

Front cover photos (from left)

- 1 Mongolia / Farmdo Co., Ltd.
- 2 Indonesia / Toyota Tsusho Corporation
- 3 Viet Nam / Yuko Keiso Co., Ltd.

Back front cover photos (from left)

- 1 Thailand / Yokohama Port Corporation
- 2 Bangladesh / Ebara Refrigeration Equipment & Systems Co., Ltd.
- 3 Thailand / KYOWA HAKKO BIO CO, LTD.



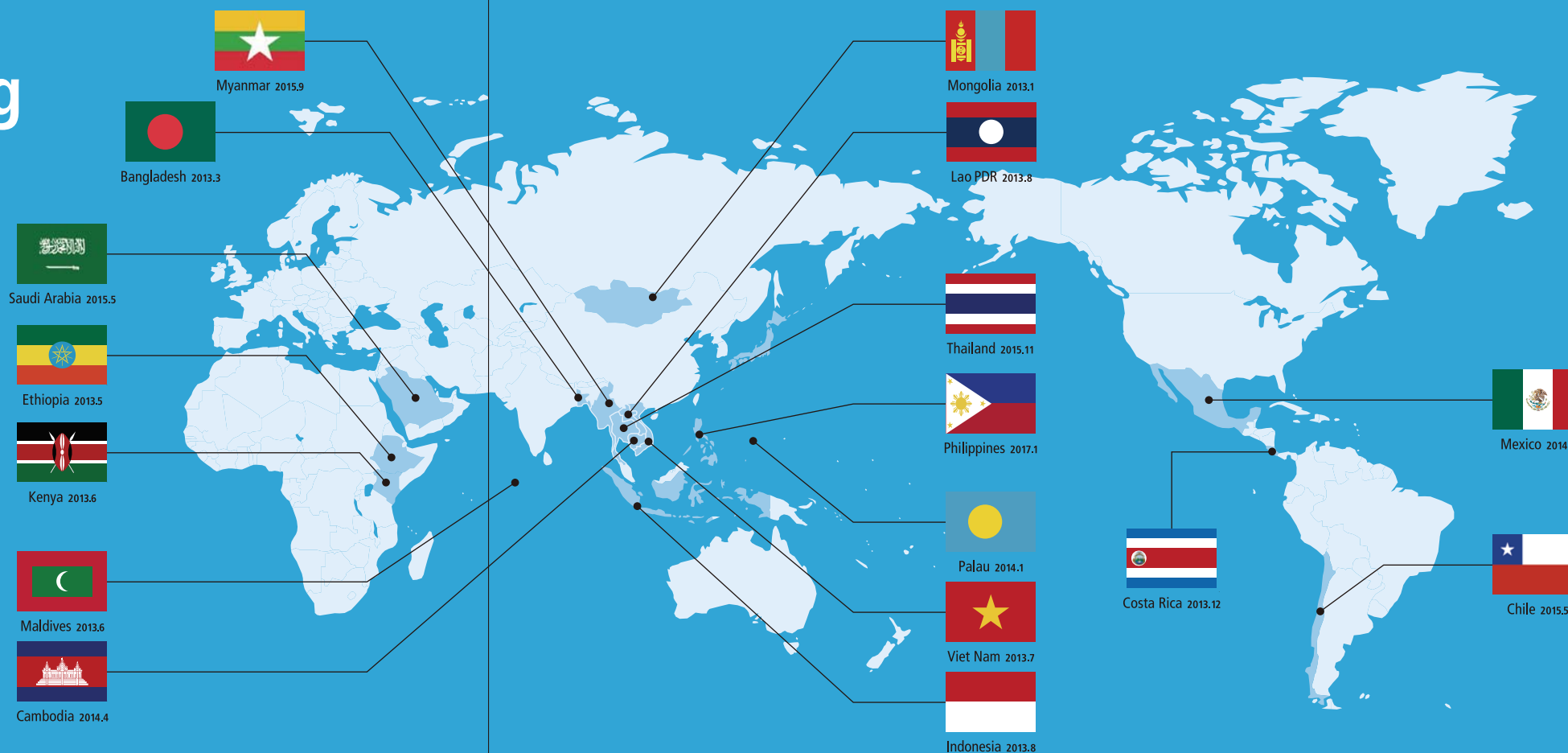
JCM THE JOINT CREDITING MECHANISM 2019



Introduction of Joint Crediting Mechanism (JCM) & Financing Programme for JCM Model Projects

About the Joint Crediting Mechanism (JCM)

Many of the advanced low-carbon technologies do not necessarily 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 Joint Crediting Mechanism (JCM). As of May 2019, Japan has established partnership with 17 countries and continues to communicate with other developing countries.

