Japan's support to realize "Leapfrog" Low Carbon Development in Asian Cities

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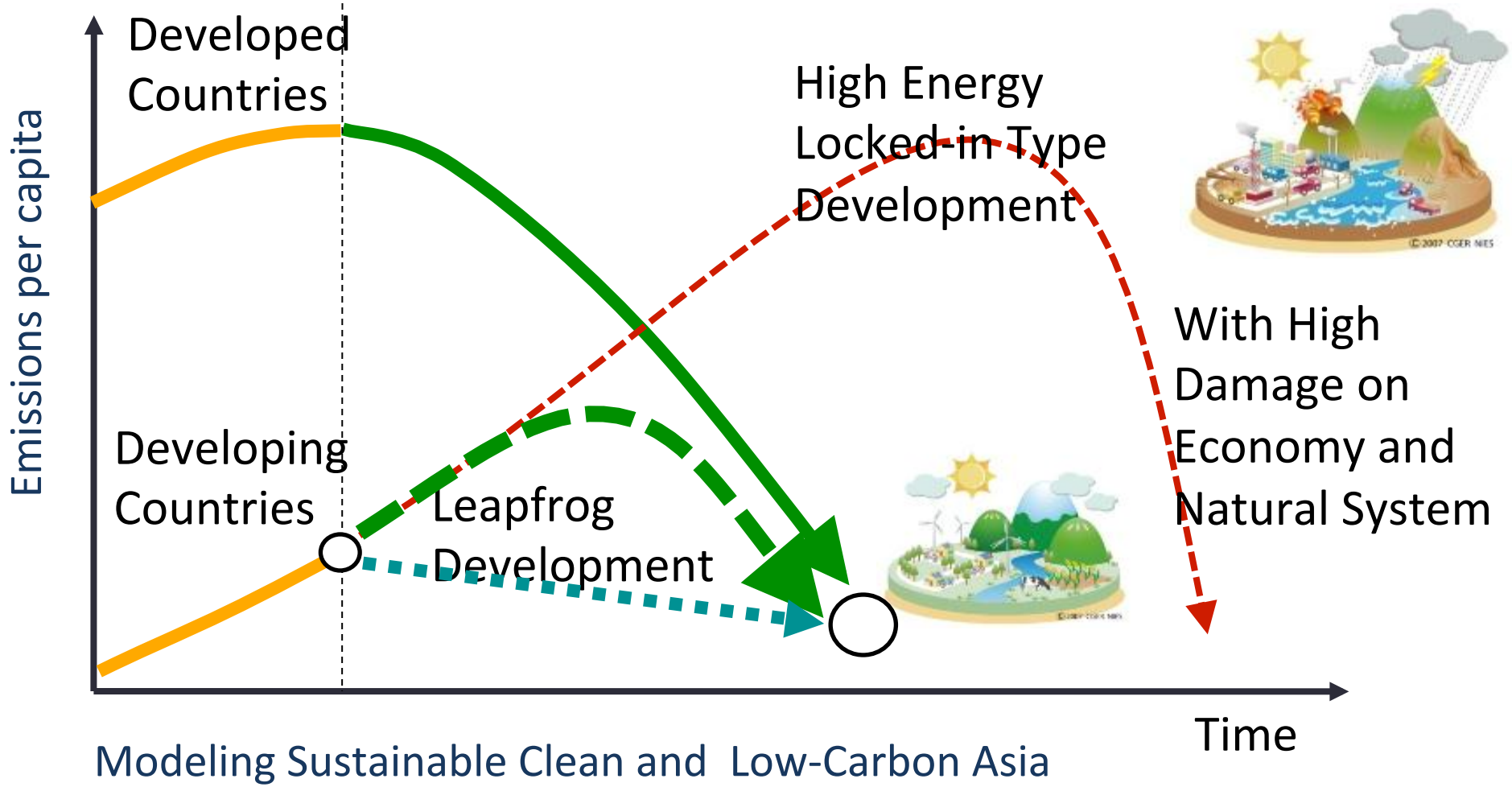
February, 2014

1.(1) Green Growth Path



Modeling Sustainable Clean and Low-Carbon Asia

"Asian Low-Carbon Society Scenario Development Study" FY2009-2013, funded by Global Environmental Research Program, MOEJ

http://2050.nies.go.jp/index.html

1.(2) Environmentally Sustainable Cities under EAS

East Asia Summit Environment Ministers Meeting (EAS-EMM)

Oct. 2008 1st EAS-EMM

"ESC should be an immediate priority area"

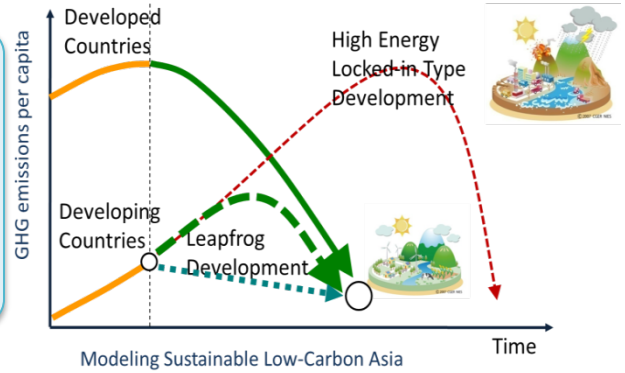
5th High Level Seminar on Environmentally Sustainable Cities is scheduled on 28 Feb -1 March 2013 at Indonesia (HLS-ESC)

HLS	Date	Venue	Co-organisers
1st	March, 2010	Jakarta, Indonesia	Japan, Indonesia, Australia, Singapore
2nd	March, 2011	Kitakyusyu, Japan	Japan, Australia, Cambodia, Malaysia, Thailand
3rd	March, 2012	Siem Reap, Cambodia	Japan, Cambodia, Australia, Thailand
4th	March, 2013	Hanoi, Viet Num	Japan, Indonesia, Australia, Viet Num

1.(3) Japan's New Support Program Enabling "Leapfrog" Development

Objective

- To support **developing countries to leapfrog to low carbon societies** with Japan's knowledge, experience, technology, human capital and finance by utilizing **JCM (Joint Crediting Mechanism)**, with establishing the concept of a **"human society that harmonizes and enriches the environment and life"** as a new paradigm for the 21st century.



Scheme

Achieving "Leapfrog" Development through creation of low carbon society in Asia-Pacific.

