Recent Development of The Joint Crediting Mechanism (JCM)

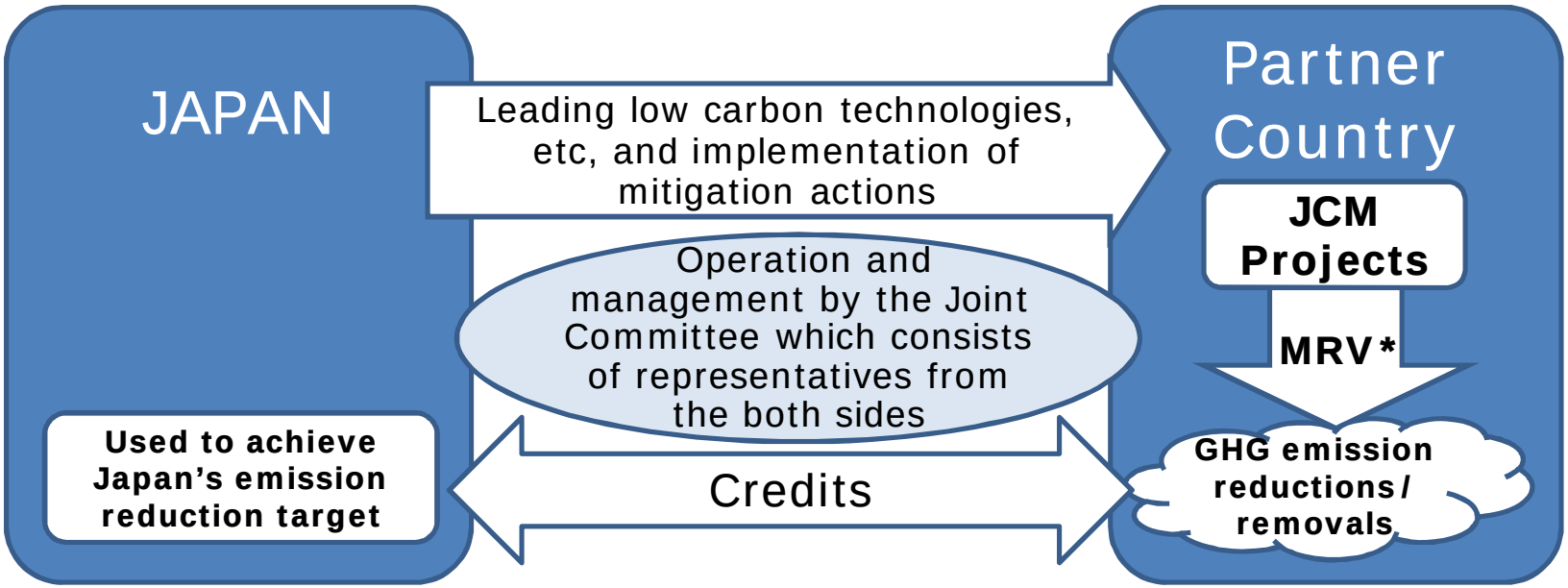
January 2017

Government of Japan

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

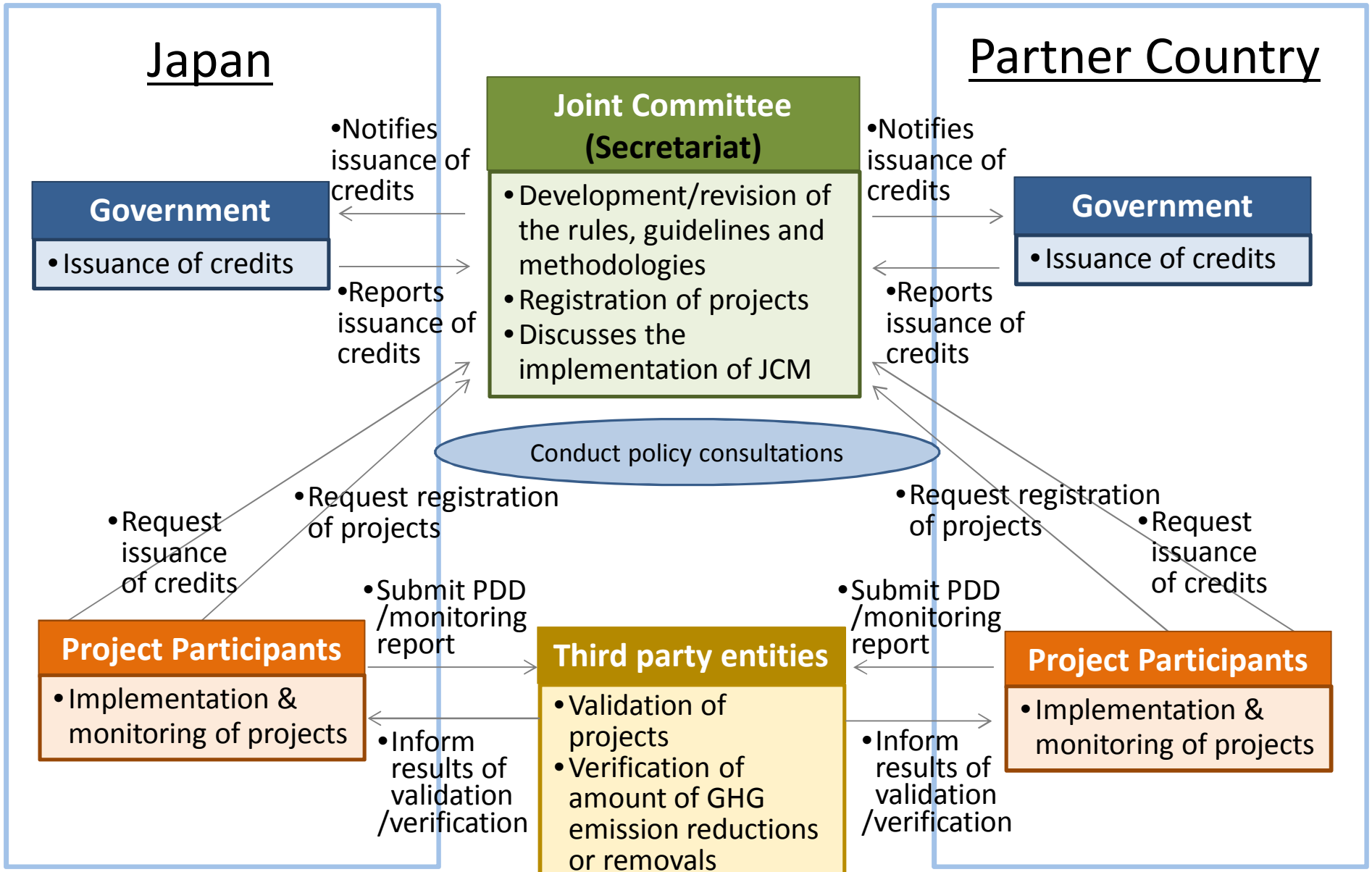
Basic Concept of the JCM

- 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

Scheme of the JCM



The role of the Joint Committee and each Government

- The Joint Committee (JC) consists of representatives from both Governments.
- The JC develops rules and guidelines necessary for the implementation of the JCM.
- The JC determines either to approve or reject the proposed methodologies, as well as develops JCM methodologies.
- The JC designates the third-party entities (TPEs).
- The JC decides on whether to register JCM projects which have been validated by the TPEs.
- Each Government establishes and maintains a registry.
- On the basis of notification for issuance of credits by the JC, each Government issues the notified amount of credits to its registry.

Features of the JCM

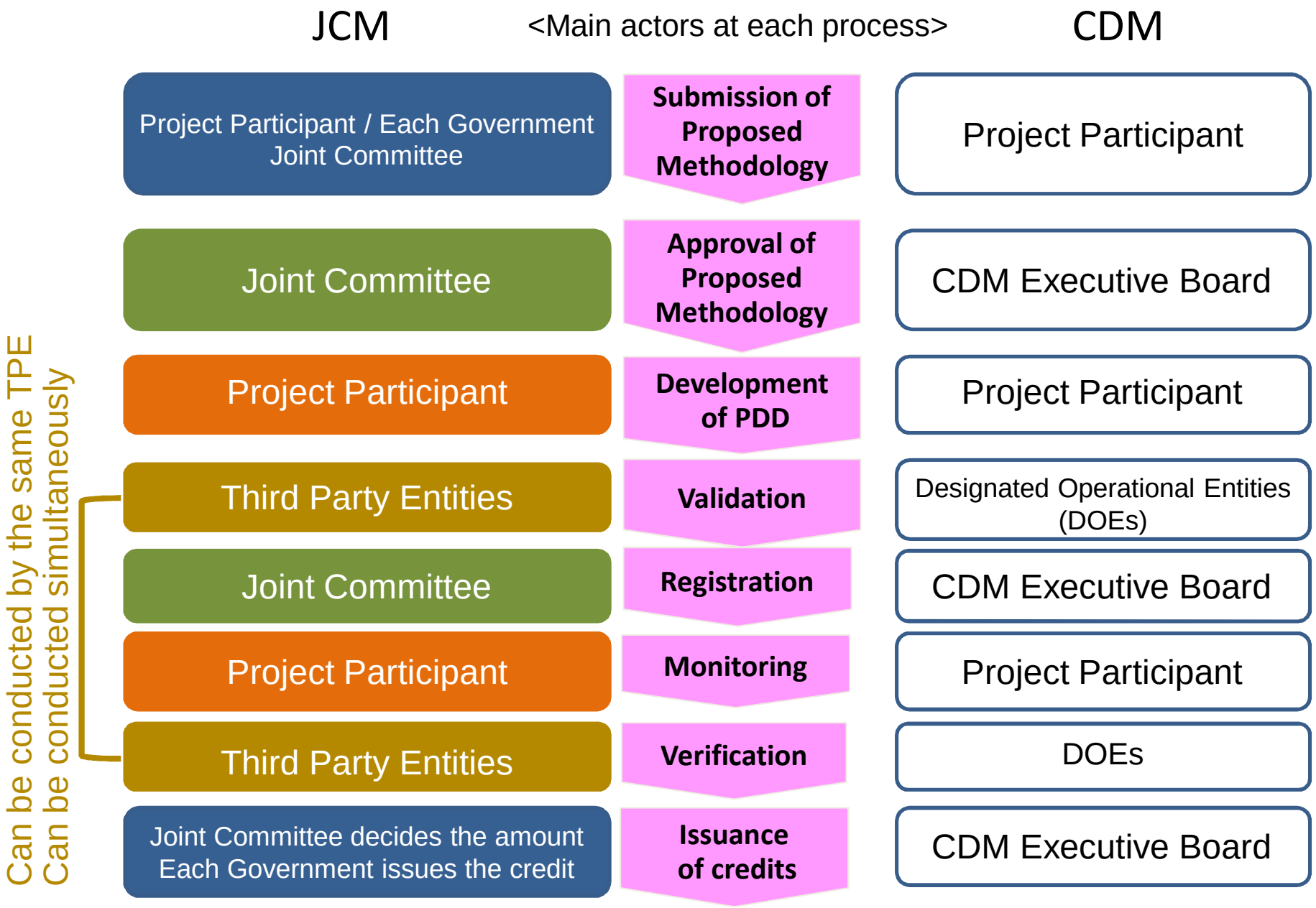
(1) The JCM starts its operation as a non-tradable credit type mechanism.

(2) Both Governments continue consultation for the transition to a tradable credit type mechanism and reach a conclusion at the earliest possible timing, taking account of implementation of the JCM.

(3) The JCM aims for concrete contributions to assisting adaptation efforts of developing countries after the JCM is converted to the tradable credit type mechanism.

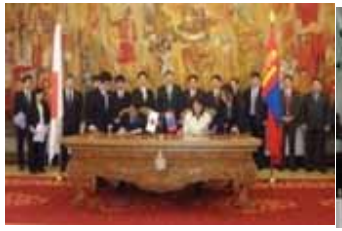
(4) The JCM covers the period until a possible coming into effect of a new international framework under the UNFCCC.

Project Cycle of the JCM and the CDM



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）

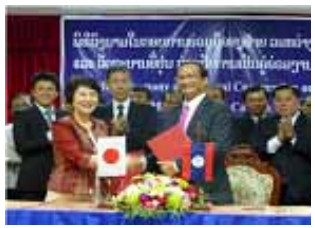
Bangladesh
Mar. 19, 2013
(Dhaka)

Ethiopia
May 27, 2013
(Addis Ababa)

Kenya
Jun. 12,2013
(Nairobi)

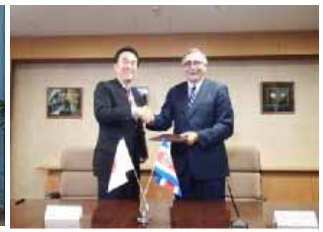
Maldives
Jun. 29, 2013
(Okinawa)

Viet Nam
Jul. 2, 2013
(Hanoi)



Lao PDR
Aug. 7, 2013
(Vientiane)

Indonesia
Aug. 26, 2013
(Jakarta)

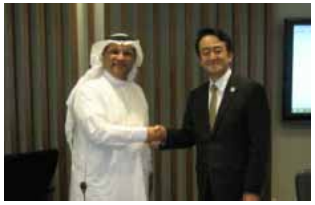


Costa Rica
Dec. 9, 2013
(Tokyo)

Palau
Jan. 13, 2014
(Ngerulmud)

Cambodia
Apr. 11, 2014
(Phnom Penh)

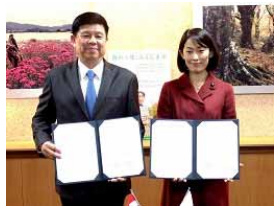
Mexico
Jul. 25, 2014
(Mexico City)



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)

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.

