



環境省

Ministry of the Environment
Government of Japan

MOEJ's Environmental Cooperation and Environmental Infrastructure Promotion in Asia

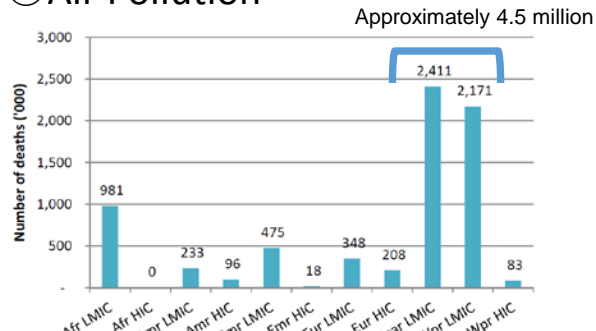
November 21st, 2018

Ryuzo SUGIMOTO

Ministry of the Environment, Japan (MOEJ)

Pollution in Developing Country (Waste, Air, Water)

Air Pollution



HAP: Household air pollution; AAP: Ambient air pollution; Amr: America, Afr: Africa; Emr: Eastern Mediterranean, Sear: South - East Asia, Wpr: Western Pacific; LMIC: Low - and middle - income countries; HIC: High - income countries.

Total deaths attributable to the joint effects of HAP and AAP in 2016, by region (Source: WHO,2018)

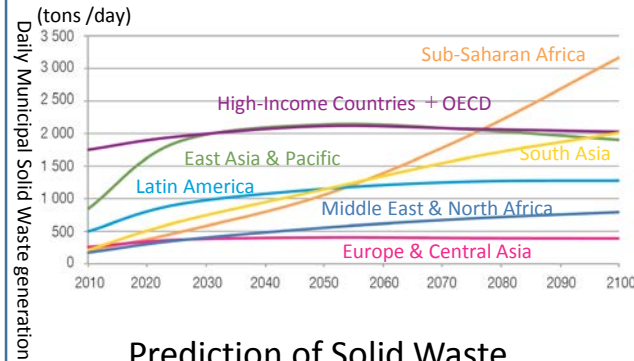


Deli at 8 am on Feb 9 in 2016

PM2.5 291.8 μ g/m³

(Source: Material provided by Embassy of Japan in India)

Solid Waste



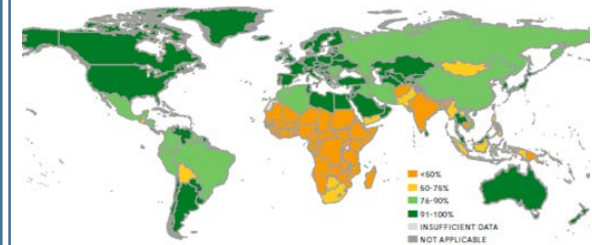
Prediction of Solid Waste

(Source: UNEP Global Waste Management Outlook)



