Updating development of the Joint Crediting Mechanism (JCM) and prospects under the Paris Agreement

Preparation and demonstrating actions for the Paris Agreement 6.2

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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 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

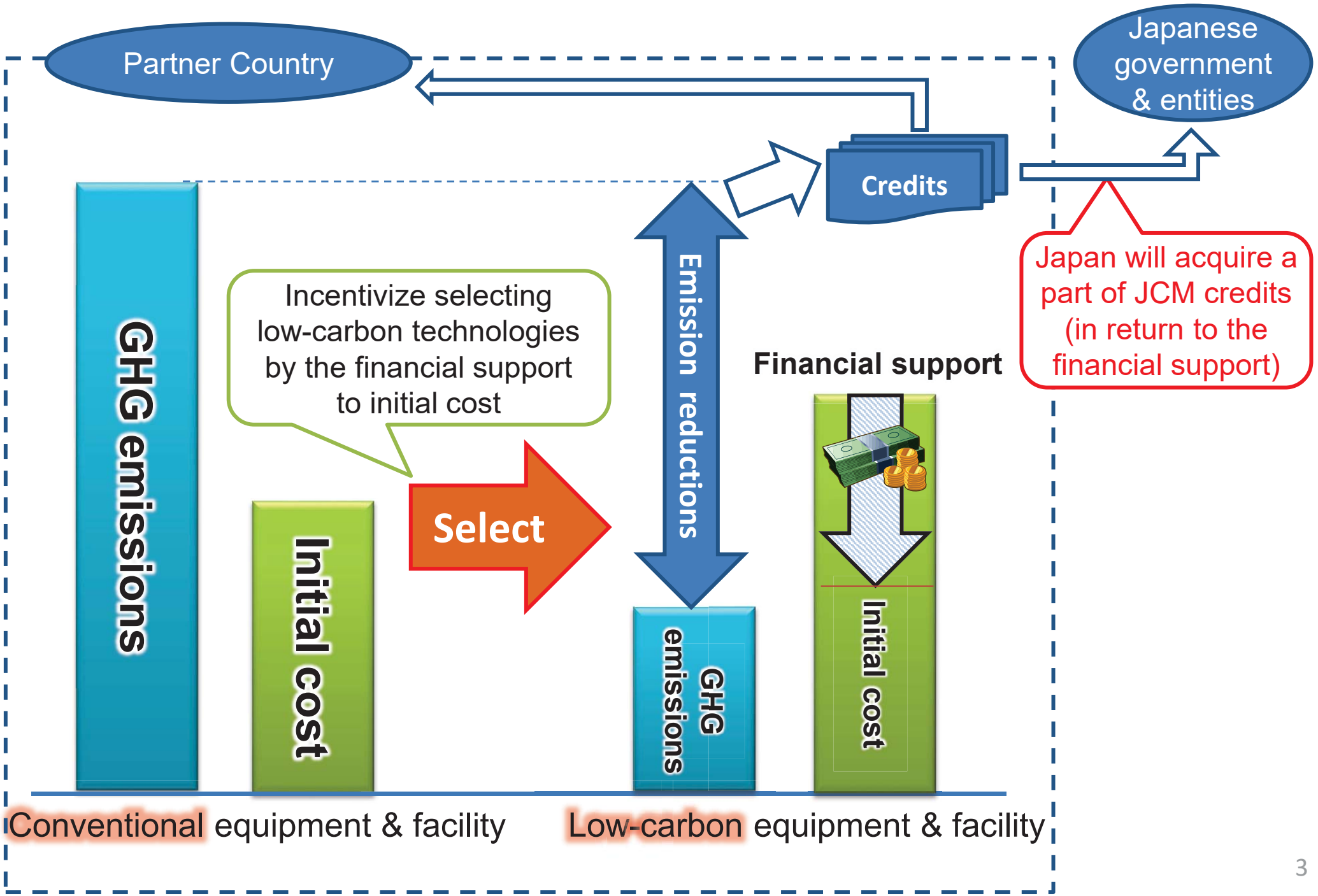
Waste to Energy Plant, JFE engineering, Myanmar

High efficient refrigerator, Mayekawa MFG, Indonesia

Regenerative Burners in industries, Toyotsu Machinery, Indonesia

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

Contributions from Japan



Statement by Prime Minister Shinzo Abe at the COP21 (Excerpt)