Japan's INDC (Excerpt)

Japan's INDC

○ Japan's INDC towards post-2020 GHG emission reductions is at the level of a reduction of 26.0% by fiscal year (FY) 2030 compared to FY 2013 (25.4% reduction compared to FY 2005) (approximately 1.042 billion t-CO_2eq. as 2030 emissions), ensuring consistency with its energy mix, set as a feasible reduction target by bottom-up calculation with concrete policies, measures and individual technologies taking into adequate consideration, *inter alia*, technological and cost constraints, and set based on the amount of domestic emission reductions and removals assumed to be obtained. .

Information to facilitate clarity, transparency and understanding

○ 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.

Reference information
GHG emissions and removals
JCM and other international contributions

○ Japan establishes and implements the JCM in order both to appropriately evaluate contributions from Japan to GHG emission reductions or removals in a quantitative manner achieved through the diffusion of low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions in developing countries, and to use them to achieve Japan's emission reduction target.

○ 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-CO_2.

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

The UNFCCC documents related to the JCM (1/2)

Decision 1/CP18

41. *Acknowledges* that **Parties, individually or jointly, may develop and implement various approaches, including opportunities for using markets** and non-markets, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries;

42. *Re-emphasizes* that, as set out in decision 2/CP.17, paragraph 79, all such approaches must meet standards that deliver real, permanent, additional and verified mitigation outcomes, avoid double counting of effort and achieve a net decrease and/or avoidance of GHG emissions;

44. *Requests* the SBSTA to conduct a work programme to elaborate a framework for such approaches, drawing on the work of the AWG-LCA on this matter, including the relevant workshop reports and technical paper, and experience of existing mechanisms, with a view to recommending a draft decision to the COP for adoption at its 19th session;

45. *Considers* that any such framework will be developed under the authority and guidance of the Conference of the Parties;

The UNFCCC documents related to the JCM (2/2)

Decision 19/CP18

Common tabular format for
"UNFCCC biennial reporting guidelines for developed country Parties"

Table 4(b) Reporting on progress

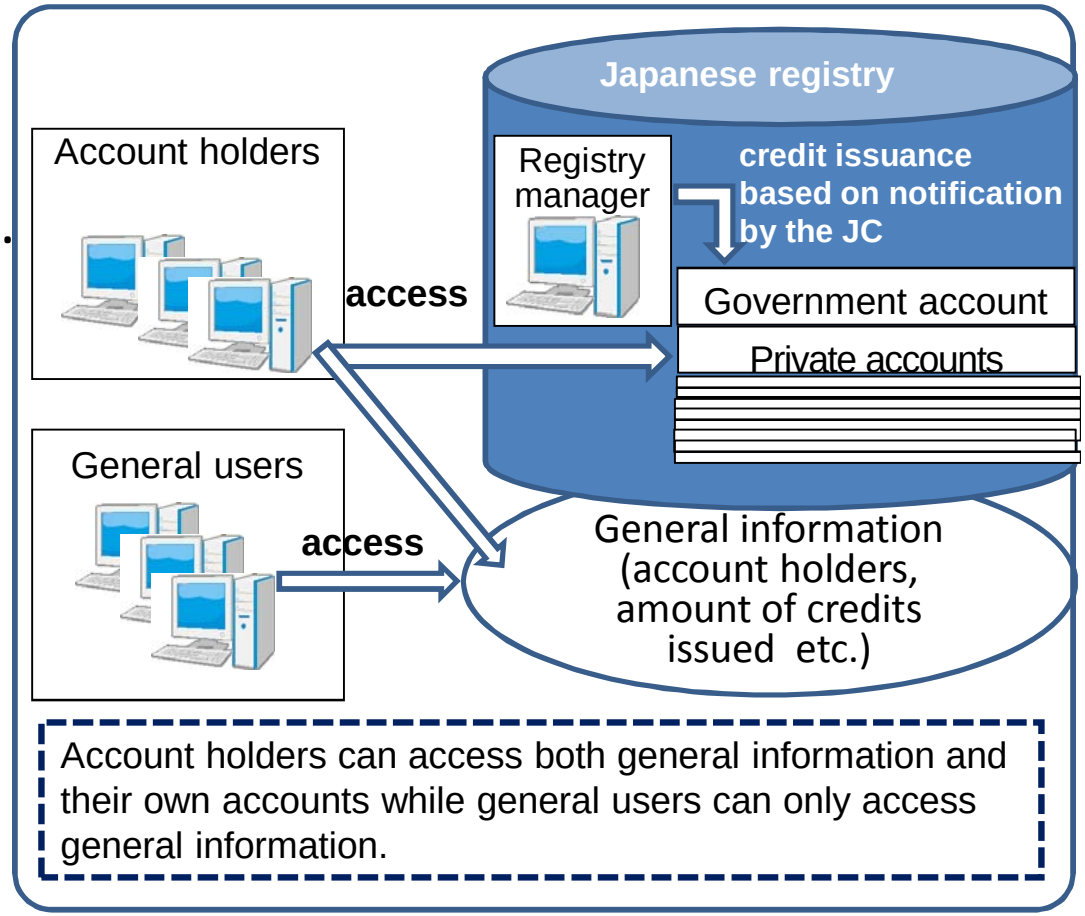
	Kyoto Protocol units[d] *(kt CO_2 eq)*										*Other units*[d,e] *(kt CO_2 eq)*			
	AAUs		*ERUs*		*CERs*		*tCERs*		*lCERs*		*Units from market-based mechanisms under the Convention*		*Units from other market-based mechanisms*	
	20XX-3	*20XX-2*	*20XX-3*	*Year X-2*	*20XX-3*	*20XX-2*	*20XX-3*	*20XX-2*	*20XX-3*	*20XX-2*	*20XX-3*	*20XX-2*	*20XX-3*	*20XX-2*
Quantity of units														
							20XX-3							
Total														

- The JCM is one of various approaches based on Decision 1/CP.18, jointly developed and implemented by Japan and partner countries, and Japan intends to contribute to elaborating the framework for such approaches under the UNFCCC.
- Japan has reported and will report to the COP the use of the JCM in Biennial Reports including the Common Tabular in line with Decision 19/CP18.

JCM Registry

Establishment & operation

- A registry will be established by each side (RoI (draft) para13 (b)).
- The registries need to share "Common specifications", e.g.,
  - functions (e.g. issuance, retirement, holding, cancelation of credits)
  - account type (e.g. holding account, government holding account, cancellation account, and retirement account)
  - rules of serial number of the credit
  - information sharing
- Japan has established its registry and started operation in Nov. 2015.
- The partner countries will also establish their own registry.



JCM Website

URL: **https://www.jcm.go.jp/**

Contents

- General information page
- Individual JCM Partner countries-Japan page

Function

- Information sharing to the public, e.g.,
  - the JC decisions,
  - rules and guidelines,
  - methodologies,
  - projects,
  - call for public inputs/comments,
  - status of TPEs, etc.
- Internal information sharing for the JC members, e.g.,
  - File sharing for electric decisions by the JC

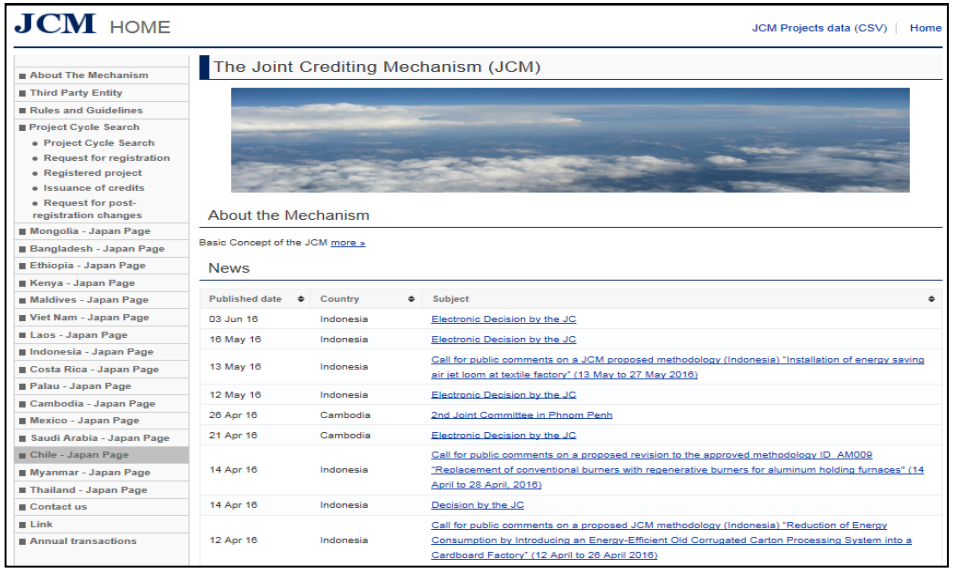


Image of the general information page

Image of the individual JCM Partner countries-Japan page

Progress of the JCM in each partner country as of Jan 13 2016

Partner countries	Start from	No. of JC	No. of registered projects	No. of approved methodologies	Pipeline (JCM Financing Programme & Demonstration Projects in FY 2013-2016)
Mongolia	Jan 2013	4	2	3	5
Bangladesh	Mar 2013	3		1	6
Ethiopia	May 2013	2		1	2
Kenya	Jun 2013	2		1	4
Maldives	Jun 2013	2		1	3
Viet Nam	Jul 2013	5	4	6	17
Lao PDR	Aug 2013	2		1	2
Indonesia	Aug 2013	5	6	10	26
Costa Rica	Dec 2013	1			2
Palau	Apr 2014	4	3	1	3
Cambodia	Apr 2014	2		1	5
Mexico	Jul 2014	1			2
Saudi Arabia	May 2015	1			1
Chile	May 2015	1			1
Myanmar	Sep 2015	1			5
Thailand	Nov 2015	2		2	21
Philippines	Jan 2017				
Total	16	38	15	28	105

Registered Projects (1/2)

No.	Country	Project Title	General description of project
MN001	Mongolia	Installation of High-Efficiency Heat Only Boilers in 118th School of Ulaanbaatar City Project	Introducing high-efficiency HOBs to fulfill the demand of new heat facilities for the school buildings. Optimizing boiler operation through the implementation of operation management and technical guidance.
MN002	Mongolia	Centralization of Heat Supply System by Installation of High-Efficiency Heat Only Boilers in Bornuur soum Project	Introducing high-efficiency HOBs to fulfill the demand for heat supply system in the public buildings. Optimizing boiler operation through the implementation of operation management and technical guidance.
VN001	Viet Nam	Eco-Driving by Utilizing Digital Tachograph System	Improving transportation fuel efficiency by installing digital tachographs, in which the quantity of fuel consumption and running distance are continuously analyzed and provide feedbacks and advices to the drivers based on the analyzed data.
VN002	Viet Nam	Promotion of green hospitals by improving efficiency / environment in national hospitals in Vietnam	Installing inverter room air conditioners (RACs) and Energy Management System (EMS) to optimize operation of multiple inverter RACs in national hospitals
VN003	Viet Nam	Low carbon hotel project in Vietnam: Improving the energy efficiency of commercial buildings by utilization of high efficiency equipment	Installing high-efficiency equipment of hot water supply, air connditioning management system and LED lighting for improving the energy efficiency of hotels
VN004	Viet Nam	Introduction of amorphous high efficiency transformers in power distribution systems in the southern part of Viet Nam	Introducing 1,618 amorphous high efficiency transformers which reduce transmission and distribution loss in the power distribution system of southern Vietnam.
ID001	Indonesia	Energy Saving for Air-Conditioning and Process Cooling by Introducing High-efficiency Centrifugal Chiller	Improving energy saving for air-conditioning and process cooling by introducing high-efficiency centrifugal chiller equipped with high-performance economizer cycle, and super-cooling refrigerant cycle in a textile factory.

Registered Projects (2/2)

No.	Country	Project Title	General description of project
ID002	Indonesia	Project of Introducing High Efficiency Refrigerator to a Food Industry Cold Storage in Indonesia	Introducing advanced energy efficient cooling system using natural refrigerant in the food industry cold storage.
ID003	Indonesia	Project of Introducing High Efficiency Refrigerator to a Frozen Food Processing Plant in Indonesia	Introducing advanced energy efficient cooling system using natural refrigerant in the frozen food processing plant.
ID004	Indonesia	Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Karawang, West Java	Improving energy saving for air-conditioning and process cooling by introducing high-efficiency centrifugal chiller equipped with high-performance economizer cycle, and super-cooling refrigerant cycle in a textile factory.
ID005	Indonesia	Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Batang, Central Java (Phase 2)	Improving energy saving for air-conditioning and process cooling by introducing high-efficiency centrifugal chiller equipped with high-performance economizer cycle, and super-cooling refrigerant cycle in a textile factory.
ID006	Indonesia	Installation of Inverter-type Air Conditioning System, LED Lighting and Separate Type Fridge Freezer Showcase to Grocery Stores in Republic of Indonesia	Introducing high-efficiency facilities to the grocery stotes for saving energy as below; - Inverter-type air conditioner - LED lighting - Fridge freezer showcase with natural refrigerant
PW001	Palau	Small Scale Solar Power Plants for Commercial Facilities in Island States	Installing high quality solar cell modules with high conversion efficiency with a monitoring system which realizes appropriate operation and management.
PW002	Palau	Small Scale Solar Power Plants for Schools in Island States	Installing high quality solar cell modules with high conversion efficiency with a monitoring system which realizes appropriate operation and management.
PW003	Palau	Small Scale Solar Power Plants for Commercial Facilities in Island States II	Installing high quality solar cell modules with high conversion efficiency with a monitoring system which realizes appropriate operation and management.

