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# JCM/BOCM, MRV, and Technology Transfer

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# Background

## JCM/BOCM:

- Joint Crediting Mechanism/Bilateral Offset Credit Mechanism
- Proposed by Japanese Government
- GEC has been the Secretariat of MOEJ's JCM/BOCM and CDM/JI feasibility studies since 1999



## Scheme of JCM/BOCM



 Promotes low-carbon technology transfer to developing countries
 Contributes to achieving NAMAs by realizing concrete emission reduction projects with simple MRV of emission reduction

- Can be an effective way to achieve Japan's post 2012 targets, complementing the existing Kyoto Mechanism

### Schedule on JCM/BOCM



Slide 12 of "Outline of The Bilateral Offset Credit Mechanism (tentative name)" by Gov. of Japan (August 2012)

## MRV DS and JCM/BOCM FS FY2012

- 10 DSs and 11 FSs in 12 countries (32 FS in FY2010-2011)
- Developing streamlined MRV methodologies for JCM/BOCM projects/activities in each study, that should:
  - Be simplified, objective and practical, while lowering uncertainty and ensuring environmental integrity
  - Accelerate the deployment of low-carbon technologies, products and services, taking into account the national circumstances in host countries
  - Facilitate the NAMAs in host countries
- Holding consultative meetings on the studies with host countries' governments and relevant organizations
  - 5 countries including Viet Nam (on Nov. 9<sup>th</sup>) in FY2012
  - 3 countries in FY2011

### MRV Demonstration Studies using Model Projects & JCM/BOCM Feasibility Studies in FY2012

#### Mongolia:

- Geo-Thermal Heat Pump for Heating
- High-Efficient Heat Only Boilers (HOBs)

#### India:

Bagasse-based Power Generation
 w/ Waste Heat Utilization

#### Moldova:

 Biomass Boiler Heating using Agricultural Waste as Fuel

#### Sri Lanka:

 Biomass-based Thermal Energy Generation

#### Lao PDR:

- Efficient Buses and Provision of Good Services
- Mechanical Biological Treatment (MBT) of MSW,/Landfill Gas (LFG) Capture, Flaring and Utilization

#### Indonesia:

- Solar-Diesel Hybrid Power Generation to Stabilize PV Power Generation
- Prevention of Peat Degradation through Groundwater Management and Rice Husk-based Power Generation
- REDD+ for Conservation of Peat Swamp Forest, and Biomass-based Power Generation using Timber Mill Waste to Process Indigenous Trees derived from Conserved Forest

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- Bagasse-based Cogen. at Sugar Mill
- Construction of MRT System
- Energy Savings through BEMS
- Waste Heat Recovery System w/ Cogen.
- Electronic Gate to Int.Trade Port to Improve Port-related Traffic Jam

#### Viet Nam

- Integrated EE Project at Beer Factory
- Biogas-based Cogen. w/ Digestion of Methane from Food/Beverage Factory Wastewater
- Improvement of Vehicle Fuel Efficiency through Introduction of Eco-Drive Management System
- REDD+ through Forest Mgmt and Biomass-based Power Gen. using Tradaula based Weath
- Timber Industry Waste
- Viet Nam, and Indonesia

♦ MRT System

#### Cambodia:

- Methane Recovery and Utilization from Livestock Manure using Bio-digesters
- Small-scale Biomass Power Generation w/ Stirling Engine
- REDD+ in Tropical Lowland Forest

# EE= Energy Efficiency MRT= Mass Rapid Transit Mexico: Small-scale Wind Power Generation with Remote Monitoring System

-- MRV Demonstration

**◇**-- BOCM Feasibility

Study (DS)

Study (FS)

Colombia: Ceothermal Power Generation under Suppressed Demand



## **DS and FS in Viet Nam**

FY	Title	Category
2012	Integrated EE Project at Beer Factory	Energy Efficiency
	Improvement of Vehicle Fuel Efficiency through Introduction of Eco- Drive Management System	Transportation
	MRT System	
	Biogas-based Cogen. w/ Digestion of Methane from Food/Beverage Factory Wastewater	Waste Management
2011-2012	REDD+ through Forest Mgmt and Biomass-based Power Gen. using Timber Industry Waste	REDD+

