

# Feasibility Studies on Joint Crediting Mechanism (JCM) Projects towards Environmentally Sustainable Cities in Asia



Ministry of the Environment, Japan

October 2014

## Project Overview

In order to halve global emissions of greenhouse gases in 2050, it will be necessary to accelerate trends in Asian-Pacific countries with strong economic growth toward identifying and organizing projects to reduce greenhouse gas emissions on a large scale and building a sustainable low carbon society in Asia.

In order to contribute to the global GHG emissions reduction and absorption, Japan promotes JCM which aims to establish frameworks of the measures against global warming and transfer advanced low-carbon technologies to developing countries in flexible and prompt manners.

In this project, studies are being conducted on the feasibility of organizing large-scale projects as regional packages like entire cities or areas. This will be done by establishing management and maintenance systems together with Japanese research institutions, local public bodies, private companies and other relevant organizations, while adapting advanced technologies and systems to suit local conditions.

### ◆ List of Projects for FY2014 ◆

No.	Project name	Country	Region/City	Responsible organization
1	The feasibility study to promote Low Carbon Technology Application in India	India	Gujarat, Maharashtra, Punjab	Institute for Global Environmental Strategies
2	Feasibility Study on Financial Scheme Development Project for Promoting Energy Savings in Indonesia	Indonesia	Jakarta City Bali	Mitsubishi Research Institute, Inc.
3	Surabaya Low-Carbon City Planning Project	Indonesia	Surabaya	Institute for Global Environmental Strategies
4	Feasibility Study on Eco-Auto Lease Scheme for Low Carbon Vehicle	Indonesia		PricewaterhouseCoopers Aarata
5	Developing a Low Carbon Society under collaboration between Bandung City and Kawasaki City in Bandung, Indonesia	Indonesia	Bandung	Institute for Global Environmental Strategies
6	Study for Developing Environmentally and Culturally Sustainable Cities through the JCM in Siem Reap	Cambodia	Siem Reap	Overseas Environmental Cooperation Center, Japan
7	Study on accelerating the Implementation of the Bangkok Master Plan on Climate Change through the JCM	Thailand	Bangkok	Overseas Environmental Cooperation Center, Japan
8	Automobile CO <sub>2</sub> emission reduction by exporting Japanese ELV engine Project in Thailand	Thailand	Bangkok	Kaiho Sangyo Co.,Ltd
9	Strategic Promotion of Recovery and Destruction of Fluorocarbons	Thailand	Bangkok, Iskandar	E&E Solutions Inc.
10	Demonstration Project on Installing an Evacuation Shelter with Renewable Energy as a "Low-Carbon/Resilient Model for Small Island Countries"	Palau, Samoa, Fiji, Tonga, Vanuatu, Kiribati, Tuvalu		Pacific Consultants Co., Ltd.
11	Feasibility study on comprehensive resource circulation system for low carbon society in Republic of Palau	Palau		AMITA Institute for Sustainable Economies Co.,Ltd.
12	The Feasibility study toward Eco-island between Kien Giang Province and Kobe City	Vietnam	Phu Quoc Island	Institute for Global Environmental Strategies
13	Hai Phong Green Growth Promotion Plan Development in association with Kitakyushu City	Vietnam	Hai Phong	Institute for Global Environmental Strategies
14	Ho Chi Minh City – Osaka City Cooperation Project for Developing Low Carbon City	Vietnam	Ho Chi Minh	Global Environment Centre Foundation
15	Feasibility Study on a Large-Scale GHG Emissions-Reduction Project Development in Iskandar Development Region, Malaysia	Malaysia	Iskandar	The Japan Research Institute, Limited
16	Feasibility Study on Rice Husk Power Generation System for Low-carbon Communities in Ayeyarwady Region, Myanmar	Myanmar	Ayeyarwady	Mitsubishi Research Institute, Inc.
17	Study for the development of JCM projects for comprehensive improvements in the power generation, transmission and distribution systems in Ulaanbaatar City and on the possibility of nationwide horizontal application of the same improvement model in Mongolia	Mongolia	Ulaanbaatar	Overseas Environmental Cooperation Center, Japan
18	Feasibility study on a programme-type finance scheme for the JCM in Mongolia	Mongolia		Overseas Environmental Cooperation Center, Japan
19	JCM Feasibility Study of GHG Mitigation Project contributing to Low Carbon Old Capital based on City-to-City Cooperation between Vientiane and Kyoto	Laos	Vientiane	Global Environment Centre Foundation

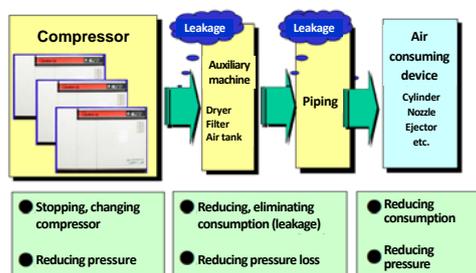
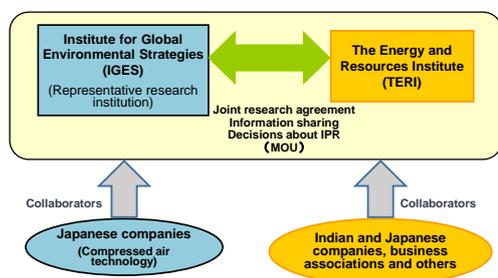
Under this project, IGES is conducting a research on promoting the application of compressed air system, as a low carbon technology, in India. The ultimate objective is to develop and formulate JCM large-scale projects that promote the application of advanced compressed air system in Indian industries and results in significant GHG emission reduction.

