

City-to-City Collaboration for Low-Carbon Society and Joint Credit Mechanism

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Environmental Infrastructure Promotion Strategy by MOEJ



- Memorandum of Cooperation in the Field of Environmental Cooperation Concluded memorandum with 5 countries until FY2017:
- Indonesia, Vietnam, Singapore, Iran and Mongolia
- Concluded more 2countries in FY2018(Thailand and Myanmar)
- Scheduled with India and Qatar etc.
- Japan Environment Week
- Japan Environmental Week was held for the first time in Myanmar in January 2018 for globalization of environment infrastructure technology promotion by government leader. Consisted "Environment Policy Dialogue", "Waste Management Workshop" and "Environment Infrastructure Technology Seminar", joined 10 Japanese companies.
- Next meeting scheduled in January 2019 in Vietnam.



Main project of Environmental Infrastructure



City's role to address climate change



<u>COP21 (Nov. – Dec. 2015)</u>

From 30 November to 11 December 2015, governments will convene in Paris for the 21st Conference of the Parties (COP21) to agree on a new global climate change agreement. COP21 Paris Agreement mentions the growing importance of cities to tackle against climate change, and enhance momentum for implementation

<u>Acknowledge actions by Non-State Actors, such as cities and local</u> <u>governments</u>

"Welcomes the efforts of non-Party stakeholders to scale up their climate actions, and encourages the registration of those actions in the Non-State Actor Zone for Climate Action platform" (118, Paris Agreement IV "Enhanced Action prior to 2020")

- Facilitate further collaboration between national and local governments "Encourages Parties to work closely with non-Party stakeholders to catalyze efforts to strengthen mitigation and adaptation action" (119, Paris Agreement, ibid.)
- At event on Lima-Paris Action Agenda (LPAA), ministers, governors and mayors discussed on roles of cities and local govt. tackling against climate change.



G7 Toyama EMM (May 2016)

• The G7 Toyama Environment Ministers' Meeting was held in Toyama City, Toyama on May 15-16.

 In addition to In the Ministers' Meeting, the G7 Toyama Environment Ministers' Meeting Parallel Session on 'The Role of Cities' was held, where global warming countermeasures and environmental protection policies were discussed while sharing actual progressive cases

- <u>Reaffirmed growing importance of the role of cities</u>, in promoting climate change mitigation measures and environment protection measures incl. adaptation.
- Unanimously agreed to further facilitate advanced actions taken by local governments, fully coordinating with actions taken by central governments.



Sustainable development goals

SUSTAINABLE G ALS



Sustainable Development Goal 11

Make cities and human settlements inclusive, safe, resilient and sustainable

City to City Collaboration Program

Outline of city-to-city collaboration program

-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

How effective is city cooperation for project establishment





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

Lao PDR		Mongolia	Asia:10 cou	untri	es, 27 cities / .	Japan: 12 cities
Foreign city	Japanese city	Foreign city	Japanese cit	у	Vietnam	
Vieng chan	Kvoto		Sapporo		Foreign city	Japanese city
Manmar		Ulaanbaatar	Hokkaido pre	ef.	Hai phong	Kitakyushu
					Da nang	Yokohama
Vangan	Kowoocki		\backslash	/	Ho chi minh	Osaka
fangon	Rawasaki		•		Kề n Giang	Kobe
Ayeyarwady	Fukushima	$\langle \rangle$	21		Philippines	
Sagaing	Fukushima	$\langle \rangle$	7	5	Foreign oity	lananasa situ
Mandalay	Kitakyushu			1		Japanese city
Thailand	and the		. 19		Quezon	Osaka
Foreign city	Japanese city		1/1		Davao	Kitakyushu
Bangkok	Yokohama		To DI		ndonesia	
Ravong	Kitakvushu	11 1			Foreign city	Japanese city
Chiang mai	Kitakyushu			1	Denpasar	Tokyo union
India				6	Surabaya	Kitakyushu
Foreign city	Japanese city		No the second se	-11	Batam	Yokohama
Bangalore	Yokohama			1999 - C.	Smarang	Toyama
Cambodia	/	Malaysia		\searrow	Bandung	Kawasaki
Foreign city	Japanese city	Foreign city	Japanese city		Jakarta	Kawasaki
Phnom penh	Kitakyushu	Iskandar	Kitakyushu		Bali	Toyama
Siem reap	Kanagawa pref.	Penang	Kawasaki		×New entr	v cities from FY2018 12

Cities joining the ci

Cities joining the city to city collaboration program in FY 2018

1. Quezon City (Philippines) – Osaka city

Energy saving technologies, Solar PV system installation and retrofit of waste collection truck

