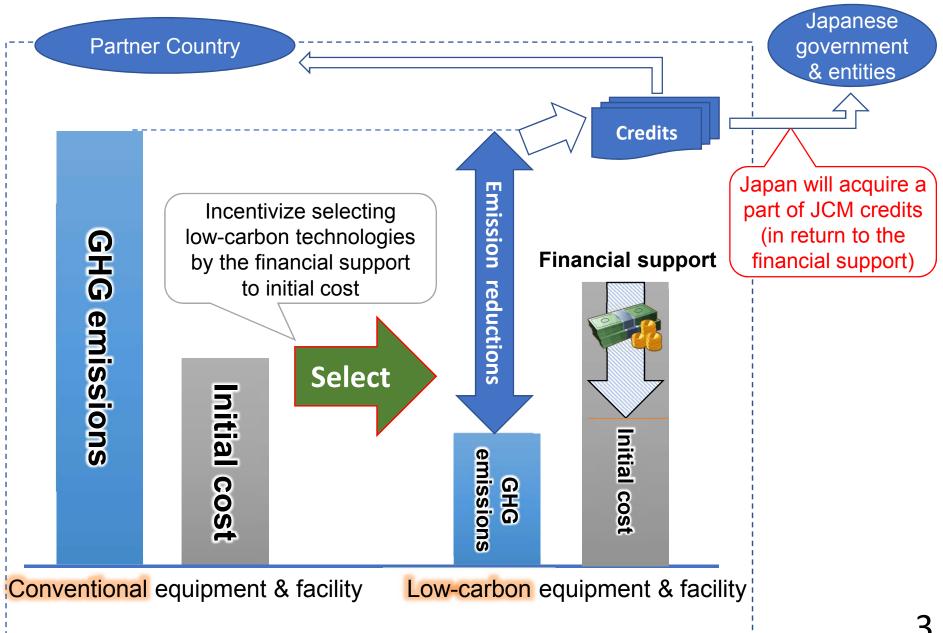


Regenerative Burners in industries, Toyotsu Machinery, Indonesia



LED street lighting system with wireless network control, MinebeaMitsumi, Cambodia

Contributions from Japan



JCM Partner Countries

➤ Japan has held consultations for the JCM with developing countries since 2011 and has established the JCM with Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar, Thailand and the Philippines.



Mongolia
Jan. 8, 2013
(Ulaanbaatar)



Bangladesh Mar. 19, 2013 (Dhaka)



Ethiopia May 27, 2013 (Addis Ababa)



Kenya Jun. 12,2013 (Nairobi)



Maldives Jun. 29, 2013 (Okinawa)



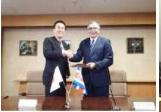
<u>Viet Nam</u> Jul. 2, 2013 (Hanoi)



Lao PDR Aug. 7, 2013 (Vientiane)



Indonesia Aug. 26, 2013 (Jakarta)



Costa Rica Dec. 9, 2013 (Tokyo)



<u>Palau</u> Jan. 13, 2014 (Ngerulmud)



Cambodia
Apr. 11, 2014
(Phnom Penh)



Mexico Jul. 25, 2014 (Mexico City)



Saudi Arabia May 13, 2015



Chile May 26, 2015 (Santiago)



Myanmar Sep. 16, 2015 (Nay Pyi Taw)



Thailand Nov. 19, 2015 (Tokyo)



the Philippines
Jan. 12, 2017
(Manila)

JCM Model Projects by MOE

The Budget for projects starting from FY 2019 is 9.9 billion JPY (approx. USD 99 million) in total by FY2021

(1 USD = 100 JPY)

Government of Japan

★Includes collaboration with projects supported by JICA and other governmental-affiliated financial institute.

Finance part of an investment cost (less than half)

1

Conduct MRV and expected to deliver at least half of JCM credits issued

International consortiums (which include Japanese entities)







- > Scope of the financing: facilities, equipment, vehicles, etc. which reduce CO2 from fossil fuel combustion as well as construction cost for installing those facilities, etc.
- ➤ Eligible Projects: starting installation after the adoption of the financing and finishing installation within three years.