Knowledge, Experience, Technology, Policy

MOE

Research Institutes, Universities, Local governments

(Participation of Various Stakeholders)

Capacity Building

(Improvement of environment law)

Identifying Development needs

Establishing business models

Financial Support

(Cooperation with JICA and ADB)

Developing Countries

Key target countries (tentative): Developing countries in Asia-Pacific, such as Indonesia, Vietnam, Myanmar, Mongolia and Palau

Subject area

Environmentally Sustainable Cities

Energy Saving and Renewable

- ✓ Photovoltaic
- ✓ Wind
- ✓ Micro hydro
- ✓ Marine energy
- ✓ Biomass
- ✓ Independent distributed power
- ✓ Battery, HEMS
- ✓ Smart meter
- ✓ Waste heat recovery
- ✓ ESCO Project
- ✓ Inverter
- ✓ Heat pump

Transport

- ✓ Public transportation system
- ✓ Electric bike and vehicle
- ✓ Logistics and traffic flow measure

Waste management

- ✓ Incinerator
- ✓ Separate collection
- ✓ Compost
- ✓ Landfill

Water treatment

- ✓ Water supply
- ✓ Sewage system
- ✓ Water saving device

1.(4) Comprehensive Environmental Support for Island Countries

COMPREHENSIVE environmental support by Island Country JAPAN

①Adaptation, Mitigation and Environment (Waste/Water)

② Technology, Capacity Building and Policy support

ADAPTATION

- Mitigation and Adaptation (water saving, water treatment powered by solar system and others)
- development of Adaptation Plan
- Coral Reef Conservation

MITIGATION

- Mitigation and Adaptation (water saving, water treatment powered by solar system and others)
- Mitigation with co-benefits for Environment (such as waste management)
- Independent and Decentralized Low-carbon Energy System (Solar, Wind and Ocean power)
- Energy Saving

ENVIRONMENT[Waste/Water]

- Mitigation with co-benefits for Environment (such as waste management)
- Recycling System
- Water treatment

Harmony with Nature ＋ Low Carbon Society ＋Sound Material Cycle Society

2.(1) Science based policy making is key!

Policy makers
Central/regional government administration
Development Agencies
NGOs

Collaboration for LCS scenario development and building roadmaps

Request of more practical, realistic roadmaps and also tractable tools for real world

Each country's domestic/ local research institute

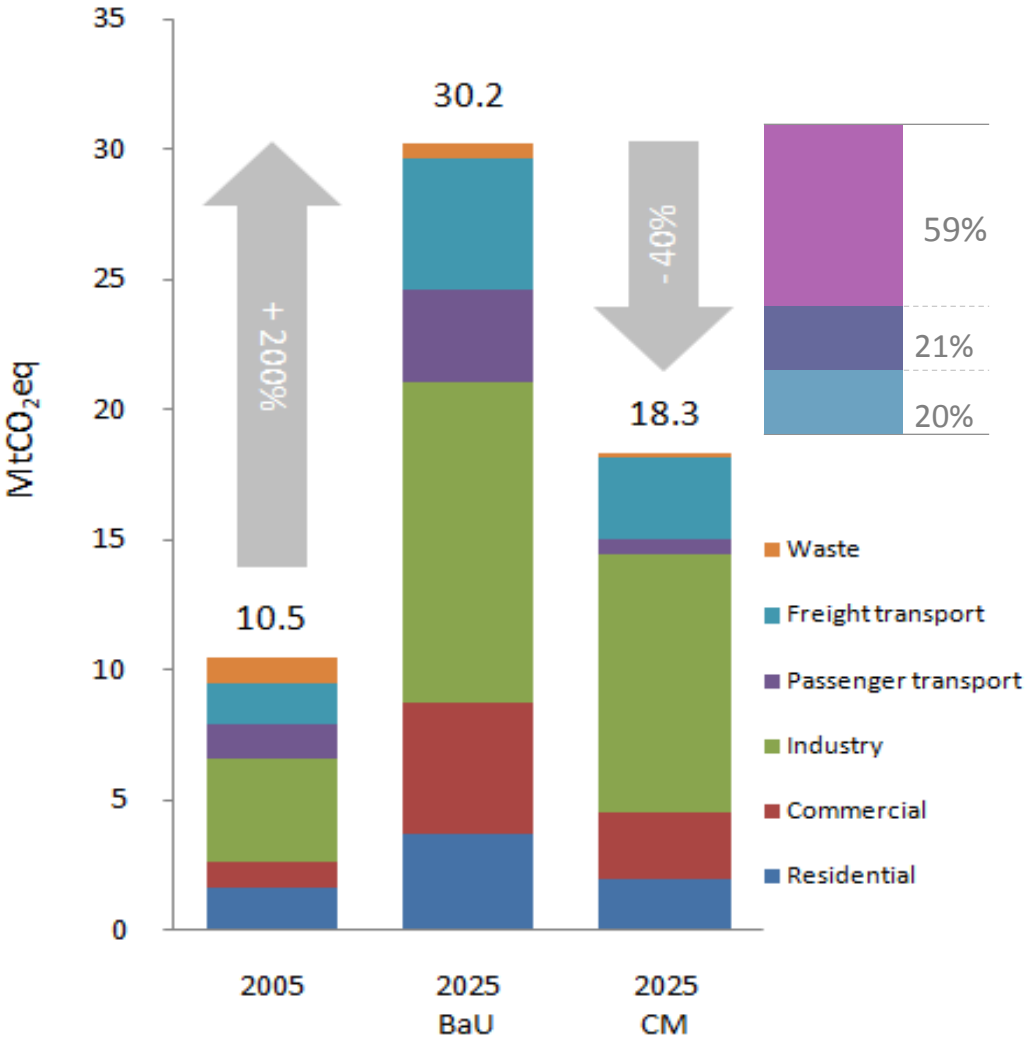
Core research members

Application and development to actual LCS processes

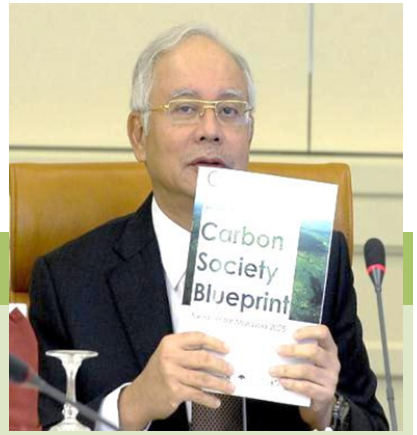
Development and maintenance of study tools/models

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

2.(2) Low Carbon Society Blueprint in Iskandar, Malaysia



12 actions for LCSBP



Green Economy

1 Integrated Green Transportation
2 Green Industry
3 Low Carbon Urban Governance
4 Green Building and Construction
5 Green Energy System and Renewable Energy