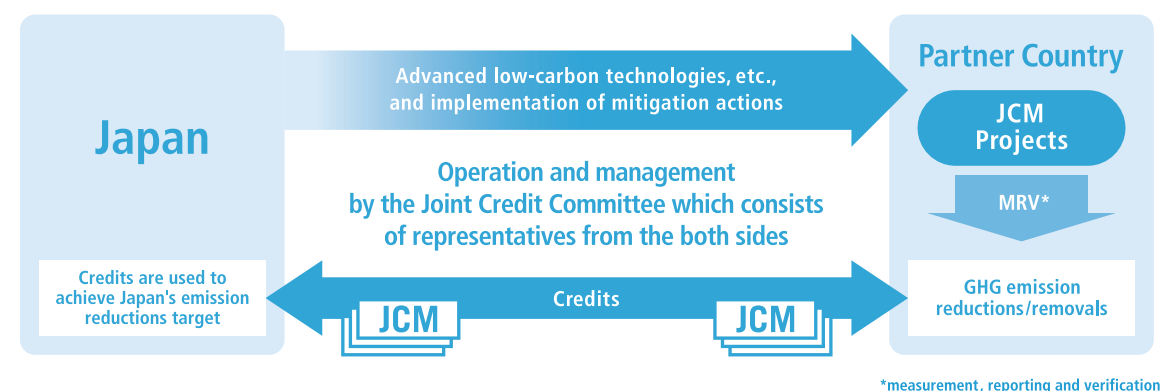


Basic concept of the JCM

Facilitating diffusion of advanced low-carbon or decarbonizing technologies, products, system, services and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing country.

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

The role of the JCM for Japan's NDC*

The JCM is not included as a basis of the bottom-up calculation of Japan's emission reductions target, but the amount of emission reductions and removals acquired by Japan under the JCM will be appropriately counted as Japan's reduction. Apart from contributions achieved through private sector-based projects, accumulated emission reductions or removals by FY2030 through governmental JCM programs to be undertaken within the government's annual budget are estimated to be ranging from 50 to 100 million t-CO₂.

(*Nationally Determined Contributions)

JCM and the Paris Agreement

The role of carbon market mechanisms, including the JCM, is described under the Article 6 as a way to use emission reductions achieved overseas (internationally transferred mitigation outcomes: ITMO) towards national emission reduction targets. Furthermore, at the COP24 held in Katowice, Poland, the Paris Agreement Work Programme was adopted for the full implementation of the Paris Agreement for 2020 onwards.



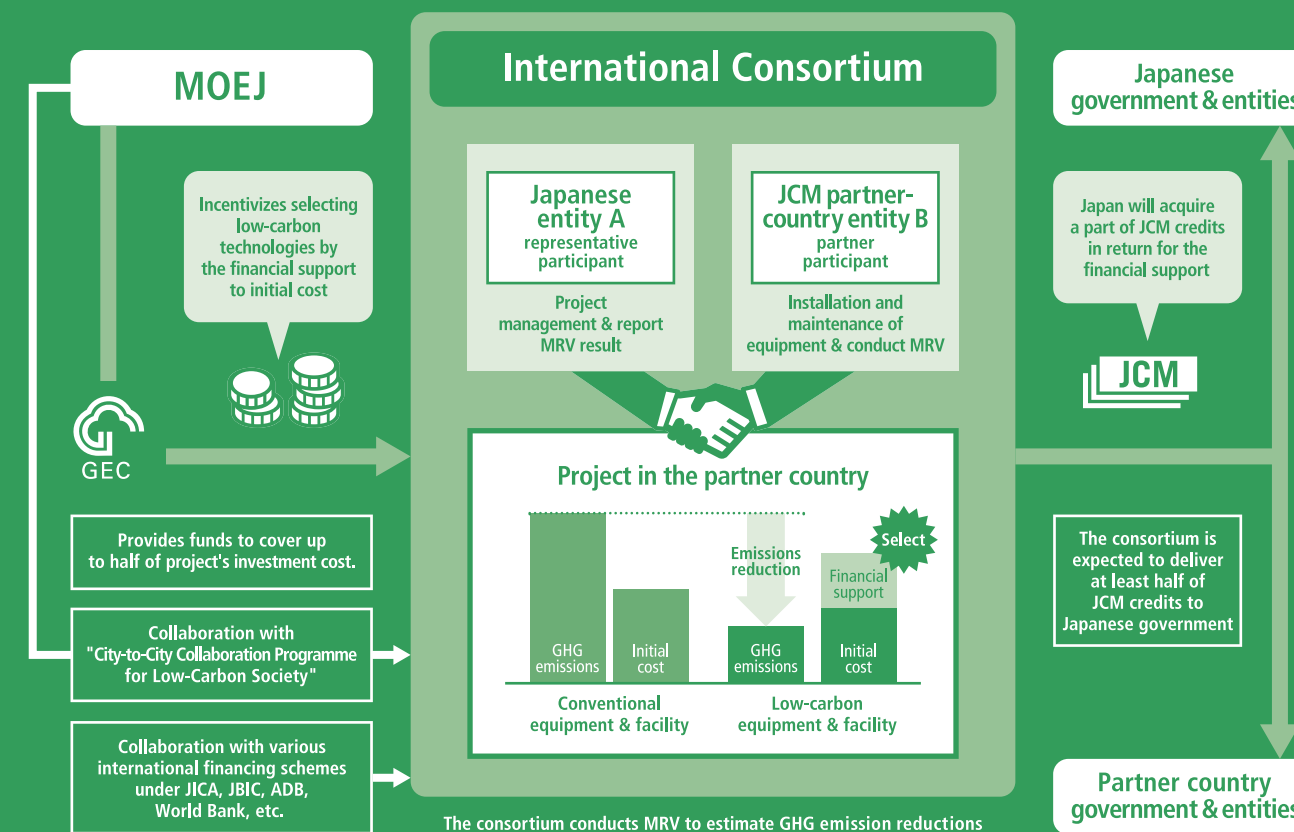
Photo by UNFCCC (<https://www.flickr.com/photos/unfccc/sets/>)