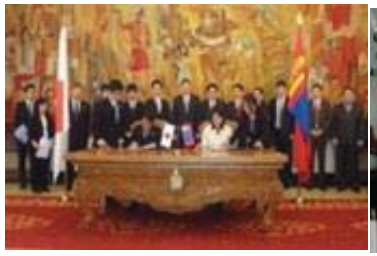
PARIS2015
CONFÉRENCE DES NATIONS UNIES
SUR LES CHANGEMENTS CLIMATIQUES
COP21·CMP11

The second component of Japan's new set of contribution is innovation. The key to acting against climate change without sacrificing economic growth is the development of innovative technologies. To illustrate, there are technologies to produce, store and transport hydrogen towards realizing CO2–free societies, and a next-generation battery to enable an electric car to run 5 times longer than the current level. By next spring Japan will formulate the "Energy and Environment Innovation Strategy." Prospective focused areas will be identified and research and development on them will be strengthened. (snip)

In addition, many of the advanced low-carbon technologies do not generally promise investment-return to developing countries. Japan will, while lowering burdens of those countries, promote diffusion of advanced low carbon technologies particularly through implementation of the JCM.

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.



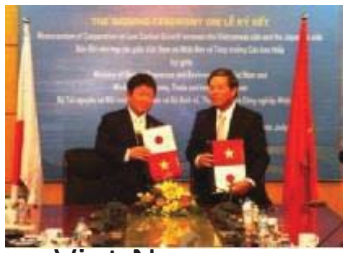
Mongolia
Jan. 8, 2013
（Ulaanbaatar）

Bangladesh
Mar. 19, 2013
(Dhaka)

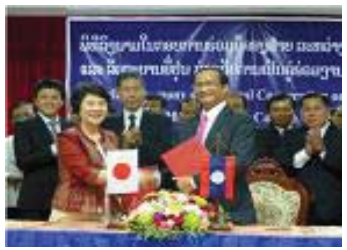
Ethiopia
May 27, 2013
(Addis Ababa)

Kenya
Jun. 12,2013
(Nairobi)

Maldives
Jun. 29, 2013
(Okinawa)

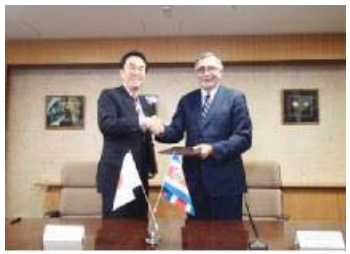


Viet Nam
Jul. 2, 2013
(Hanoi)

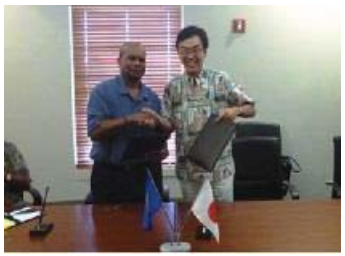


Lao PDR
Aug. 7, 2013
(Vientiane)

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)

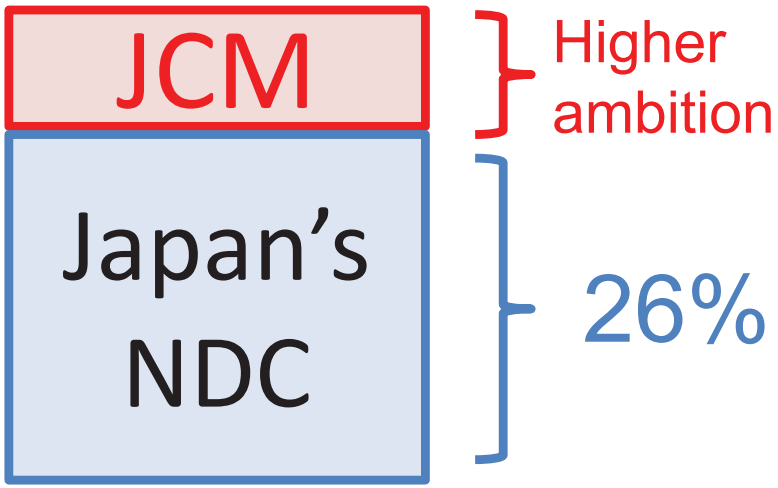
Myanmar
Sep. 16, 2015
(Nay Pyi Taw)

Thailand
Nov. 19, 2015
(Tokyo)

the Philippines
Jan. 12, 2017
(Manila)

Japan's emission reduction target and the JCM

- Japan will achieve the target of 26% reduction through domestic emission reductions and removals without using international credits while the amount of credits acquired by Japan under the JCM will be appropriately counted as Japan's reduction.
- 10 million tCO2 is expected to be realized by 2030 from the pipeline projects.
- Implementation of JCM projects is to be scaled-up through further mobilization of private sector finance.