Green Community

6 Low Carbon Lifestyle
7 Community Engagement and Consensus Building

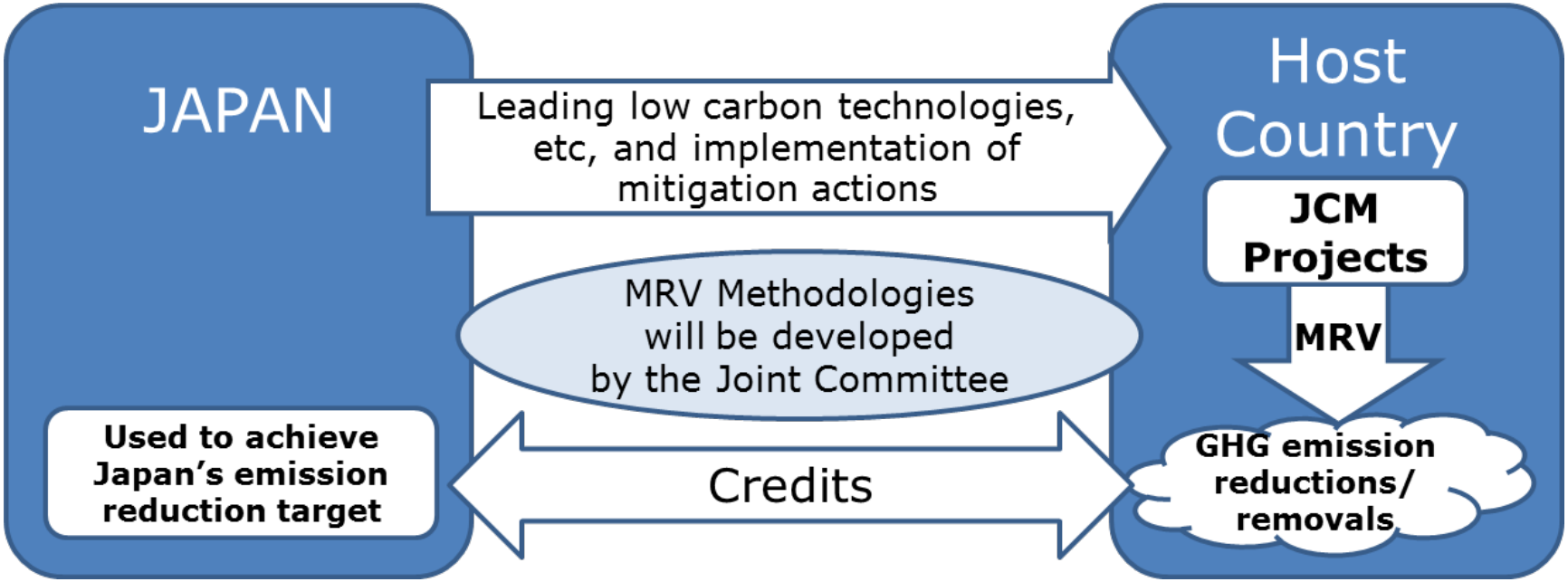
Green Environment

8 Walkable, Safe and Livable City Design
9 Smart Urban Growth
10 Green and Blue Infrastructure and Rural Resources
11 Sustainable Waste Management
12 Clean Air Environment**

56% reduction of GHG emission intensity and 40% emission reduction from BaU (business as usual) by 2025 using 2005 as a base year can be achievable by LCSBP, simulated by AIM (Asia-Pacific Integrated Model) supported by MOEJ

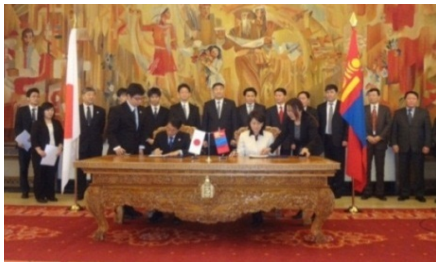
3.(1) Basic Concept of the JCM

- Facilitating diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries.
- Appropriately evaluating contributions to GHG emission reductions or removals from Japan in a quantitative manner, by applying measurement, reporting and verification (MRV) methodologies, 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, complementing the CDM.



3. (2) Countries with which Japan has signed on bilateral documents

- Japan has held consultations for the JCM with developing countries since 2011 and signed the bilateral document for the JCM with Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia, Costa Rica and Palau.
- Intend to increase the number of signed countries to at least 16 in 3 years



Mongolia
On January 8, 2013
（Ulaanbaatar）

Bangladesh
On March 19, 2013
(Dhaka)

Ethiopia
On May 27, 2013
(Addis Ababa)

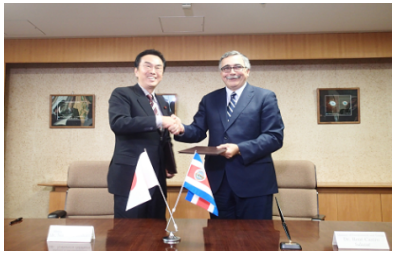
Kenya
On June 12,2013
(Nairobi)

Maldives
On June 29, 2013
(Okinawa)

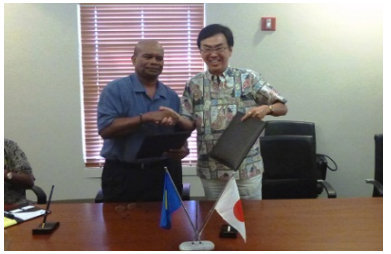
Viet Nam
On July 2, 2013
(Hanoi)

Lao PDR
On August 7, 2013
(Vientiane)

Indonesia
On August 26, 2013
(Jakarta)



Costa Rica
On December 9, 2013
(Tokyo)