The conduct of this research built up on IGES's experience from a recently conducted 4 years project on promoting the application of low carbon technology in India, and up on IGES's wide network in India, especially with The Energy and Resource Institute (TERI) and Indian small and medium-sized enterprises (SME).

This will enable the contribution not only to tap the potential greenhouse gas (GHG) emission reduction in India, which is one of the world's largest energy consumers and GHG emitters in the world, but also to contribute to Japanese economy through the deployment of advanced low carbon technology to India.

### [Project Description]

- Explore energy saving potential at existing compressed air systems;
- Estimate the impact of introducing inverter-type air compressor (hardware);
- Propose best operating practices (soft technology), in terms of operation, maintenance, and management of existing compressed air system, that can be introduced as package along with the hardware.



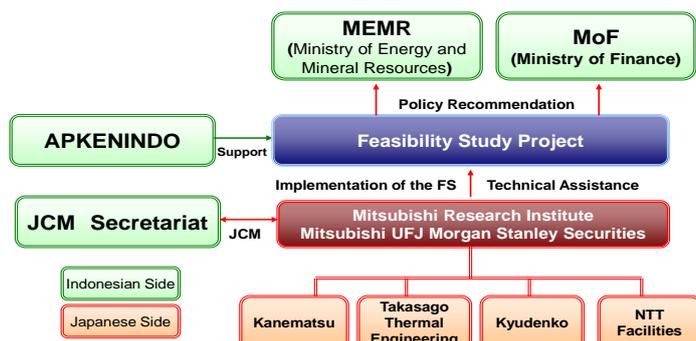
[Kickoff meeting]

Because of the upward trend of energy price including electricity fee, energy conservations are strongly needed in Indonesia. By such a background, many energy audits that target the commercial buildings are conducted. However, improvement demonstrated and demonstration projects have been delayed due to face obstacles of finance.

The project will perform energy auditing to present energy saving proposals for factories, hotels, office buildings, a "superblock" commercial area in Indonesia. And, the aim of the study is to develop energy conservation projects to promote joint efforts in energy savings between Japan and Indonesia, by taking into consideration about the feasible financing scheme.

### [Project Description]

- Perform energy audits to present energy saving measures for facilities in industry, hotels, commercial complex, offices
- Examine MRV methodology and estimate GHG emission reduction potential
- Propose recommendations to policies relating to energy conservation
- Business planning



Industry



Hotels



Commercial Complex

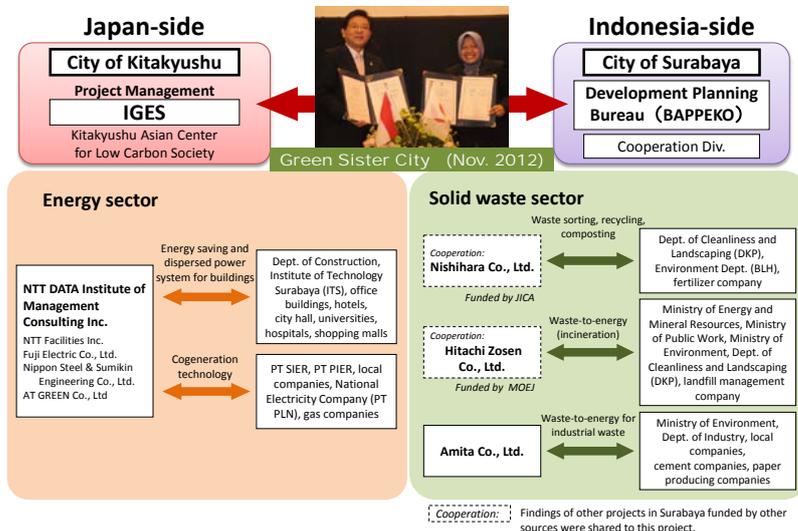


Offices

This project studies the potential to reduce greenhouse gas (GHG) emissions (in order to develop JCM projects) in Surabaya City, Indonesia targeting the energy and waste management sectors. The project also aims to support Surabaya City to develop a low-carbon city plan under the framework of cooperation between Surabaya City and Kitakyushu City, who formally became Green Sister Cities in 2012.

**[Project Description]**

- Energy Sector: Energy saving and dispersed power system for buildings, heat and power supply (cogeneration technology) for industrial estates, etc.
- Solid Waste Management Sector : Waste sorting, recycling, composting, waste-to-energy for municipal solid waste, waste-to-energy for industrial waste, etc.