"Plan for Global Warming Countermeasures (Cabinet Decision, May 2016)"

- *Apart from contributions achieved through private-sector based projects, accumulated emission reductions or removals by FY 2030 through governmental JCM programs to be undertaken within the government's annual budget are estimated to be ranging from 50 to 100 million t-CO2.*
- *The JCM is not included as a basis of the bottom-up calculation of Japan's emission reduction target, but the amount of emission reductions and removals acquired by Japan under the JCM will be appropriately counted as Japan's reduction.*

The JCM related Articles in the Paris Agreement

Article 6 of the Agreement

2. Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement.

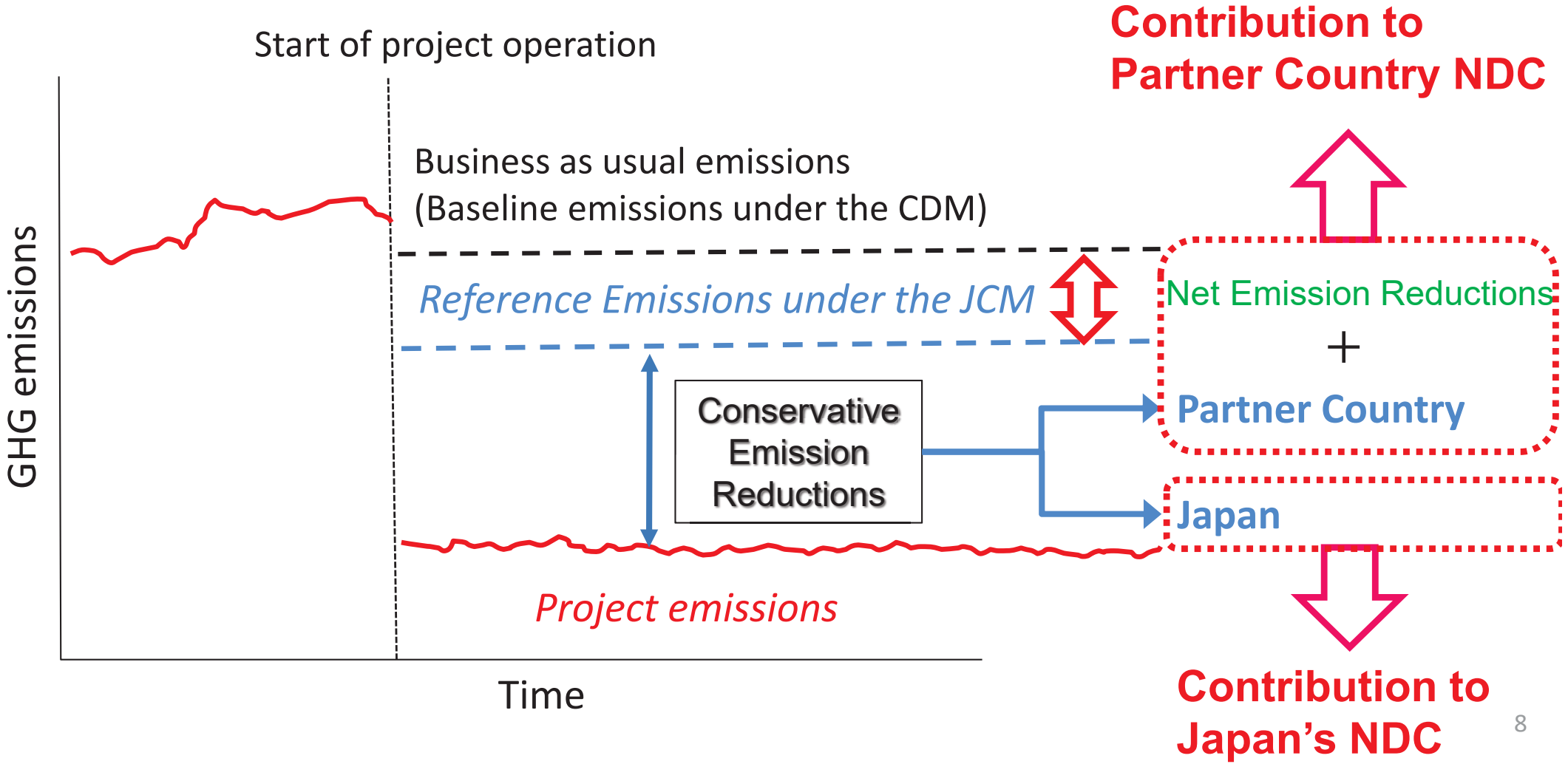
3. The use of internationally transferred mitigation outcomes to achieve nationally determined contributions under this Agreement shall be voluntary and authorized by participating Parties.