Approved Methodologies (1/4)

No.	Country	Sectoral Scope	Methodology Title	GHG Emission Reduction Measures
MN_AM001	Mongolia	Energy distribution	Installation of energy-saving transmission lines in the Mongolian Grid	Reduction of transmission loss by introduction of LL-ACSR/SA (Low Electrical Power Loss Aluminum Conductors, Aluminum-Clad Steel Reinforced).
MN_AM002	Mongolia	Energy industries	Replacement and Installation of High Efficiency Heat Only Boiler (HOB) for Hot Water Supply Systems	Installation of new HOB for hot water supply system and the replacement of existing coal-fired HOB. The boiler efficiency of the reference HOB is typically lower than that of the project HOB. Therefore, the project activity leads to the reduction of coal consumption, resulting in lower emission of GHGs as well as air pollutants.
MN_AM003	Mongolia	Energy industries	Installation of Solar PV System	Displacement of grid electricity and/or captive electricity by installation and operation of solar PV system(s).
BD_AM001	Bangladesh	Energy demand	Energy Saving by Introduction of High Efficiency Centrifugal Chiller	Saving energy by introducing high efficiency centrifugal chiller for the target factory, commerce facilities etc.
ET_AM001	Ethiopia	Energy industries	Electrification of communities using Micro hydropower generation	Displacement of electricity using diesel fuel and/or lighting using kerosene by installation and operation of the micro hydropower generation unit.
KE_AM001	Kenya	Energy industries	Electrification of communities using Micro hydropower generation	Displacement of electricity using diesel fuel and/or lighting using kerosene by installation and operation of the micro hydropower generation unit.
MV_AM001	Maldives	Energy industries	Displacement of Grid and Captive Genset Electricity by Solar PV System	Displacement of grid electricity and/or captive electricity using diesel fuel as a power source by installation and operation of the solar PV system(s)

Approved Methodologies (2/4)

No.	Country	Sectoral Scope	Methodology Title	GHG Emission Reduction Measures
VN_AM001	Viet Nam	Transport	Transportation energy efficiency activities by installing digital tachograph systems	Improvement of driving efficiency by installation of digital tachograph system to freight vehicle fleets providing to the drivers a real-time feedback against inefficient driving.
VN_AM002	Viet Nam	Energy demand	Introduction of Room Air Conditioners Equipped with Inverters	Energy saving achieved by introduction of RACs equipped with inverters.
VN_AM003	Viet Nam	Energy demand	Improving the energy efficiency of commercial buildings by utilization of high efficiency equipment	Reduction of electricity and fossil fuel consumed by existing facilities is achieved by replacing or substituting these facilities with high efficiency equipment.
VN_AM004	Viet Nam	Waste handling and disposal	Anaerobic digestion of organic waste for biogas utilization within wholesale markets	Avoid the emissions of methane to the atmosphere from organic waste that have been left to decay anaerobically at a solid waste disposal site and to introduce renewable energy technologies that supply biogas that displaces fossil fuel use.
VN_AM005	Viet Nam	Energy distribution	Installation of energy efficient transformers in a power distribution grid	Installation of energy efficient transformers (transformers with amorphous metal core) in a power distribution grid to reduce no-load losses by transformers, which leads to reduction of losses for grid electricity.
VN_AM006	Viet Nam	Energy demand	Introduction of air conditioning system equipped with inverters	Saving energy by introducing air-conditioning system with inverter.
LA_AM001	Laos	Energy demand	Installation and operation of energy-efficient container-based data center (DC) in the Lao PDR	Energy reduction which leads to reductions of GHG is achieved by introducing energy-efficient container-based project DC in place of the reference DC.

Approved Methodologies (3/4)

No.	Country	Sectoral Scope	Methodology Title	GHG Emission Reduction Measures
ID_AM001	Indonesia	Energy industries	Power Generation by Waste Heat Recovery in Cement Industry	Waste heat recovery (WHR) system generates electricity through waste heat recovered from cement production facility. Electricity generated from the WHR system replaces grid electricity resulting in GHG emission reductions of the connected grid system.
ID_AM002	Indonesia	Energy demand	Energy Saving by Introduction of High Efficiency Centrifugal Chiller	Saving energy by introducing high efficiency centrifugal chiller for the target factory, commerce facilities etc.
ID_AM003	Indonesia	Energy demand	Installation of Energy-efficient Refrigerators Using Natural Refrigerant at Food Industry Cold Storage and Frozen Food Processing Plant	Saving energy by introducing high efficiency refrigerators to the food industry cold storage and frozen food processing plants.
ID_AM004	Indonesia	Energy demand	Installation of Inverter-Type Air Conditioning System for Cooling for Grocery Store	Saving energy by introducing inverter-type air conditioning system for cooling for grocery store.
ID_AM005	Indonesia	Energy demand	Installation of LED Lighting for Grocery Store	Saving energy by introducing LED (Light Emitting Diode) lighting for grocery store.
ID_AM006	Indonesia	Energy demand	GHG emission reductions through optimization of refinery plant operation in Indonesia	Introduction of plant optimization control systems (APC) that reduce energy consumption in the hydrogen production unit (HPU) and hydro cracking unit (HCU) at a refinery plant.
ID_AM007	Indonesia	Energy demand	GHG emission reductions through optimization of boiler operation in Indonesia	The project achieves energy conservation in boilers, through operation optimization by applying Utility Facility Operation Optimization Technology.
ID_AM008	Indonesia	Energy demand	Installation of a separate type fridge-freezer showcase by using natural refrigerant for grocery store to reduce air conditioning load inside the store	Saving total energy of in-store showcase and air conditioning system by introducing a separate type natural refrigerant fridge-freezer showcase for grocery store, which leads to GHG emission reductions, through the reduction of air conditioning electricity load demand by not releasing waste heat inside the store.

Approved Methodologies (4/4)

No.	Country	Sectoral Scope	Methodology Title	GHG Emission Reduction Measures
ID_AM009	Indonesia	Energy demand	Replacement of conventional burners with regenerative burners for aluminum holding furnaces	By replacing conventional burners with regenerative burners for aluminum holding furnaces, consumption of natural gas is reduced, which leads to the reduction of GHG emissions.
ID_AM010	Indonesia	Energy demand	Introducing double-bundle modular electric heat pumps to a new building	The project contributes to GHG emission reductions at a new building, by reducing electricity and oil consumption with efficient double-bundle modular electric heat pumps where heating/cooling energy is simultaneously generated.
PW_AM001	Palau	Energy industries	Displacement of Grid and Captive Genset Electricity by a Small-scale Solar PV System	Displacement of grid electricity and/or electricity using diesel fuel as a power source by installation and operation of the solar PV system(s).
KH_AM001	Cambodia	Energy demand	Installation of LED street lighting system with wireless network control	The street lighting system that introduces LED lamps and lighting control devices with utilization of wireless network is installed on streets to save electricity consumption.
TH_AM001	Thailand	Energy industries	Installation of Solar PV System	Displacement of grid electricity and/or captive electricity using fossil fuel as power source by installation and operation of the solar PV system(s)
TH_AM002	Thailand	Energy demand	Energy Saving by Introduction of Multi-stage Oil-Free Air Compressor	Introducing multi-stage oil-free air compressor in manufacturing process of semiconductors.

Programmes by Government of Japan

- JCM Demonstration Projects and JCM Financing Programme
- Feasibility Studies
- Capacity Building

JCM Promotion Scheme by METI

JCM Demonstration Projects (Budget for FY2016: 2.4 billion yen)

■JCM Demonstration Projects are implemented by NEDO (New Energy and Industrial Technology Development Organization), which supports the project costs necessary to verify the amount of GHG emission reduction in line with JCM rules and guidelines.

■Coverage of project cost: Cost of the JCM Demonstration Projects necessary for MRV

e.g. Cost of design, machines, materials, labor, travel, etc.

■Eligibility for the JCM Demonstration Projects:

- Concrete Projects to demonstrate the effectiveness of leading Japanese technologies and/or products installed and operated in the projects, and the amount of their GHG emission reduction with MRV methodology by actual operation
- Project Participants consist of entities from both countries, only the Japanese entities can apply for the JCM Demonstration projects. The projects shall be completed within 3 years.

JCM Feasibility Study (FS)

■The study to promote potential JCM projects and to survey their feasibility as well as to check the practicality of the MRV methodology.

MRV Application Study

■ By applying MRV methodology to the facility with low-carbon technologies that have already been installed or will certainly be installed in any JCM signatory country; 1) to obtain verification by third party entity under the JCM; and 2) to conduct review and feedback on efficiency and applicability of MRV.

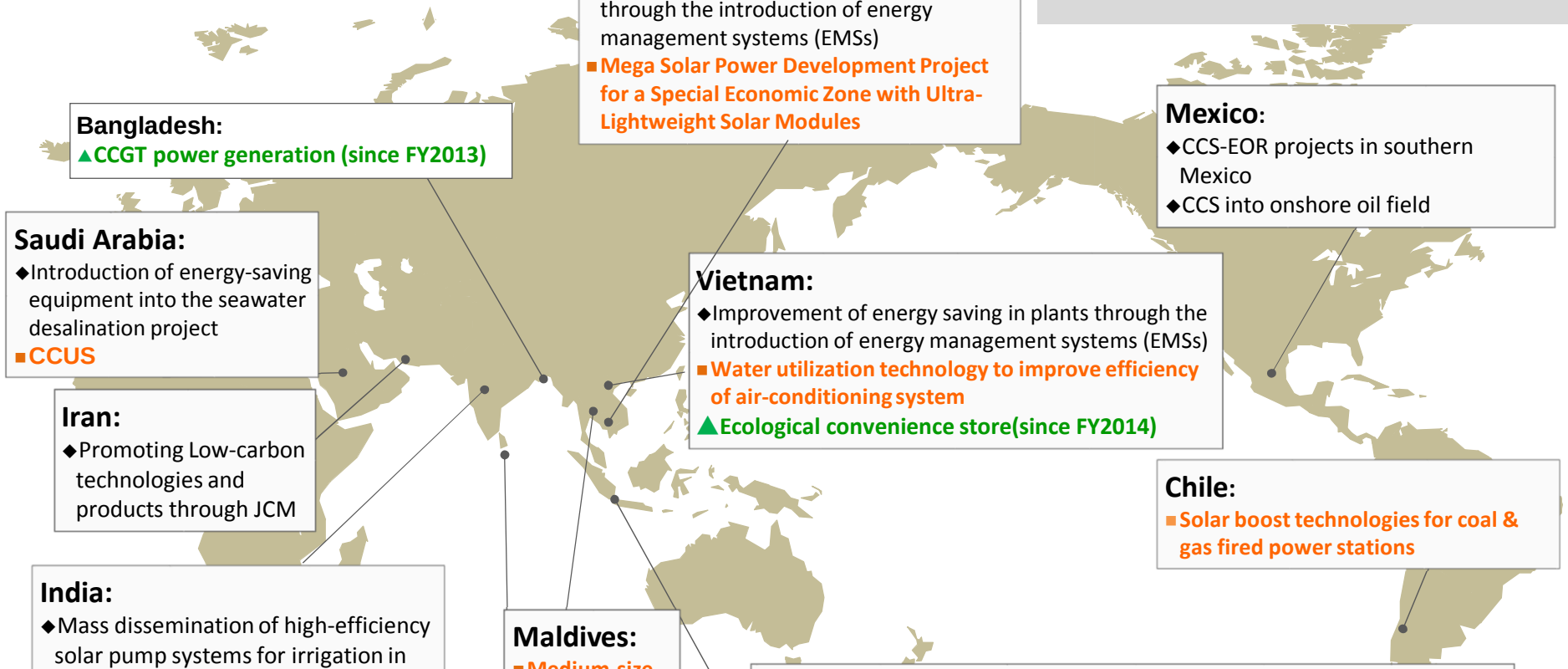
Capacity Building Programmes

■Variety of capacity building activities to increase technical experts

e.g.,) Experts on measuring amount of emission reductions by introducing low carbon technologies and products in the host country.

JCM Feasibility Studies, MRV Applicability and Verification Studies by METI & NEDO in FY2015

◆→ METI's FSs for Policy Recommendation
■→ NEDO's FSs for Project Exploration /Development
▲→ NEDO's MRV Applicability Verification Studies



Cambodia:
◆Improvement of energy saving in plants through the introduction of energy management systems (EMSs)
■**Mega Solar Power Development Project for a Special Economic Zone with Ultra-Lightweight Solar Modules**

Bangladesh:
▲**CCGT power generation (since FY2013)**

Mexico:
◆CCS-EOR projects in southern Mexico
◆CCS into onshore oil field

Saudi Arabia:
◆Introduction of energy-saving equipment into the seawater desalination project
■**CCUS**

Vietnam:
◆Improvement of energy saving in plants through the introduction of energy management systems (EMSs)
■**Water utilization technology to improve efficiency of air-conditioning system**
▲**Ecological convenience store(since FY2014)**

Iran:
◆Promoting Low-carbon technologies and products through JCM

Chile:
■**Solar boost technologies for coal & gas fired power stations**

India:
◆Mass dissemination of high-efficiency solar pump systems for irrigation in the field of agriculture
◆Introduction of energy-saving technology into India's steel industry
◆Smart City in Navi Mumbai