JCM Financing Programme by MOEJ (FY2013~2018) as of March 31, 2019

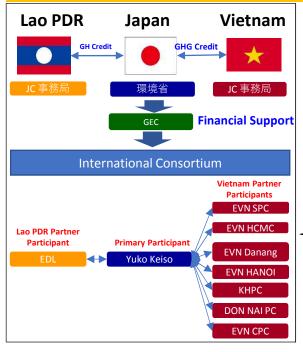
Thailand:29 projects	Mongolia:8 projects			
		3)** O2.1MW Solar PV in Farm* O10MW Solar PV*		
<u>OEnergy Saving at Convenience Store</u> <u>O1MW Solar PV on Factor</u>	1100:00			
<u>○Upgrading Air-saving Loom*</u> <u>○Centrifugal Chiller & Cor</u>	TIPI CSSOI			
<u>○Centrifugal Chiller in Tire Factory</u> <u>○Co-generation in Motoro</u>	cycle Factory 21MW Solar PV	■Upscaling Renewable Energy Sector		
OAir Conditioning System & Chiller* ORefrigeration System	Viat Name 10 avaisate			
○Ion Exchange Membrane Electrolyzer ○Chilled Water Supply Sys	stem Viet Nam:19 projects			
OLED Lighting to Sales Stores O12MW Waste Heat Reco	very in Coment Plant ODigital Tachographs*	○Amorphous transformers*		
OCo-generation System ORefrigerator and Evapor				
O2MW Solar PV O3.4MW Solar PV*	○Container Formation F	Facility ○320kW Solar PV in Shopping Mall*		
OHeat Recovery Heat Pump O5MW Floating Solar PV	OAmorphous transform	ers 2* Air-conditioning Control System		
O30MW Solar PV O30MW Solar PV O30MW Solar PV		OHigh Efficiency Water Pumps		
	Delet Flant	©Energy saving Equipment in Lens Factory ©Amorphous transformers 3		
Air-conditioning Control System OBiomass Co-generation Sy	Sterri	OEnergy Saving Equipment in Wire Production Factory		
OEnergy Saving Equipment in Port OCo-generation in Fiber Fac	OAmorphous transformer			
○25MW Solar PV in Industrial Park ○3.4MW Solar PV		nent in Brewery Factory OHigh Efficiency Chiller		
OBiomass Boiler O0.8MW Solar PV and Centr		Container OInverters for Raw Water Intake Pumps		
▲ Introduction of Scheme for F-gas Recovery and Destruction				
	▲ Collection Scheme and	Dedicated System of F-gas		
Bangladesh:6 projects		W : 6 : 1		
	Laos:4 projects	Mexico:6 projects		
OCentrifugal Chiller OLoom at Weaving Factory	● REDD+ through controlling slush-and-burn	○2.4MW Power Generation with Methane Gas Recovery System		
○315kW PV-diesel Hybrid System ○50MW Solar PV Power Plant	OAmorphous transformers	Once-through Boiler and Fuel Switching		
<u>○Centrifugal Chiller*</u> ■ High Efficiency Transmission Line	│ ○14MW Floating Solar PV ○11MW Solar PV	○64MW Wind Farm ○20MW Solar PV		
	, , , , , , , , , , , , , , , , , , ,	□ ○30MW Solar PV ○Energy Efficient Distillation System		
Saudi Arabia:1 projects		Solity Sold 1 V Selicity Efficient Distillation System		
○Electorolyzer in Chlorine	Cambodia:5 projects			
Production Plant				
Froduction Flant	OLED Street Lighting	O200kW Solar PV at International School*		
Manual 2 number to	OSolar PV & Centrifugal Chiller	○Inverters for Distribution Pumps		
Kenya: 2 projects	■ Battambang Wastewater Treatme	ent Project		
Ethiopia:1 projects O1MW Solar PV at Salt Factory				
OBiomass CHP Plant 38MW Solar PV	Palau:4 projects	Costa Rica: 2 projects		
	○370kW Solar PV for Commercial Fa	acilities*		
Myanmar: 7 projects	○155kW Solar PV for School*	Chiller and Heat Recovery System		
Tryallia 17 projects	○445kW Solar PV for Commercial Fa	acilities II*		
O700kW Waste to Energy Plant	chergy Fight			
OBrewing Systems to Brewery Factory	Maria Cara Cara Cara Cara Cara Cara Cara	Chile:2 projects		
Once-through Boiler in Instant Noodle Factory	Phillipines:8 projects			
	↑ ○15MW Hydro Power Plant ○4MW Hydro P	Ower Plant Old November 1997		
ORefrigeration System in Logistics Center	○1.53MW Rooftop Solar PV ○1MW Roofto			
○8.8MW Waste Heat Recovery in Cement Plant		Husk Power Generation		
OBrewing Systems and Biogas Boiler to Brewery Factory	0.16MW Micro Hydro Power Plant 04MW Solar P			
3 4, 44 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Ou. Tolyw Micro Hydro Power Plant O4MW Solar P			
Maldivog 2 projects	Indonesia 21 projects			
Maldives: 2 projects	Indonesia:31 projects			
○186kW Solar Power on School Rooftop*		gy Saving at Convenience Store*		
■Smart Micro-Grid System		ole Bundle-type Heat Pump*		
	Ocentrifugal Chiller at Textile Factory 2*	W Waste Heat Recovery in Cement Industry*		
O Model Project in FY 2013 (7 projects in 3 countries)	○507kW Solar Power Hybrid System ○ Rege	nerative Burners		
O Model Project in FY 2014 (12 projects in 5 countries)		Corrugated Cartons Process*		
■ ADB Project in FY 2014 (1 project in 1 country)		rifugal Chiller in Shopping Mall*		
Model Project in FY 2015 (32 projects in 10 countries)		-through Boiler System in Film Factory		
Model Project in FY 2016 (25 projects in 10 countries)				
O Model Project in FY 2016 (35 projects in 10 countries)	Gas Co-generation System Once-through Boiler in Golf Ball Factory Once-through governors cluster and burns			
 REDD+ Model Project (2 projects in 2 countries) 	○1.6MW Solar PV in Jakabaring Sport City* ● REDD+ through controlling slush-and burn ○1.6MW Linday Private Plant ○1.6MW Solar PV in Jakabaring Sport City*			
○ Model Project in FY 2017 (19 projects in 8 countries)	O10MW Hydro Power Plant OLooms in Weaving Mill OLED Lighting to Sales Stores			
■ ADB Project in FY 2017 (1 project in 1 country)	<u>OIndustrial Wastewater Treatment System</u> <u>O.5MW Solar PV*</u>			
 Model Project in FY2018 (24 projects in 11 countries) 	○ Absorption Chiller ○10MW Hydro Power Plant			
■ ADB Project in FY 2018 (2 projects in 2 country)	OHigh Efficiency Autoclave OCNG-	Diesel Hybrid Public Bus ORehabilitation of Hydro Power Plant		
▲ F-gas Project in FY 2018 (2 projects in 2 country)		tion Molding Machine		
2 1-gas Frojecti III i 2010 (2 projects III 2 country)	S == Signass : Sins:sinc			