- Use of market mechanisms, including the JCM, is articulated under Article 6 which prescribes for the use of emission reductions realized oversees towards national emission reduction targets.
- The amount of emission reductions and removals acquired by Japan under the JCM will be appropriately counted as Japan's reduction in accordance with the Paris Agreement.
- Japan is going to contribute to the development of the guidance for robust accounting including for avoidance of double counting to be adopted by the CMA*.

*the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement

JCM's Contribution to NDC

- JCM's conservative emission reduction calculation (reference emissions below BaU emissions) will ensure a net decrease and/or avoidance of GHG emissions.
- This part of emission reductions will automatically contribute to the achievement of NDC.



Progress of the JCM in each partner country as of Dec 3 2018

Partner countries	Start from	No. of JC	No. of registered projects	No. of approved methodologies	Pipeline (JCM Financing Programme & Demonstration Projects in FY 2013-2018)
Mongolia	Jan 2013	6	5	3	9
Bangladesh	Mar 2013	4	1	3	6
Ethiopia	May 2013	3		3	2
Kenya	Jun 2013	3		3	2
Maldives	Jun 2013	3	1	1	2
Viet Nam	Jul 2013	7	9	14	22
Lao PDR	Aug 2013	4	1	3	4
Indonesia	Aug 2013	8	16	16	34
Costa Rica	Dec 2013	2		3	2
Palau	Apr 2014	5	3	1	4
Cambodia	Apr 2014	4	1	2	6
Mexico	Jul 2014	2		1	6
Saudi Arabia	May 2015	2	1	1	1
Chile	May 2015	2		1	2
Myanmar	Sep 2015	2		1	7
Thailand	Nov 2015	4	4	7	27
Philippines	Jan 2017	1			8
Total	17	62	40	63	144

JCM Model Projects by MOE

The budget for projects starting from FY 2018 is 6.9 billion JPY (approx. USD 69 million) in total by FY2020

※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 F-gas Recovery and Destruction Model Project by MOE

【Budget for FY 2018】
40 million JPY (approx. 0.4 million USD) (1 USD = 100 JPY)

Government of Japan

Finance part of the cost in flat-rate (up to 40 million JPY/year)

Conduct MRV to estimate GHG emission reductions.
At least half or ratio of financial support to project cost (larger ratio will be applied) of JCM credits issued are expected to be delivered to the government of Japan

International consortiums (which include Japanese entities)

- Manufacturers of equipment which uses F-gas
- Users of equipment which uses F-gas
- Entities for recovery and transportation of used F-gas (recycling or scrap entities)
- Entities for destruction of used F-gas (may use existing facility for destruction)

Purpose

To recover and destroy F-gas (GHG except for energy-related CO2, etc) from used equipment instead of releasing to air, and reduce emissions

Scope of Financing

- Establish scheme for recovery and destruction
- Install facilities/equipment for recovery/destruction
- Implementation of recovery, transportation, destruction and monitoring

Project Period

Three years in maximum (Ex. 1st year for scheme, 2nd year for facilities, 3rd year for recovery/destruction)

Eligible Projects

- After the adoption of financing, start implementation of recovery/destruction within three years
- Aim for the registration as JCM project and issuance credits

ADB Trust Fund: Japan Fund for Joint Crediting Mechanism (JFJCM)

Budget for FY2017

JPY 1 billion (approx. USD 10 million)

(1 USD = 100 JPY)