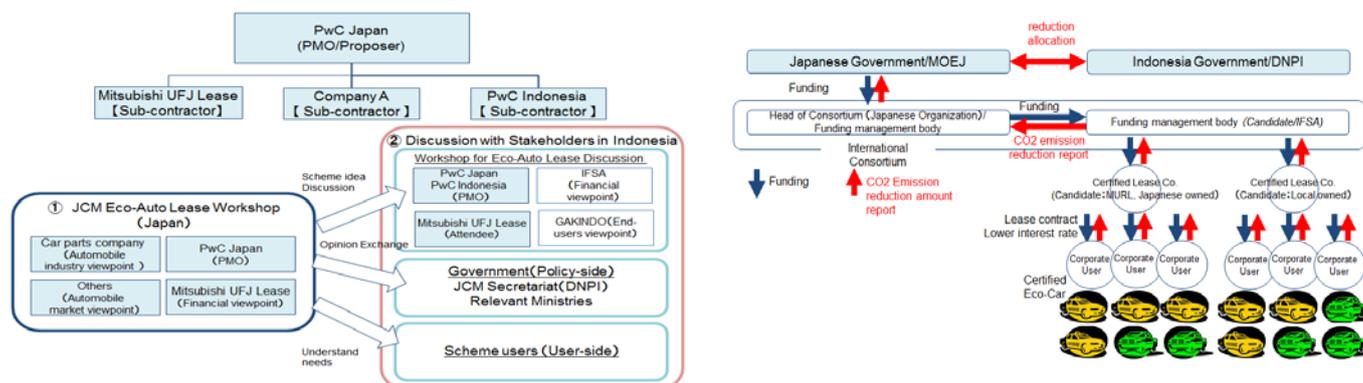
Automobile market in Indonesia has been remarkably growing. Sales unit in 2013 approx.1.2million. This result in serious traffic congestion and pollution by emission gas, and aggravation is anticipated.

Due to affordable price gasoline (subsidized fuels) and relatively high price of low emission vehicle, solution for energy saving, CO2 emission and emission gas reduction is stagnated.

Combining lease finance, used by 70-80% of automobile purchase, with low emission vehicle, "Eco-Auto Lease Scheme" is developed.

**[Project Description]**

- "Eco-Auto Lease Scheme" development
- MRV methodology development
- Eco-Auto Lease program development
- Capacity building for large scale project development

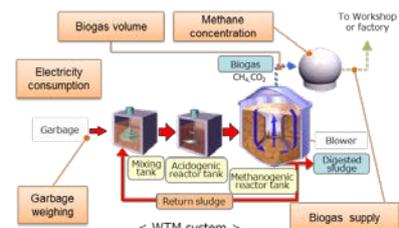
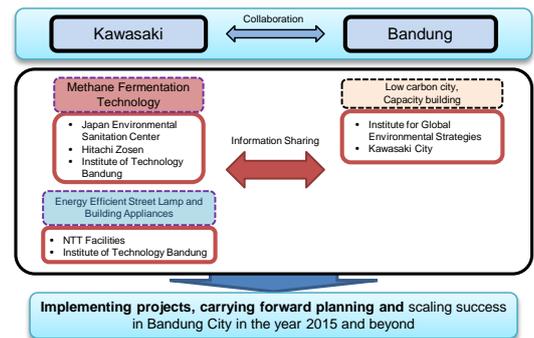


Bandung City, the capital of WestJava Province and located 140 kilometers south east of Jakarta, is experiencing rapid urbanization and motorization, requiring immediate actions to improve waste and water environment in the city. City to city cooperation between Bandung and Kawasaki City will serve as the basis for development in Bandung for a low carbon city. This study will try to treat organic waste with methane fermentation technology and gain co-benefits in the form of sanitary improvement and GHG emission reductions.

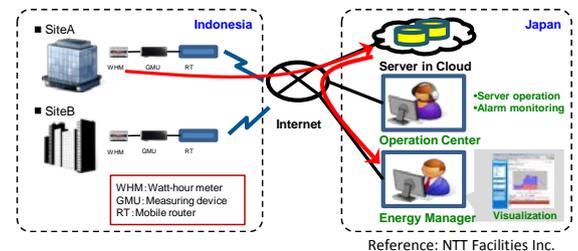
Furthermore, it will look at possibilities in reducing energy consumption by replacing the city's street lamps with efficient lighting and introducing energy efficient appliances to buildings.

### [Project Description]

- Methane fermentation technology for organic waste
  - Analyze existing similar plants and offer solutions to current issues
  - Quantify and develop the MRV methodologies for the GHG emissions reductions
- Energy efficient street lamps and building appliances
  - Select appropriate Japanese appliances
  - Visualization, data gathering and analysis of power consumption
  - Quantify and develop the MRV methodologies for the GHG emissions reductions
- Low carbon city development and capacity building support
  - Support to Bandung in low carbon city planning
  - Capacity building such as offering Japanese experience on "streamlining legislative structures" to ensure smooth transfer of Japanese technology



Reference : Hitachi Zosen Corporation

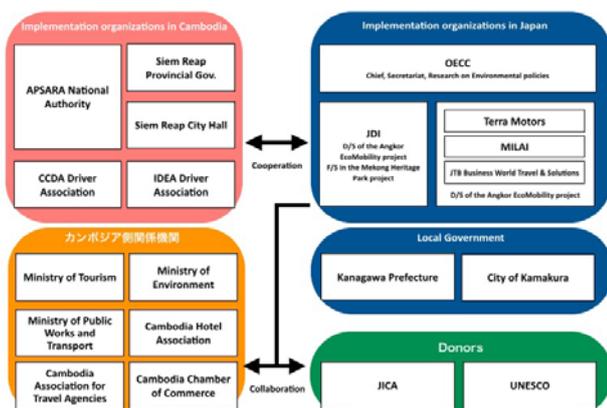


Reference: NTT Facilities Inc.