Landfill site in Surabaya, Indonesia

Water Pollution



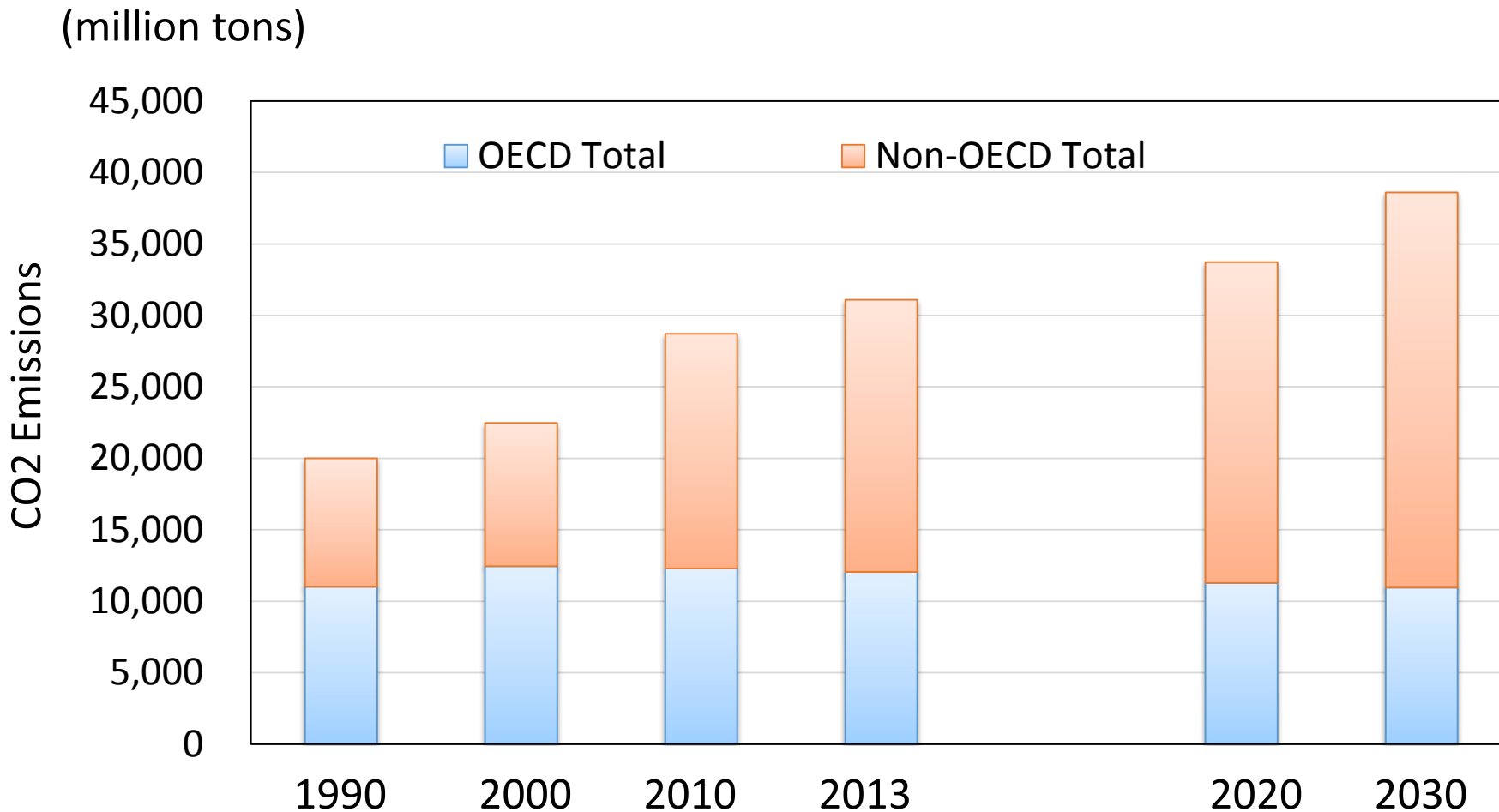
Family rates to use sanitation facilities (Source: unicef•WHO,2017)



Water pollution in public water area

Issues for Developing Countries (3)

Global CO2 emission from energy use



Environmental Infrastructure Promotion Strategy

(Published on 25 July, 2017)

[Objective]

- Promote Environmental infrastructure in developing countries for
 - 1) Reduction of pollution damage,
 - 2) “Leapfrog” development that minimizes the cost of pollution measures.
 - 3) Realization of both environmental improvement and economic development.
- Transferring advanced technologies, know-how and systems based on experience.

3 Actions

1. Top Sales by Ministers and High level officials

- ✓ Bilateral Policy Dialogue, Regional Forums, etc.
- ✓ Japan Environmental Week at partner countries

2. Package support

- ✓ Legal System, Technology and Finance, Capacity developments, and Sharing Economic/Social benefits

3. Collaboration with stakeholders

- ✓ Private companies, local governments, related ministries, donor agencies, etc.

Package support

Support for Framework development

- Support for formulating legal system, standards, guidelines, etc.
- Capacity development support for law enforcement, etc.

Support for Project Formulation

- Matching needs and seeds for technology and supporting project formulation
- Sharing the long-term economic and social merits by high-quality environmental infrastructure
- Support for policy and project formulation through city-to-city collaboration

Financial Support for Project

- Financial support such as Joint Crediting Mechanism (JCM)
- Support for the use of government financial institutions, Asian Development Bank (ADB) and Green Climate Fund (GCF)



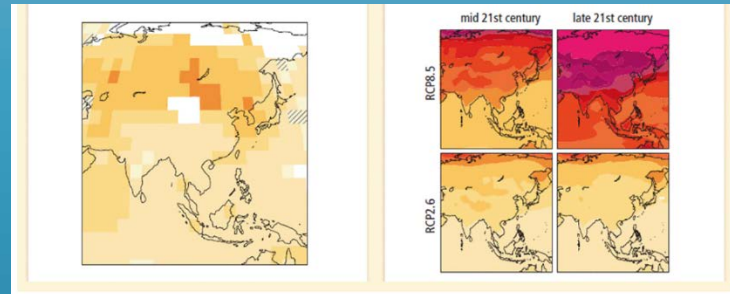
Strategically implemented by each category / region