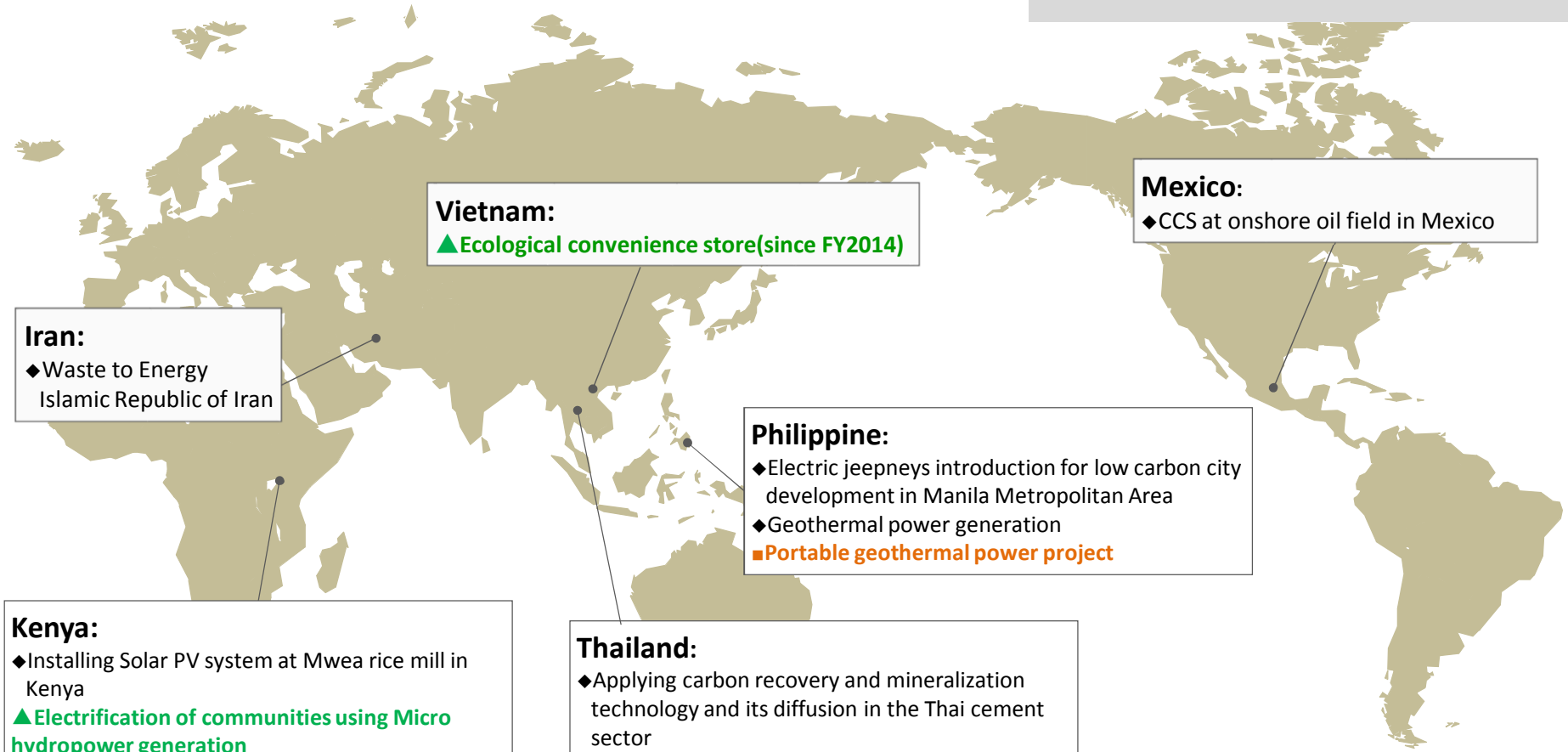
Maldives:
■**Medium-size wind power generation**

Indonesia:
◆Reduction of Global Warming Gases through torrefaction systems in which Indonesian biomass is used
■**Investigation for developing energy saving and heat recovering waste treatment system**

Thailand:
◆Introduction of energy-saving technology into plants that manufacture thin steel sheets
■**Energy Conservation Distillation System**
■**High-efficiency thermal power generation**

JCM Feasibility Studies, MRV Applicability and Verification Studies by METI & NEDO in FY2016

◆→ METI's FSs for Policy Recommendation
■→ NEDO's FSs for Project Exploration /Development
▲→ NEDO's MRV Applicability Verification Studies



Vietnam:
▲Ecological convenience store(since FY2014)

Mexico:
◆CCS at onshore oil field in Mexico

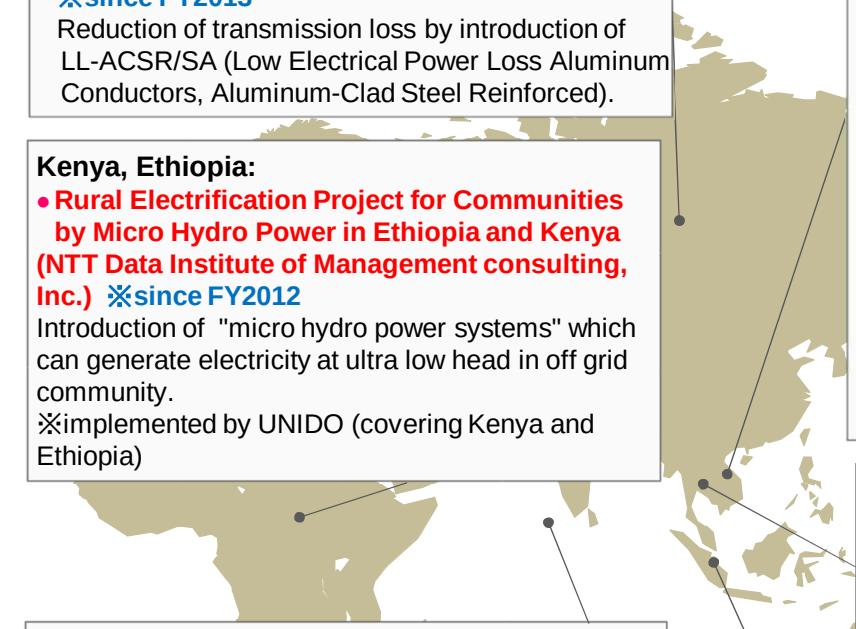
Iran:
◆Waste to Energy
Islamic Republic of Iran

Philippine:
◆Electric jeepneys introduction for low carbon city development in Manila Metropolitan Area
◆Geothermal power generation
■Portable geothermal power project

Kenya:
◆Installing Solar PV system at Mwea rice mill in Kenya
▲Electrification of communities using Micro hydropower generation

Thailand:
◆Applying carbon recovery and mineralization technology and its diffusion in the Thai cement sector
■Energy saving projects in automobile factories

JCM Demonstration Projects by NEDO in FY2016



Mongolia:

- **High efficiency and low loss power transmission and distribution system (Hitachi) ※since FY2013**

  Reduction of transmission loss by introduction of LL-ACSR/SA (Low Electrical Power Loss Aluminum Conductors, Aluminum-Clad Steel Reinforced).

Kenya, Ethiopia:

- **Rural Electrification Project for Communities by Micro Hydro Power in Ethiopia and Kenya (NTT Data Institute of Management consulting, Inc.) ※since FY2012**

Introduction of "micro hydro power systems" which can generate electricity at ultra low head in off grid community.
※implemented by UNIDO (covering Kenya and Ethiopia)

Maldives:

- **Isolated area type wind power generation and ReMs demonstration project(KOMAI HALEC, TAKAOKA TOKO, TEPCO Power Grid) ※since FY2016**

The Renewable energy Management System (ReMs) combined with 300kW wind power generator is introduced in Naifaru and Himafushi.

Total：**12 projects**（7 countries）
Underlined Project in Vietnam is registered as a JCM project.

Vietnam:

- **Energy saving by inverter air conditioner optimum operation at National Hospital (Mitsubishi Electric) ※since FY2013**

  Installing inverter room air conditioners (RACs) and Energy Management System (EMS) to optimize operation of multiple inverter RACs in national hospitals.
- **Energy saving by BEMS optimum operation at Hotel (Hibiya Engineering) ※since FY2013**

  Integrating highly-proven energy saving technologies for hot water supply and lighting combined with energy management system to optimize these technologies.
- **Energy saving paper making process(Marubeni) ※since FY2014**

  Introduction of high efficient and environment friendly machines to alter old papermaking process in paper production line.
- **Energy Saving and Work Efficiency Improvement Project by special LED Equipment with new technology, COB(Stanley Electric) ※since FY2015**

  Introducing the special LED lighting equipment with new technology, COB module as a source of light into the fishing vessels currently equipped with the metal halide light and incandescent lamps.

Lao PDR:

- **Lao PDR Energy efficient date center(LEED) (Toyota Tsusho Corporation, Internet Initiative Japan) ※since 2014**

Utilizing high energy efficient container-type data centers, related technologies will be demonstrated under Lao PDR environment, such as unstable power supply, hot and humid atmosphere etc.

Indonesia:

- **Energy saving by optimum operation at Oil factory (Yokogawa Electric) ※since FY2013**

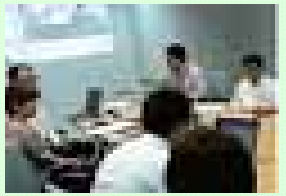
  Multivariable model predictive control (MMPC), a kind of advanced optimization control at oil refinery plants, is added on existing DCS (Distributed Control System) and realizes the automatic operation control for the optimum production.
- **Utility facility operation optimization technology into Oil factory（Yokogawa） ※since FY2013**

  The project achieves energy conservation in boilers, through operation optimization by applying Utility Facility Operation Optimization Technology.
- **The low carbonization of mobile communication's BTS (Base Transceiver Station) by the Introduction of "TRIBRID system" (KDDI) ※since FY2015**

  Energy management system for BTS "TRIBRID system" will be installed at 22 locations in Off-grid and Poor-grid area.

JCM Project Development & Outreach Programme by MOEJ

JCM Project development



- To **identify barriers and needs** for JCM project development in partner countries in terms of technology, financing and partnership, and **provide solutions for overcoming barriers** through consultations and matching between companies.
- To **enhance overall capacity for JCM project implementation** through facilitating understanding on the JCM rules & guidelines, and MRV methodologies by workshops, seminars, training courses and site visits.
- To **conduct feasibility studies** on specific projects for elaborating investment plan with considering expected emission reductions. To see reports, access: <http://gec.jp >

Types of Feasibility Studies (FS)

FS on JCM Project by City to City Collaboration
FS on JCM large-scale CO2 reduction project

Outreach

- **New Mechanisms Information Platform website** provides information on the latest updates on the JCM and on the relevant programme such as JCM promotion schemes by the Government of Japan. <http://www.mmechanisms.org/e/index.html>
- **Mail magazine** and up-to-date information are distributed regularly. To register, access:

(for JP) <http://www.mmechanisms.org/newsletter/index.html>
(for EN) <http://www.mmechanisms.org/e/newsletter/index.html>

JCM Model Projects by MOE

The draft budget for projects starting from FY 2017 is 6.0 billion JPY (approx. USD 60million) in total by FY2019

(1 USD = 100 JPY)

※Budget will be fixed after approval by the Parliament

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)

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

- 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.

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

Draft Budget for FY2017

JPY 1 billion (approx. USD 10 million)

※Budget will be fixed after approval by the Parliament
(1 USD = 100 JPY)

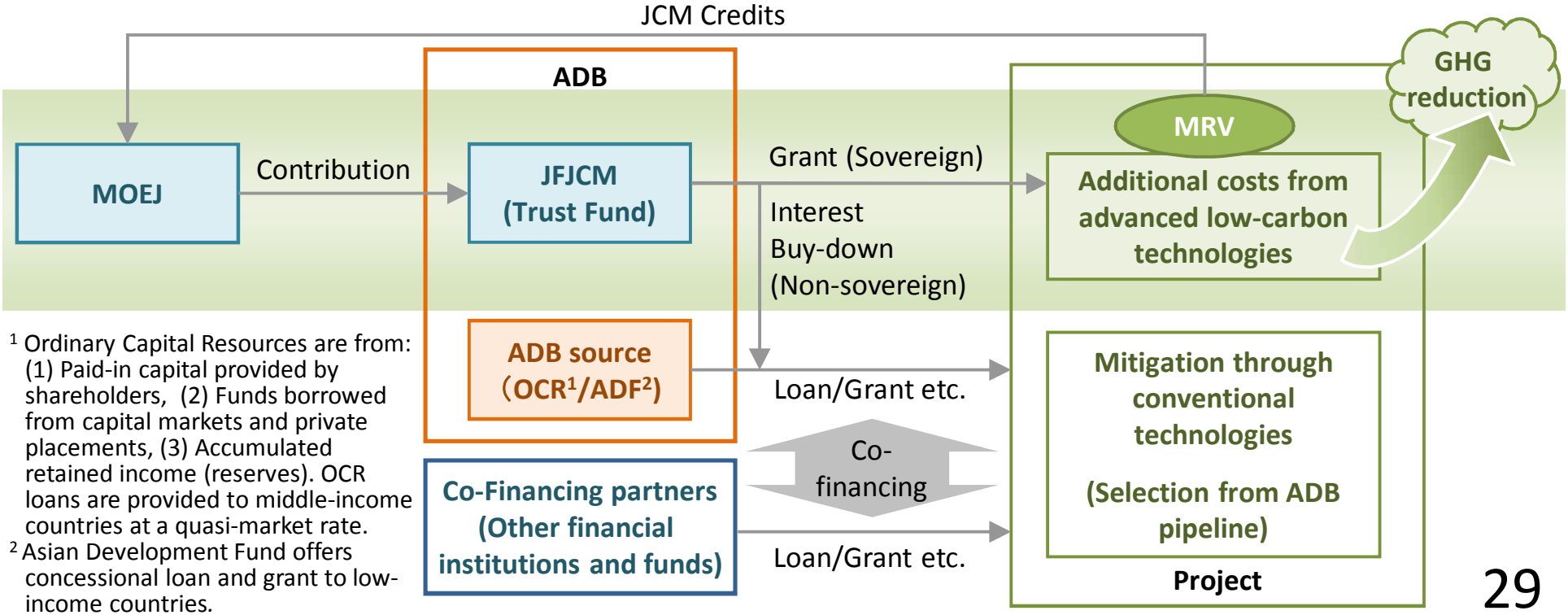
※JPY 1.2 billion in 2016, and 1.8 billion in 2015 and 2014 respectively

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 REDD+ Model Projects by MOE

(1 USD = 100 JPY)

【Background 】

- Deforestation and forest degradation in developing countries
- 17 demonstration feasibility studies from 2011 to 2014

【Expected outcome 】

- Participatory monitoring of illegal logging, disaster prevention, and forest restoration
- Provision of alternative livelihoods

《 Projects outline》

※Budget will be fixed after approval by the Parliament

【Draft budget for FY 2017】80 million JPY (approx. USD 0.8 million)

Government of Japan → Finance part of the cost → International consortiums (which include Japanese entities)

International consortiums (which include Japanese entities) → Deliver JCM credits issued * → **Government of Japan**

*At least half or ratio of financial support to project cost of JCM credits issued are expected to be delivered to the government of Japan except the amount which is allocated to the partner country based on its legislation.