Other 1 project in Malaysia
 Total 137 projects in 17 partner countries

Underlined projects have started operation (88 projects)
Projects with * have been registered as JCM projects (34 projects)

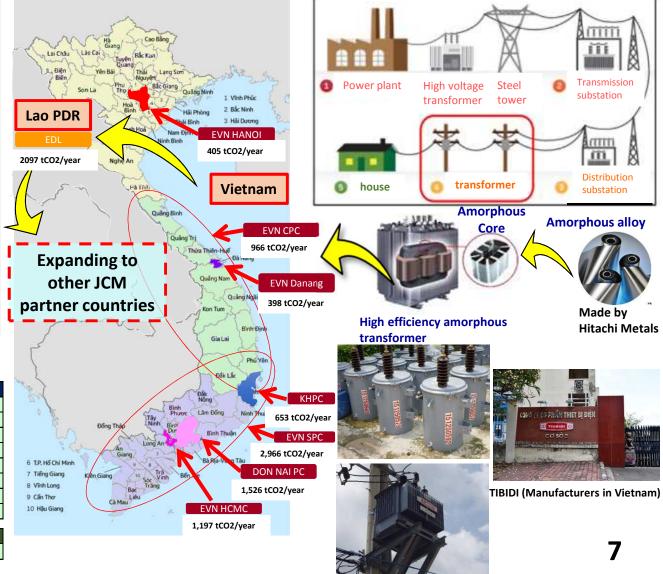
JCM Expansion Example 1: High efficiency amorphous transformers from Vietnam to Lao PDR

- ★ Transformers in Vietnam are being replaced with amorphous high efficiency transformers from 2015 through 2020.
- ★Succeeded in developing the same product and technology in Lao PDR since 2018. Preparing for expansion to other countries.
- ★ Providing excellent amorphous alloy low carbon technology. A total of 10,000 transformers introduced throughout Vietnam.