Promotion of Environmental Infrastructure

Climate Change Mitigation



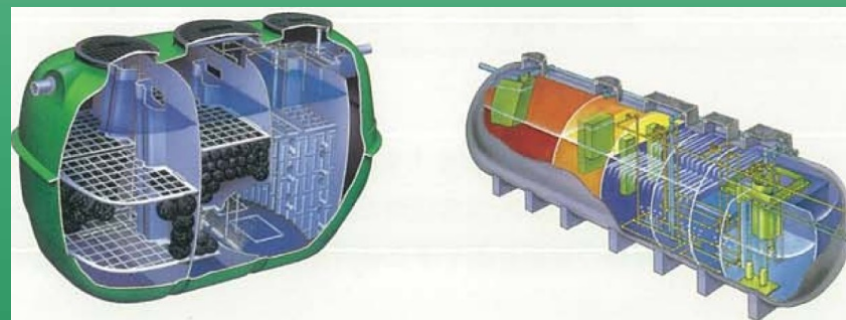
Climate Change Adaptation



Solid Waste Management



Johkasou



Water Environment Conservation

Environmental Impact Assessment



Main project of Environmental Infrastructure

Africa (waste management)



Established "African Clean Cities Platform" for cooperation in waste treatment field. (2017)

Vietnam (WtE plant, co-benefit between air pollution and against global warming)

Thailand (WtE plant, industrial waste)

Mongolia (co-benefit between air pollution and against global warming)

Kuwait (waste management)

China (co-benefit between air pollution and against global warming)



Pilot project of High efficiency tenter in Textile dyeing factory in China (Fabric finishing drying equipment)

Philippine (WtE plant)

Malaysia (WtE plant)

Myanmar (WtE plant)



Installed first WtE plant in Myanmar (2017)

Indonesia (WtE plant, heat recovery plant, co-benefit between water quality control and against global warming)

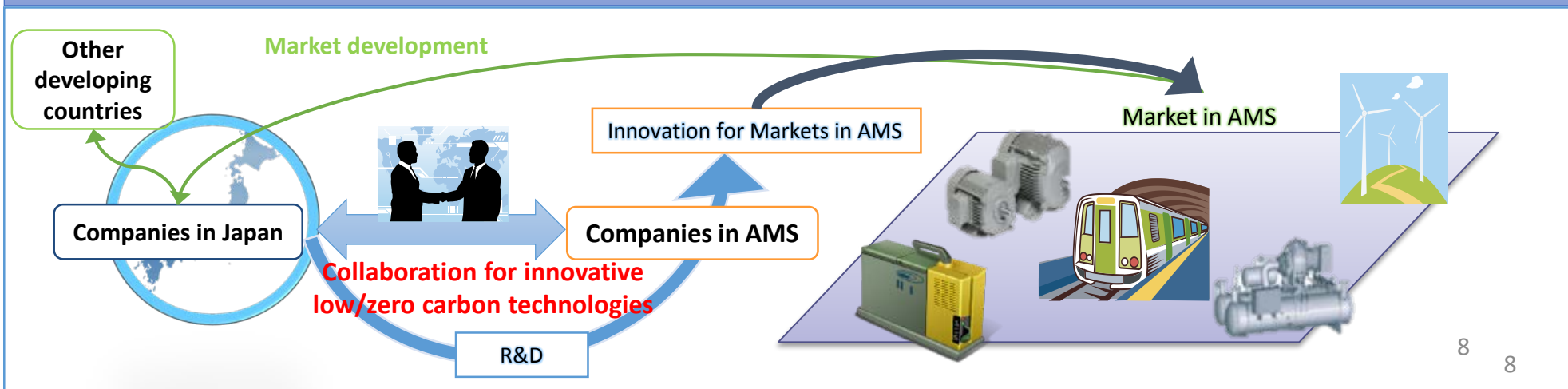


Heat recovery plant; generating electricity utilizing waste heat from cement factory

Partnership to Strengthen Transparency for Co-Innovation (PaSTI)

- To strengthen the regional cooperation on climate change
- To enhance **Co-Innovation** by using Japanese advanced low/zero carbon and resilient technologies with ASEAN.

