Recent Development of the JCM

Kazumasa NAGAMORI
Ministry of the Environment
July 2019
Contributions from Japan

Incentivize selecting low-carbon technologies by the financial support to initial cost.

Japan will acquire a part of JCM credits (in return to the financial support).
JCM Model Projects by MOE

Budget for projects starting from FY 2019 is 9.9 billion JPY (approx. USD 99 million) in total by FY2021
(1 USD = 100 JPY)

- 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.

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

Finance part of an investment cost (less than half)

Government of Japan

International consortiums (which include Japanese entities)

Conduct MRV and expected to deliver at least half of JCM credits issued
**Budget for FY2019**

• JPY 1 billion (approx. USD 10 million

**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

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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 F-gas Recovery and Destruction Model Project by MOE

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

Scope of Financing
• Establish scheme for recovery and destruction
• Install facilities/equipment for recovery/destruction
• Implementation of recovery, transportation, destruction and monitoring

Government of Japan

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

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

International consortiums (which include Japanese entities)

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

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

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

【Budget for FY 2019】
41 million JPY (approx. 0.41 million USD) (1 USD = 100 JPY)

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### Expected schedule of JCM financing programme in FY2019

#### [JCM Model Project ]

<table>
<thead>
<tr>
<th>Items</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Starting date for request</td>
<td>From 2019, Application is open from 5th April through 29th November.</td>
</tr>
<tr>
<td>• Deadline for entities to submit their</td>
<td>(It may close before the deadline due to the availability of remaining budget.)</td>
</tr>
<tr>
<td>application</td>
<td></td>
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<tr>
<td>Announcement of selection</td>
<td>At any time upon selection</td>
</tr>
</tbody>
</table>
JCM Financing Programme by MOEJ (FY2013 ~ 2019) as of June 27, 2019

<table>
<thead>
<tr>
<th>Country</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand: 29</td>
<td>Projects</td>
</tr>
<tr>
<td>Bangladesh: 6</td>
<td>Projects</td>
</tr>
<tr>
<td>Laos: 4</td>
<td>Projects</td>
</tr>
<tr>
<td>Myanmar: 7</td>
<td>Projects</td>
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<tr>
<td>Cambodia: 5</td>
<td>Projects</td>
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<tr>
<td>Maldives: 2</td>
<td>Projects</td>
</tr>
<tr>
<td>Costa Rica: 2</td>
<td>Projects</td>
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<tr>
<td>Chile: 2</td>
<td>Projects</td>
</tr>
<tr>
<td>Philippines: 10</td>
<td>Projects</td>
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<tr>
<td>Palau: 5</td>
<td>Projects</td>
</tr>
<tr>
<td>Indonesia: 31</td>
<td>Projects</td>
</tr>
<tr>
<td>Total 143 projects in 16 countries</td>
<td></td>
</tr>
</tbody>
</table>

Thailand: 29 projects
- Energy Saving at Convenience Store
- Upgrading Air-saving Loom
- Centrifugal Chiller in Tire Factory
- Air Conditioning System & Chiller
- Ion Exchange Membrane Electrolizer
- LED Lighting to Sales Stores
- Co-generation System
- 2MW Solar PV
- Heat Recovery Heat Pump
- 30MW Solar PV
- Air-conditioning Control System
- Energy Saving Equipment in Port
- 25MW Solar PV in Industrial Park
- Biomass Boiler
- Introduction of Scheme for F-gas Recovery and Destruction

Bangladesh: 6 projects
- Centrifugal Chiller
- 115kW PV-diesel Hybrid System
- Centrifugal Chiller
- 38MW Solar PV

Laos: 4 projects
- REDD+ through controlling slash-and-burn
- Amorphous transformers
- 14MW Floating Solar PV
- 11MW Solar PV

Myanmar: 7 projects
- 70kW Waste to Energy Plant
- Brewing Systems to Brewery Factory
- Once-through Boiler in Instant Noodle Factory
- 1.8MW Rice Husk Power Generation
- Refrigeration System in Logistics Center
- 8.8MW Waste Heat Recovery in Cement Plant
- Brewing Systems and Biogas Boiler to Brewery Factory

Cambodia: 5 projects
- LED Street Lighting
- 200kW Solar PV at International School
- Solar PV & Centrifugal Chiller
- Inverters for Distribution Pumps
- Battambang Wastewater Treatment Project

Maldives: 2 projects
- 186kW Solar Power on School Rooftop
- Smart Micro-Grid System

Costa Rica: 2 projects
- 5MW Solar PV
- Chiller and Heat Recovery System

Chile: 2 projects
- 1.8MW Rooftop Solar PV
- 2.8MW Solar PV and 4MW Storage Battery

Subtotal: 94 projects in 9 countries

Underlined projects have started operation (90 projects)
Projects with * have been registered as JCM projects (42 projects)
MOEJ provides total support for the JCM project from idea to action and implementation.

“Co-innovation”
“PaSTI”
“City-city cooperation”

MOEJ development
Commercialization
GHG emission reduction

Total support for JCM by MOEJ and more

Consultation
Equipment installation
Monitoring
Issuance

MRV

Financial support for JCM model project
Support
Support

Project development
Capacity Building

Collaboration

Japan
Partner Country
A 186.72kW grid-connected photovoltaic (PV) system was installed on the rooftops of school buildings. Uses high quality PV modules of a Japanese manufacturer and general-purpose inverters with easy maintenance suitable for small-scale applications. The power generated is normally consumed in-house. When there is surplus power, it is supplied to the grid.