Financing Programme for JCM Model Projects by MOEJ

Ministry of the Environment, Japan (MOEJ) has been implementing the "Financing Programme for JCM Model Projects" in order to promote diffusion of low-carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions in developing countries. Participants in the model project implement a project to reduce GHG emissions utilizing advanced low-carbon technologies, etc. and also conduct measurement, reporting and verification (MRV) of GHG emission reductions. The model project will finance part of an investment cost (up to half), on the premise of seeking to deliver at least half of the issued JCM credits to the Government of Japan. The finance will be provided to a Japanese representative participant in an international consortium.



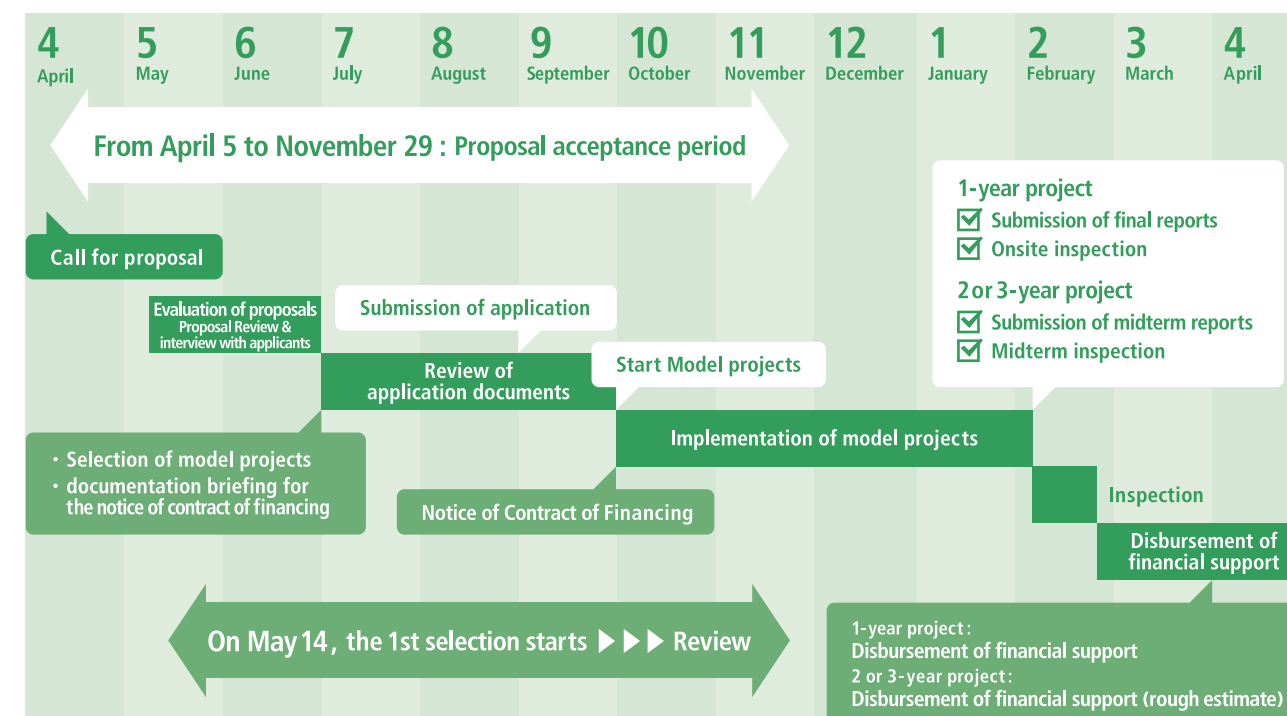
1 Viet Nam / HOYA CORPORATION
2 Maldives / Pacific Consultants Co., Ltd.



