Ministry of the Environment

Support of leading low-carbon technologies for developing countries

開発途上国への低炭素技術導入支援の取組

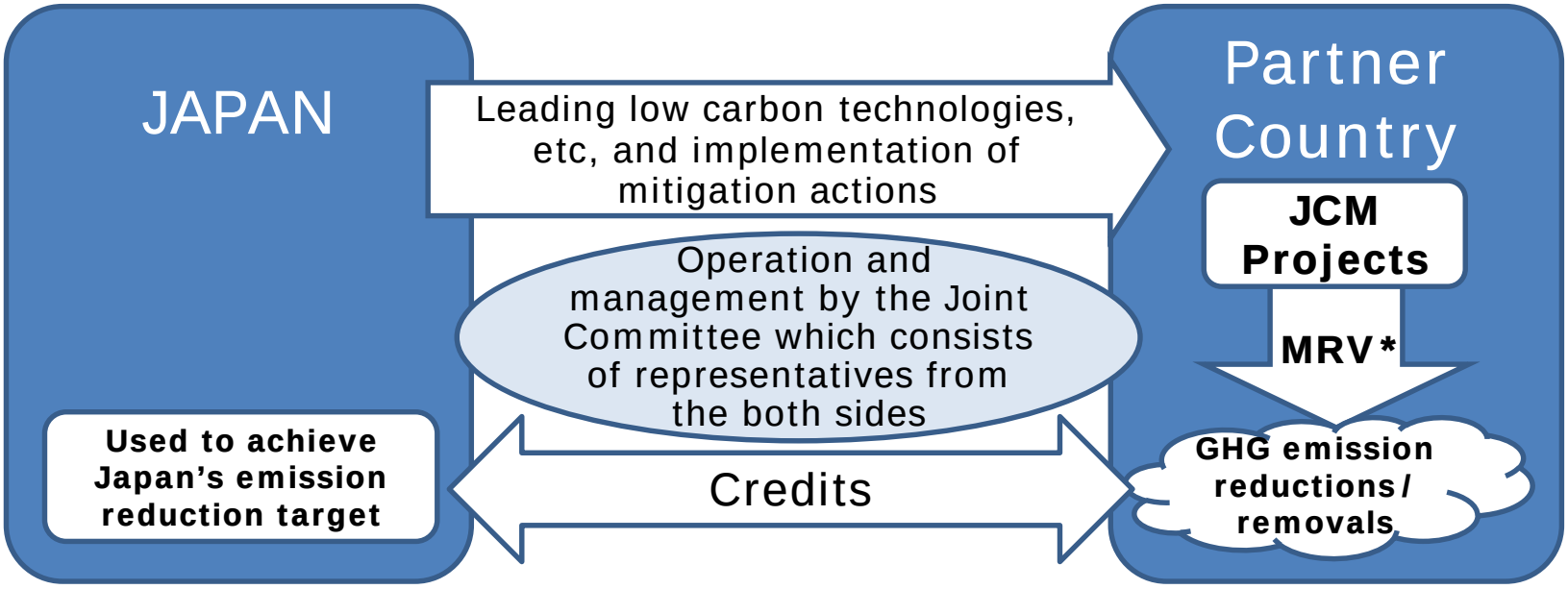
July 2019

All ideas are subject to further consideration and discussion with partner countries

Recent Development of The Joint Crediting Mechanism (JCM)

Basic Concept of the JCM

- Facilitating diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries.
- 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

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 as of Feb. 2018) 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 air-conditioning 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 air-conditioning system, Hitachi, Daikin, Vietnam

Solar PV System at Salt Factory, PCKK, Kenya

Waste to Energy Plant, JFE engineering, Myanmar

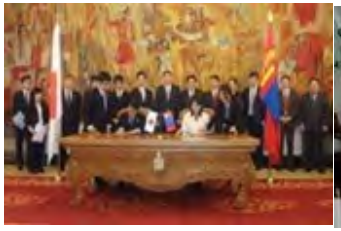
High efficient refrigerator, Mayekawa MFG, Indonesia

Regenerative Burners in industries, Toyotsu Machinery, Indonesia

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

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.