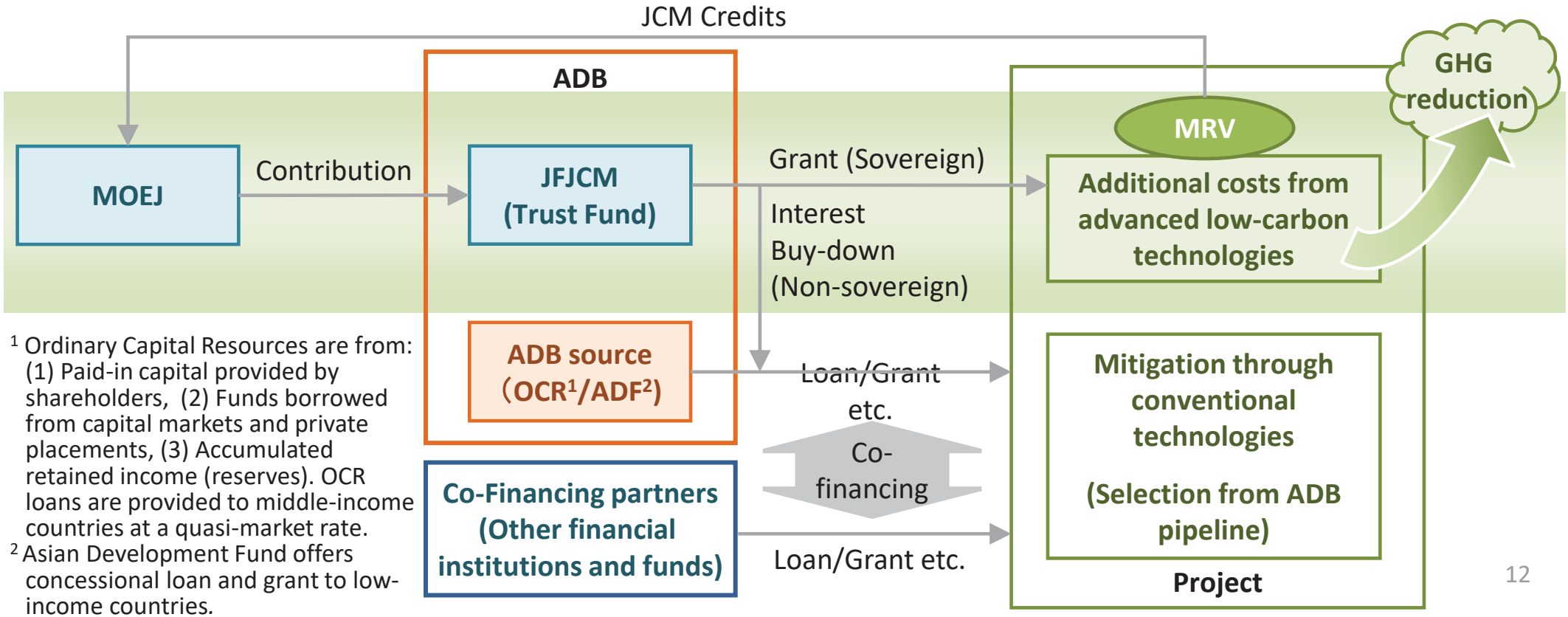
※JPY 1.2 billion in 2016, and 1.8 billion in 2015 and 2014 respectively

Scheme

To provide the financial incentives for the adoption of advanced low-carbon technologies which are superior in GHG emission reduction but expensive in ADB(Asian Development Bank)-financed projects

Purpose

To develop ADB projects with sustainable and low-carbon transition perspective by introducing advanced low-carbon technologies as well as to acquire JCM credits



[1] Ordinary Capital Resources are from: (1) Paid-in capital provided by shareholders, (2) Funds borrowed from capital markets and private placements, (3) Accumulated retained income (reserves). OCR loans are provided to middle-income countries at a quasi-market rate.

[2] Asian Development Fund offers concessional loan and grant to low-income countries.

JCM Financing Programme by MOEJ (FY2013～2018) as of December 03, 2018

Thailand:27 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
- ○27MW Solar PV
- ○Air-conditioning Control System
- ○Energy Saving Equipment in Port
- ○25MW Solar PV in Industrial Park
- ○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

▲ Introduction of Scheme for F-gas Recovery and Destruction

Mongolia:8 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

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
- ○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

▲ Collection Scheme and Dedicated System of F-gas

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

Mexico:6 projects
- ○4.8MW 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:6 projects
- ○LED Street Lighting
- ○Solar PV & Centrifugal Chiller
- ■Battambang Wastewater Treatment Project
- ○200kW Solar PV at International School*
- ○Inverters for Distribution Pumps
- ○1.5MW Solar PV