While a huge influx of tourists to the Angkor historic area comprising the Angkor ruins and Siem Reap has been a major driver of the recent economic development of the country, it has also caused a wide range of environmental problems, including air pollution. Against this background, the study is conducted to contribute to the transfer of advanced Japanese low-carbon technologies through the JCM and introduce relevant environmental policies of the Kamakura city to the stakeholders of the APSARA Authority and the Siem Reap provincial government, thereby supporting the development of an Asia's leading city in environmental and cultural sustainability in Cambodia.

### [Project Description]

- JCM demonstration study of the Angkor Eco Mobility project
- JCM feasibility study of the Mekong Heritage Park
- Research on environmental policies in the Angkor Park and the Siem Reap city



[Study session with drivers]



[Mobility monitoring survey]

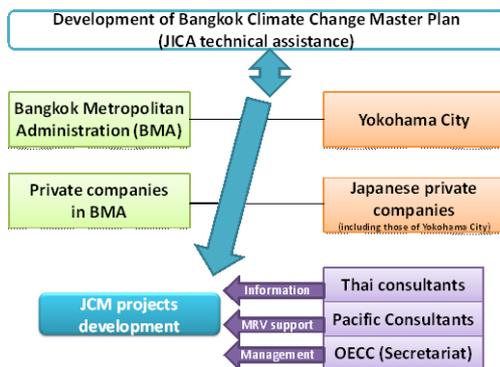


[Electric motorcycle test driving]

The vibrant capital of Thailand – Bangkok – is one of the economic centers of Southeast Asia with huge potentials for GHG emissions reductions. Building upon inter-city cooperation between Yokohama City and Bangkok Metropolitan Administration (BMA) on sustainable urban development, the proposed study aims to develop potential JCM projects in the key economic sectors of BMA, including energy, transport, solid and waste/wastewater treatment to support the implementation of the Bangkok Master Plan on Climate Change.

### 【Project Description】

- Develop potential JCM projects that could contribute to the implementation of the Bangkok Master Plan on Climate Change (2013-2023)
- Facilitate matchmaking between needs for GHG emissions reductions in Bangkok and leading Japanese low-carbon technologies
- Provide technical assistance for technology transfer between Japanese-Thai companies building upon the partnership between Yokohama City and BMA



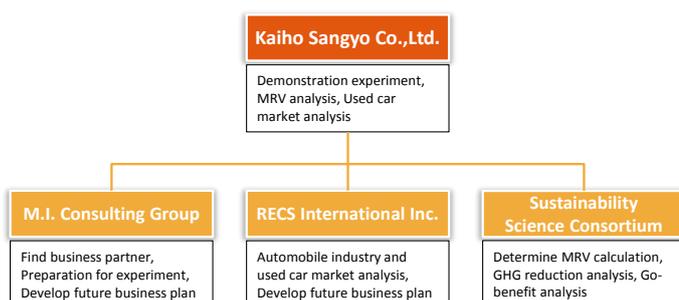
[Skyline in Bangkok at night]

The proposed project is first to verify the business feasibility of high quality Japanese used engines to replace old inefficient performance engines with monitoring the reduction of CO<sub>2</sub> emission. In addition, this project is to establish automobiles and parts recycling system in Bangkok metropolitan area in order to mitigate CO<sub>2</sub> Emissions.

The feasibility of expanding the business and the system should be examined not only in Thailand but in other developing countries.

### 【Project Description】

- Understand current automobile industry and used car market
- Find business partner
- Demonstration experiment
- Determine MRV calculation
- Develop future business plan



[Classroom lecture]

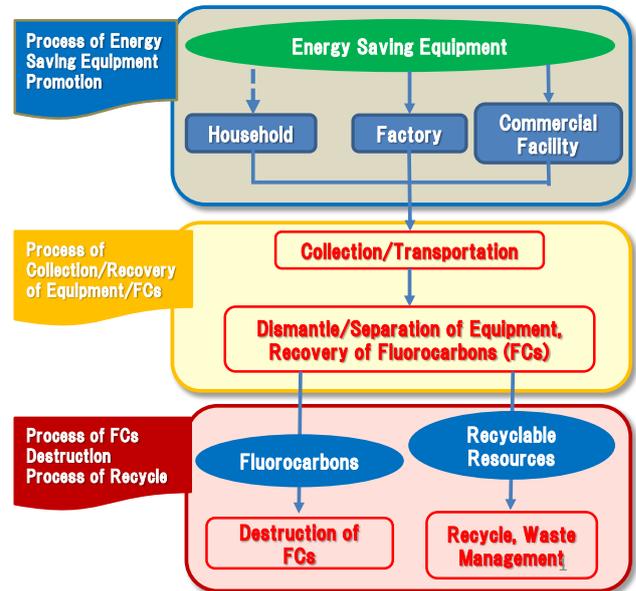


[Field training]

This project aims to establish the scheme to collection of end-of-life equipment (e.g. air conditioner) and recovery and destruction of fluorocarbons in order to promote installation of energy saving equipment in Thailand and Malaysia.