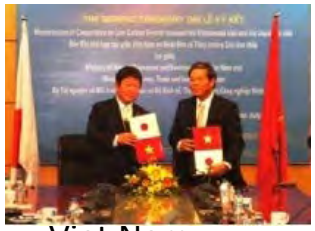
Mongolia
Jan. 8, 2013
（Ulaanbaatar）

Bangladesh
Mar. 19, 2013
(Dhaka)

Ethiopia
May 27, 2013
(Addis Ababa)

Kenya
Jun. 12,2013
(Nairobi)

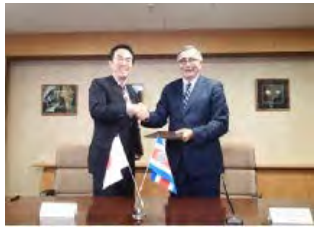
Maldives
Jun. 29, 2013
(Okinawa)



Viet Nam
Jul. 2, 2013
(Hanoi)

Lao PDR
Aug. 7, 2013
(Vientiane)

Indonesia
Aug. 26, 2013
(Jakarta)



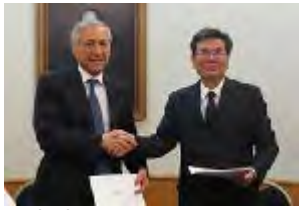
Costa Rica
Dec. 9, 2013
(Tokyo)

Palau
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

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

(1 USD = 100 JPY)

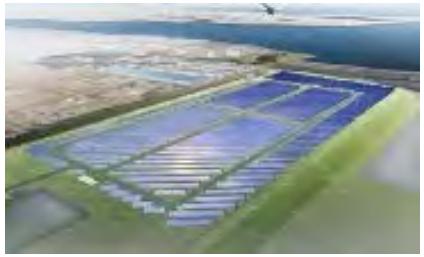
※Includes collaboration with projects supported by JICA and other governmental-affiliated financial institute.

Government of Japan

Finance part of an investment cost (**less than half**)

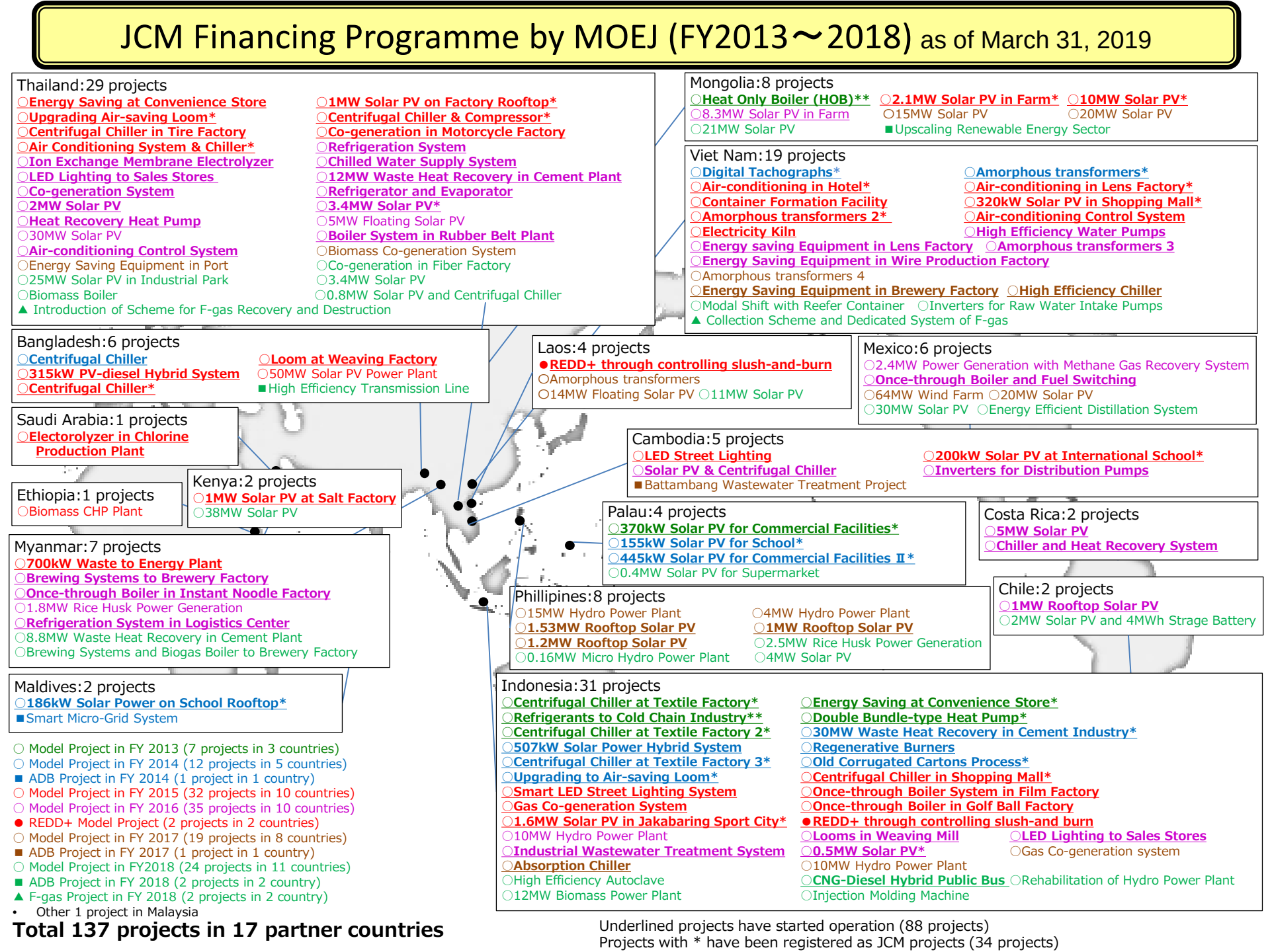
Conduct MRV and expected to deliver at least half of JCM credits issued