Ethiopia:1 projects
- ○Biomass CHP Plant

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

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

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
- ○Centrifugal Chiller and Air-conditioning Control System
- ○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
- ○LED Lighting to Sales Stores
- ○Gas Co-generation system
- ○2.8MW Solar PV
- ○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 (17 projects in 9 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 134 projects in 17 partner countries

Underlined projects have started operation (77 projects, including 1 partially started projects)
Projects with * have been registered as JCM projects (31 projects)

Technologies Transferred through JCM by MOEJ(FY2013-2018)

- Total of 130 **JCM Model Projects** being developed in 17 partner countries
- 53% are **energy efficiency** and 39% are **renewable energy**
- Transport, waste to energy, F-gas Recovery and Destruction and REDD+ project shares 8%

Transport 2%

- Digital Tachographs
- Modal Shift
- CNG-Diesel Hybrid

Waste 2%

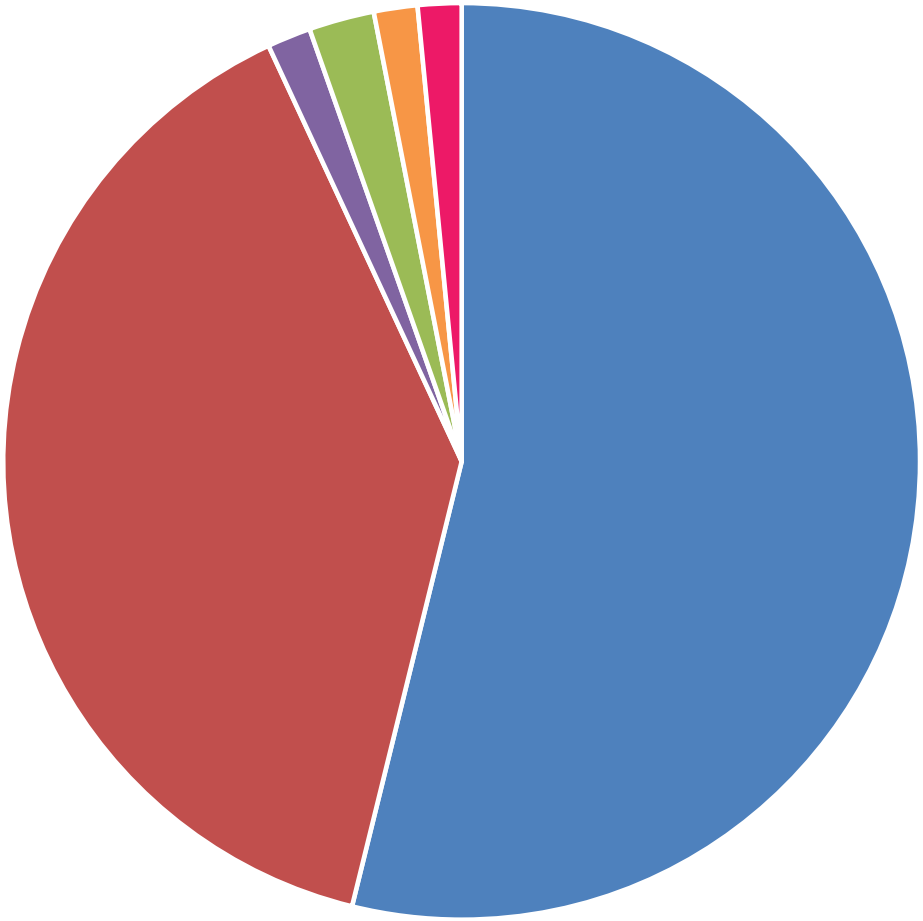
- Waste to Energy

REDD+ 2%

- Controlling slush and burn

F-gas counter measure 2%

- Recovery & Destruction



Renewable energy 41%

- Solar
- Micro hydro
- wind
- Biomass

Energy efficiency 53%

- Boiler
- Air Conditioning
- Refrigerating
- Chiller
- Looms
- Transformer
- Gas Co-generation
- LED Lighting

As of Oct 31, 2018

The Case of JCM's Contribution to NDC (Mongolia)

- Emission reduction of 14% is aimed to be realized by 2030 in total national GHG emissions, compared to the projected emissions under BAU scenario.
- In energy sector, the share of renewable electricity capacity to be increased up to 30% of total electricity generation capacity by 2030, from 7.62% in 2014.