Overview of Financing Programme for JCM Model Project in FY2019

| | | |
|--|---|--|
| Budget | JPY9.9 billion (Approx. USD90million) | Financial support per project From ¥50million to ¥2billion (approx.) |
| Executing Entity | International Consortium that consists of a Japanese entity and a JCM partner-country entity (ies) | |
| Scope of Financing | Facilities, equipment, vehicles, etc. which reduce CO2 from fossil fuel combustion as well as construction cost for installing those facilities, etc. | |
| Eligible Projects | Start installation after the Contract of Finance is concluded and finish installation within 3 years. | |
| Maximum percentage of Financial Support | Maximum of 50% and reduce the percentage according to the number of already selected project(s) using a similar technology in each partner country. ※ Number of already selected project(s) using a similar technology in each partner country : none (0) = up to 50%, up to 3 (1-3) = up to 40%, more than 3 (>3) = up to 30%. The percentage of financial support will be determined by GEC. | |
| Cost-effectiveness | Cost-effectiveness of GHG emission reductions is expected to be JPY4,000/tCO2eq or better. ※ If the number of PV projects in a partner country is 5 or more, cost-effectiveness is expected to be JPY3,000/tCO2eq or better. | |

JCM Model Projects Schedule in FY2019



- 1 Thailand / FAST RETAILING CO., LTD. High Efficiency LED Lighting
- 2 Cambodia / AEON MALL Co., Ltd. Solar Power System and High Efficiency Centrifugal Chiller
- 1 Bangladesh / Ebara Refrigeration Equipment & Systems Co., Ltd. High Efficiency Centrifugal Chiller
- 2 Mexico / Suntory Spirits Limited Once-through Boiler and Fuel Switching



- 3 Palau / Pacific Consultants Co., Ltd. Solar Power Plants for Commercial Facilities
- 4 Indonesia / Toyota Tsusho Corporation Double-Bundle type Heat Pump
- 1 Indonesia / Hokusan Co., Ltd. CNG-Diesel Equipment to Public Bus
- 2 Thailand / Yokohama Port Corporation Energy Efficient Equipment to Bangkok Port



- 3 Indonesia / Environmental Management and Technology Center Energy Saving in Industrial Wastewater Treatment System
- 4 Myanmar / Kirin Holdings Company, Limited. Energy Saving Brewing Systems
- 1 Thailand / TSB Co., Ltd. Floating Solar Power System
- 2 Mexico / NTT DATA INSTITUTE OF MANAGEMENT CONSULTING, Inc. Power Generation with Methane Gas Recovery System



- 1 Viet Nam / Yuko Keiso Co., Ltd. Amorphous High Efficiency Transformers in power grid
- 2 Viet Nam / Yokohama Water Co., Ltd. High Efficiency Water Pumps
- 3 Myanmar / JFE Engineering Corporation Waste to Energy Plant in Yangon City
- 3 Myanmar / Fujita Corporation Rice Husk Power Generation

COMMERCE

JCM Model Projects by MOEJ FY2013 - 2019 as of August 31, 2019

INDUSTRY

Mongolia: 8 Projects

- Heat Only Boiler (HOB)
- 15MW Solar PV
- 2.1MW Solar PV in Farm
- 20MW Solar PV
- 10MW Solar PV
- 21MW Solar PV
- 8.3MW Solar PV in Farm
- Fuel Conversion by Introduction of LPG Boilers

Myanmar: 7 Projects

- 700kW Waste to Energy Plant
- Brewing Systems to Brewery Factory
- Once-through Boiler in Instant Noodle Factory
- 1.8MW Rice Husk Power Generation
- Refrigeration System in Logistics Center
- 8.8MW Waste Heat Recovery in Cement Plant
- Brewing Systems and Biogas Boiler to Brewery Factory

Bangladesh: 5 Projects

- Centrifugal Chiller
- 50MW Solar PV Power Plant
- Loom at Weaving Factory
- Centrifugal Chiller
- 315kW PV-diesel Hybrid System

Saudi Arabia: 1 Project

- Electrolyzer in Chlorine Production Plant

Kenya: 2 Projects

- 1MW Solar PV at Salt Factory
- 38MW Solar PV

Maldives: 1 Project

- 186kW Solar Power on School Rooftop

Laos: 3 Projects

- Amorphous transformers
- 14MW Floating Solar PV
- 11MW Solar PV

Cambodia: 4 Projects

- LED Street Lighting
- 200kW Solar PV at International School
- Solar PV & Centrifugal Chiller
- Inverters for Distribution Pumps

Philippines: 11 Projects

- 15MW Hydro Power Plant
- 4MW Hydro Power Plant
- 1.53MW Rooftop Solar PV
- 1MW Rooftop Solar PV
- 1.2MW Rooftop Solar PV
- 2.5MW Rice Husk Power Generation
- 0.16MW Micro Hydro Power Plant
- 4MW Solar PV
- 19MW Hydro Power Plant
- 18MW Solar PV
- Biogas Power Generation and Fuel Conversion

POWER GENERATION AND SUPPLY

- Energy Efficiency
- Effective Use of Energy
- Renewable Energy
- Transport
- Waste Handling and Disposal

Viet Nam: 21 Projects

- Digital Tachographs
- Amorphous transformers 1
- 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 Pumps1
- Energy saving Equipment in Lens Factory
- Amorphous transformers 3
- 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
- Waste to Energy Plant
- High Efficiency Water Pumps2
- Biomass Boiler to Chemical Factory