International consortiums
(which include Japanese entities)



- Scope of the financing: facilities, equipment, vehicles, etc. which reduce CO_2 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

- ○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
- ○Energy Saving Equipment in Port
- ○25MW Solar PV in Industrial Park
- ○Biomass Boiler
- ○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
- ○Co-generation in Fiber Factory
- ○3.4MW Solar PV
- ○0.8MW Solar PV and Centrifugal Chiller
- ▲ Introduction of Scheme for F-gas Recovery and Destruction

Mongolia:8 projects

- ○Heat Only Boiler (HOB)**
- ○8.3MW Solar PV in Farm
- ○21MW Solar PV
- ○2.1MW Solar PV in Farm*
- ○15MW Solar PV
- ■Upscaling Renewable Energy Sector
- ○10MW Solar PV*
- ○20MW Solar PV

Viet Nam:19 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
- ○Amorphous transformers 4
- ○Energy Saving Equipment in Brewery Factory
- ○Modal Shift with Reefer Container
- ▲ Collection Scheme and Dedicated System of F-gas
- ○Amorphous transformers*
- ○Air-conditioning in Lens Factory*
- ○320kW Solar PV in Shopping Mall*
- ○Air-conditioning Control System
- ○High Efficiency Water Pumps
- ○Amorphous transformers 3
- ○High Efficiency Chiller
- ○Inverters for Raw Water Intake Pumps

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:6 projects

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

Saudi Arabia:1 projects

- ○Electorolyzer in Chlorine Production Plant

Cambodia:5 projects

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

Kenya:2 projects

- ○1MW Solar PV at Salt Factory
- ○38MW Solar PV

Ethiopia:1 projects

- ○Biomass CHP Plant

Palau:4 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

Costa Rica:2 projects

- ○5MW Solar PV
- ○Chiller and Heat Recovery System

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

Phillipines:8 projects

- ○15MW Hydro Power Plant
- ○1.53MW Rooftop Solar PV
- ○1.2MW Rooftop Solar PV
- ○0.16MW Micro Hydro Power Plant
- ○4MW Hydro Power Plant
- ○1MW Rooftop Solar PV
- ○2.5MW Rice Husk Power Generation
- ○4MW Solar PV

Chile:2 projects

- ○1MW Rooftop Solar PV
- ○2MW Solar PV and 4MWh Strage 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