AMS Markets Development for Low/Zero carbon technologies/products/services

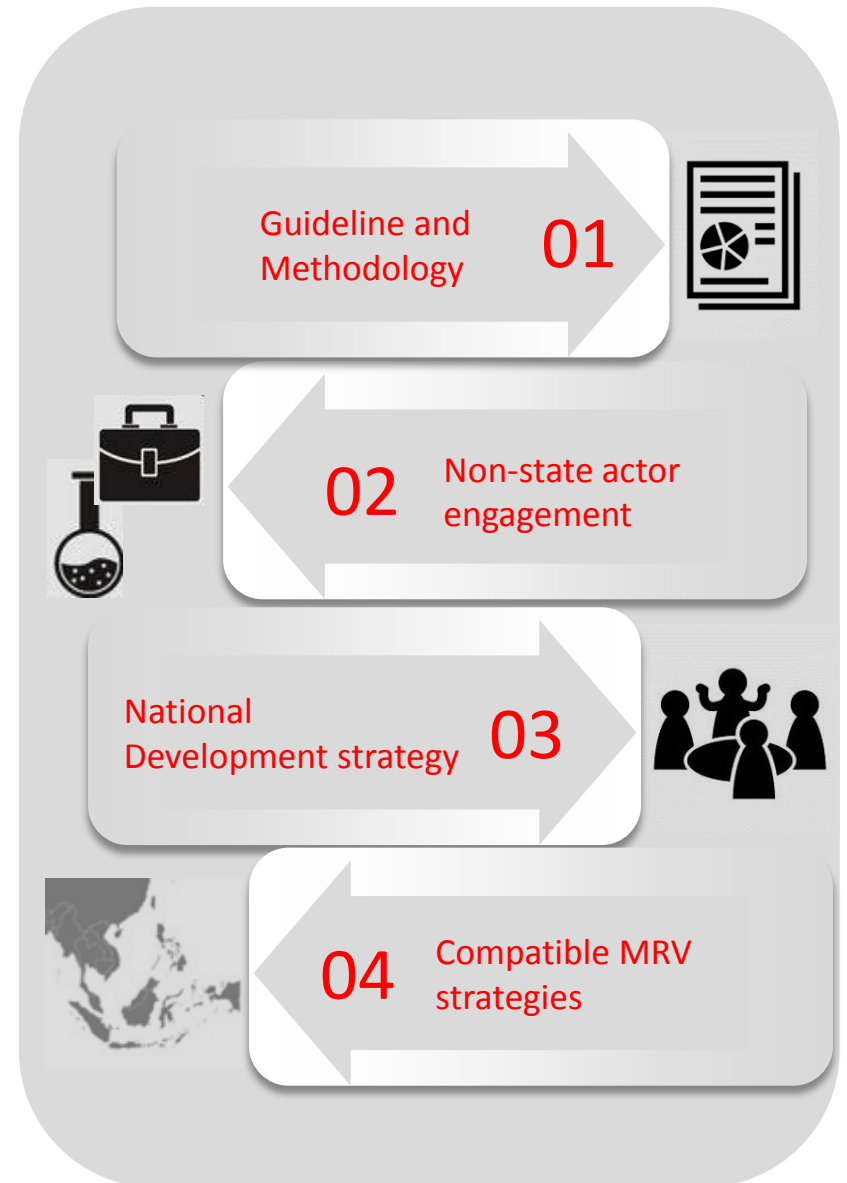


PaSTI

- Key initiative: **Partnership to Strengthen Transparency for Co-Innovation (PaSTI)**

- Actions:

- To support the development and use of critical tools including guidelines and methodologies;
- To reinforce the initiative of compatible MRV systems and enhance cooperative climate actions across the ASEAN Member States.



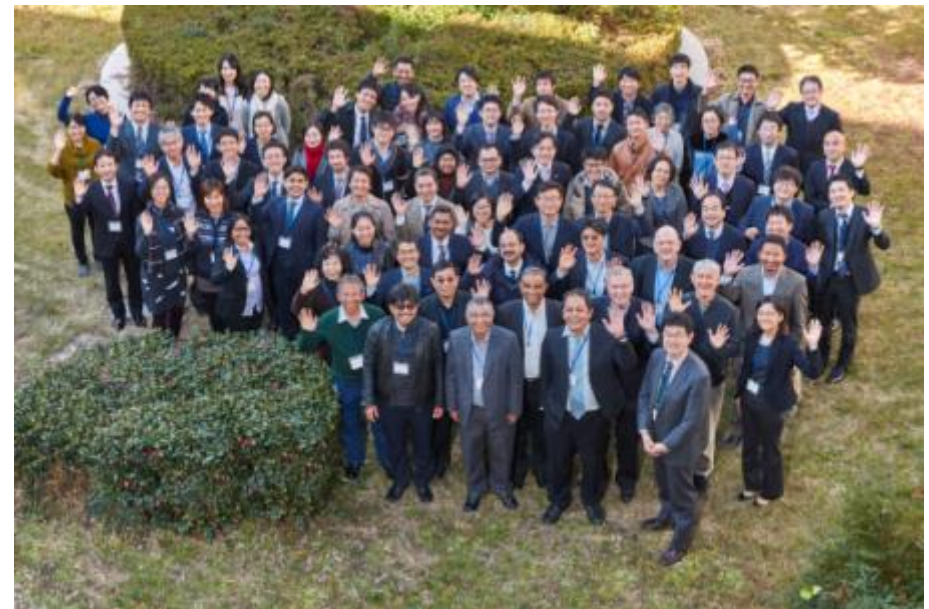
What is AIM?