Thailand: 30 Projects

- Energy Saving at Convenience Store
- 1MW Solar PV on Factory Rooftop
- Upgrading Air-saving Loom
- Centrifugal Chiller & Compressor
- Centrifugal Chiller in Tire Factory
- Co-generation in Motorcycle 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
- 2MW Solar PV
- 3.4MW Solar PV
- Heat Recovery Heat Pump
- 5MW Floating Solar PV
- 30MW Solar PV
- Boiler System in Rubber Belt Plant
- Air-conditioning Control System
- Biomass Co-generation System
- Energy Saving Equipment in Port
- Co-generation in Fiber Factory
- 25MW Solar PV in Industrial Park
- 3.4MW Solar PV
- Biomass Boiler
- 0.8MW Solar PV and Centrifugal Chiller
- 37MW Solar PV and Melting Furnace
- Heat Exchanger in Fiber Factory

Palau: 5 Projects

- 370kW Solar PV for Commercial Facilities
- 155kW Solar PV for School
- 445kW Solar PV for Commercial Facilities II
- 0.4MW Solar PV for Supermarket
- 1MW Solar PV for Supermarket

Indonesia: 30 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
- 507kW 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
- 10MW Hydro Power Plant
- Looms in Weaving Mill
- LED Lighting to Sales Stores
- Industrial Wastewater Treatment System
- 0.5MW Solar PV
- Gas Co-generation system
- Absorption Chiller
- 10MW Hydro Power Plant
- High Efficiency Autoclave
- CNG-Diesel Hybrid Public Bus
- Rehabilitation of Hydro Power Plant
- 12MW Biomass Power Plant
- Injection Molding Machine

Mexico: 7 Projects

- 2.4MW Power Generation with Methane Gas Recovery System
- Once-through Boiler and Fuel Switching
- 64MW Wind Farm
- 20MW Solar PV
- 30MW Solar PV1
- Energy Efficient Distillation System
- 30MW Solar PV2

Costa Rica: 2 Projects

- 5MW Solar PV
- Chiller and Heat Recovery System

Chile: 2 Projects

- 1MW Rooftop Solar PV
- 2MW Solar PV and 4MWh Storage Battery

Total 139 projects

TRANSPORT



URBAN INFRASTRUCTURE



Case Examples of JCM Model Project 1

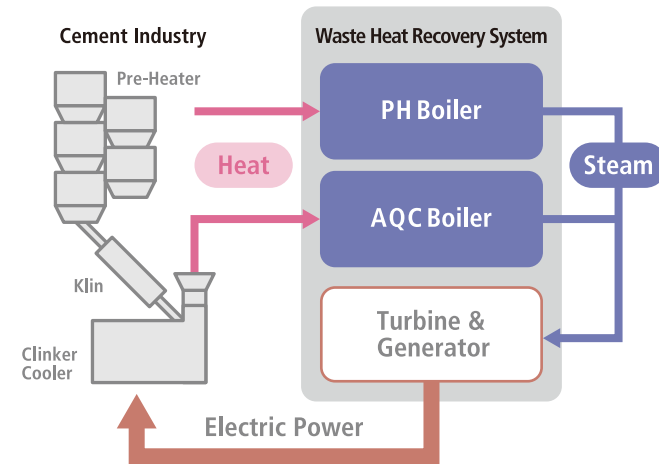
Waste Heat Recovery Power Generation at a Cement Plant in Indonesia

Representative JFE Engineering Corporation
 Partner PT. Semen Indonesia



Effective Use of Energy

This project installs a waste heat recovery system at a PT Semen Indonesia plant. Electricity is generated using heat recovered during the cement production process, which then is turned into steam to power a turbine generator. This technology, expected to expand to other plants in the future, is one of the most effective choices for reducing CO2 emissions in Indonesia's cement industry.



Case Examples of JCM Model Project 2

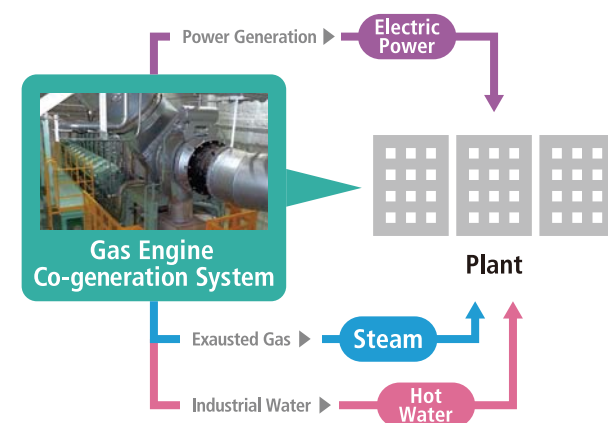
Gas Co-generation System at an Automobile Factory in Indonesia

Representative Toyota Tsusho Corporation
 Partner PT. Toyota Motor Manufacturing Indonesia



Effective Use of Energy

This project aims to provide a portion of power and heat demands at an automobile factory by installing a gas engine co-generation system. By doing so, it promotes the use of waste heat and contributes to the reduction of CO2 emissions in Indonesia, where coal, petroleum, and other fossil fuel of high-CO2 source make up a high proportion of energy sources and efficient power generation systems are still not available. Economically, cost reduction can be expected from switching to natural gas which can be acquired at a relatively low cost in the country.