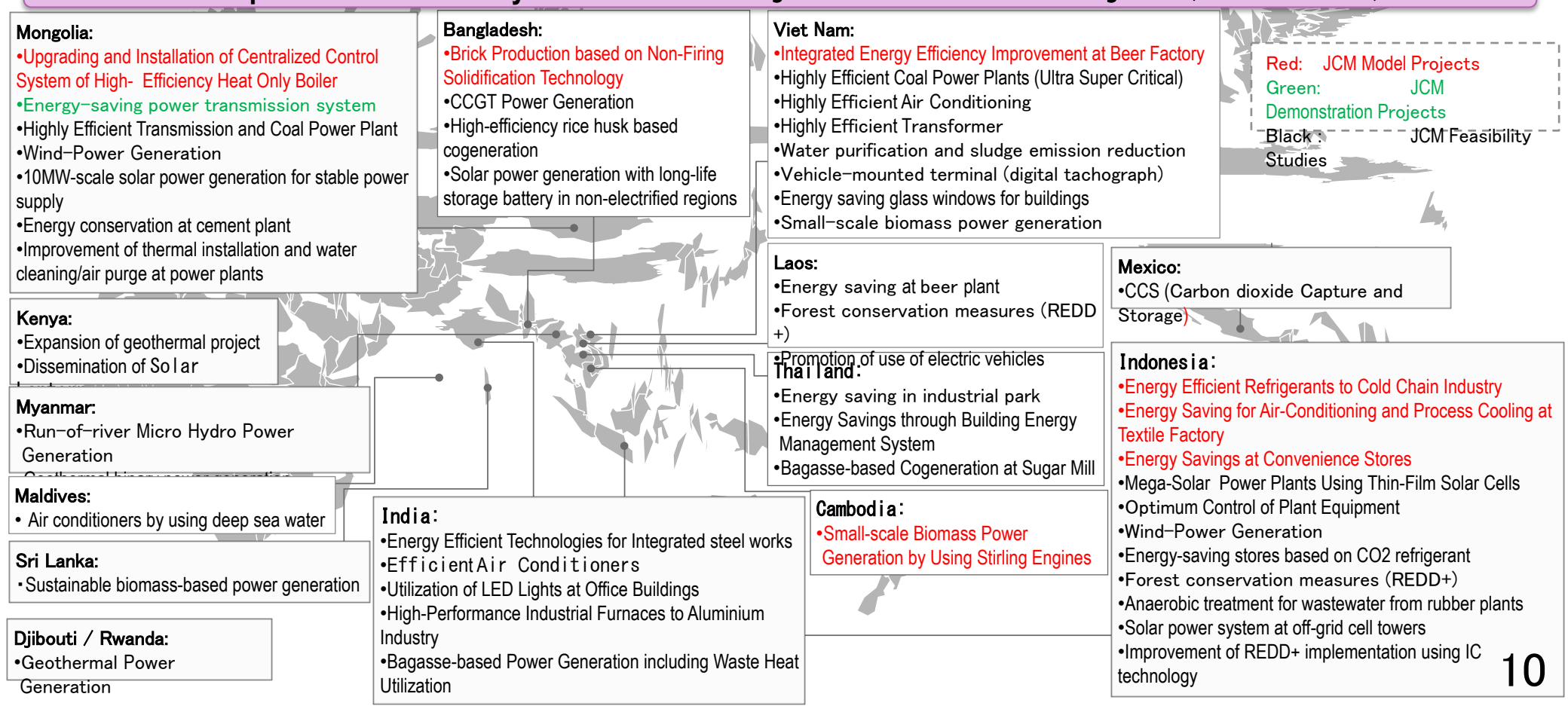
Palau
On January 13, 2014
(Ngerulmud)

- Japan held the 1st Joint Committee with Mongolia, Bangladesh, Ethiopia, Kenya, Viet Nam and Indonesia respectively.

3. (3) Approaches for promoting JCM project formulation

- Implementation of JCM Demonstration Projects and Financing Program for JCM Model Projects
- Establishment of a fund to assist emission reduction projects which cooperate with projects assisted by JICA and ADB
- Assistance to cities and islands as a whole
- Utilization of the consultative meetings of relevant ministries, agencies, and organizations.

Example of JCM Feasibility Studies/Model Projects /Demonstration Projects (2010 to 2013)



Mongolia:
- Upgrading and Installation of Centralized Control System of High- Efficiency Heat Only Boiler
- Energy-saving power transmission system
- Highly Efficient Transmission and Coal Power Plant
- Wind-Power Generation
- 10MW-scale solar power generation for stable power supply
- Energy conservation at cement plant
- Improvement of thermal installation and water cleaning/air purge at power plants

Bangladesh:
- Brick Production based on Non-Firing Solidification Technology
- CCGT Power Generation
- High-efficiency rice husk based cogeneration
- Solar power generation with long-life storage battery in non-electrified regions

Viet Nam:
- Integrated Energy Efficiency Improvement at Beer Factory
- Highly Efficient Coal Power Plants (Ultra Super Critical)
- Highly Efficient Air Conditioning
- Highly Efficient Transformer
- Water purification and sludge emission reduction
- Vehicle-mounted terminal (digital tachograph)
- Energy saving glass windows for buildings
- Small-scale biomass power generation

Red: JCM Model Projects
Green: JCM Demonstration Projects
Black : JCM Feasibility Studies

Laos:
- Energy saving at beer plant
- Forest conservation measures (REDD +)
- Promotion of use of electric vehicles

Mexico:
- CCS (Carbon dioxide Capture and Storage)

Kenya:
- Expansion of geothermal project
- Dissemination of Solar

Thailand:
- Energy saving in industrial park
- Energy Savings through Building Energy Management System
- Bagasse-based Cogeneration at Sugar Mill

Myanmar:
- Run-of-river Micro Hydro Power Generation

Maldives:
- Air conditioners by using deep sea water

Sri Lanka:
- Sustainable biomass-based power generation

Djibouti / Rwanda:
- Geothermal Power Generation

India:
- Energy Efficient Technologies for Integrated steel works
- Efficient Air Conditioners
- Utilization of LED Lights at Office Buildings
- High-Performance Industrial Furnaces to Aluminium Industry
- Bagasse-based Power Generation including Waste Heat Utilization

Cambodia:
- Small-scale Biomass Power Generation by Using Stirling Engines

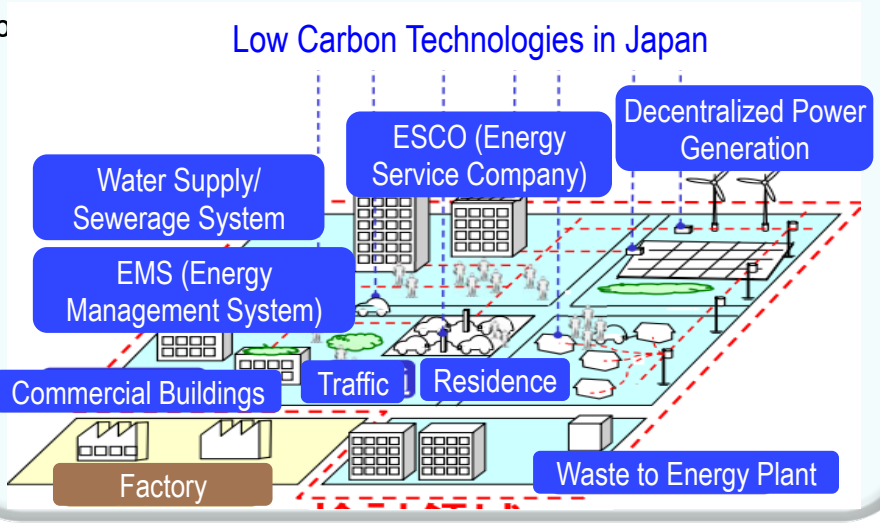
Indonesia:
- Energy Efficient Refrigerants to Cold Chain Industry
- Energy Saving for Air-Conditioning and Process Cooling at Textile Factory
- Energy Savings at Convenience Stores
- Mega-Solar Power Plants Using Thin-Film Solar Cells
- Optimum Control of Plant Equipment
- Wind-Power Generation
- Energy-saving stores based on CO2 refrigerant
- Forest conservation measures (REDD+)
- Anaerobic treatment for wastewater from rubber plants
- Solar power system at off-grid cell towers
- Improvement of REDD+ implementation using IC technology

4.(1) New Financial Support Program for the International Deployment of Low-Carbon Technologies ～Achieving "Leapfrog" Development in Developing Countries～

Japan helps developing countries in Asia Pacific region "Leapfrog" toward Low-Carbon Societies by Japanese advanced low-carbon technologies .