#### [Project Description]

- To implement energy saving analysis for target facility and to propose energy saving JCM project
- Feasibility study on collection of end-of-life equipment
- Feasibility study on recovery and destruction of used fluorocarbons



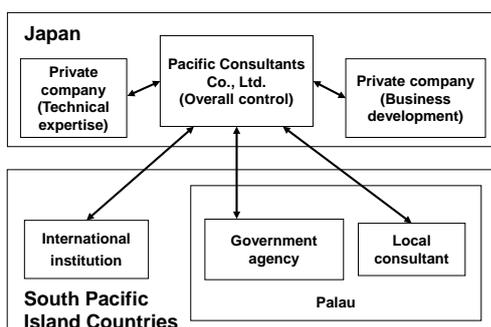
[Image of Future Project]

In island countries, measures for climate change adaptation are a critical issue which are involving the survival of the state. In addition, use of renewable energy has a potential to realize a resilient and wealthy social economy even though their GHG emission are small.

The objective of this project is to formulate a project on “Low-Carbon/Resilient Model for Small Island Countries” which integrates renewable energy (mitigation) and disaster risk reduction (adaptation) in Palau and to consider a scheme for upscaling the model to whole South Pacific Island Countries.

#### [Project Description]

- Feasibility study for introducing an evacuation facility with PV system in Palau
  - Consideration on necessary disaster risk deduction measures
  - Consideration on candidate facilities and appropriate PV system
  - Consideration on applicable finance support scheme and organization
- Consideration on scheme for large-scale upscaling JCM in South Pacific Island Countries

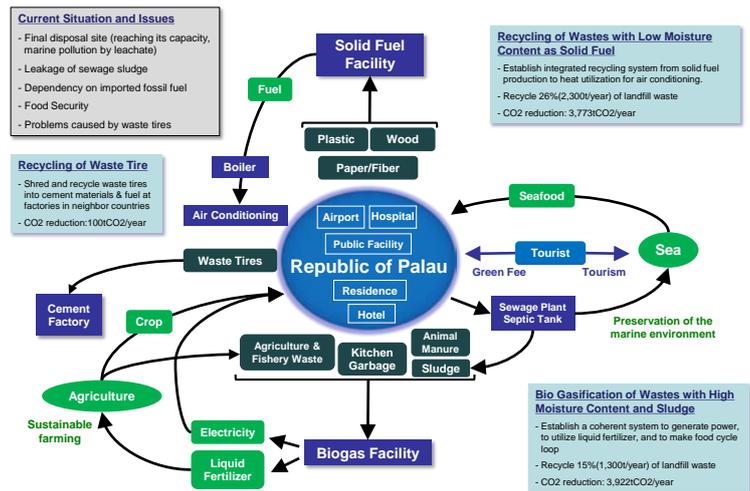
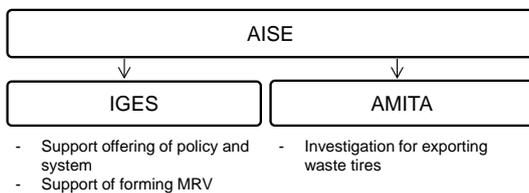


[Examples of public facilities which has been used as evacuation shelters]

Drawing up a scheme of resource circulation project and MRV methodologies, this project aims to establish a comprehensive and compact island model of material-cycle and low carbon society by using technology of solid fuel processing and bio gasification in Republic of Palau.

**[Project Description]**

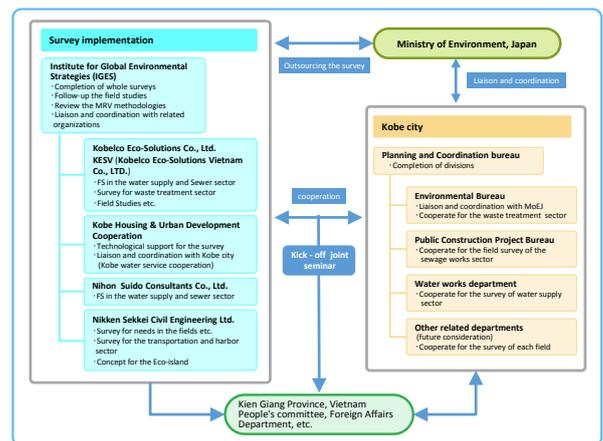
- Waste composition / amount survey of households and main business sectors.
- Trial of waste segregation.
- Basic system design and making business scheme and plan of Solid waste fuel system, Bio gasification system.
- Demonstration of gasification.
- Basic investigation for recycling waste tires.
- Proposing the comprehensive circulation system plan and MRV methodology.



The project aims to excavate and form JCM scheme by custom made system under the efforts of inter-city cooperation in the field of water supply and sewerage between Kien Giang Province and Kobe-city, and the background of experience in Phu Quoc Island with jointly implementing organizations. Through this project, achievement of economic/tourism development that is compatible with low-carbon society and natural environment protection, contemplates the expansion to island countries and other regions are aimed.

**[Project Description]**

- Water infrastructure cooperation is progressing in Kien Giang Province(Phu Quoc Island) for water and sewage field, conducted Feasibility Study investigation, aimed at introducing advanced technologies that contribute to the reduction of CO2 emissions (sewage digester gas utilization equipment, etc.)
- About possibility of introducing low-carbon technologies, such as waste incineration power generation, in the waste sector, it is considered in light of the needs of local understanding, etc.
- Conducting local needs are also investigated in the field of urban facilities such as transportation, ports, production facilities, hotels, and extract the applicable domestic technology seeds.