Case Examples of JCM Model Project 3

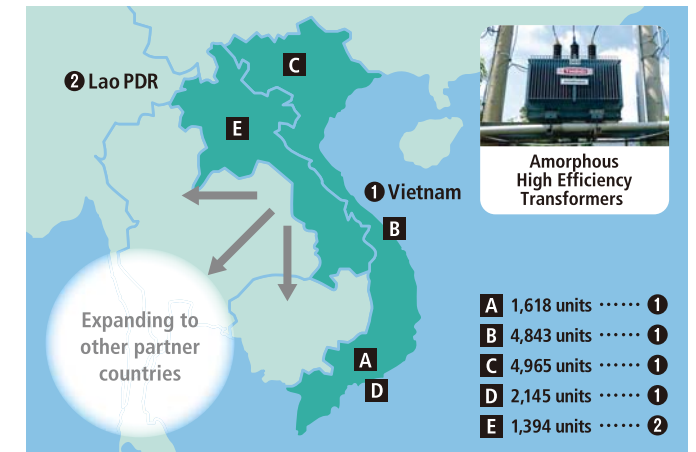
Expanding Amorphous High Efficiency Transformers from Vietnam to Lao PDR

Representative Yuko-Keiso Co., Ltd.
 Partner 1 EVN SPC, EVN HANOI, KHANH HOA, PCDON NAI PC
 2 Electricite Du Laos



Energy Efficiency

This project introduced energy-saving amorphous high-efficiency transformers for the EVN Southern Power Corporation (EVNSPC). This reduces power loss during power transmission and contributes to stabilizing electrical power supply. Thanks to this achievement recognized in Vietnam, other power distribution companies are starting to introduce new procurement standards for this technology, promoting further use in other regions in Vietnam. Électricité du Laos has also commenced a project under JCM Financing Programme, from which we can expect further progress in the future.



Case Examples of JCM Model Project 4

LED Lighting Utilizing Wireless Network in Cambodia

Representative MinebeaMitsumi Inc.
 Partner Overseas Cambodian Investment Corporation, Siem Reap Provincial Hall, APSARA



Energy Efficiency

This project aims to reduce energy consumption and CO2 emissions by introducing total of 5,672 units of high-efficiency LED lighting utilizing wireless network in Cambodia, where demand for energy has grown with the development of infrastructure. This project can also achieve more energy saving by introducing a dimming control system which operates through wireless network. MinebeaMitsumi has started feasibility studies with local organizations to build a smart city centered on wireless networks.



Case Examples of JCM Model Project 5

Expansion of Water Business Basic Infrastructure in Vietnam

Representative Yokohama Water Co., Ltd.
Partner Danang City Water Supply Corporation, Ho Chi Minh City Water Purification Plant

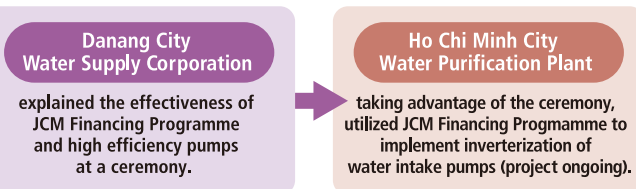


Energy Efficiency

In Da Nang City in central Vietnam, two pumps in the water treatment plant owned by Da Nang Water Supply Corporation are replaced with high efficiency pumps. By reducing the power consumption associated with the operation of the pumps, they realize energy saving and contribute to CO2 emission reductions. Danang City Water Corporation held a ceremony where water supply officials gathered and explained the effectiveness of the pump. People working in the water supply industry in Ho Chi Minh City who attended the ceremony utilized the JCM Financing Programme to make the pumps more efficient.



A ceremony held by Danang City Water Corporation



Case Examples of JCM Model Project 6

Diverse Renewable Energy Projects as Regional Basic Infrastructure in the Philippines

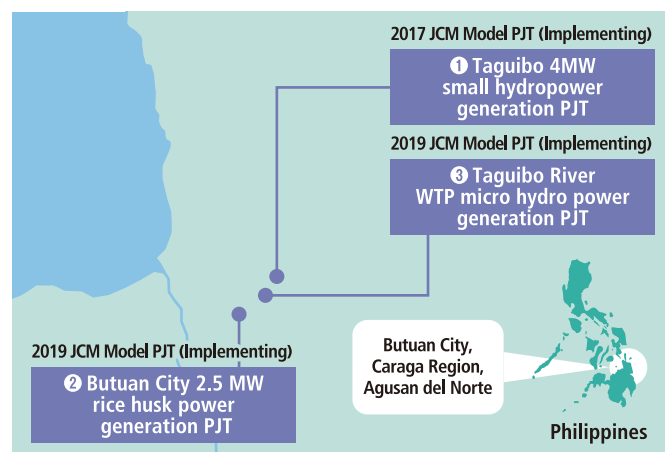
Representative CHODAI CO., LTD.
Partner ① ETHRC, HRMCI ② CBPC ③ TASC ④ EPCC, etc. (Construction)