2 Bangkok and Laem Chabang (Thailand) – Yokohama city

CO2 emission reduction and to become "Smart Ports"

3. <u>Davao city (Philippines) – Kitakyushu city</u>

Support for a development of local climate change action plan

4. <u>Phnom Penh city (Cambodia) – Kitakyushu city</u>

- Low carbonization in transportation and green production fields
- 5. Jakarta city (Indonesia) Kawasaki City
 - Green Building and Green Power Optimization

6. <u>Semarang city (Indonesia) – Toyama city</u>

Introduction of energy saving equipment in industry sector

7. <u>Yangon city (Myanmar) – Kawasaki city</u>

Utilization of energy and energy saving in wholesale market

8. Batam city (Indonesia) – Kawasaki city

 Green Building and optimization of renewable energy utilization in Industrial Parks

9. Ho Chi Minh (Vietnam) – Osaka city

Promoting energy efficiency equipment in water supply system

10. <u>Bali City (Indonesia) – Toyama city</u>

Support on Tourism Future City

11. Ayeyarwady Region , Sagaing Region (Myanmar) – Fukushima city

- Feasibility of low-carbon industrial area and promotion of activities
- 12. <u>Chiangmai Province (Thailand) Kitakyushu city</u>
 - Project to accelerate low carbonization in newly industrial estate

13. <u>Hai Phong city (Vietnam) – Kitakyushu city</u>

·Low carbonization project through Eco Park in Vietnam

14. <u>Mandalay (Myanmar) – Kitakyushu city</u>

To realize low carbonization in Mandalay region in the field of Waste & Energy





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**

Joint Crediting Mechanism(JCM)



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 through JCM



Waste heat recovery in Cement Industry



Eco-driving with Digital Tachographs



Energy saving at convenience stores



High efficiency airconditioning and process cooling



Co-generation system at factory



Regenerative LE Burners in industries. sys



High-efficiency Heat only Boilers





16

High efficiency airconditioning system



LED street lighting



Upgrading air-saving loom



Solar PV System



Installing solar PV system

Waste to Energy

Plant.

Amorphous transformers



High efficient refrigerator,





Contributions from Japan









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.



Saudi Arabia May 13, 2015



Chile May 26, 2015 (Santiago)



Mvanmar Sép. 16. 2015 (Nav Pvi Taw)



Thailand Nov. 19. 2015 (Tokyo)



the Philippines Jan. 12, 2017 (Manila)

19



JCM Model Projects by MOE

The budget for projects starting from FY 2018 is <u>6.9 billion JPY (approx.</u> <u>USD 69 million) in total by</u> FY2020 (1 USD = 100 JPY)

Finance part of an investment cost (less than half)

Government of Japan Includes collaboration with projects supported by JICA and other governmentalaffiliated financial institute.

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

International consortiums (which include Japanese entities)



Scope of the financing: facilities, equipment, vehicles, etc. which reduce CO₂ from fossil fuel combustion as well as construction cost for installing those facilities, etc.

Eligible Projects : starting installation after the adoption of the financing and finishing installation within three years.



JCM Financing programme by MOEJ (FY2013~2018)