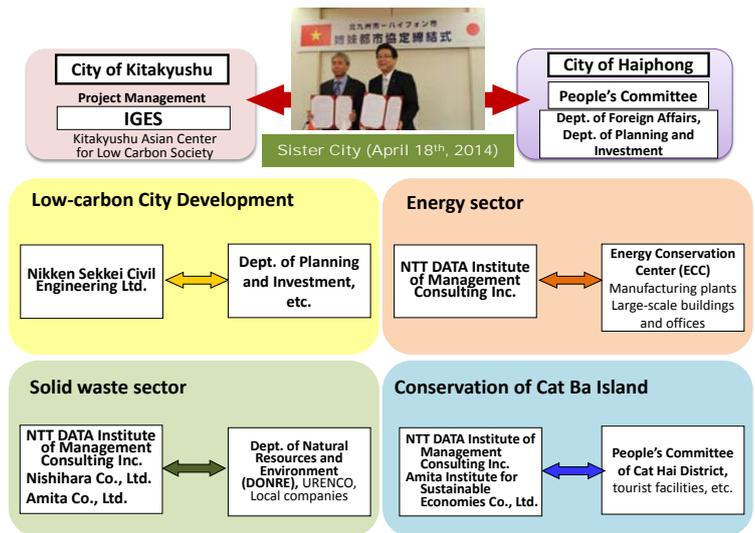
[Signing ceremony between Kobe-city and Kien Giang Province]

Following their 5 year friendship and cooperative relations, the City of Kitakyushu and City of Hai Phong signed a Sister City agreement on April 18<sup>th</sup>, 2014. Based on requests from Hai Phong City, City of Kitakyushu is supporting the development of a Green Growth Promotion Plan in cooperation with Hai Phong City. The plan includes an analysis of current situation, strategy formulation, and concrete measures by using the Kitakyushu Model. The Green Growth Promotion Plan complements the Green Growth Plan, which Hai Phong City is currently developing under the direction of the national government of Viet Nam to enhance its effectiveness.

This project is also studying the potential to reduce greenhouse gas (GHG) emissions (to develop JCM projects) targeting the sectors of energy and waste management, as well as conservation on Cat Ba island.

**[Project Description]**

- Low Carbon City Development: Development of Green Growth Promotion Plan
- Energy Sector: Cleaner production to factories, Energy conservation of buildings and offices, Dispersed power system
- Waste Management Sector: Recycling of solid waste, Waste-to-energy, Cement raw material and waste fuel, and A package model for addressing energy conservation and F-gases
- Conservation of Cat Ba Island: Eco-friendly facilities and transportation, Recycling of all kinds of MSW generated in the island



This project aims at developing a low carbon mega-city model in Asia, through the provision of Osaka’s environmental technologies and environmental administration in an integrated manner, to promote following:

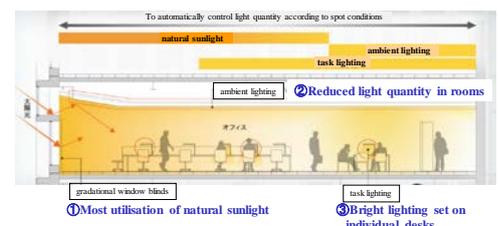
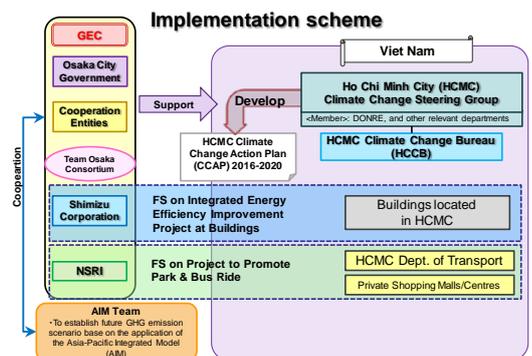
- development and realization of widespread and packaged JCM projects
- establishment of operation and management scheme for low carbon city master plan

Based on “MoU on Developing Low-Carbon City between Ho Chi Minh City and Osaka City” signed by both mayors, this project helps Ho Chi Minh City develop their climate change action plan 2016-2020.

In addition, 2 projects whose Feasibility Study has been conducted in 2013 are now at implementation stage, and the feasibilities of 2 more projects are studied in 2014.

**[Project Description]**

- Support to the development of Ho Chi Minh City’s Climate Change Action Plan 2016-2020
- JCM Project FS “Integrated Energy Efficiency Improvement at Buildings”
- JCM Project FS “Introduction of Park & Bus Ride System to Promote Modal Shift to Public Transportation”
- Promotion of city-to-city cooperation and public-private cooperation
- Development of new JCM project candidates



[Integrated Energy Efficiency Improvement at Buildings / task & ambient lighting]

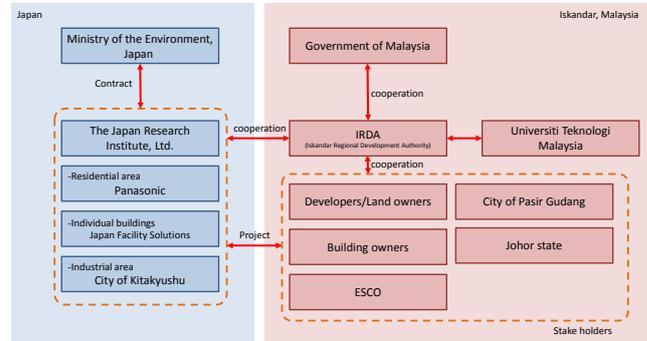


[Image of Park & Bus Ride System]

This project aims to develop the Large-Scale GHG Emissions-Reduction Project through the application of “Fujisawa-model by Panasonic”, “Kitakyushu-model” and “ESCO business-model”, in the field of residential area, industrial area and individual buildings, based on “Low Carbon Society Blueprint (LCSBP)” in Iskandar development region, Malaysia.