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# **JCM/BOCM Methodology**

### Key Features of the methodology formats

- The methodology formats should be designed, so that project proponents can use them easily, verifiers can verify the data easily, and calculation logic is disclosed transparently
- In order to reduce monitoring burden, default values should be widely used in conservative manner

Eligibility	A "check list' will allow easy determination of eligibility of a proposed project under the mechanism and applicability of methodologies to the project.
Method	Flow chart will guide project proponents to the most appropriate calculation method for the proposed project.
Data	<ul> <li>List of required parameters will inform project proponents of what data is necessary to calculate GHG emission.</li> <li>Default values for specific country and sector are provided beforehand.</li> </ul>
Calculation	Premade spread sheets will help calculate GHG emission reductions/removals automatically by inputting required parameters, in accordance with methodologies.

#### MRV Demonstration Study using Model Project

Outline of GHG Mitigation Activity

#### Integrated Energy Efficiency Improvement at Beer Factory

#### Integrated energy-saving and renewable energy systems are introduced to the energy-intensive manufacturing processes of breweries in Vietnam, to substantially reduce energy consumptions and GHG emissions. **Employed technologies** Beer manufacturing process (1) Vapor recompression (1) system (VRC) Cascade cooling system (2)**Biogas recovery boiler** (3)(4) Heat pump pasteurizer (4) Fermentation Filtration Preparation Brewing Packaging Site of MRV Model Project Draft Simple MRV Methodology GHG emission reductions are evaluated based on Thanh Hoa City, Thanh Hoa Province specific energy consumption. By setting default values, only energy consumptions and production amount under the project/activity scenario are necessary to be monitored. Calculation for GHG emission reduction amount $ER_{,v} = (AEM_{RR,v} - AEM_{PJ,v}) \times PO_{v}$ $\mathsf{ER}_{,\mathsf{y}}$ GHG emission reduction amount (tCO<sub>2</sub>/vear) $AEM_{RR,y}$ Specific GHG emissions of Reference **Expected GHG Reductions** Scenario (tCO2 /HL) [to be defaulted] AEM<sub>pi,v</sub> Specific GHG emissions of Project Scenario 7,500 tCO<sub>2</sub>/year (for the model project) $(t-CO_2/HL)$ 150,000 tCO<sub>2</sub>/year (potential in entire Vietnam) Pov Annual beer production volume (HL/year)

#### FS Entity: Recycle One

Thanh Hoa Brewery as the pilot project, located at

#### Improvement of Vehicle Fuel Efficiency through Introduction of Eco-Drive Management System FS Entity: Almec

#### Outline of GHG Mitigation Activity

Eco-drive Management System (EMS), which is developed in Japan as application software for smartphone, will be introduced to taxies running in Hanoi. At the same time, the eco-drive training is provided to the taxi drivers: Japanese skilled instructors give lectures with the reference to the analysis results based on EMS driving data, for the Hanoi taxi drivers to learn the eco-driving technique. As a result, fuel consumption will reduce due to the improvement of fuel efficiency through drivers' eco-drive practices.



#### **Draft Simple MRV Methodology**

In principle, CO2 emissions can be calculated through the multiplication of fuel consumptions, travel distance, and fuel emission factor (specific to fuel type).

Fuel efficiency is the most important parameter to be monitored, which can be read from data recorded automatically in EMS during project/activity implementation period. The pre-project fuel efficiency (under the reference scenario) should be set based on actual fuel efficiency data at least for past 1 year. If fuel efficiency data for past 1-year are not available, actual data should be monitored after the installation of EMS equipment.

#### **Expected GHG Reductions**

[GHG Reductions] = [difference of fuel efficencies between pre- and post-project] x [driving distance] x [fuel CO2 emission factor]

In case 1,000 taxis improve fuel efficiency by 10%, **1,000tCO2/yr of GHG reductions are expected**. It is equivalent to 438kl of fuel consumption reduction in a year.

#### **BOCM Feasibility Study (FS)**

#### Host Country: Viet Nam and Indonesia

Promotion of Modal Shift from Road-based Transport to Mass Rapid Transit (MRT) System FS Entity: Mitsubishi Research Institute

#### Outline of GHG Mitigation Activity

Mass Rapid Transit (MRT) systems are planned to be introduced in 3 cities; Hanoi, Ho Chi Minh City, and Jakarta. The MRT systems will lead to the modal shift from the current road-oriented transport

to rail-based mass public transport in the mega cities to reduce GHG emissions.