as of October 2, 2018

Thailand: 27 projects	Mongolia:8 projects
CEnergy Saving at Convenience Store 10MW Solar BV on Eactor	A Pooffon*
<u>Clinergy Saving at Convenience Store</u> <u>Clinery Solar PV on Factor</u>	0.8 3MW Solar PV 0.15MW Solar PV 0.20MW Solar PV
Opprauling Alf-Saving Loom* Ocentrifugal Chiller & Com	Control Contro
OREFIGERATION System & Chiller↑ OREFIGERATION System	Viet Nam:19 projects
Olon Exchange Membrane Electrolyzer OChilled Water Supply Syst	<u> Pigital Tachographs*</u> Amorphous transformers*
OLED Lighting to Sales Stores Olighting to Sales Stores	ry in Cement Plant
ORefrigerator and Evaporator	Container Formation Facility 320kW Solar PV in Shopping Matrix
○1.5MW Solar PV and EMS in Paint Factory ○3.4MW Solar PV	Company transformers 2* Objectioning Control System
OFMW Floating Solar PV	Carrier prior 2 - Carrier and Control and
O27MW Solar PV OBoiler System in Rubber E	elt Plant
OBiomass Co-generation System	em
OEnergy Saving Equipment in Port OCo-generation in Fiber Factor	C Energy Saving Equipment in wire Production Factory
○25MW Solar PV in Industrial Park ○3.4MW Solar PV	OAmorphous transformers 4
▲ Introduction of Scheme for F-gas Recovery and Destruction	OEnergy Saving Equipment in Brewery Factory OHigh Efficiency Chiller
	OModal Shift with Reefer Container OInverters for Raw Water Intake Pumps
Bandladesh 6 projects	▲ Collection Scheme and Dedicated System of F-gas
<u>Ocentrifugal Chiller</u> <u>OLoom at Weaving Factory</u>	Laos:3 projects
<u>O320kW PV-diesel Hybrid System</u> O50MW Solar PV Power Plant	• REDD+ through controlling slush- • A.8MW Power Generation with Methane Gas Recovery System
Centrifugal Chiller* High Efficiency Transmission Line	and-burn
	Amorphous transformers
Saudi Arabia:1 projects	Old MW Floating Solar PV
OElectorolyzer in Chlorine	
Production Plant	Combadia 6 projects
	Camboula.o projects
Ethiopie 1 preioste	OLED Street Lighting
Ethiopia: 1 projects	Onverters for Distribution Pumps
OBiomass CHP Plant	Battambang Wastewater Treatment Project O1.5MW Solar PV
Kenya:1 projects	Palau:4 projects Costa Rica:2 projects
O1MW Solar PV at Salt Factory	370kW Solar PV for Commercial Facilities* 5MW Solar PV
	□ <u>□150kW Solar PV for School*</u> <u>□Chiller and Heat Recovery System</u>
Myanmar: 6 projects	O440kW Solar PV for Commercial Facilities Ⅱ*
O 700kW Waste to Energy Plant	0.4MW Solar PV for Supermarket
OProwing Systems to Prowery Eastery	Chile:1 project
Onco-through Boiler in Instant Needle Factory	Phillipines:8 projects
Once-through Boller III Instant Nooule Factory	Image: A state of the state
OI.8MW Rice Husk Power Generation	□ 1.53MW Rooftop Solar PV ○1MW Rooftop Solar PV
OREFRIGERATION System in Logistics Center	01.2MW Rooftop Solar PV 02.5MW Rice Husk Power Generation
08.8MW waste Heat Recovery in Cement Plant	O4MW Solar PV □0.16MW Micro Hydro Power Plant /
Maldives: 2 projects	Indonesia: 30 projects
190kW Solar Power on School Roofton*	Centrifugal Chiller at Textile Factory*
Smart Micro-Crid System	Befrigerants to Cold Chain Industry** Double Bundle-type Heat Pump*
	Centrifugal Chiller at Textile Factory 2* 30MW Waste Heat Recovery in Cement Industry*
\bigcirc Model Project in FY 2013 (7 projects in 3 countries)	20kW Solar Power Hybrid System
O Model Project in FY 2014 (12 projects in 5 countries)	Contribut Chiller at Taxtile Eactory 3* Old Corrugated Cartors Process*
ADB Project in FY 2014 (1 project in 1 country)	Output and the second s
○ Model Project in FY 2015 (32 projects in 10 countries)	Compart Lep Street Lighting System
\bigcirc Model Project in FY 2016 (35 projects in 10 countries)	One consistion Outcom
Prodel Project II 1 2010 (35 projects in 10 countries)	<u>Ounce-currougn Boiler in Goil Bail Factory</u>
$\bigcirc \text{Model Project in EV 2017 (10 projects in 2 countries)}$	U.L. on wy solar PV in Jakabaring Sport City
Model Froject III FT 2017 (19 projects III 6 Country)	ULUMW Hydro Power Plant ULED Lighting to Sales Stores
ADD Project III FT 2017 (1 project III 1 COUNTRy) Model Device the EV2018 (17 evolution)	<u>Olympustrial Wastewater Treatment System</u> <u>O.5MW Solar PV</u> OGas Co-generation system
\bigcirc Model Project in FY2018 (1/ projects in 9 countries)	OAbsorption Chiller 010MW Hydro Power Plant 02.8MW Solar PV
ADB Project in FY 2018 (2 projects in 2 country)	OHigh Efficiency Autoclave OCNG-Diesel Hybrid Public Bus
▲ F-gas Project in FY 2018 (2 projects in 2 country)	OCentrifugal Chiller and Air-conditioning Control System
Other 1 project in Malaysia	
Total 130 projects in 17 partner countries	Projects with * have been registered as JCM projects (31 projects) 21

Examples of successful activities



City collaboration – Yokohama city and Da Nang city-



Outline of GHG Mitigation Activity

This project aims to replace existing conventional water pumps with high efficiency pumps in two water pump stations of the treatment plant owned by Danang Water Supply One-member Limited Company (DAWACO). The pumps to be installed perform with high efficiency because pumps are customized to specific conditions and requirements of the recipient plants. <u>CO2 reduction ; 1,145 [tCO₂/year]</u>





City collaboration –Kitakyushu city and Phnom Penh Capital city-

City collaboration



Outline of GHG Mitigation Activity

This project reduces electric power consumption of a new large shopping mall by introducing 1MW-class photovoltaic generation equipment(PV) and high-efficient chiller.