- **Asia-Pacific Integrated Model (AIM)** is a family of analytical models which are developed by research institutes in Japan. AIM contributes IPCC reports, discussion on climate change mitigation actions in Japan and Asian countries.
- AIM can be regarded as “**researchers network**”, because AIM is developed and applied through collaboration with researchers in various countries.

Model



Researchers Network



21th AIM International Workshop

Example of AIM's structure and output

AIM activities in Asia

- AIM has expanded their field of LCS study to Asian countries. LCS roadmaps of Thailand, Malaysia, whole Asia, etc. are developed through collaborative works with Asian researchers.

CHINA
Asia Local Scenario

KOREA
Asia Local Scenario

INDIA
Asia Scenario

BANGLADESH
Asia Scenario

VIETNAM
Asia Scenario

THAILAND
Asia Scenario

CAMBODI
Asia Scenario

MALAYSIA
Asia Scenario

INDONESIA
Asia Scenario

Whole Asia

Roadmap to Low Carbon Thailand towards 2050

http://2050.nies.go.jp/LCS/index_j.html

Contribution on Policy Making Process

LoCARNET: Low Carbon Asia Research Network

An open network of researchers, research organisations, as well as like-minded relevant stakeholders that facilitates the formulation and implementation of science-based policies for low-carbon development in Asia.

Lessons learnt from activities and outcomes from dialogues between Researchers and Policy-makers in Asia

Synthesis Reports: <http://lcs-rnet.org/publications>

Members of Steering Committee

Rizaldi BOER Indonesia	Bundit LIMMEECHOKCHAI Thailand	Jiang KEJUN China	Ho Chin SIONG Malaysia	Sirintornthep TOWPRAYOON Thailand	Mikiko Kainuma Japan	Hak MAO Cambodia	P.R. SHUKLA India	Shuzo NISHIOKA Japan
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LoCARNET 2nd Annual Meeting in Yokohama, July 2013

Secretary General

Kainuma (2013): 20th AIM Workshop

Collaborative Network among Asian Researchers

AIM activities in Asia (2/2)

- AIM has contributed processes to formulate climate policy in Japan, and the activities are expanded to Asia. **AIM has been involved in formulation processes of low carbon policies through collaboration with Asian researchers.**
- Since FY2014, “Asia Low Carbon Society Research (LCSR) Project” which is funded by MoEJ is launched. The project includes **not only making low carbon scenarios but also designing practical programs to realize LCS** in target regions.



Target Regions FY2014 -

National	<ul style="list-style-type: none"> • Thailand • Indonesia • Malaysia • Cambodia • Vietnam
City	<p>[Vietnam]</p> <ul style="list-style-type: none"> • Ho Chi Minh • Da Nang • Hai Phong <p>[Malaysia]</p> <ul style="list-style-type: none"> • Putrajaya • Iskandar

- Basic concept is transferring the **knowledge and experience of Japanese cities for creating low carbon society** to foreign cities which have the mutual relationship.
- Private companies formulate the consortiums with Japanese cities and support foreign cities to create low carbon cities.

Ex) Support to design city masterplan and install low carbon technology etc.



- **Creating low carbon project** efficiently and effectively
- Designing **the local systems** to promote low carbon society
Ex) low carbon action plan and technology evaluation criteria etc.
- **Capacity building** for local staffs

Promotion of private investment

Self-sustained development of foreign city

Transferring low-carbon technology to other fields



Cities joining the city to city collaboration program FY 2013 - 2018

Asia:10 countries, 27 cities / Japan: 12 cities

Lao PDR

Foreign city	Japanese city
Vieng chan	Kyoto

Mongolia

Foreign city	Japanese city
Ulaanbaatar	Sapporo Hokkaido pref.