※These projects may be implemented in cooperation with other organizations such as JICA

※REDD+ (Reducing Emissions from Deforestation and Forest Degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries)

Purpose

Implement activities for REDD+ and use them for contributing to achieve Japan's emission reduction target through the JCM.

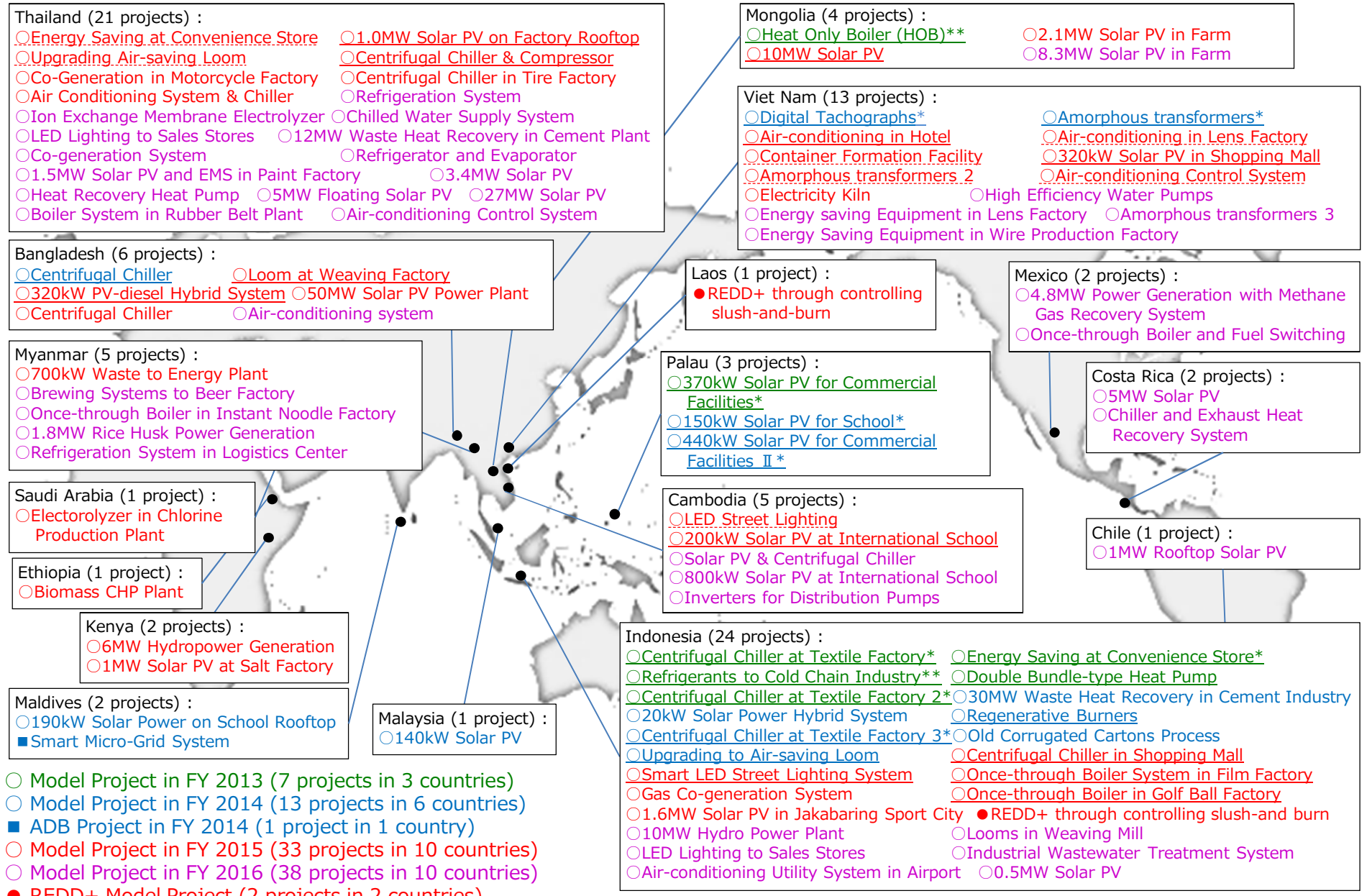
Project budget and implementation term

Up to 80 million JPY/year (fixed)

Eligible Companies

Japanese corporation(the representative of international consortiums)

JCM Financing programme by MOEJ (FY2013～2016) as of January 13, 2017



Thailand (21 projects) :
- ○Energy Saving at Convenience Store
- ○1.0MW Solar PV on Factory Rooftop
- ○Upgrading Air-saving Loom
- ○Centrifugal Chiller & Compressor
- ○Co-Generation in Motorcycle Factory
- ○Centrifugal Chiller in Tire Factory
- ○Air Conditioning System & Chiller
- ○Refrigeration System
- ○Ion Exchange Membrane Electrolyzer
- ○Chilled Water Supply System
- ○LED Lighting to Sales Stores
- ○12MW Waste Heat Recovery in Cement Plant
- ○Co-generation System
- ○Refrigerator and Evaporator
- ○1.5MW Solar PV and EMS in Paint Factory
- ○3.4MW Solar PV
- ○Heat Recovery Heat Pump
- ○5MW Floating Solar PV
- ○27MW Solar PV
- ○Boiler System in Rubber Belt Plant
- ○Air-conditioning Control System

Mongolia (4 projects) :
- ○Heat Only Boiler (HOB)**
- ○2.1MW Solar PV in Farm
- ○10MW Solar PV
- ○8.3MW Solar PV in Farm

Viet Nam (13 projects) :
- ○Digital Tachographs*
- ○Amorphous transformers*
- ○Air-conditioning in Hotel
- ○Air-conditioning in Lens Factory
- ○Container Formation Facility
- ○320kW Solar PV in Shopping Mall
- ○Amorphous transformers 2
- ○Air-conditioning Control System
- ○Electricity Kiln
- ○High Efficiency Water Pumps
- ○Energy saving Equipment in Lens Factory
- ○Amorphous transformers 3
- ○Energy Saving Equipment in Wire Production Factory

Bangladesh (6 projects) :
- ○Centrifugal Chiller
- ○Loom at Weaving Factory
- ○320kW PV-diesel Hybrid System
- ○50MW Solar PV Power Plant
- ○Centrifugal Chiller
- ○Air-conditioning system

Laos (1 project) :
- ●REDD+ through controlling slush-and-burn

Mexico (2 projects) :
- ○4.8MW Power Generation with Methane Gas Recovery System
- ○Once-through Boiler and Fuel Switching

Myanmar (5 projects) :
- ○700kW Waste to Energy Plant
- ○Brewing Systems to Beer Factory
- ○Once-through Boiler in Instant Noodle Factory
- ○1.8MW Rice Husk Power Generation
- ○Refrigeration System in Logistics Center

Palau (3 projects) :
- ○370kW Solar PV for Commercial Facilities*
- ○150kW Solar PV for School*
- ○440kW Solar PV for Commercial Facilities Ⅱ*

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

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

Cambodia (5 projects) :
- ○LED Street Lighting
- ○200kW Solar PV at International School
- ○Solar PV & Centrifugal Chiller
- ○800kW Solar PV at International School
- ○Inverters for Distribution Pumps

Chile (1 project) :
- ○1MW Rooftop Solar PV

Ethiopia (1 project) :
- ○Biomass CHP Plant

Kenya (2 projects) :
- ○6MW Hydropower Generation
- ○1MW Solar PV at Salt Factory

Indonesia (24 projects) :
- ○Centrifugal Chiller at Textile Factory*
- ○Energy Saving at Convenience Store*
- ○Refrigerants to Cold Chain Industry**
- ○Double Bundle-type Heat Pump
- ○Centrifugal Chiller at Textile Factory 2*
- ○30MW Waste Heat Recovery in Cement Industry
- ○20kW Solar Power Hybrid System
- ○Regenerative Burners
- ○Centrifugal Chiller at Textile Factory 3*
- ○Old Corrugated Cartons Process
- ○Upgrading to Air-saving Loom
- ○Centrifugal Chiller in Shopping Mall
- ○Smart LED Street Lighting System
- ○Once-through Boiler System in Film Factory
- ○Gas Co-generation System
- ○Once-through Boiler in Golf Ball Factory
- ○1.6MW Solar PV in Jakabaring Sport City
- ●REDD+ through controlling slush-and burn
- ○10MW Hydro Power Plant
- ○Looms in Weaving Mill
- ○LED Lighting to Sales Stores
- ○Industrial Wastewater Treatment System
- ○Air-conditioning Utility System in Airport
- ○0.5MW Solar PV

Maldives (2 projects) :
- ○190kW Solar Power on School Rooftop
- ■Smart Micro-Grid System

Malaysia (1 project) :
- ○140kW Solar PV

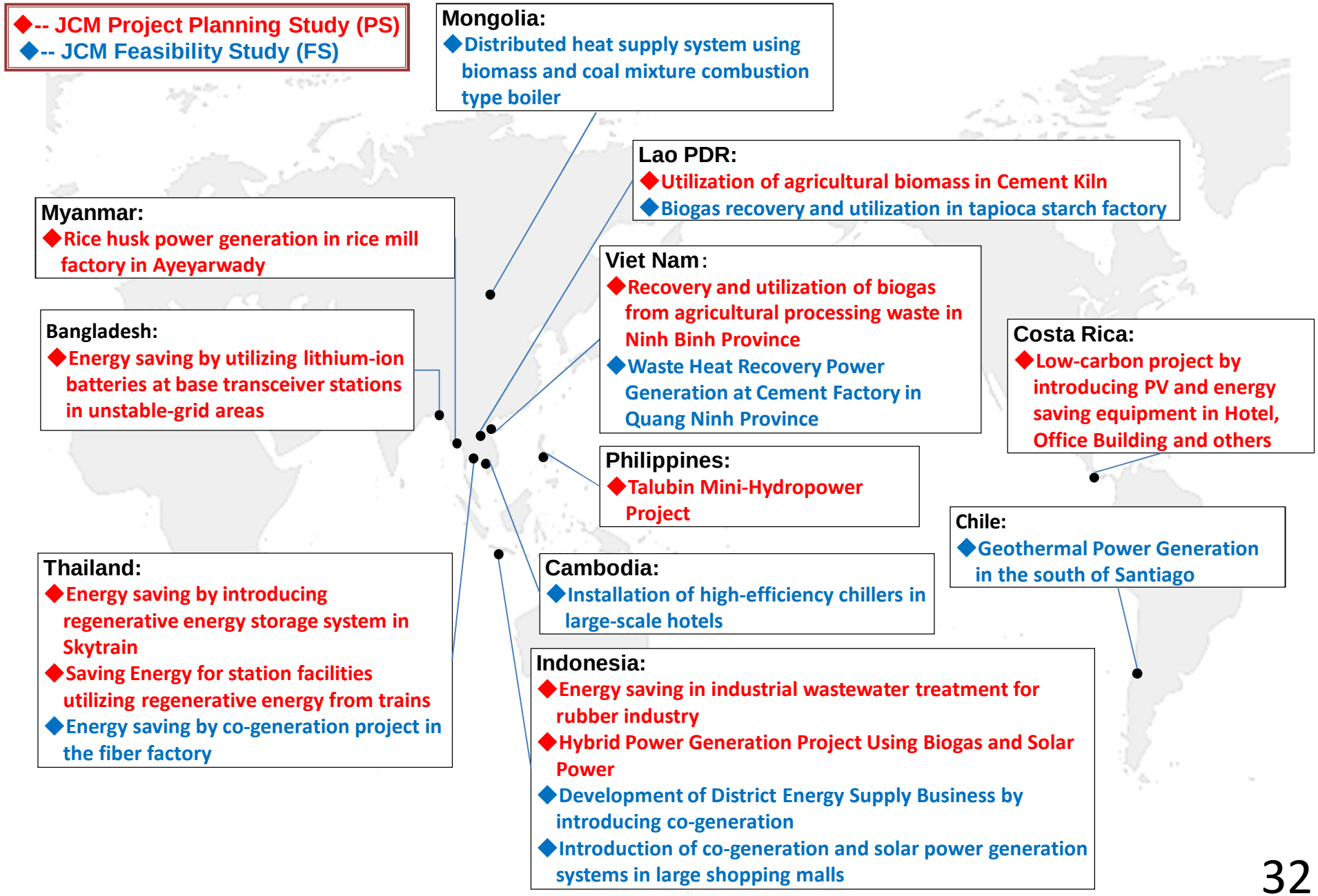
○ Model Project in FY 2013 (7 projects in 3 countries)
○ Model Project in FY 2014 (13 projects in 6 countries)
■ ADB Project in FY 2014 (1 project in 1 country)
○ Model Project in FY 2015 (33 projects in 10 countries)
○ Model Project in FY 2016 (38 projects in 10 countries)
● REDD+ Model Project (2 projects in 2 countries)

Total 93 projects in 16 partner countries

Underlined projects have started operation (34 projects, including 7 partially started projects)
Projects with * have been registered as JCM projects (13 projects)

JCM Planning/Feasibility Studies in FY2015 by MOEJ

◆-- JCM Project Planning Study (PS)
◆-- JCM Feasibility Study (FS)