**156tCO₂/year**

CO₂ emission reduction

\[ \text{CO₂ emission reduction} = \text{PV generation (a)} \times \text{Grid emission factor (b)} \]

\[ = 293.05 \text{ MWh/year} \times 0.533 \text{ tCO₂/MWh} \]
JCM Expansion Example①: High efficiency amorphous transformers from Vietnam to Lao PDR

- Transformers in Vietnam are being replaced with amorphous high efficiency transformers from 2015 through 2020.
- Succeeded in developing the same product and technology in Lao PDR since 2018. Preparing for expansion to other countries.
- Providing excellent amorphous alloy low carbon technology. A total of 10,000 transformers introduced throughout Vietnam.

<table>
<thead>
<tr>
<th>Lao PDR</th>
<th>Japan</th>
<th>Vietnam</th>
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<tbody>
<tr>
<td>GH Credit</td>
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<td>International Consortium</td>
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- Lao PDR Partner Participant: EDL
- Primary Participant: Yuko Keiso
- Vietnam Partner Participants: EVN SPC, EVN HCMC, EVN CPC, EVN Danang, EVN HANOI, KHPC, DON NAI PC, EVN CPC

**Amount of amorphous transformer introduced (as of JAN2019)**

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<tr>
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**Lao PDR**
- 2097 tCO2/year
- 1,197 tCO2/year
- 405 tCO2/year

**Japan**
- 966 tCO2/year
- 398 tCO2/year
- 1,526 tCO2/year

**Vietnam**
- 653 tCO2/year
- 2,966 tCO2/year
- 1,197 tCO2/year

**Expansion to other JCM partner countries**

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**International Consortium**

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JCM Expansion Example②: Expansion into smart city environment from LED street light network in Cambodia

★ 70% energy saving is achieved by LED street light in emerging city and world heritage.
★ Commenced joint study with local partners to build smart city environment by wireless network environment deployment.
★ LED street light of 5,600 installed in Cambodia such as Phnom Penh and Angkor Wat (total installation area is 120km² in total).

The total footprint of the LED street light is 1.5 times that of Manhattan Island (120km²).

Deploying various IOT sensors and wireless networking environments will enable the Smart City environmental infrastructure.

December 2016
Received Minister of the Environment Award in Cambodia

Japan
Cambodia

LED street light management system

Smart City environmental infrastructure

Siem Reap Province Hall (SRPH)
OCIC Diamond Island

Consortium No. of Introduction
APSARA 1,670
Siem Reap 1,948
OCIC 2,054

70% energy saving achieved
JCM Expansion Example 3: Basic infrastructure of water business in Vietnam

- Yokohama City and Da Nang City signed a Memorandum of Understanding on Technical Cooperation for Sustainable Urban Development.
- Representative participant utilized JCM Model Project to Danang municipal water supply corporation, introduced high efficiency pumps and conducted monitoring.
- About 80% of the water treatment volume of Da Nang City is treated by JCM introduction pump.

Introduction of high efficiency pump to Danang municipal water supply corporation (representative Participant: Yokohama Water Co., Ltd.)

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

- Distribution Pumps: 21% (95,042,222 m³)
- Total Water Processed in 2018 for Danang City
  - 79% (75,228,480 m³)

High efficiency pumps (Da Nang City Water Corporation)

- Pumps installed through the JCM project
- Other pumps

[Ho Chi Minh City Water Treatment Plant]
Using the ceremony as an opportunity, JCM Model Project was utilized implementation of inverter of water intake pump (project ongoing)

[Danang City Water Corporation]
Explained the effectiveness of JCM Model Project and high efficiency pump at the ceremony
JCM Expansion Example④: Basic Infrastructure of Regional Development in the Philippines

- The representative participant aims to realize a stable supply of basic infrastructure by participating in and investing in power generation and water supply against the unstable infrastructure of Butuan City.
- Small/micro hydropower generation and biomass power generation are implementing by three JCM Model Projects.
- Partnering with local leading partners, developing three projects. Supply 10% of peak demand in Northern Agusan.

Taguibo River Small Hydroelectric Power Project / Taguibo River Water Treatment Plant Micro Hydro Power Project / Butuan City Rhinoceros Power Generation Project (Representative Participant: CHODAI CO., LTD.)

2017 JCM Model PJT (Implementing)
① Taguibo 4MW small hydropower generation PJT
Both IPPs to supply 11% power for Agusan del Norte region
- Capacity (①+②) 6.5 MW (11%)
- Other sources
Regional Demand: 57 MW (peak)

2019 JCM Model PJT (Implementing)
③ Taguibo River WTP Micro hydro power generation PJT

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

2019 JCM Model Project (Implementing)
② Butuan City 2.5 MW rice husk power generation PJT

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

Micro hydraulic generator
Water purification plant (30,000t ons / day) as part of the In-house power Usage (0.16 MW)
intake dam

Rice husk biomass IPP

Rice mill
Rice polishing machine

Both IPPs to supply 11% power for Agusan del Norte region
JCM Expansion Example(5) : Large-scale photovoltaic power generation projects in Mongolia

- Implemented six large-scale solar power project using Japanese superior technologies in various places in Mongolia from 2015 to 2018. Promoted new private investments triggered by introduction in JCM.
- Sharp Energy Solutions has implemented four projects (currently operating at two locations and introducing at two locations).
- Firm Do has implemented a new model by combining agriculture and PV power generation at Monnaran.