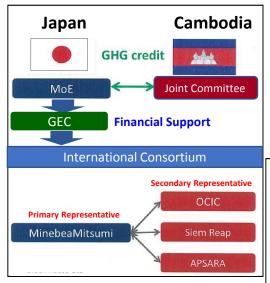
Amount of amorphous transformer introduced (as of JAN2019)

ベトナム	FY2015	FY2016	FY2017	FY2018	Total	
EVN SPC	1,618	2,686	2,507		6,811	
EVN HCMC		552	340		892	
EVN CPC		981			981	
EVN Danang		282			282	
EVN HANOI		121	65		186	
KHPC		111	305	30	446	
DON NAI PC		168	580	207	955	
Total	1,618	4,901	3,797	237	10,553	
ラオス	FY2015	FY2016	FY2017	FY2018	Total	
EDL				465	465	

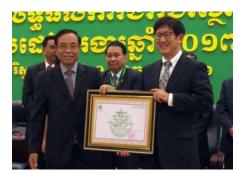


JCM Expansion Example 2: Expansion into smart city environment from LED street light network in Cambodia

- ★70% energy saving is achieved by LED street light in emerging city and world heritage.
- ★Commenced joint study with local partners to build smart city environment by wireless network environment deployment.
- ★LED street light of 5,600 installed in Cambodia such as Phnom Penh and Angkor Wat (total installation area is 120km in total).



The total footprint of the LED street light is 1.5 times that of Manhattan Island (120km)



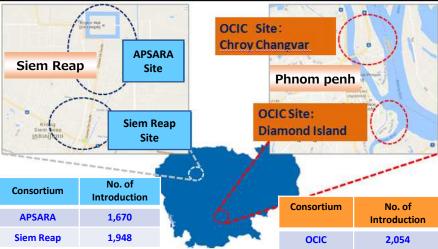
December 2016
Received Minister of the Environment
Award in Cambodia



APSARA (Angkor Wat)



OCIC Chroy Changvar



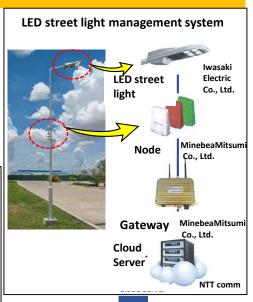
Actual number installed in Cambodia



Siem Reap Provincial Hall (SRPH)



OCIC Diamond Island





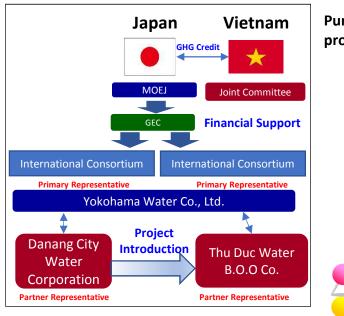
Deploying various IOT sensors and wireless networking environments will enable the Smart City environmental infrastructure.



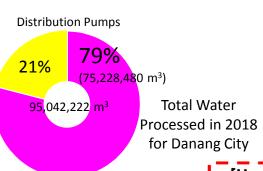
JCM Expansion Example 3: Basic infrastructure of water business in Vietnam

- ★ Yokohama City and Da Nang City signed a Memorandum of Understanding on Technical Cooperation for Sustainable Urban Development.
- *Representative participant utilized JCM Model Project to Danang municipal water supply corporation, introduced high efficiency pumps and conducted monitoring.
- ★ About 80% of the water treatment volume of Da Nang City is treated by JCM introduction pump.

Introduction of high efficiency pump to Danang municipal water supply corporation (representative Participant: Yokohama Water Co., Ltd.)



Pumps installed through the JCM project process major part of Danang water demand.