**[Project Description]**

- The Residential area: Developing the projects and systems based on the “Fujisawa model” in order to realize GHG emissions reduction of the area.
- The industrial area: Developing the relationship and cooperation based on the “Kitakyushu model” in order to realize GHG emissions reduction of the area.
- The individual buildings: Developing the ESCO-business in order to construct the system of GHG emissions reduction of the individual buildings.



[Meeting with Pasir Gudang]



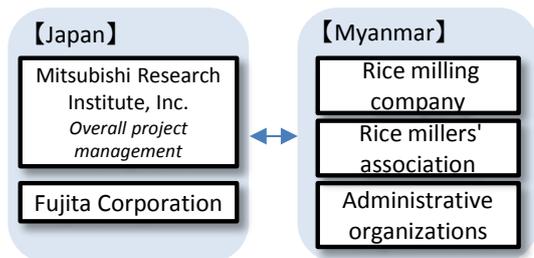
[The waterway in the industrial area]

The project aims to establish a distributed regional energy supply system in the Ayeyarwady region in Myanmar based on rice husk biomass generation in rice mills, supplying electricity to the surrounding community whose electrification rate is low.

The expected outcome is the formation of a low-carbon community centering on the rice mill, including new industries based on electricity and heat generation, and improved energy access of the local residents.

**[Project Description]**

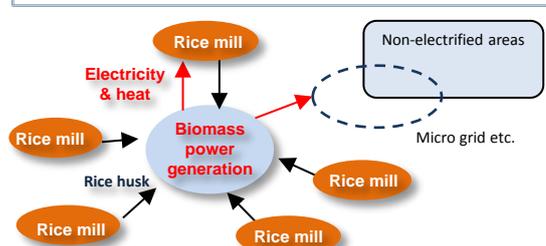
- Designing rice husk power generation systems
- Proposing implementation of the project
- Analysis of project effects (GHG reduction etc.)
- Proposing promotion systems for Low-carbon Communities



**Needs in target area**

- Unutilized rice husk in rice mills
- Necessity of electrification of quality of life, and industry promotion

Rice husk power generation system, as “energy supply center” in rural community



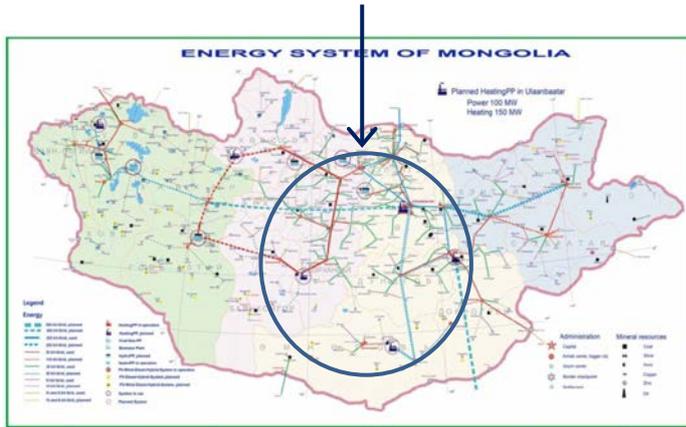
[Current situation of rice husk]

**[Project Description]**

- (1) Improvement in the efficiency of the Ulaanbaatar CHPs with the use of advanced maintenance, operation and management technologies
- (2) Comprehensive replacement and upgrading of the facilities for power transmission and distribution in Ulaanbaatar City
- (3) Understanding the needs of power generation, transmission and distribution in other major cities in the country with a view to nationwide horizontal application of the improvement measures of (1) and (2).

**[Target Site]**

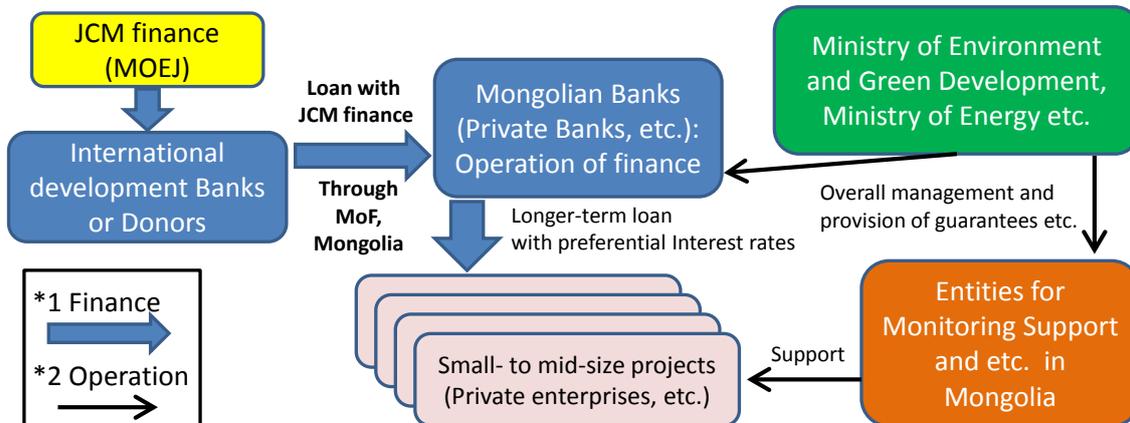
Ulaanbaatar City and Central Grid in Mongolia



[Combined Heat and Power]

**[Project Description]**

The proposed study will be carried out in order to design a program-type finance scheme for the JCM with the use of the JCM leap-frog finance and in partnership with local banks that will facilitate the implementation of small- to middle-scale JCM projects.