The electricity generated by the PV replaces grid power, resulting in the GHG emission reduction, along with the energy-saving effect by the chiller. <u>CO2 reduction ; 1,564.3 tCO₂/year</u>

1MW Solar Power System and High Efficiency Centrifugal Chiller





City collaboration –Kawasaki city and Yangon city-

City collaboration

To contribute to sustainable development and realize low carbon society in Yangon, the study aims to formulate prospective JCM projects collaborate with Kawasaki city and Japanese private entities, which have high-efficiency and low carbon technologies.



The objective of this project is to build and operate a waste-to-energy plant that (1) generates electricity, some of which will be supplied to a power company, resulting in reduction of fossil fuel consumption at the power plant, (2) mitigates electricity shortage, (3) reduces CH_4 emissions from landfill disposal, and (4) improvement of waste management in Yangon City. <u>CO2 reduction ; 4,732tCO2/year</u>



Japan Fund for Joint Crediting Mechanism (JFJCM)



History:

ADB was conceived in 1966 as a financial institution that would be Asian in character and foster economic growth and cooperation in Asia. ADB currently has 67 member countries/regions.

Relations with Japan:

Japan is a founding member of ADB and the largest shareholder (15.624%), having votes of 12.798% of total membership.

ADB's Vision:

An Asia and Pacific region free of poverty

ADB's Mission:

To help our developing member countries reduce poverty and improve quality of life

ADB's Mode of Operation:

- ADB finances projects and programs in the territories of its developing members.

- Main instruments comprise loans, equity investments, guarantees, grants, and technical assistance.

- ADB mobilizes financial resources through its co-financing operations.

- ADB also provides policy dialogues and advisory services.



ADB Members Countries





- <u>ADB's financial resources consist of Ordinary Capital Resources (OCR)</u> and Special Funds.
- Ordinary Capital Resources (OCR)
 - (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.

Special Funds

- the Asian Development Fund (ADF), the Technical Assistance Special Fund (TASF), the Japan Special Fund (JSF), ADB Institute (ADBI), the Climate Change Fund (CCF) etc.

- Japan has been the top contributor to ADB's Special Funds
- ADF offers concessional loan and grant to low-income countries.

In May, 2015, the initiative of combining the ADF's equity and lending operations with the OCR balance sheet was approved, and becomes effective in January, 2017.



Approaches to Climate Finance Mobilization by ADB

Deploying concessional resources	Maximizing market mechanisms	Catalyzing private capital
 Internally-managed funds ✓ Clean Energy Financing Partnership Facility (CEFPF) Fund size: 138 million USD (cumulative since 2017) ✓ Climate Change Fund (CCF) Fund size: 60 million USD (cumulative since 2008) ✓ Others with bilaterals 	 Carbon Finance Asia Pacific Carbon Fund (closed in 2014) Future Carbon Fund Carbon Market Technical Support Facility CDM support Domestic emission trading 	 Direct Project Finance (lending, guarantees, syndications), and equity investment Public private partnerships (PPPs)
 Externally-managed funds ✓ Climate Investment Funds (CIFs) Fund size: 160 million USD (cumulative since 2008) ✓ Global Environment Facility (GEF) Fund size: 10.5 billion USD, 51 billion USD (Co- financing) (cumulative since 1991) ✓ Green Climate Fund (GCF) Fund size: 10.2 billion USD (cumulative since 2010) 	Supporting other market nechanisms ✓ Japan Fund for the Joint Crediting Mechanism (JFJCM) Fund size: 51.6 million USD (5.8 billion JPY) (cumulative as of 2017) ✓ Renewable energy credits; Feed in Tariffs (FIT)	

30

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





Maldives: Smart Micro-Grid system

- Additional assistance using JFJCM (USD 5million) approved by ADB
- Install smart micro-grid technology with advanced battery system and energy management system (EMS)

Cambodia: Wastewater Treatment

- Additional assistance using JFJCM (USD 10million) approved by ADB
- Install high-efficient and energy-saving Wastewater Treatment Plant

Bangladeshi: High Efficiency Transmission Line

- Additional assistance using JFJCM (USD 7million)
- Install High-efficiency transmission lines (HTLS conductors) for saving line losses about 22%

Mongolia: Advanced Solar PV System

- Additional assistance using JFJCM (USD 6million)
- Install Solar PV with advanced battery system and an energy management system (EMS)



Thank you for your attention