Vietnam

Foreign city	Japanese city
Hai phong	Kitakyushu
Da nang	Yokohama
Ho chi minh	Osaka
Kiên Giang	Kobe

Myanmar

Foreign city	Japanese city
Yangon	Kawasaki
Ayeyarwady	Fukushima
Sagaing	Fukushima
Mandalay	Kitakyushu

Thailand

Foreign city	Japanese city
Bangkok	Yokohama
Rayong	Kitakyushu
Chiang mai	Kitakyushu

India

Foreign city	Japanese city
Bangalore	Yokohama

Cambodia

Foreign city	Japanese city
Phnom penh	Kitakyushu
Siem reap	Kanagawa pref.

Malaysia

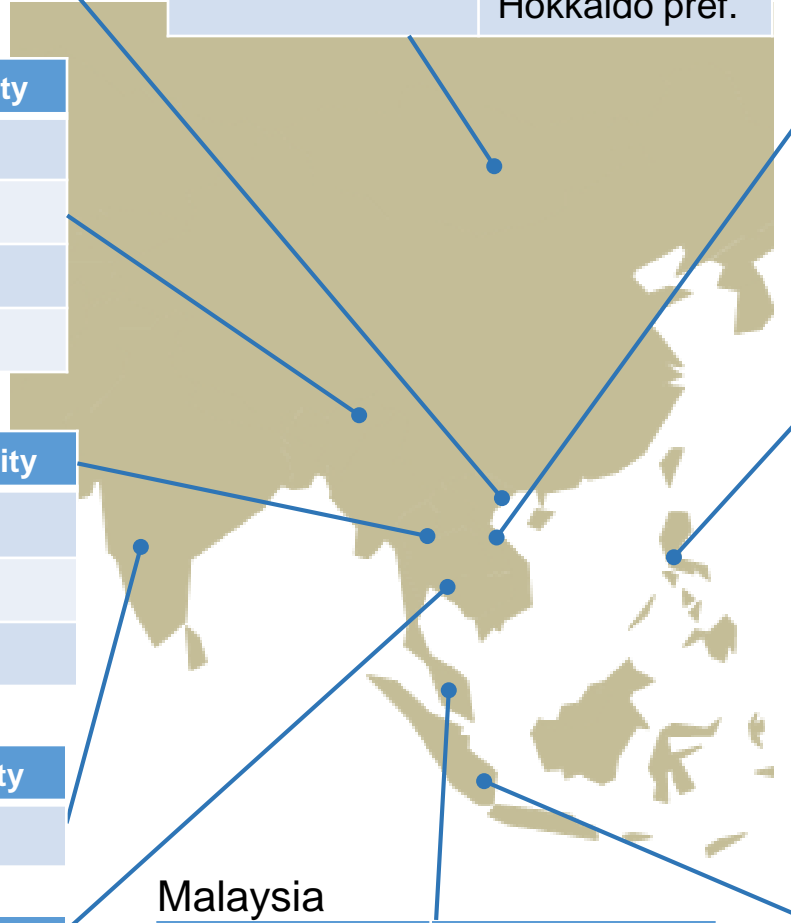
Foreign city	Japanese city
Iskandar	Kitakyushu
Penang	Kawasaki

Philippines

Foreign city	Japanese city
Quezon	Osaka
Davao	Kitakyushu

Indonesia

Foreign city	Japanese city
Denpasar	Tokyo union
Surabaya	Kitakyushu
Batam	Yokohama
Smarang	Toyama
Bandung	Kawasaki
Jakarta	Kawasaki
Bali	Toyama





JCM projects established from city to city collaboration

Myanmar:

- **Waste to Energy Plant in Yangon**
- **Brewing Systems to Beer Factory in Yanogn**
- **Once-through Boiler in Instant Noodle Factory in Yangon**
- **Rice Husk Power Generation in Ayeyarwady**

Thailand:

- **Waste Heat Recovery in Cement Plant in Rayong**
- **Solar PV and EMS in Paint Factory in Bangkok**
- **Energy Saving Equipment in Port in Bangkok**

Cambodia:

- **Solar PV & Centrifugal Chiller in Phnom Penh**

Vietnam:

- **Digital Tachographs for eco driving in Ho chi minh**
- **Solar PV in Shopping Mall in Ho chi minh**
- **Air-conditioning Control System in Ho chi minh**
- **Water Pumps in Da nang**

Malaysia:

- **Solar PV in Iskandar**

Indonesia:

- **Centrifugal Chiller in Shopping Mall in Surabaya**
- **Smart LED Street Lighting System in Bandung**
- **Introduction of CNG-Diesel Hybrid Equipment to Public Bus in Semarang**

Project in 2014
Project in 2015
Project in 2016
Project in 2017
Project in 2018

- 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 through JCM



Waste heat recovery in Cement Industry



Eco-driving with Digital Tachographs



Energy saving at convenience stores



High efficiency air-conditioning and process cooling



High-efficiency Heat only Boilers



Upgrading air-saving loom



Installing solar PV system



Amorphous transformers



Co-generation system at factory



High efficiency air-conditioning system



Solar PV System



Waste to Energy Plant.