75% of solar PV power facilities so far have been installed by the JCM as of June 2018

JCM Projects

Other Projects

Darkhan 10MW SPI

Darkhan 20MW DSEDN

Monnaran 2.1MW Everyday Farm

Monnaran 8.3MW Everyday Farm

Chandmani 20MW Solar Chandmani Energy

Ulaanbaatar

New Airport 15MW Tenun Gerel

Choir 10MW PV

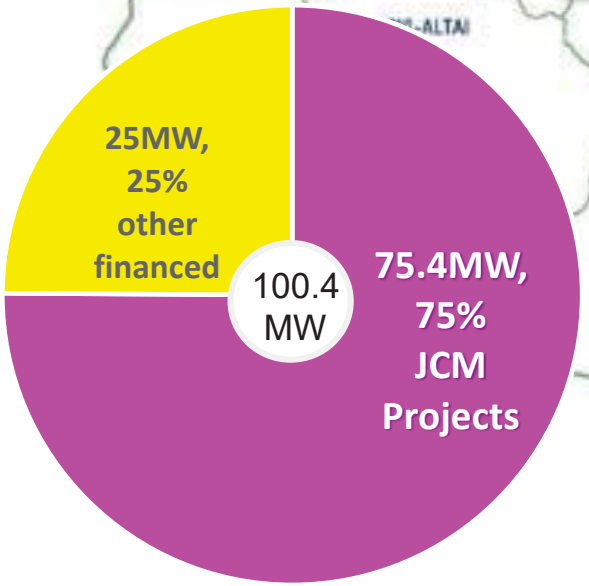
✓ Private Investment + GCF

*Status: Finance Approval from GCF
(AE: Xac Bank, Mongolia)

Adopted as JCM project newly

Zaminuud 15MW PV SPI

✓ 100% Private Investment

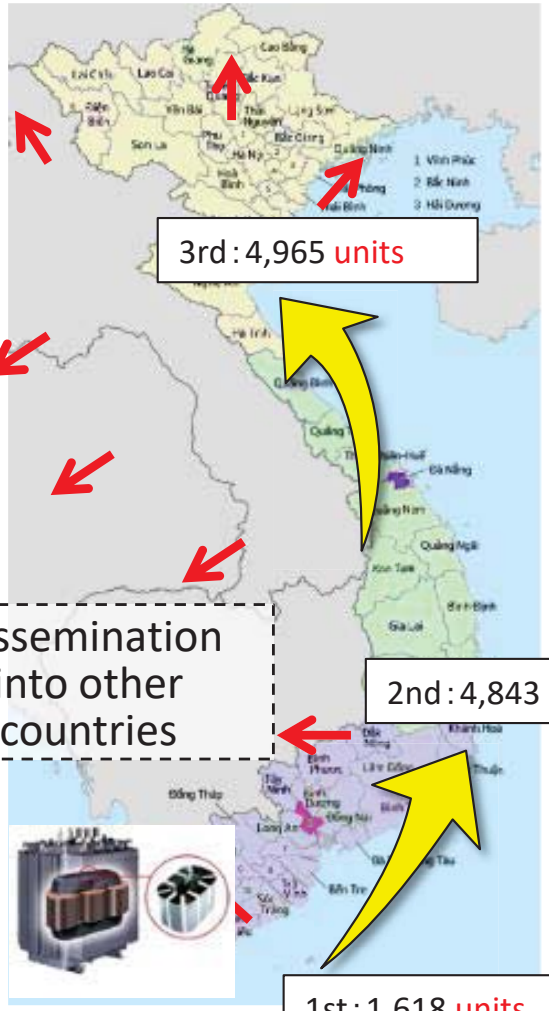


***JCM related Contribution for NDC in Mongolia: 75 MW**

*Private Investment PV Project by the trigger of successful JCM projects: 25MW

Business Model Case① : Replicating through specific actions

- Company succeeded to introduce amorphous high efficiency transformers all over Viet Nam through the JCM
- Local energy distribution company included specifications for hiring the technology in its procurement standard based on understanding on its effectiveness
- Further business development is happening in other countries (e.g. Lao PDR)