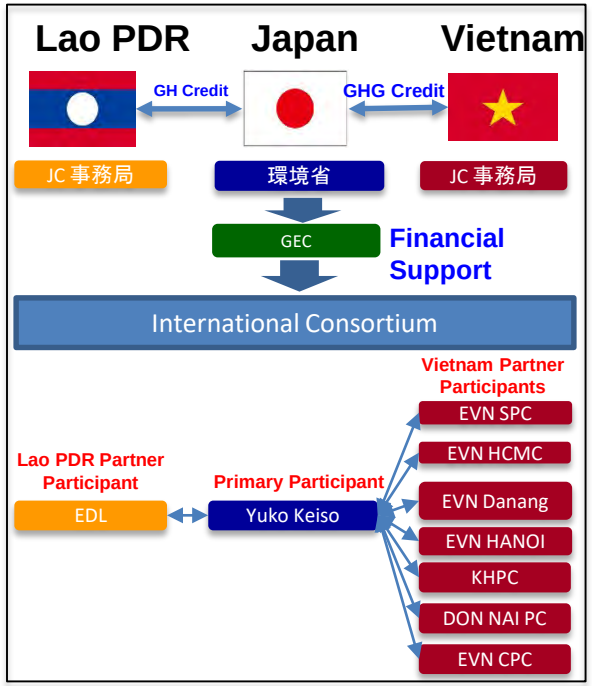
○ Model Project in FY 2013 (7 projects in 3 countries)
○ Model Project in FY 2014 (12 projects in 5 countries)
■ ADB Project in FY 2014 (1 project in 1 country)
○ Model Project in FY 2015 (32 projects in 10 countries)
○ Model Project in FY 2016 (35 projects in 10 countries)
● REDD+ Model Project (2 projects in 2 countries)
○ Model Project in FY 2017 (19 projects in 8 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)
• Other 1 project in Malaysia

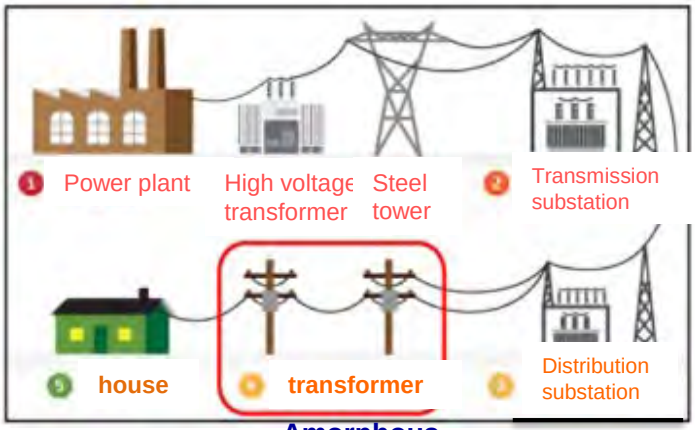
Total 137 projects in 17 partner countries

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

JCM Expansion Example①：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.





Made by Hitachi Metals

High efficiency amorphous transformer

TIBIDI (Manufacturers in Vietnam)

Amount of amorphous transformer introduced (as of JAN2019)

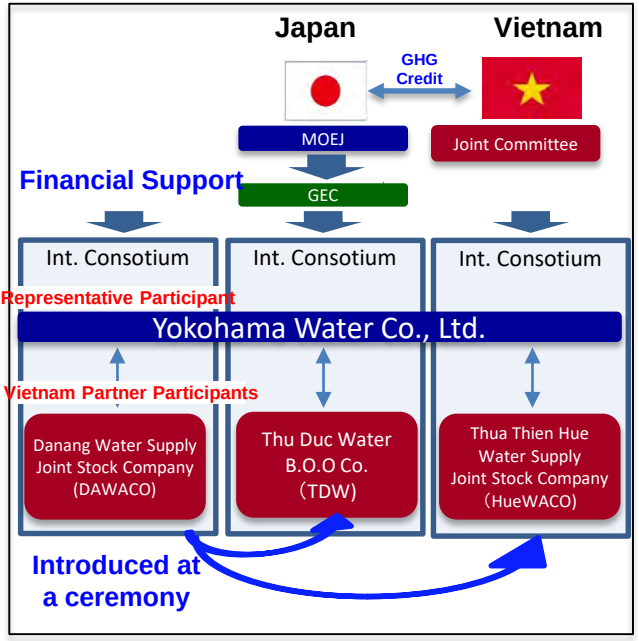
ベトナム	FY2015	FY2016	FY2017	FY2018	Total
EVN SPC	1,618	2,686	2,507		6,811
EVN HCMC		552	340		892
EVN CPC		981			981
EVN Danang		282			282
EVN HANOI		121	65		186
KHPC		111	305	30	446
DON NAI PC		168	580	207	955
Total	1,618	4,901	3,797	237	10,553