Basic Concept

- Creation of " Low Carbon Societies" by de-carbonizing social infrastructure (water supply and sewerage, waste to energy plant, etc.) in developing countries.
- Large-scale deployment of Japanese advanced low-carbon technologies
- Transfer technologies, know-how and social systems as a p



Approach

★ **Deploying Japan's advanced low-carbon technologies in Asia-Pacific region, in cooperation with development assistance agencies including JICA and ADB.**

★ **Establishing the "Joint Crediting Mechanism (JCM)" which provides win-win solution for developing countries and Japan.**

[Support for Initial Costs]

－New Financial support for "Leapfrog" development

[Support for establishing the JCM Framework / Creating the JCM projects]

－Promoting JCM Feasibility Studies and Capacity Building

4. (2) Financing Programme for JCM Model Projects

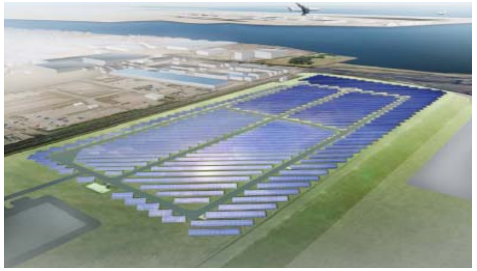
The budget for FY 2013:
1.2 billion JPY (approximately ***$13 million****)*

MOE Japan

Finance part of an investment cost (**up to the half**)

Conducting MRV and seeking to deliver JCM credits

International consortiums which include Japanese entities



- Scope of the financing: Facilities which reduce CO_2 from fossil fuel combustion as well as construction cost for installing those facilities, etc.
- Eligible Projects : Starting construction after the adaption of the financing, and finish construction within that year (one year extension may be approved).

4. (3) New Support Program Enabling "Leapfrog" Development (Fund)

Background and Purpose

By utilizing the superior and advanced low-carbon technologies, Japan assists the developing countries to enable to "Leapfrog" development and let the developing countries achieve the "Harmony with Nature, Low Carbon and Sound Material Cycle" Society" as the new paradigm suit to 21th Century in Asia Pacific Area

Description

Establishing the fund to finance the projects which has the better efficiency of reducing GHG from the ones supported by JICA and other national organizations.
Due to this finance scheme, the expansion of superior and advanced low-carbon technologies in Japan could be done. By building the low carbon society as the whole city wise and area wise in the wider fields, acquiring Credit by JCM .

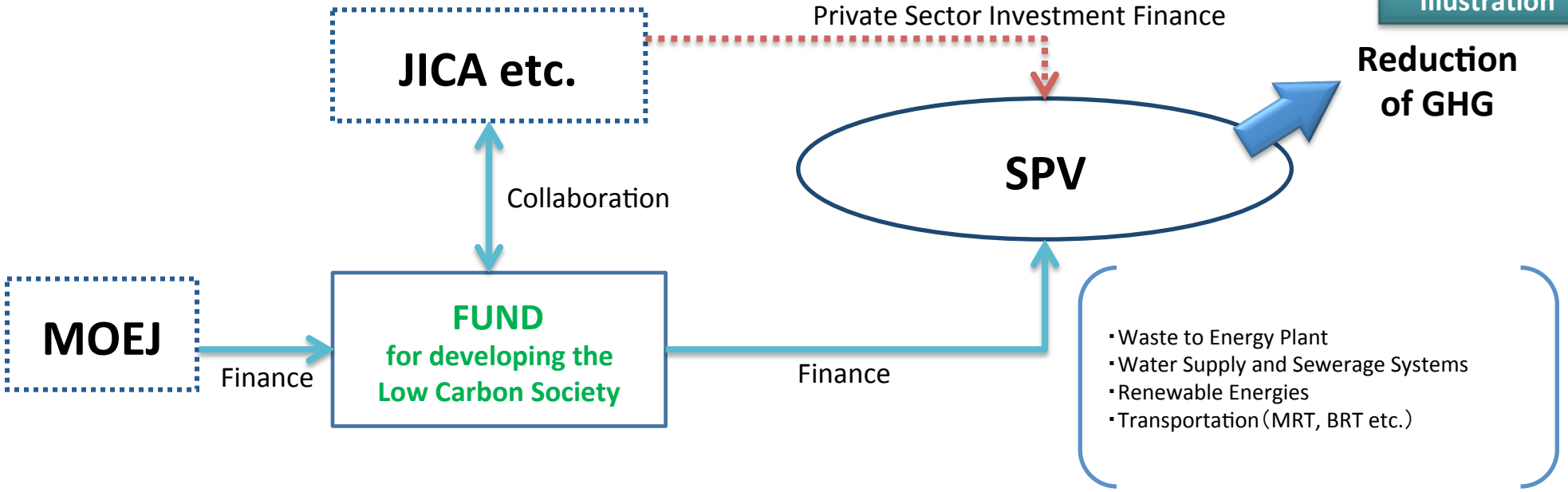
Scheme

（1）Financing from MOEJ to SPV (Special Purpose Vehicle)
（2）Project Period：2014 to 2020

Effectiveness

- Contribution to acquire the Credit by JCM as well as reducing the GHG in the developing countries.
- Expanding the superior and advanced low-carbon technologies in Japan to Asia and Pacific.