Small Hydro Generators / Same Model

Renewable Energy

This project aims to stabilize supply of water and electricity in Butuan city on the Mindanao island of the Philippines and its surrounding area (Caraga region) through water supply (concession) and power generation facilities. CHODAI utilized the JCM Financing Programme in three projects on renewable energy centering on small hydro power and biomass power, and collaborated with local partners in consulting, construction and O&M to undertake multiple projects.



Case Examples of JCM Model Project 7

CNG-Diesel Hybrid Equipment for Public Buses in Indonesia

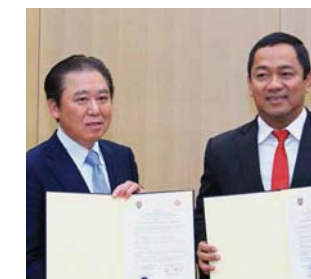
Representative Hokusan Co., Ltd.
Partner BLU UPTD Trans Semarang



Completion ceremony in Semarang City

Transport

Toyama City of Japan has signed a cooperation agreement with Semarang City of Indonesia to realize a low carbon society under-inter-city cooperation. Based on the cooperation agreement, this project aims to reduce GHG emissions through a fuel switch from diesel to CNG. In this project, 72 buses were converted to hybrid engines by attaching tanks for compressed natural gas. Diesel oil is used to start the engines, and then it is automatically switched to the mixed combustion mode of natural gas and diesel oil. Using not only diesel but also natural gas as fuel, these buses will reduce CO2 emissions and improve fuel efficiency.



Toyama City and Semarang City signed an inter-city cooperation agreement to realize a low-carbon society in December 2017.



A total of 72 units of 25 large buses and 47 medium-sized buses, which are expected to be cost-effective due to fuel conversion, was remodeled.

Case Examples of JCM Model Project 8

Expansion of Large-scale Solar Power Projects in Mongolia, and Cooperation with JBIC and ADB

Representative ① Farmdo Co., Ltd. ② Sharp Energy Solutions Corporation
Partner ① Everyday Farm LLC, Bridge LLC ② Solar Power International LLC etc.



Renewable Energy

From 2015 to 2018, large-scale solar power projects using Japan's superior technology were implemented in several regions of Mongolia. These projects will contribute to the country's policy target of increasing renewable energy to 30% by 2030. By combining agriculture and power generation, Farmdo has realized a new hybrid model that solves the problems of CO2 emissions, energy and food. JBIC also provided loans for their projects. Sharp Energy Solutions has introduced solar power generation in four locations, one of which received a loan from ADB.



① Ulaanbaatar Suburb 2.1MW+8.3MW + JBIC Loan



② Vicinity of New Airport 15MW + ADB Loan

※ JBIC: Japan Bank for International Cooperation ADB: Asian Development Bank

Basic structure of International Consortium

Q. Who is eligible to apply for this programme?

A. Entities which meet the following requirements are eligible.

- A representative participant of the model project shall be a Japanese entity, such as a private company, etc.
- A participant described above shall be the representative entity of an international consortium.
- A participant shall have developed structure for the implementation of the eligible project and have technical capacity to appropriately implement the eligible project.
- A participant shall have a financial basis to bear the costs necessary to appropriately implement the eligible project.
- A participant shall have adequate management structures and handling capacity for accounting and other administrative work related to the eligible project.
- A participant shall explain the contents, effect on GHG emission reductions, details of the cost, investment plan, etc. of the eligible project.

Requirements of Representative Participant of International Consortium

Q. What are the responsibilities of a Japanese entity as a Representative Participant of an international consortium?

A. Representative Participant is responsible for the followings:

- Applying for the model project
- Managing the progress of the project, developing the project implementation plan, and acting as the contact entity for accounting and other administrative work related to the project
- Introducing the leading low carbon technology
- Purchasing, installing and commissioning facilities/equipment during the construction period, and ensuring that the facilities/equipment are utilized according to the purpose of the model project for the legal durable years of the facilities/equipment as stipulated by the Japanese law
- Returning funds received if there are any violations of the Financing Regulations by any of the partner participants