High efficient refrigerator,



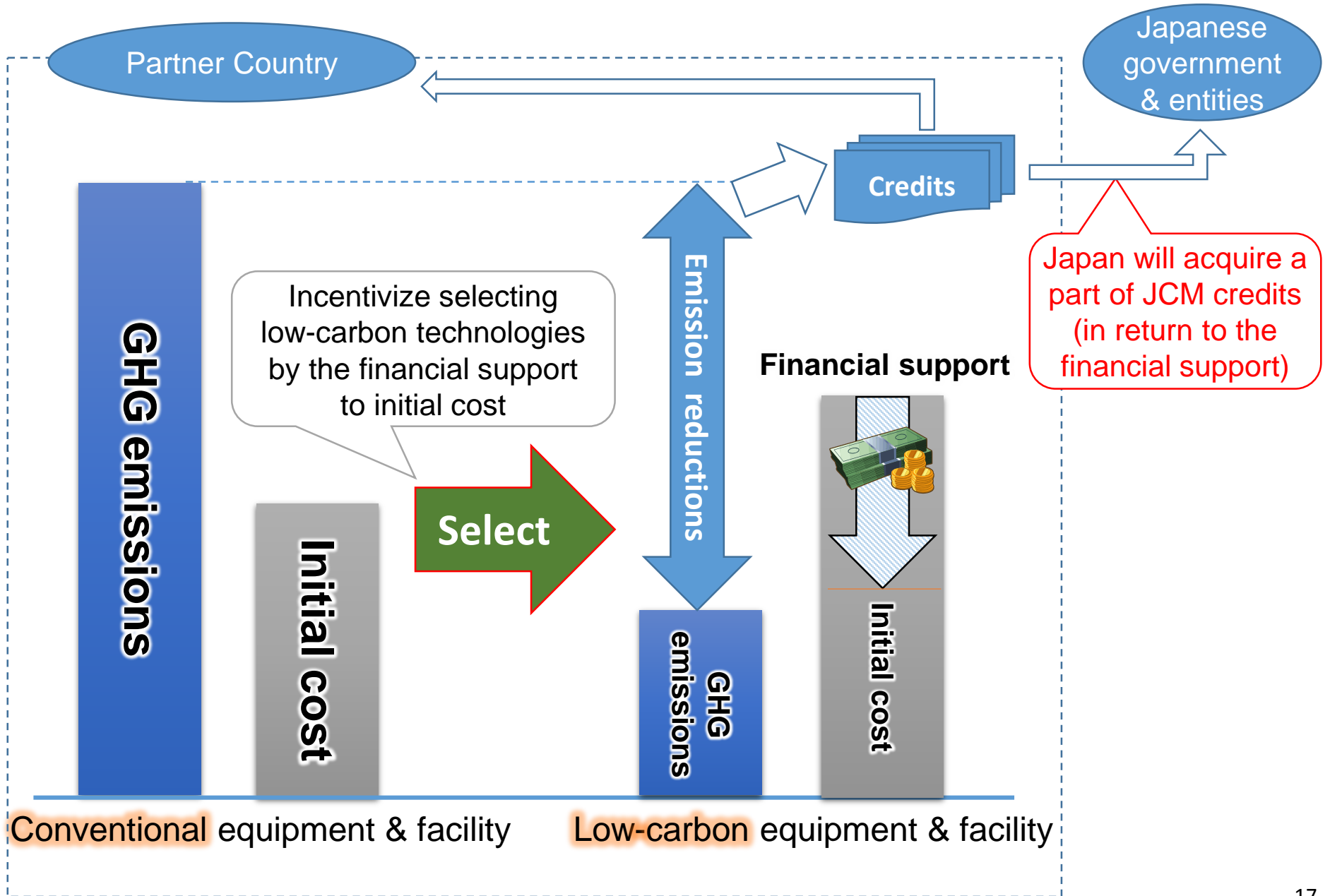
Regenerative Burners in industries,



LED street lighting system



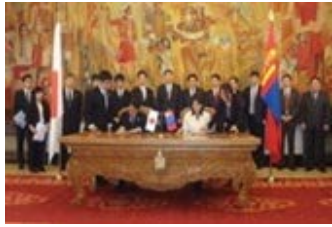
Contributions from Japan





JCM Partner Countries

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



Mongolia
Jan. 8, 2013
(Ulaanbaatar)