Illustration



4. (4) New Support Program Enabling "Leapfrog" Development (ADB)

Background and Purpose

By utilizing the superior and advanced low-carbon technologies, Japan assists the developing countries to enable to "Leapfrog" development and let the developing countries achieve the "Harmony with Nature, Low Carbon and Sound Material Cycle" Society" as the new paradigm suit to 21th Century in Asia Pacific Area

Scheme

Fund to ADB
Project Period：2014 to 2020

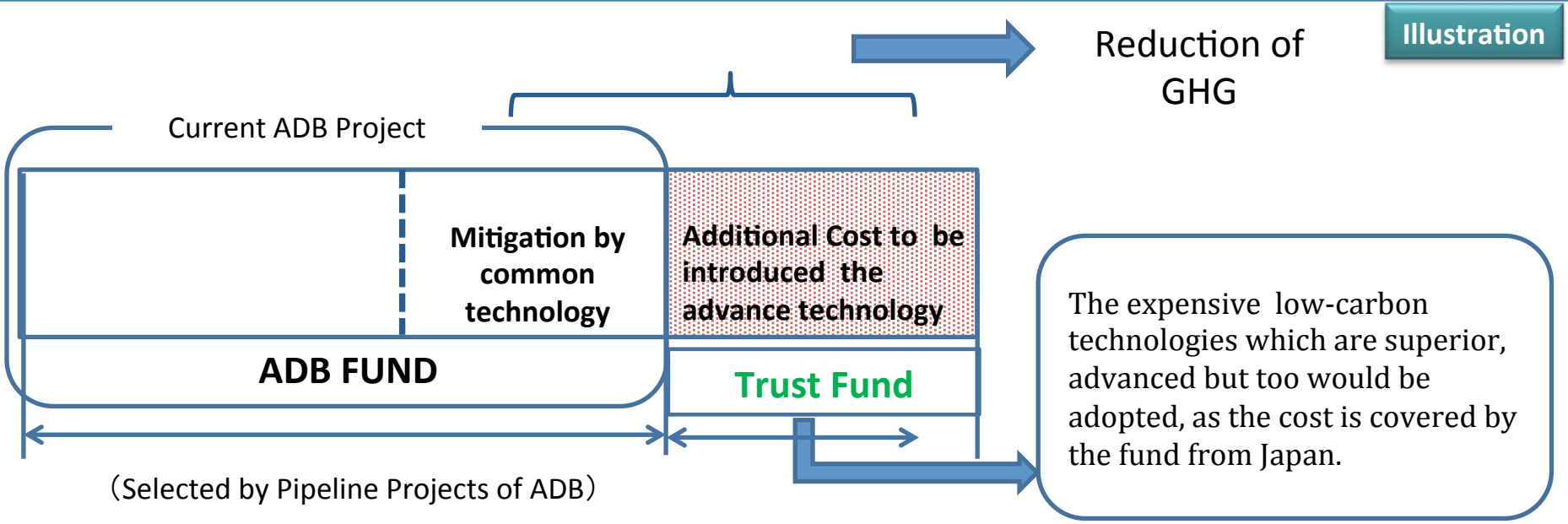
Description

The expensive low-carbon technologies which are superior, advanced but too would be adopted, as the cost is covered by the fund from Japan. Due to this finance scheme, the assistances to developing countries by ADB lead to the "Leapfrog" developments and Japan acquires Credit by JCM .

Effectiveness

- Contribution to acquire the Credit by JCM as well as reducing the GHG in the developing countries.
- Expanding the superior and advanced low-carbon technologies in Japan to Asia and Pacific.

Illustration



（Selected by Pipeline Projects of ADB）

Reference：http://www.env.go.jp/guide/budget/h26/h26-gaiyo/034.pdf

5.(1) Realizing Environmentally Sustainable Cities by "Leapfrog"

Areas which need more support

Community development

Smart city

Basic Infrastructure

Biomass

Offshore wind

ICT(VICS,ETC)

Power system

Smart Infrastructure

LRT

Green building

Green housing

Life Infrastructure

Water supply

Sewage system

Waste management

Life service and Life Style

Demand response

Cool Biz

MOTTAINAI

Proposing package of low carbon technology and Know-how possessed by Japan

(出典: ｱｽﾋﾞﾙ、川崎重工業、清水建設、日建設計、三井不動産、三井ﾎｰﾑ)

5.(2) Waste to Energy (WTE)

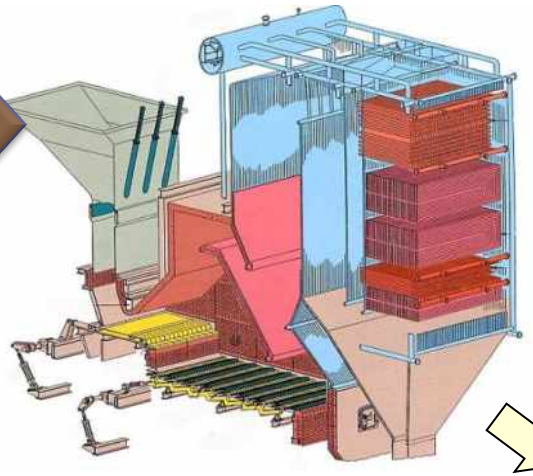

MSW


RDF


Ash


Medical Waste

Stoker Furnace



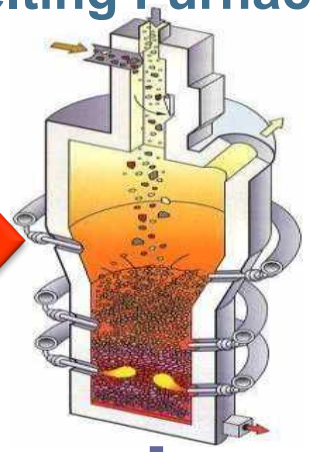
Main Ash Fly Ash

- Minimum emission
- 85% Volume Reduction
- Extension of lifetime of Final Disposal Site