Mongolia:
◆Distributed heat supply system using biomass and coal mixture combustion type boiler

Lao PDR:
◆Utilization of agricultural biomass in Cement Kiln
◆Biogas recovery and utilization in tapioca starch factory

Myanmar:
◆Rice husk power generation in rice mill factory in Ayeyarwady

Viet Nam:
◆Recovery and utilization of biogas from agricultural processing waste in Ninh Binh Province
◆Waste Heat Recovery Power Generation at Cement Factory in Quang Ninh Province

Bangladesh:
◆Energy saving by utilizing lithium-ion batteries at base transceiver stations in unstable-grid areas

Costa Rica:
◆Low-carbon project by introducing PV and energy saving equipment in Hotel, Office Building and others

Philippines:
◆Talubin Mini-Hydropower Project

Chile:
◆Geothermal Power Generation in the south of Santiago

Thailand:
◆Energy saving by introducing regenerative energy storage system in Skytrain
◆Saving Energy for station facilities utilizing regenerative energy from trains
◆Energy saving by co-generation project in the fiber factory

Cambodia:
◆Installation of high-efficiency chillers in large-scale hotels

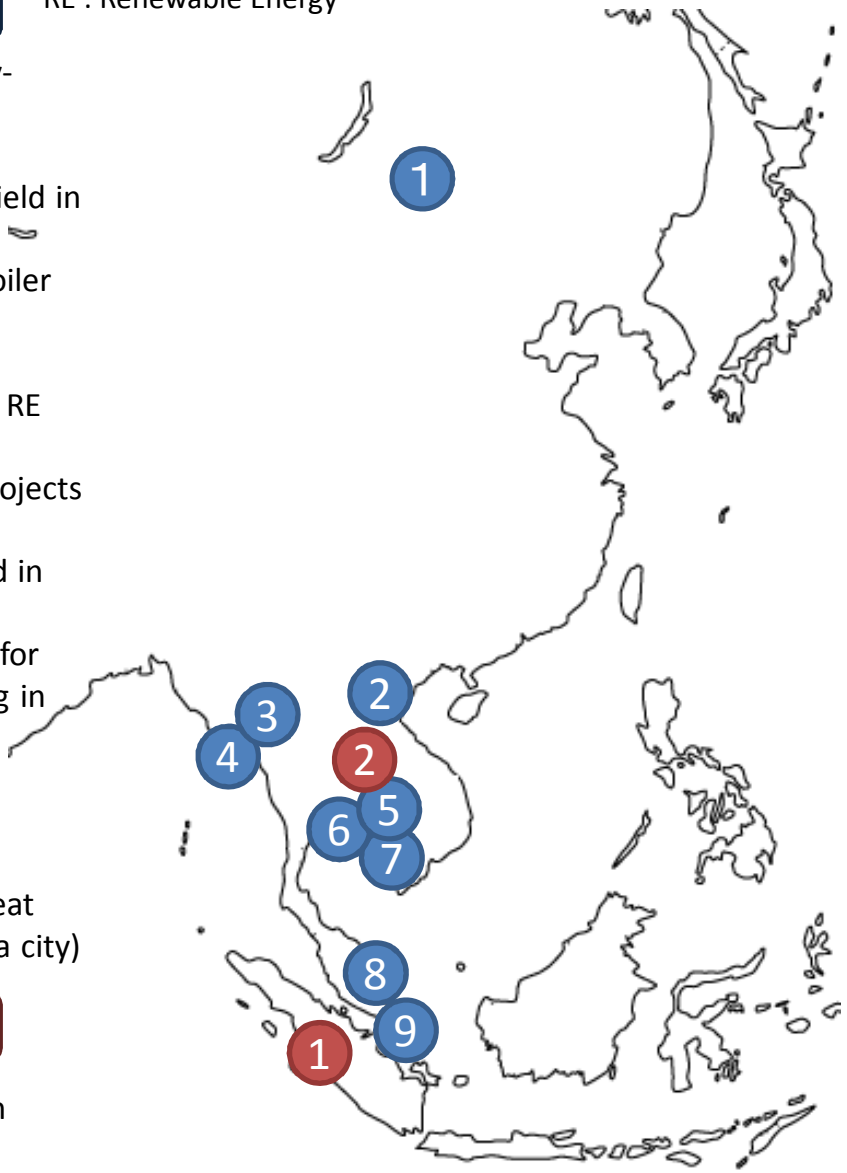
Indonesia:
◆Energy saving in industrial wastewater treatment for rubber industry
◆Hybrid Power Generation Project Using Biogas and Solar Power
◆Development of District Energy Supply Business by introducing co-generation
◆Introduction of co-generation and solar power generation systems in large shopping malls

FY2016 Feasibility studies on JCM projects by MOEJ

Feasibility Study on JCM Project by City to City Collaboration

*RE : Renewable Energy

1. The study of high-efficiency heat pump installation projects for Energy-saving field and PV generation projects for RE* field in Mongolia(Ulaanbaatar city-Sapporo city/Hokkaido)
2. The study of cogeneration and exhaust heat recovery projects for RE field in Vietnam(Hai phong city-Kitakyushu city)
3. The study of PV generation projects for RE field and high-efficiency boiler installation projects for Energy-saving field in Myanmar(Yangon city-Kawasaki city)
4. The study of water treatment system installation and WtE projects for RE field in Myanmar(Pathein city-Fukushima city)
5. The study of biomass power generation projects and PV generation projects for RE field in Cambodia(Siem reap state-Kanagawa pref.)
6. The study of WtE, cogeneration and exhaust heat recovery for RE field in Thailand(Rayong prov.-Kitakyushu city)
7. The study of project formulation by assisting planning the action plan for the climate change strategy and projects for RE field and Energy-saving in Cambodia(Phnom Penh city-Kitakyushu city)
8. The study of cogeneration projects for RE field and high-efficiency air conditioning system installation projects for Energy-saving field in Malaysia(Iskandar development region-Kitakyushu city)
9. The study of high-efficiency air conditioning system installation and heat desorption unit installation projects in Indonesia(Batam city-Yokohama city)



Feasibility Study on JCM large-scale CO2 reduction project

1. The study of a biomass power generation project by rice hull and grain waste for RE field in Indonesia(West Sumatra prov.)
2. The study of refining waste water and residue into bio gas and supplying for vehicles for RE field in Thailand(Ubon Ratchathani prefecture etc.)

Reference:
Technical Details for the JCM

(Subject to further consideration and discussion with partner countries)

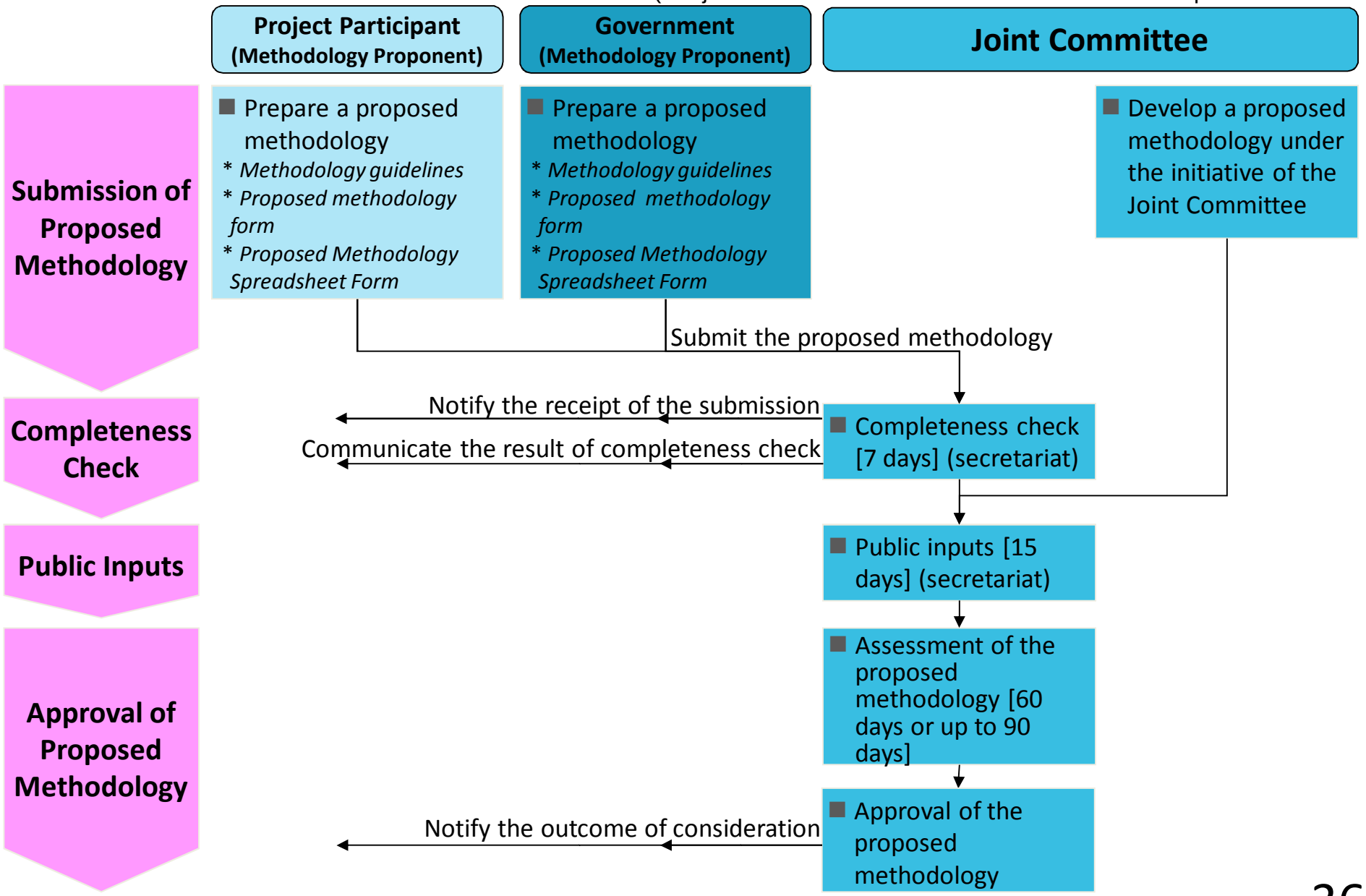
Necessary documents for the JCM

(Subject to further consideration and discussion with partner countries)

		Rules and Guidelines
Overall		✓ Rules of Implementation ✓ Project Cycle Procedure ✓ Glossary of Terms ✓ Guidelines for Designation as a Third-Party Entity (TPE guidelines)
Joint Committee		✓ Rules of Procedures for the Joint Committee (JC rules)
Methodology		✓ Guidelines for Developing Proposed Methodology (methodology guidelines)
Project Procedures	**Developing a PDD**	✓ Guidelines for Developing Project Design Document and Monitoring Report (PDD and monitoring guidelines)
	Monitoring	
	Validation	✓ Guidelines for Validation and Verification (VV guidelines)
	Verification	

Methodology Development Procedure of the JCM

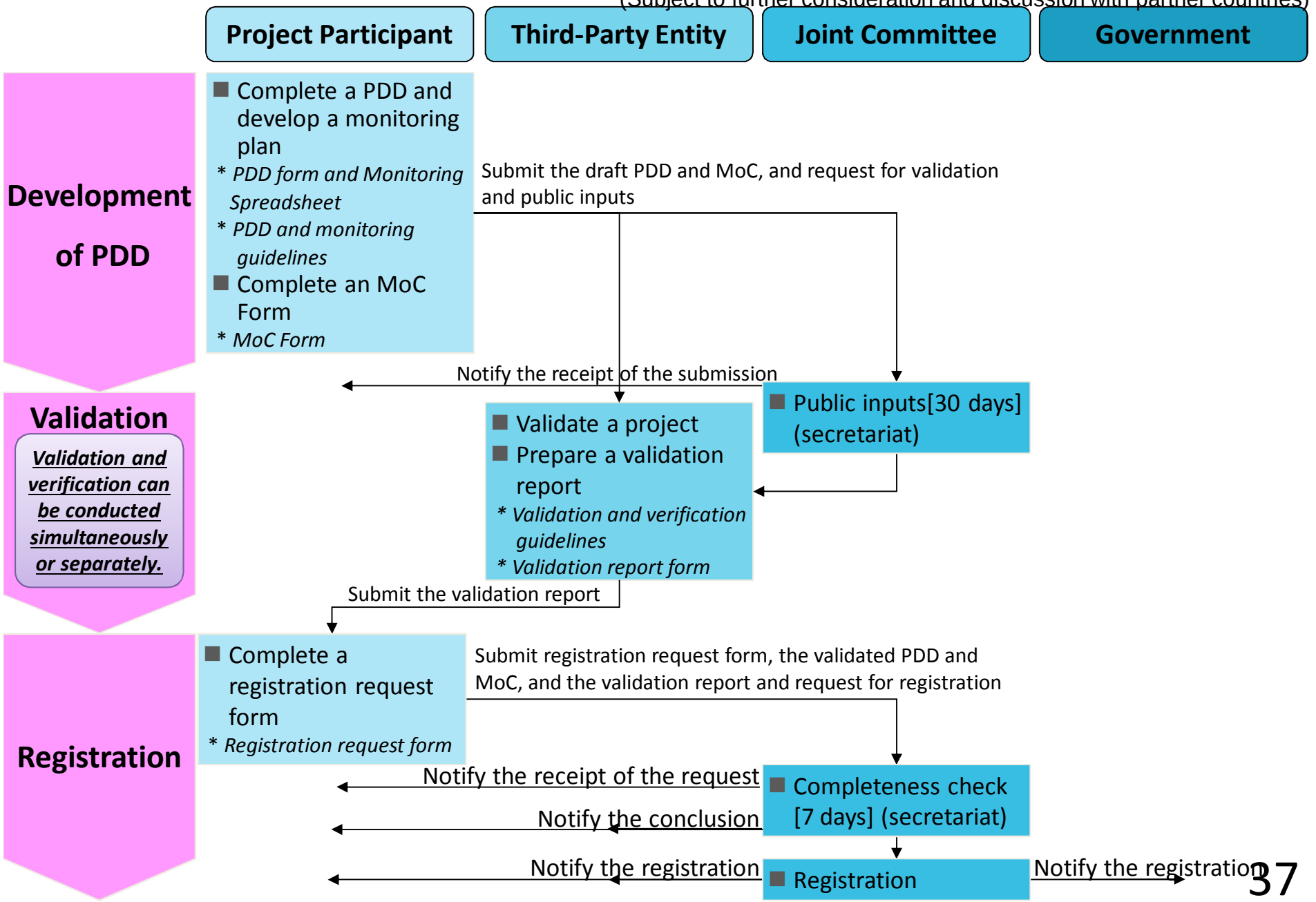
(Subject to further consideration and discussion with partner countries)