Costs Eligible for Financing

Q. What kind of costs are covered by this programme?

A. The following are the costs this programme DOES and DOES NOT cover;

| Covered | NOT covered |
|---|---|
| <ul style="list-style-type: none"> ● Facilities/equipment (including monitoring equipment) ● Main construction work ● Ancillary work ● Machinery and appliances ● Surveying and testing ● Administrative work; and ● Other necessary costs approved by GEC | <ul style="list-style-type: none"> ● Removal of existing facilities/equipment (including miscellaneous expenses related to removal costs) ● Equipment and consumable supplies/materials for maintenance of the facilities/equipment installed by the model project, emergency facilities/equipment, safety equipment (such as fire extinguisher, sprinkler, PPE, etc.) and security equipment. ● Civil engineering work and building (excluding structures that directly contribute to energy-related CO2 emission reductions) ● Cost related to a simple restoration of function, such as restoring the function to the state at the time of installation by updating existing facilities/equipment ● Spare parts (excluding those used for testing and commissioning) ● On-site inspections and writing reports that are submitted to GEC as part of the model project ● Forward exchange contract and remittance charge ● Cost related to land acquisition |

Legal Durable Years

Q. What is “the Legal Durable Years” used for estimation of total GHG emission reductions, etc.?

A. Please refer to the following Japanese law (Japanese only).

| Ministerial Ordinance on the Durable Years, etc. of Depreciable Assets (Ordinance NO.15 of Ministry of Finance, March 31, 1965) | Appendix table 2 | Producing “other final products” by using installed facilities |
|--|------------------|--|
| | Appendix table 1 | Other cases than the above ex. the building owner introduces facilities as shared equipment |

Please note that the legal durable years of the same facility may vary depending on the purpose of installation.

(Examples)

| Category of technology | Purpose of installation | Legal durable years |
|-----------------------------------|---|---------------------|
| Solar power generation facilities | Electric power sales | 17 years |
| | Internal consumption at car manufacturing factories | 9 years |
| | Internal consumption from rooftop equipment on warehouses | 12 years |
| Boilers | Cooking oil production | 10 years |
| | Rubber products production | 9 years |
| | Hot water supply for hotels | 17 years |
| Absorption chillers | Producing chilled water in chemical factories | 8 years |
| | Air conditioning in shopping malls | 15 years |

※ For questions regarding how to determine the appropriate legal durable years for your project, please contact Japanese local tax office.

Cost-effectiveness of emission reductions of GHG

Q. What are the criteria of cost-effectiveness?

A. The cost of reducing 1 ton of GHG emissions must be 4,000JPY/tCO2eq or lower.

$$\text{Cost-effectiveness of emission reductions of GHG [JPY/tCO2eq]} = \text{Amount of financial support [JPY]} \div \text{Total emission reductions of GHG [tCO2eq]}^{**}$$

※ Total emission reductions of GHG = Emission reductions of GHG per year [tCO2eq/y] × legal durable years [y]

In the following case, the cost must be 3,000JPY/tCO2eq or lower.

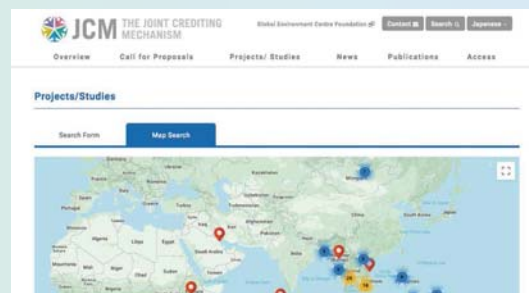
In case the number of PV JCM Model Projects in a partner country is 5 or more. (Mongolia and Thailand)

Application Support by GEC for JCM Model Project

GEC offers various application support at various phases of your project.

GEC Website

GEC introduces project examples selected so far in the JCM Model Project on the GEC website. You can search by sector such as renewable energy and from the map for project study. For additional information, please refer to "Guidelines for Submitting Proposals" for FY2019 and Q&A on the website.



Suitable for Learning about the programme and past projects at early phase.

JCM Business Matching Platform "JCM Global Match"

(Free of charge. Released in July 2019)



This is an automated matching website which enables Japanese companies offering leading low-carbon or decarbonizing technologies (sellers) to meet with companies in JCM partner countries implementing such technologies (buyers), based on the users' interests. The users also can make appointments with their matched business partners to meet in person at one of the JCM seminars. Registration of consulting firms and financial companies is also welcome. We invite you to register today!

Suitable for Finding a JCM project partner offering technologies or services of your interest.

Consultation by GEC

GEC provides application consultation in order to assist project formation for entities interested in JCM Model Project. Please feel free to contact us. Please send an e-mail to jcm-info@gec.jp. Subject of e-mail should be "Consultation on application for JCM Model Project (Your company name)".



Suitable for Getting advice on your proposal at various phases.



About Global Environment Centre Foundation

Global Environment Centre Foundation (GEC) was established in 1992 as a United Nations Environment Programme (UNEP) support entity committed to conservation of the global environment, supporting IETC's activities for urban environmental management and promoting partnership between Japan and developing countries. GEC has served as an implementation agency of the Financing Programme for JCM Model Projects since 2014.

<http://gec.jp/jcm/jp/>
http://twitter.com/GEC_JCM_Info



Website



Twitter

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