Waste to Heat Recovery

Power Generation

Gasifying and Direct Melting Furnace



WTE Plant 330 t/d

Power generation 6.7 MW

CO_2 reduction 20,000 t / y

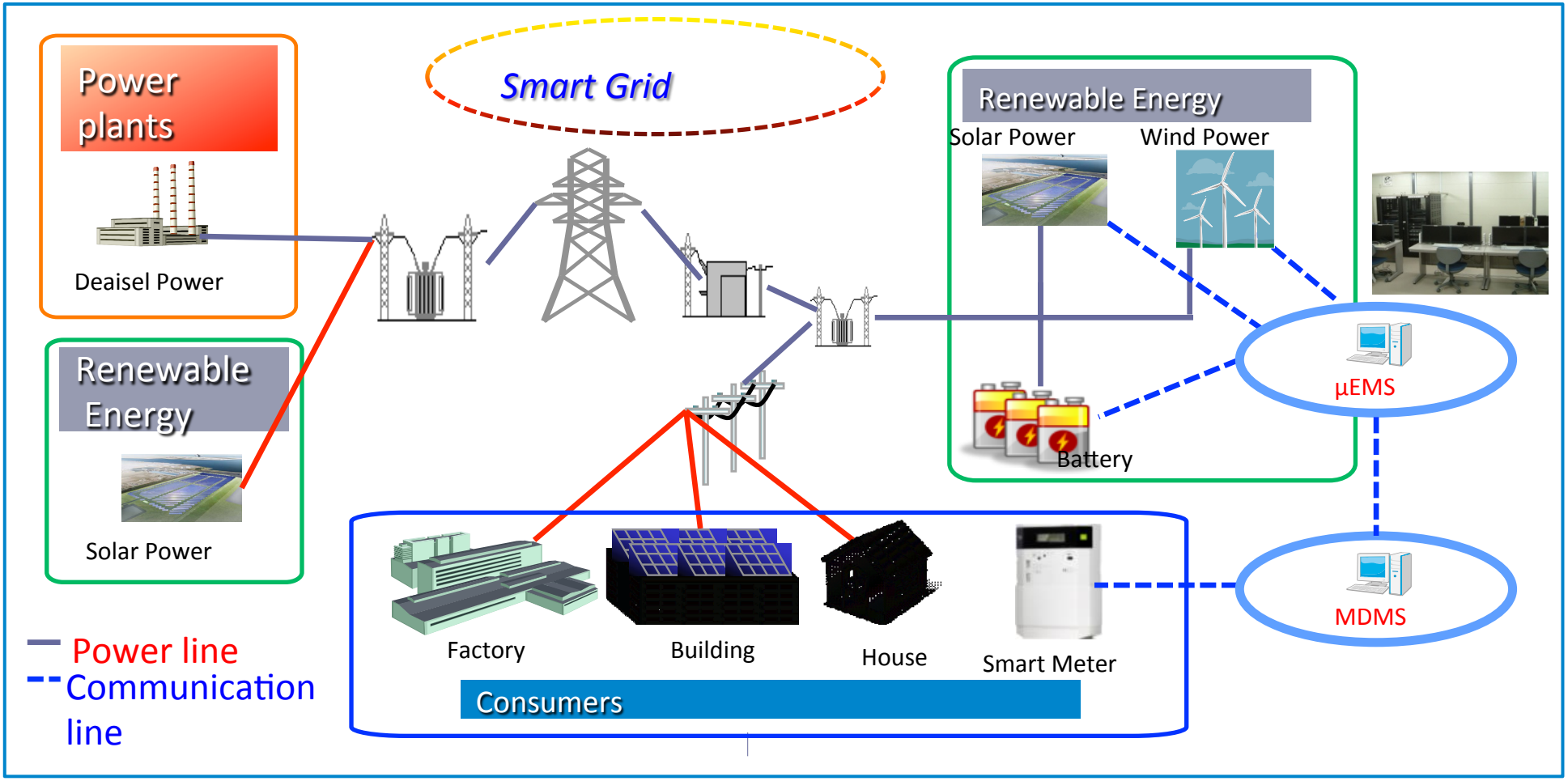
Slag Metal

Recycle

Back-filling material
Counter weight
etc

3R circle

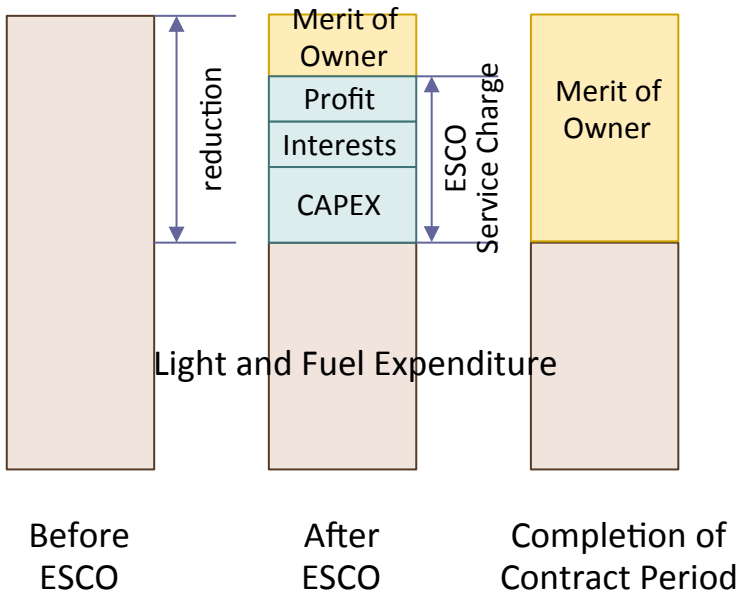
5.(3) Smart Grid (RE+Battery+EMS)



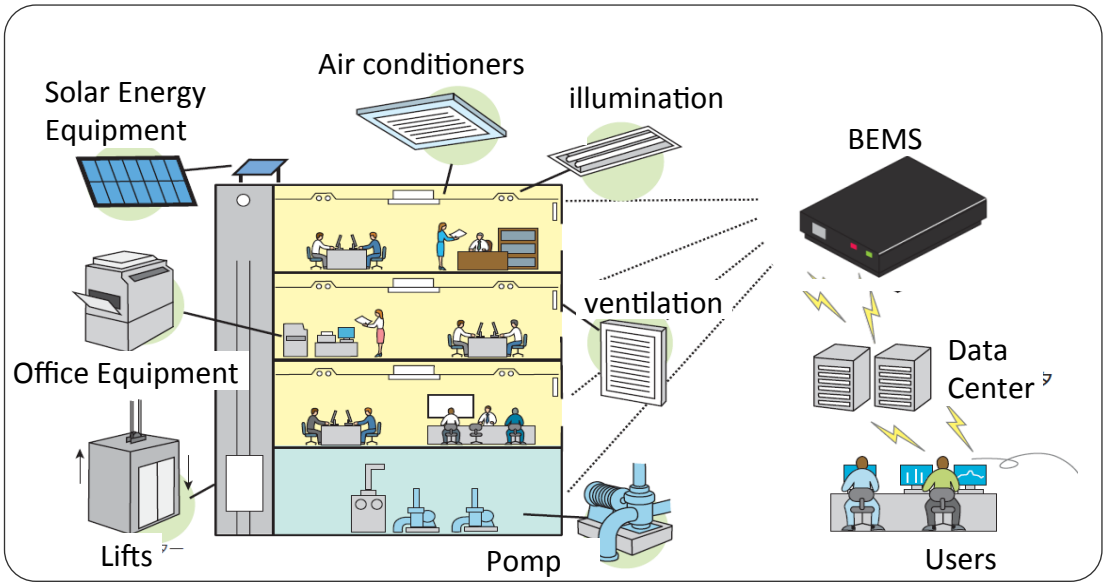
Micro Energy Management System (µEMS) is used to stabilize and suppress power fluctuation from Renewable energy source by utilizing Battery Charged Discharged function.