Pumps installed through the JCM

project

Other pumps

[Ho Chi Minh City **Water Treatment** Plant]

Using the ceremony as an opportunity, JCM Model Project was utilized implementation of inverter of water intake pump (project)



7 Tiếng Giang Thu Duc Water B.O.O Co. 8 Vinh Long (Ho Chi Minh City Water 10 Hậu Giang **Purification Plant**)

Vietnam

[Danang City Water

Corporation

Explained the effectiveness of

JCM Model Project and high efficiency pump at the ceremony

> **Danang City Water** Corporation

Thứa Thiên-Huế

6 T.P. Hổ Chỉ Minh

9

High efficiency pumps (Da Nang City Water Corporation)



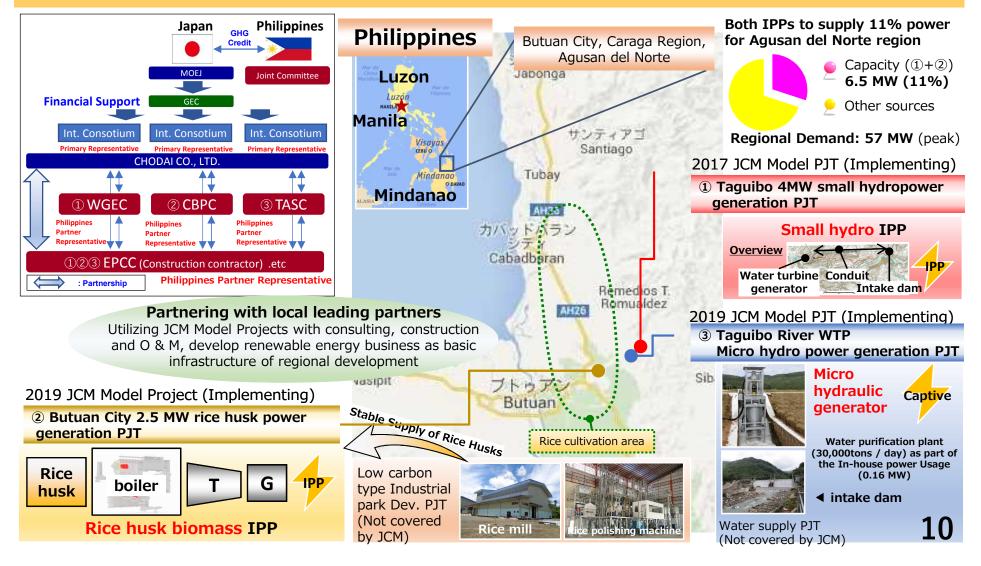




JCM Expansion Example : Basic Infrastructure of Regional Development in the Philippines

- The representative participant aims to realize a stable supply of basic infrastructure by participating in and investing in power generation and water supply against the unstable infrastructure of Butuan City.
- Small/micro hydropower generation and biomass power generation are implementing by three JCM Model Projects.
- Partnering with local leading partners, developing three projects. Supply 10% of peak demand in Northern Agusan.

Taguibo River Small Hydroelectric Power Project / Taguibo River Water Treatment Plant Micro Hydro Power Project / Butuan City Rhinoceros Power Generation Project (Representative Participant: CHODAI CO.,LTD.)



JCM Expansion Example (5): Large-scale photovoltaic power generation projects in Mongolia

- ★ Implemented six large-scale solar power project using Japanese superior technologies in various places in Mongolia from 2015 to 2018. Promoted new private investments triggered by introduction in JCM.
- ★ Sharp Energy Solutions has implemented four projects (currently operating at two locations and introducing at two locations).
- ★ Firm Do has implemented a new model by combining agriculture and PV power generation at Monnaran.



Project Cycle of the JCM and the CDM

JCM CDM <Main actors at each process> **Submission of** Project Participant / Each Government **Proposed** Project Participant Joint Committee Methodology **Approval of Proposed CDM Executive Board** Joint Committee Methodology **Development Project Participant Project Participant** conducted by the same TPE of PDD simultaneously **Designated Operational Entities** Third Party Entities **Validation** (DOEs) Registration Joint Committee **CDM Executive Board** conducted **Monitoring Project Participant Project Participant DOEs** Verification Third Party Entities be be Joint Committee decides the amount Issuance Can **CDM Executive Board** Each Government issues the credit of credits