The use of government guarantees and JCM finance will enable the introduction of advanced technologies with the use of longer-term loan with preferential interest rates.

**[Advantages to the proposed finance scheme]**

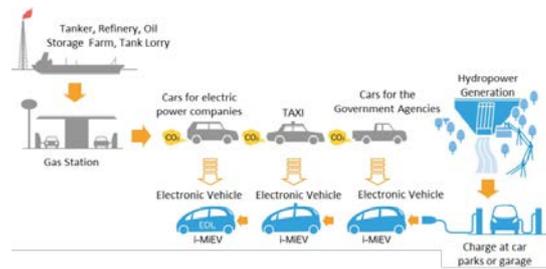
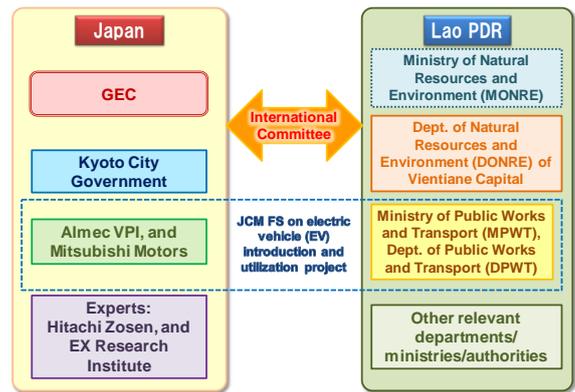
- \* It will enable the introduction of advanced technologies tailored to the needs of Mongolia.
- \* Local entities will effectively manage a number of small- to middle-scale projects.

This study aims at developing a low carbon old capital city as a model of sustainable development for Asian historical cities, through the provision of Kyoto's administrative and social experiences and environmental technologies, to promote the conservation of cultural and historical heritages and the development of JCM projects contributing to the realization of Low-Carbon Old Capital Vientiane.

In addition, a Feasibility Study of JCM Project on electric vehicle (EV) introduction and utilization is implemented, toward the realization of the project implementation on the ground in 2015, with co-benefit of the improvement of air pollution caused by auto exhausts.

**[Project Description]**

- To establish an operation and management scheme to realize low-carbon old capital formulation
- To grasp local needs of environmental improvement and cultural and historical heritage conservation in Vientiane
- To identify elements necessary for Vientiane Low-Carbon Old Capital Formulation Plan
- To undertake JCM project FS on electric vehicle (EV) introduction and utilization
- To develop new JCM project candidates
- To promote city-to-city cooperation and public-private cooperation



[Image of JCM project on electric vehicle (EV) introduction and utilization]

The following platforms for local governments, companies, and research institutions (researchers and universities) have been established as forums for exchanging views and interaction among partner countries, cities in partner countries and domestic stakeholders, for supporting the program building of large-scale JCM projects. For details, please check each portal site.

<p><b>Web Portal for Low Carbon Development in Asia</b>  <a href="http://www.env.go.jp/earth/coop/lowcarbon-asia/english/">http://www.env.go.jp/earth/coop/lowcarbon-asia/english/</a></p>	<ul style="list-style-type: none"> <li>➤ Trends in international negotiations and related policies</li> <li>➤ Information on projects regarding low carbon development in Asia</li> </ul>
<p><b>Business Collaboration Support Website for Low Carbon Development in Asia</b>  <a href="http://lowcarbon-asia.org/english/">http://lowcarbon-asia.org/english/</a></p>	<ul style="list-style-type: none"> <li>➤ Information on low carbon technology possessed by Japanese firms</li> <li>➤ Consultation service relating to overseas expansion, etc.</li> </ul>
<p><b>Information for Local Government for Low Carbon Development in Asia</b>  <a href="http://www.env.go.jp/earth/coop/lowcarbon-asia/english/localgov/">http://www.env.go.jp/earth/coop/lowcarbon-asia/english/localgov/</a></p>	<ul style="list-style-type: none"> <li>➤ Information and tools to support developing countries</li> <li>➤ Information on consortiums with companies, etc.</li> </ul>
<p><b>Website of the Low Carbon Asia Research Network (LoCARNet)</b>  <a href="http://lcs-rnet.org/">http://lcs-rnet.org/</a></p>	<ul style="list-style-type: none"> <li>➤ Low carbon research activities in Asia</li> <li>➤ Low carbon related research results and researchers</li> </ul>

**Ministry of the Environment, Japan**  
 Global Environment Bureau

17th floor, Daido Seimei Kasumigaseki Bldg, 1-4-2, Kasumigaseki, Chiyoda-ku, Tokyo 100-0013  
 Tel: +81-3-5521-8248 Fax: +81-3-3581-3423