ラオス	FY2015	FY2016	FY2017	FY2018	Total
EDL				465	465

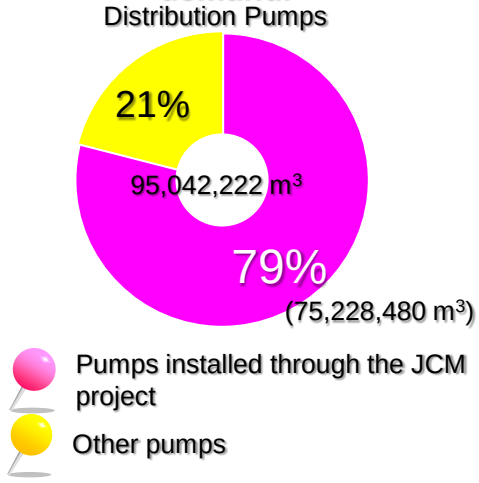
JCM Expansion Example② ：Basic infrastructure of water business in Vietnam

★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 introduce high efficiency pumps to Danang Water Supply Joint Stock Company. Monitoring is being conducted.
★Based on the achievement in Danang project, JCM Model Project is expanding to other cities in Vietnam, such as Ho Chi Minh and Hue.

Introduction of high efficiency pumps and inverters in Vietnam (Representative Participant: Yokohama Water Co., Ltd.)

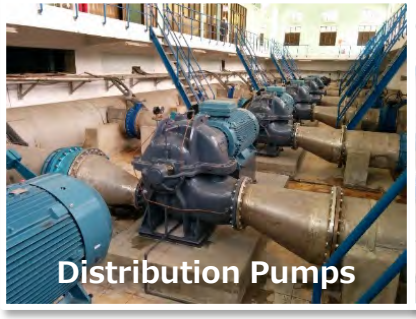


Pumps installed through the JCM project process major part of Danang water demand.



Total Water Processed in 2018 for Danang City

High efficiency pumps
(Danang Water Supply Joint Stock Company)



[Hue City]
The success of the Danang project helped to accelerate the decision making process. HueWACO decided to install high efficiency water pumps with inverters. (installing)

Thua Thien Hue Water Supply Joint Stock Company (HueWACO)

Danang Water Supply Joint Stock Company (DAWACO)

[Danang City]
Explained the effectiveness of JCM Model Project and high efficiency pumps at the ceremony

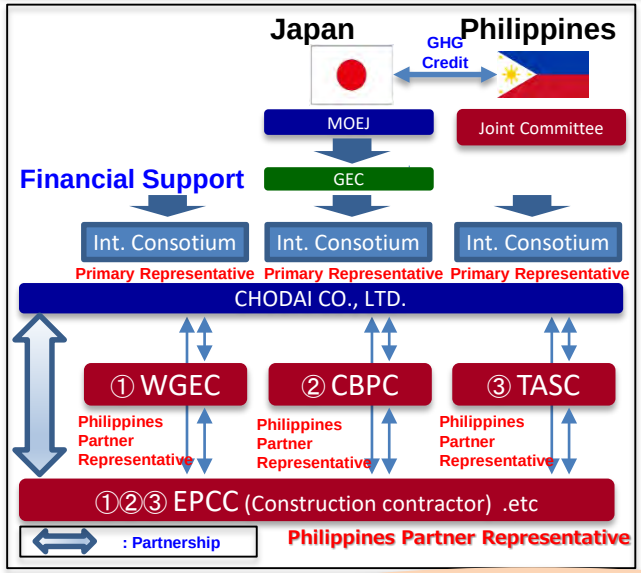
[Ho Chi Minh City]
Using the ceremony as an opportunity, JCM Model Project was utilized implementation of inverters of water intake pumps (installing)

Thu Duc Water B.O.O Co. (Ho Chi Minh City Water Treatment Plant)

JCM Expansion Example③：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.)



Partnering with local leading partners
Utilizing JCM Model Projects with consulting, construction and O & M, develop renewable energy business as basic infrastructure of regional development

Both IPPs to supply 11% power for Agusan del Norte region

Regional Demand: 57 MW (peak)

2017 JCM Model PJT (Implementing)

① Taguibo 4MW small hydropower generation PJT

Small hydro IPP

2019 JCM Model PJT (Implementing)

③ Taguibo River WTP Micro hydro power generation PJT

Micro hydraulic generator

Captive

Water purification plant (30,000tons / day) as part of the In-house power Usage (0.16 MW)

◀ intake dam

Water supply PJT (Not covered by JCM)

2019 JCM Model Project (Implementing)

② Butuan City 2.5 MW rice husk power generation PJT

Rice husk biomass IPP

Low carbon type Industrial park Dev. PJT (Not covered by JCM)

International Cooperation between MOEJ and India

International Cooperation between MOEJ and India

Comprehensive Cooperation

- Held the "First Senior Officials' Meeting of Indo-Japan Policy Dialogue on Environment" in Delhi in April 2018. Between MOEJ and MoEFCC agreed to form cooperation in the environmental field.
- The Memorandum of Cooperation (MOC) between MOEJ and MoEFCC was signed when PM Modi visited Japan in October 2018. The MOC includes "waste management/recycling", "Johkasou/water quality management", "climate change" and "air pollution".