5. (4) ESCO (Energy Service Company) Business

- No initial cost for building owners
- Cost for Installation of Energy Saving Technologies is paid by ESCO company
- ESCO company will get a part of energy saving benefits
- Market size of ESCO: US$ 9 billion(China), US$ 400 M(Japan), US$ 70 M (Thailand).
- ESCO are NOT familiar in the developing countries in Asia yet.

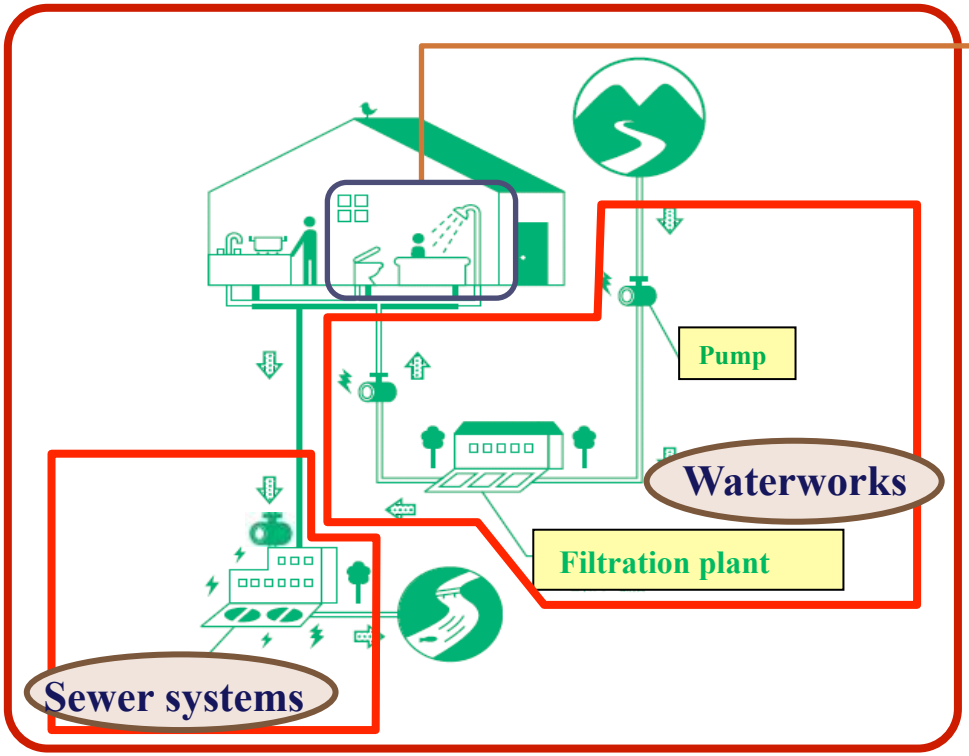


<Business Model of ESCO>



Reduction of Energy Consumption and CO2

5. (5) Water Saving (The relation of water and CO2)



Water supply/Sewer System requires a large amount of energy.

With 1m^3 water saved...
0.59kg-CO_2 reduction
is possible.(example in Japan)

For Bathroom

Toilet

6L(full)
5L(half) per Flush

20～40% DOWN

3.8～4.8L(full)
3.0～3.6L(half) per Flush

Hand Shower

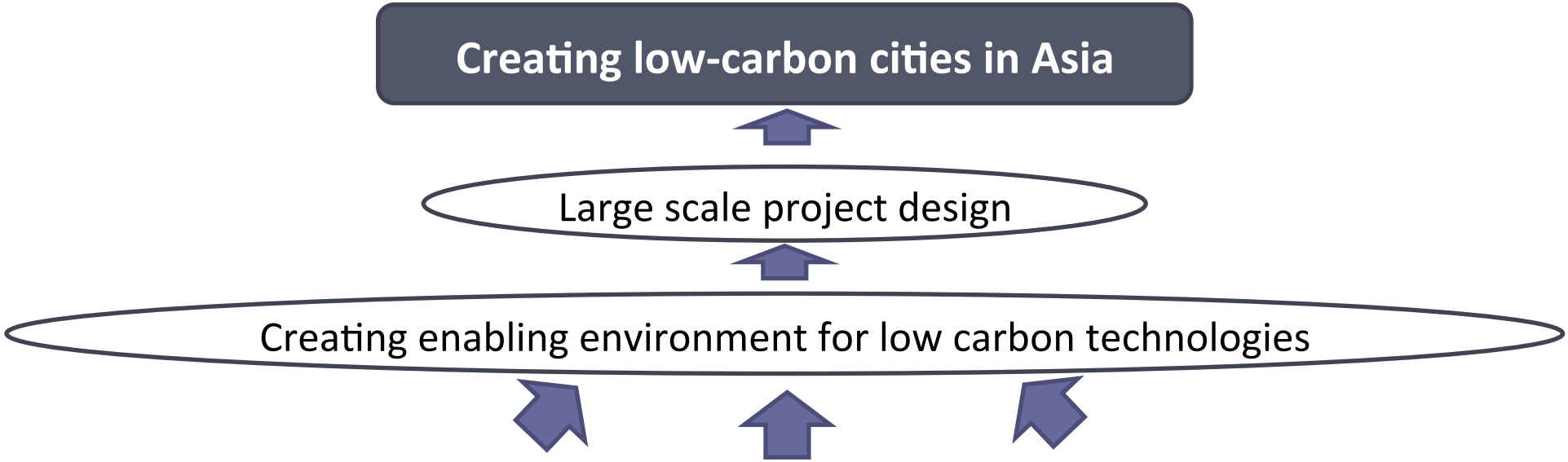
Water Flow:10L/min

35% DOWN

Water Flow:6.5L/min

Spread of water-saving equipment lead to the reduction of CO_2 emissions

3 Platforms to Support Leapfrog Development



Business platform

- One stop service to support business
- Sharing information incl. local regulations, needs
- Matching partnership among companies

Local government platform

- Promotion of city-to-city environment cooperation
- Support for Japanese companies to disseminate low carbon technologies

Research platform

- Support for cooperation between researchers and policymaker
- Support for low carbon plan in countries/cities
- Promotion of joint research

http://lowcarbon-asia.org/english/

6. What is expected to 3E Nexus ?

- Help realizing leapfrog to low-carbon societies in terms of implementation by
  - raising awareness of central/local government and local businesses on JCM and advanced technologies
  - Identifying local needs and matching with advanced technologies in order to realize co-benefits
  - assisting Japanese businesses to develop JCM projects
  - creating enabling environment for advanced technologies

Thank you!

Please find more info on JCM at

http://www.mmechanisms.org

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