Note: Asterisk (*) indicates documentation relevant for each step of the procedure

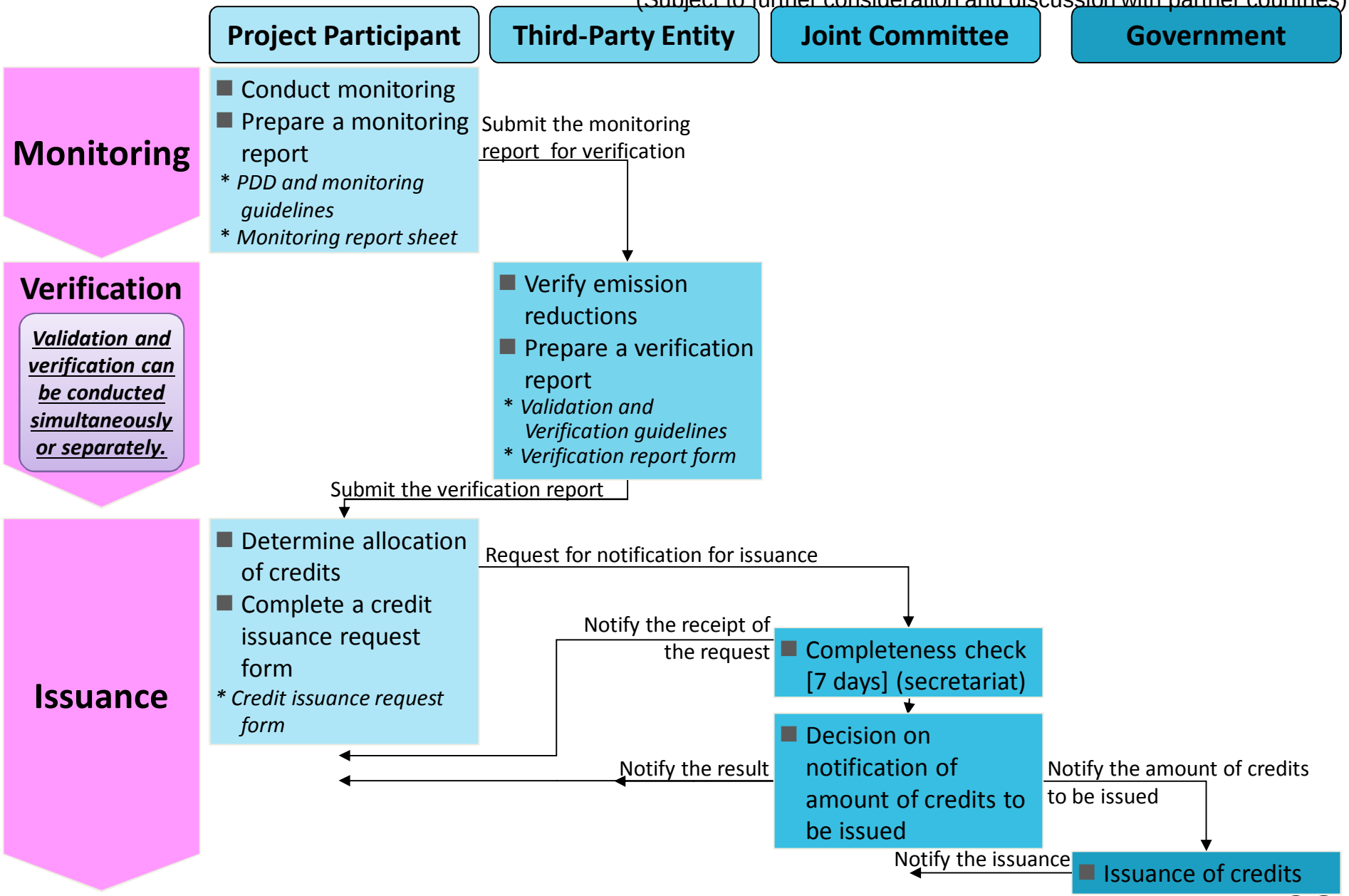
Registration & Issuance Procedure of the JCM (1/2)

(Subject to further consideration and discussion with partner countries)



Registration & Issuance Procedure of the JCM (2/2)

(Subject to further consideration and discussion with partner countries)



Rules of Procedures for the Joint Committee

(Subject to further consideration and discussion with partner countries)

Members

- The Joint Committee (JC) consists of representatives from both Governments.
- Each Government designates members, which may not exceed [10].
- The JC has two Co-chairs to be appointed by each Government (one from the partner country and the other from Japan). Each Co-Chair can designate an alternate from members of the JC.

Decision making in the JC

- The JC meets no less than once a year and decision by the JC is adopted by consensus.
- The JC may adopt decisions by electronic means in the following procedure:
  (a) The proposed decisions are distributed by the Co-Chairs to all members of the JC.
  (b) The proposed decision is deemed as adopted when,
    i) no member of the JC has provided negative assertion within [10] calendar days after distribution and both Co-Chairs have made affirmative assertion, or
    ii) all members of the JC have made affirmative assertion.
- If a negative assertion is made by one of the JC members, the Co-Chairs take into account the opinion of the member and take appropriate actions.
- The JC may hold conference calls to assist making decisions by electronic means.

External assistance

- The JC may establish panels and appoint external experts to assist part of its work.

Languages: English **Secretariat:** The secretariat services the JC.

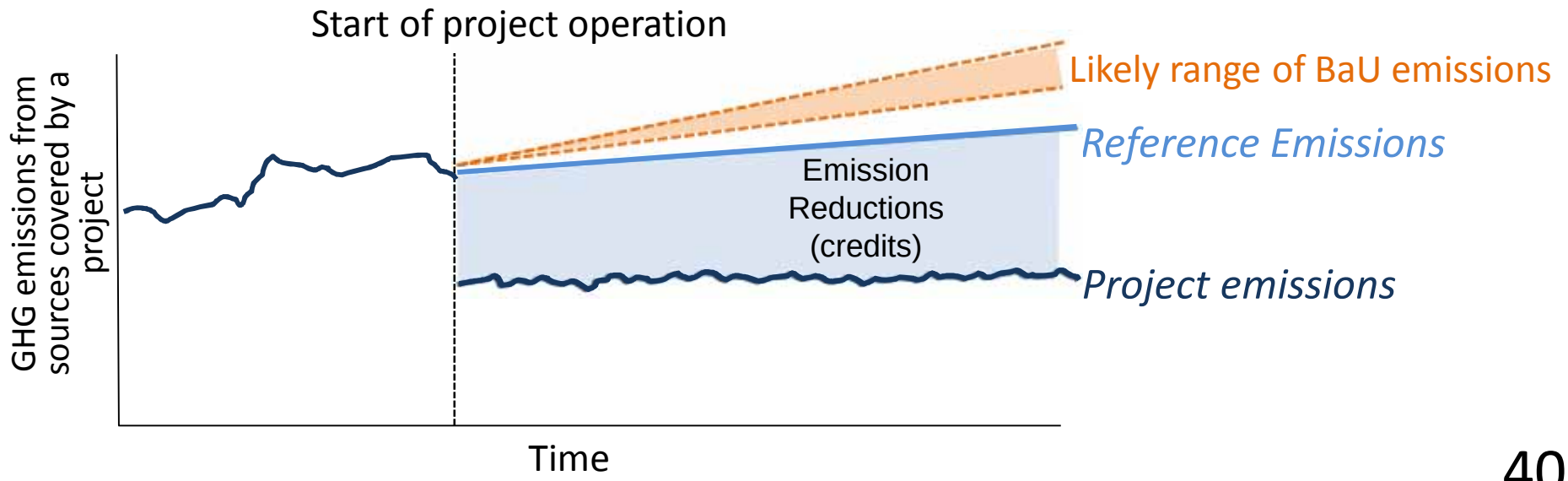
Confidentiality: Members of the JC, Secretariat, etc. respect confidentiality.

Record of the meeting: The full text of all decisions of the JC is made publicly available.

Basic Concept for Crediting under the JCM

(Subject to further consideration and discussion with partner countries)

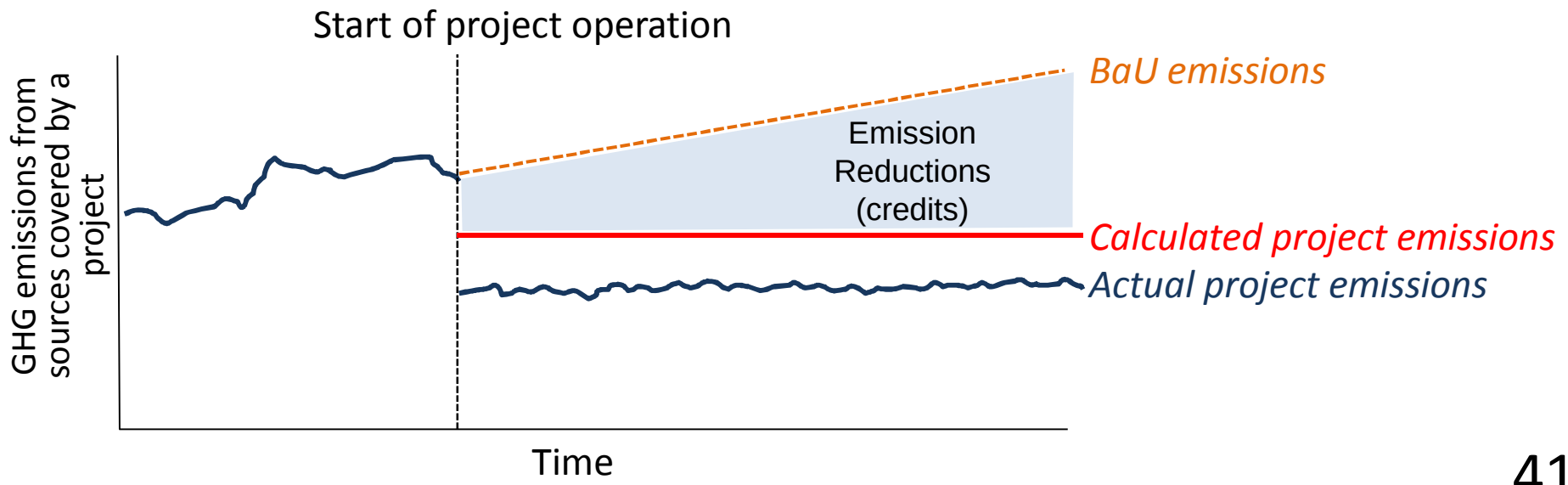
- In the JCM, emission reductions to be credited are defined as the difference between "reference emissions" and project emissions.
- The reference emissions are calculated below business-as-usual (BaU) emissions which represent plausible emissions in providing the same outputs or service level of the proposed JCM project in the partner country.
- This approach will ensure a net decrease and/or avoidance of GHG emissions.



Addendum: ways to realize net reduction

(Subject to further consideration and discussion with partner countries)

- A net decrease and/or avoidance of GHG emissions can be realized in alternative way, instead of calculating the reference emissions below BaU emissions.
- Using conservative default values in parameters to calculate project emissions instead of measuring actual values will lead calculated project emissions larger than actual project emissions.
- This approach will also ensure a net decrease and/or avoidance of GHG emissions, as well as reduce burdens of monitoring.



JCM Methodology

- Key Features of the JCM methodology
  - ➢The JCM methodologies are designed in such a way that project participants can use them easily and verifiers can verify the data easily.
  - ➢In order to reduce monitoring burden, default values are widely used in a conservative manner.
  - ➢Eligibility criteria clearly defined in the methodology can reduce the risks of rejection of the projects proposed by project participants.

Eligibility criteria	• A “check list” will allow easy determination of eligibility of a proposed project under the JCM and applicability of JCM methodologies to the project.
Data (parameter)	• List of parameters will allow project participants to determine what data is necessary to calculate GHG emission reductions/removals with JCM methodologies. • Default values for specific country and sector are provided beforehand.
Calculation	• Premade spreadsheets will allow GHG emission reductions/removals to be calculated automatically by inputting relevant values for parameters, in accordance with methodologies.

Basic concept of Eligibility criteria in JCM methodology

(Subject to further consideration and discussion with partner countries

Eligibility criteria in JCM methodologies contain the following:

- ✓ The requirements for the project to be registered as a JCM project. *<Basis for the assessment of validation and registration of a proposed project>*
- ✓ The requirements for the project to be able to apply the JCM methodology. *<same as "applicability condition of the methodology" under the CDM>*

1. Both Governments determine what technologies, products, etc should be included in the eligibility criteria through the approval process of the JCM methodologies by the Joint Committee.
2. Project participants can use the list of approved JCM methodologies when applying for the JCM project registration.

Examples of eligibility criteria 1.