Waste Management/recycling

- Held the "8th Regional 3R Forum in Asia and the Pacific" in cooperation with the Indian Ministry of Housing and Urban Affairs in Indore in April 2018.
- Promote waste-to-energy projects to improve India's waste management by utilizing Japan's leading technology.

Johkasou/water quality treatment

- Johkasou seminars and field surveys have started in 2017 to share knowledge on Johkasou technology and its system, and promote Japanese companies activities in India.
- Seminars have been held in Mumbai and Chennai, and surveys in Nagpur and Chennai respectively. The next seminar is planned to be held in Delhi, this FY.

Air pollution

- Implementing a capacity development program for large Indian cities since 2017, through international NGO Clean Air Asia, to support MoEFCC's "National Clean Air Programme".
- Hold seminars to introduce Japanese technology and workshops for decision makers of 4 Indian cities.

Climate change

- Continue to discuss on the Joint Crediting Mechanism (JCM).
- Operating the "The Japan-India Technology Matchmaking Platform" to match Japanese and Indian companies regarding low carbon technology.
- Hold the "Japan-India Climate Policy Research Workshop" since 2005.

Progress of JCM establishment with India

1 . Latest Status of JCM discussion between India and Japan

"Japan- India vision statement in Japan-India Summit Meeting in 2018"

Underscoring the need for concerted global action to combat climate change, in line with the Paris Agreement adopted under UN Framework Convention on Climate Change (UNFCCC), they shared the view to play a leading role in this field, and reiterated their commitment to finalising the work programme for implementation of the Paris greement and ***accelerate further consultations for establishing the Joint Crediting Mechanism.***

Japan-India Summit Meeting

2 . Activities related to the JCM

"Workshop on the Joint Crediting Mechanism (JCM)
: Exploring opportunities in India"

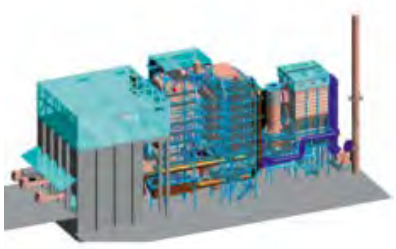
- This event was jointly organized by The Energy and Resource Institute (TERI), Ministry of the Environment Japan, and the Institute for Global Environmental Strategies (IGES) on 27th July 2018.
- The participants from Japanese and Indian stakeholder's including policy makers, industry representatives and research experts.
- The participants shared their views on ways to promote the deployment of low carbon technologies and best practices in India through potential opportunities under JCM.

Workshop on the JCM

3 . Next actions in 2019

- JCM study trip to Japan will be held in this fall.
  - Discussion with Japanese companies which have implemented JCM project
  - Visit to Japanese companies sites such as advanced Waste Treatment site
- Accelerate the discussion for establishing the JCM.

Japan’s Blue Sky Initiatives

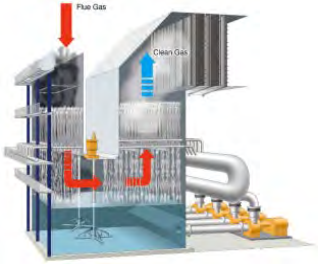


Waste Incineration Facility (Waste to Energy Plant)

Solar Pump System for Irrigation

Biomass Fuels

Environmental Equipment for Coal Thermal Power Plants



Dust Suppressants

Next Generation Vehicle

Intelligent Transport System

Smart Telecom Towers

The Embassy of Japan in India launched “Japan‘s Blue Sky Initiatives” to promote cooperation in controlling India’s air pollution by making full use of Japanese knowledge and technology. The “Japan’s Blue Sky Initiatives” is comprised of a list of efforts implemented by Japanese public and private sectors in India to improve air pollution. The Embassy of Japan intends to further expand efforts under the “Japan’s Blue Sky Initiatives” in cooperation with Japanese companies and organizations.