#### **Draft Simple MRV Methodology**



When the project boundary is limited to only MRT transportation, the monitoring burden would be avoided, however the emission reduction effect would be also deducted.

Under this simpler methodology, the monitoring items are limited to the numbers of and the travel distance of passengers, which can be recorded through IC-card based ticketing system. CO<sub>2</sub> emission factor (unit: tCO<sub>2</sub>/PKM) will be defaulted for each traffic mode.

If the project boundary is expanded to the inclusion of access/egress traffic, the GHG reductions would increase – but the monitoring practice gets burdensome. GHG emission reductions are expected to be as shown in the right figure including only traffic volume on MRT.

#### Sites and GHG Reductions

Projects	Expected GHG reductions
Hanoi Line#1	Approx. 114,000 tCO <sub>2</sub> /year
Hanoi Line#2	Approx. 105,000 tCO <sub>2</sub> /year
HCMC Line#1	Approx. 114,000 tCO2/year
Jakarta N-S Line	Approx. 116,000 tCO2/year
Hanoi + Hue Da Nan Oui Nhon Hô Chi Mini	
is and the second	North-South
Jakarta	Market Starkets Market

#### **BOCM Feasibility Study (FS)**

#### Host Country: Viet Nam

Biogas-based Cogeneration with Digestion of Methane from Food/Beverage Factory Wastewater FS Entity: Tepia Corporation Japan

#### **Outline of GHG Mitigation Activity**

To treat highly concentrated organic wastewater discharged from food-processing plants (breweries and tapioca plants), utilizing UASB reactor.

To generate electricity and hot water from biogas occurred in the process, using biogas cogeneration system. This will be replacing the considerable amount of fossil fuel and grid power consumed in the plants, and lead to GHG reductions.



#### Draft Simple MRV Methodology

In this MRV methodology, GHG emission reductions are to be calculated using calorific values and CO<sub>2</sub> emission factors of both baseline fossil fuel and grid power, applying specs (power generation efficiency and hot water recovery efficiency).

The amount of methane emitted from waste water treatment (anaerobic lagoon) is to be calculated, applying CDM methodology [AMSIII.H].

#### **Sites of GHG Mitigation Activity**



#### Expected GHG Reductions

3.9m t-CO<sub>2</sub> in 10 years (from 2012 to 2021)

- a. Targeting food processing plants whose displacement is over 1,000 m<sup>3</sup> per day.
- b. Annual GHG reduction is 39k t-CO<sub>2</sub>/y per plant.
- c. The project is to be implemented at 10 plants every year for the next 10 years – 100 plants altogether.

#### **BOCM Feasibility Study (FS)**

## REDD+ through Forest Management Scheme, and Biomass-based Power Generationusing Timber Industry WasteFS Entity:Sumitomo Forestry Co., Ltd.

#### **Outline of GHG Mitigation Activity**

Carry out development of community forests and production forests for the purpose of timber sales to outside parties, as well as regeneration of reserve forests through low-cost methods such as natural regeneration. Additionally provide guidance on sustainable agriculture methods to replace slash-andburn techniques. Through this establishment of agricultural and forestry business, reduce pressure on existing natural forest, and quantify the resulting increase in carbon accumulation by plantations in order to estimate the reduction in GHG emissions.In the future, timber processing businesses will be attracted to manufacture high value-added timber products, and biomass power generation will be undertaken to supply electricity otherwise provided through thermal



#### Sites of GHG Mitigation Activity

FS will be carried out in Dien Bien province, Northwest region of Vietnam.



Na Tau/Na Nhan commune Poor forest and denuded land

Production forest for local imber use / Commercial production forest / forestation for watershed protection

#### Muong Phang commune

city Forest conservation / Forest enrichment / Expanding watershed protection forest

#### **Draft Simple MRV Methodology**

Establish new MRV methodology

- REDD+: based on existing MRV methods, such as VCS and J-VER
- Biomass power generation: based on existing approved CDM methodologies

#### **Expected GHG Reductions**

Forest management :  $1.3 \text{ mil } \text{t-CO}_2$  and Biomass utilization :  $1.6 \text{ mil } \text{t-CO}_2$  for 20 years 13