- Introduction of *xx* (products/technologies) whose design efficiency is above *xx* (e.g. output/kWh) *<Benchmark Approach>*
- Introduction of *xx* (specific high efficient products/technologies, such as air conditioner with inverter, electric vehicles, or PV combined with battery) *<Positive List Approach>*

Examples of eligibility criteria 2.

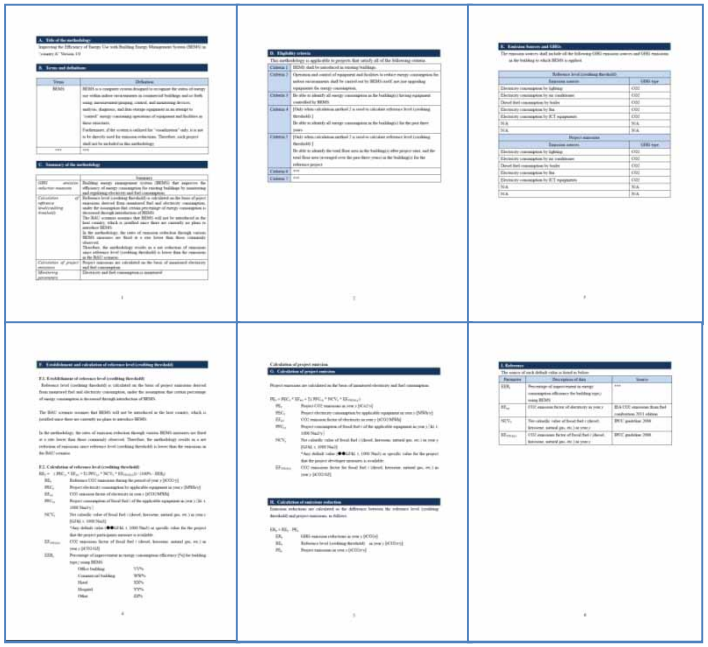
- Existence of historical data for *x* year(s)
- Electricity generation by *xx* (e.g. PV, wind turbine) connected to the grid
- Retrofit of the existing boiler

Overview of JCM Methodology, Monitoring Plan and Monitoring Report

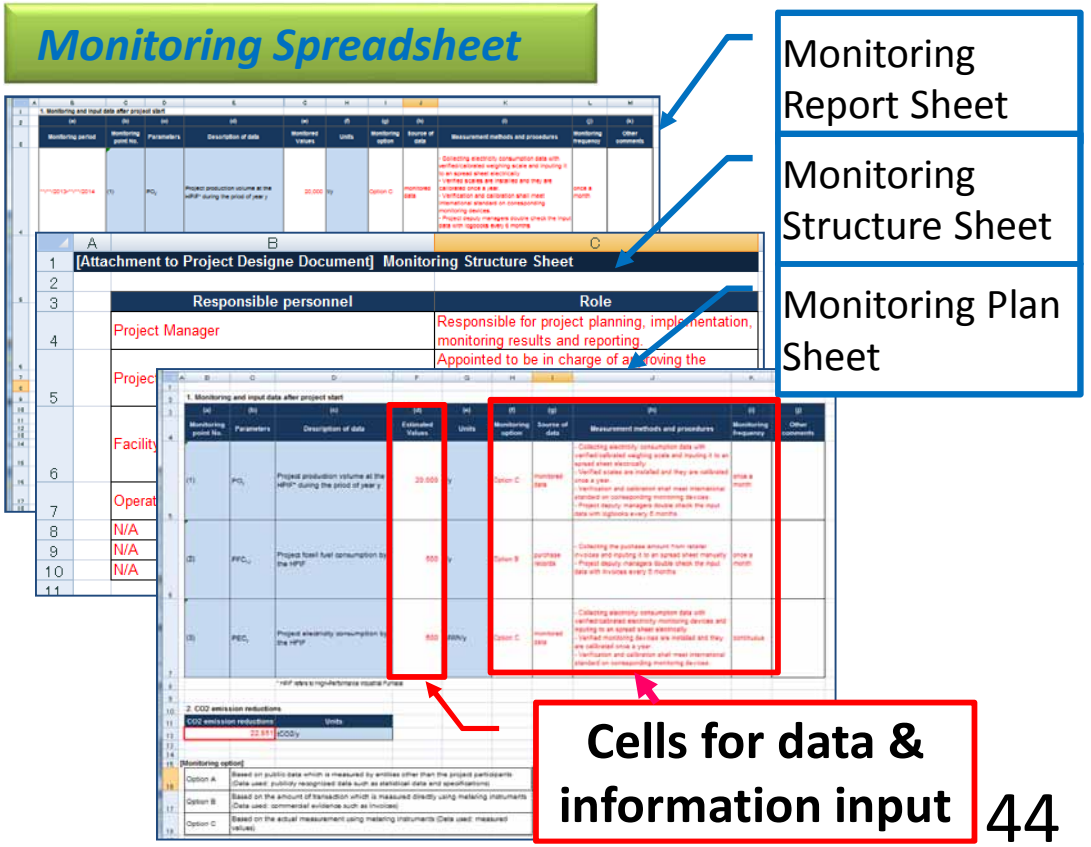
(Subject to further consideration and discussion with partner countries)

- JCM methodology consists of the followings.
  - Approved Methodology Document
  - Monitoring Spreadsheet
    - Monitoring Plan Sheet (including Input Sheet & Calculation Process Sheet)
    - Monitoring Structure Sheet
    - Monitoring Report Sheet (including Input Sheet & Calculation Process Sheet)

Approved Methodology Document



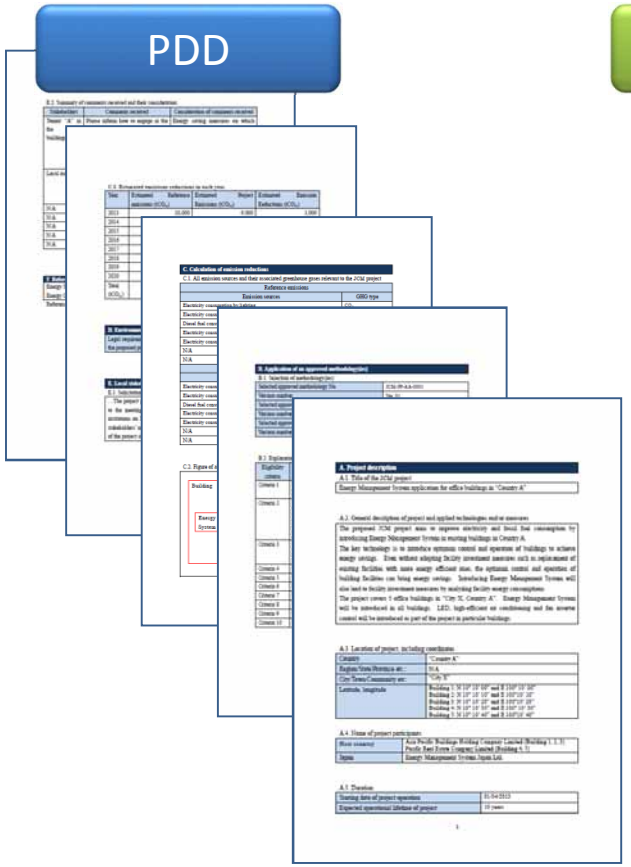
Monitoring Spreadsheet

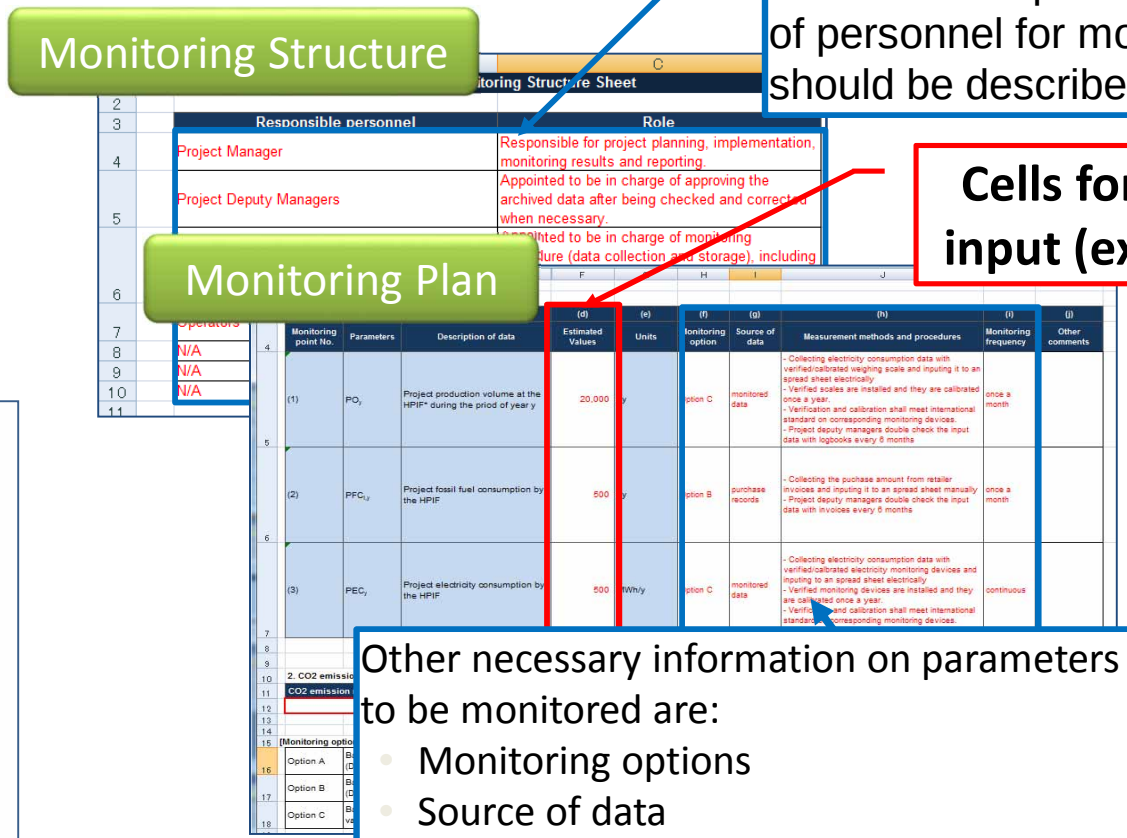


PDD and Monitoring Plan

(Subject to further consideration and discussion with partner countries)

- Developing a Project Design Document (PDD) and a Monitoring Plan
  - ➢A PDD form should be filled in with information of the proposed project.
  - ➢A Monitoring Plan consists of Monitoring Plan Sheet and Monitoring Structure Sheet, and it should be filled in as well.





Possible Contents of the JCM PDD

(Subject to further consideration and discussion with partner countries)

A. Project description
- A.1. Title of the JCM project
- A.2. General description of project and applied technologies and/or measures
- A.3. Location of project, including coordinates
- A.4. Name of project participants
- A.5. Duration
- A.6. Contribution from developed countries

B. Application of an approved JCM methodology(ies)
- B.1. Selection of JCM methodology(ies)
- B.2. Explanation of how the project meets eligibility criteria of the approved methodology

C. Calculation of emission reductions
- C.1. All emission sources and their associated greenhouse gases relevant to the JCM project
- C.2. Figure of all emission sources and monitoring points relevant to the JCM project
- C.3. Estimated emissions reductions in each year

D. Environmental impact assessment

E. Local Stakeholder consultation
- E.1. Solicitation of comments from local stakeholders
- E.2. Summary of comments received and their consideration

F. References

Annex

Approved Methodology Spreadsheet consists of Monitoring Plan Sheet, Monitoring Structure Sheet and Monitoring Report Sheet, and it shall be attached to the PDD.

Monitoring Report

(Subject to further consideration and discussion with partner countries)

- Making a Monitoring Report
  - ➢A Monitoring Report should be made by filling cells for data input (ex post) in the Monitoring Report Sheet with monitored values.
  - ➢Project participants prepare supporting documents which include evidence for stated values in the cells for data input.

Monitoring Report

Monitoring period

Cells for data input (ex post)

(a) Monitoring period	(b) Monitoring point No.	(c) Parameters	(d) Description of data	(e) Monitored Values	(f) Units	(g) Monitoring option	(h) Source of data	(i) Measurement methods and procedures	(j) Monitoring frequency	(k) Other comments
//2013-**/**/2014	1)	PO_y	Project production volume at the HPIF* during the priod of year y	20,000	t/y	Option C	monitored data	- Collecting electricity consumption data with verified/calibrated weighing scale and inputting it to an spread sheet electrically - Verified scales are installed and they are calibrated once a year. - Verification and calibration shall meet international standard on corresponding monitoring devices. - Project deputy managers double check the input data with logbooks every 6 months	once a month	
//2013-**/**/2014	2)	PFO_{iy}	Project fossil fuel consumption by the HPIF	500	t/y	Option B	purchase records	- Collecting the puchase amount from retailer invoices and inputing it to an spread sheet manually - Project deputy managers double check the input data with invoices every 6 months	once a month	
N/A	3)	PEC_y	Project electricity consumption by the HPIF	500	MWh/y	Option C	monitored data	- Collecting electricity consumption data with verified/calibrated electricity monitoring devices and inputing to an spread sheet electrically - Verified monitoring devices are installed and they are calibrated once a year. - Verification and calibration shall meet international standard on corresponding monitoring devices.	continuous	

* HPIF refers to High-Performance Industrial Furnace.

2. CO2 emission reductions

CO2 emission reductions	Units
22,851	tCO2/y

[Monitoring option]

Option A	Based on public data which is measured by entities other than the proj... used: publicly recognized data such as statistical data and specificati...
Option B	Based on the amount of transaction which is measured directly using m... used: commercial evidence such as invoices)
Option C	Based on the actual measurement using metering instruments (Data us...

Other necessary information on monitored parameters are to be filled in:

- Monitoring options
- Source of data
- Measurement methods and procedures
- Monitoring frequency