JCM model projects

Demonstration of energy efficiency effects

Specifications included in procurement standard

Sustainable business development

Dissemination of technology domestically and internationally

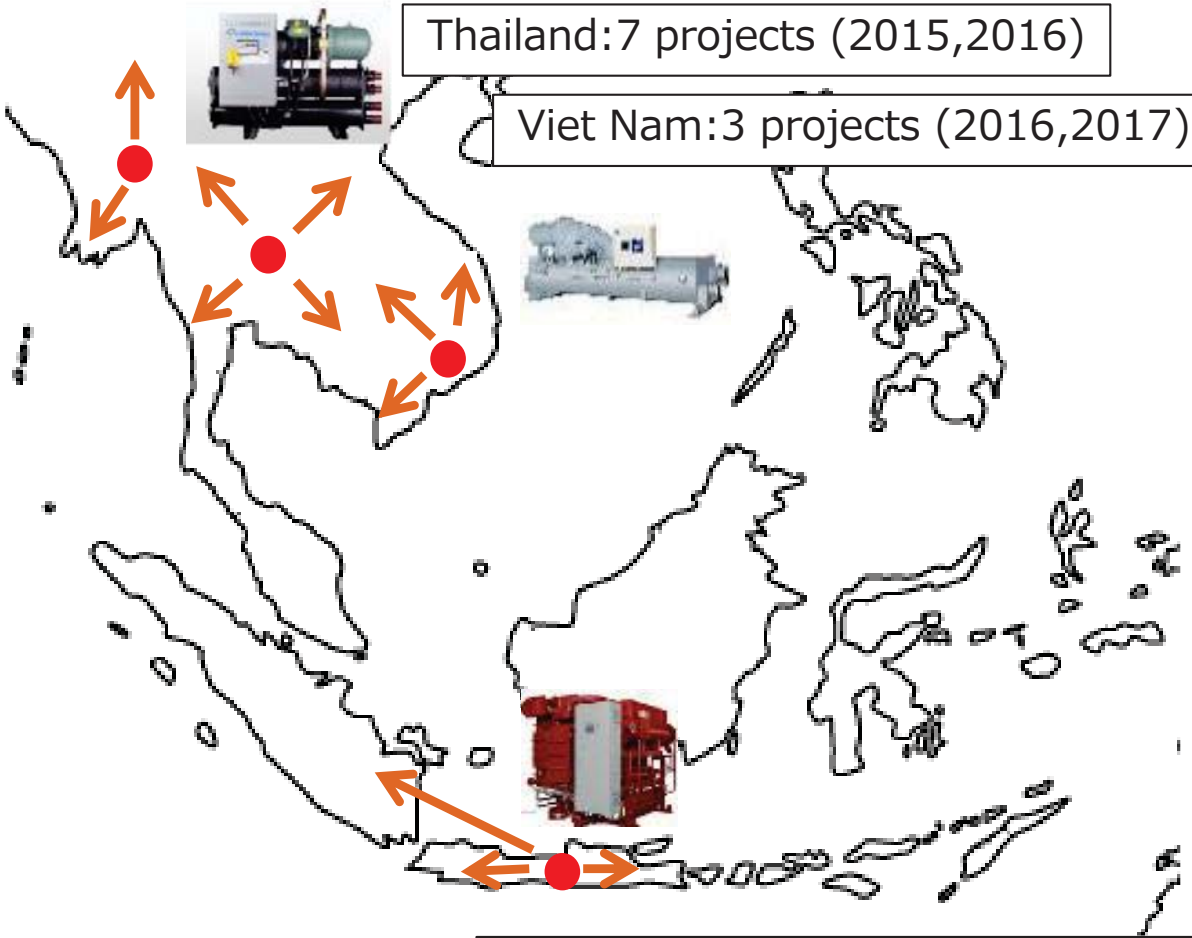
Business Model Case② : Replicating through Standard & Institutional Arrangement

- Company succeeded to implement leading low carbon technologies through the JCM
- Using the project as a showcase, their business was developed in ASEAN countries
- Further business development is expected through the establishment of energy efficiency standards and relevant institutional arrangements

Myanmar:2 JCM model projects (2016)

Thailand:7 projects (2015,2016)

Viet Nam:3 projects (2016,2017)



Chillers/Refrigerator

Indonesia:6 projects (2013-2017)

JCM model project

↓

Demonstration of energy efficiency effects

↓

Establish standards & institutional arrangements

- Regulations
- Standards
- Taxes

↓

Business development in other countries, sectors