Bangladesh
Mar. 19, 2013
(Dhaka)



Ethiopia
May 27, 2013
(Addis Ababa)



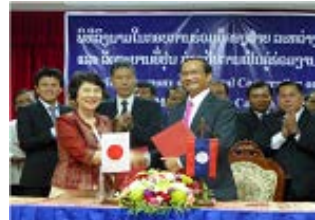
Kenya
Jun. 12, 2013
(Nairobi)



Maldives
Jun. 29, 2013
(Okinawa)



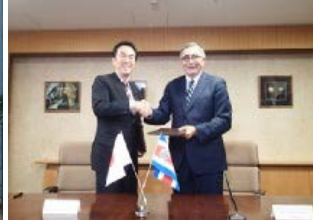
Viet Nam
Jul. 2, 2013
(Hanoi)



Lao PDR
Aug. 7, 2013
(Vientiane)



Indonesia
Aug. 26, 2013
(Jakarta)



Costa Rica
Dec. 9, 2013
(Tokyo)



Palau
Jan. 13, 2014
(Ngerulmud)



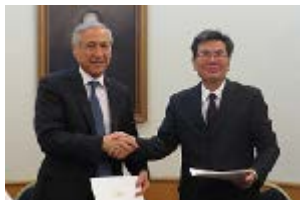
Cambodia
Apr. 11, 2014
(Phnom Penh)



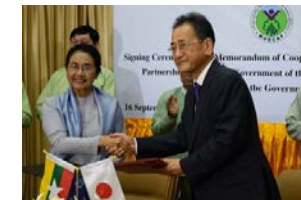
Mexico
Jul. 25, 2014
(Mexico City)



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 Financing programme by MOEJ (FY2013~2018)

as of October 2, 2018

Thailand: 27 projects

- Energy Saving at Convenience Store
- Upgrading Air-saving Loom*
- Centrifugal Chiller in Tire Factory
- Air Conditioning System & Chiller*
- Ton Exchange Membrane Electrolyzer
- LED Lighting to Sales Stores
- Co-generation System
- 1.5MW Solar PV and EMS in Paint Factory
- Heat Recovery Heat Pump
- 27MW Solar PV
- Air-conditioning Control System
- Energy Saving Equipment in Port
- 25MW Solar PV in Industrial Park
- ▲ Introduction of Scheme for F-gas Recovery and Destruction
- 1.0MW 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

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
- High Efficiency Chiller
- Modal Shift with Reefer Container
- Inverters for Raw Water Intake Pumps
- ▲ 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

Bangladesh: 6 projects

- Centrifugal Chiller
- 320kW PV-diesel Hybrid System
- Centrifugal Chiller*
- Loom at Weaving Factory
- 50MW Solar PV Power Plant
- High Efficiency Transmission Line

Saudi Arabia: 1 projects

- Electrolyzer in Chlorine Production Plant

Ethiopia: 1 projects

- Biomass CHP Plant

Kenya: 1 projects

- 1MW Solar PV at Salt Factory

Myanmar: 6 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
- 0.8MW Waste Heat Recovery in Cement Plant

Maldives: 2 projects

- 190kW Solar Power on School Rooftop*
- Smart Micro-Grid System

- 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 130 projects in 17 partner countries

Laos: 3 projects

- REDD+ through controlling slash-and-burn
- Amorphous transformers
- 14MW Floating Solar PV

Mexico: 5 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

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

Palau: 4 projects

- 370kW Solar PV for Commercial Facilities*
- 150kW Solar PV for School*
- 440kW Solar PV for Commercial Facilities II*
- 0.4MW Solar PV for Supermarket

Costa Rica: 2 projects

- 5MW Solar PV
- Chiller and Heat Recovery System

Chile: 1 project

- 1MW Rooftop Solar PV

Philippines: 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

Indonesia: 30 projects

- Centrifugal Chiller at Textile Factory*
- Refrigerants to Cold Chain Industry**
- Centrifugal Chiller at Textile Factory 2*
- 20kW 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 slash-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

Underlined projects have started operation (77 projects, including 1 partially started projects)

Projects with * have been registered as JCM projects (31 projects)

Move forward

- **Tangible Project** is expected to contribute NDC.
- **Science knowledge (e.g. AIM)** contribute to develop Low carbon scenario and policy making.
- **Series of Science, Policy, Technology and Action (Project)** make a good synergy for realizing low carbon society
- MOEJ supports **developing framework, project formulation and financial support for Tangible Project** as a package