MOEJ/GEC
MRV Demonstration Study & Feasibility Study Programme on GHG Mitigation Projects in 2012

~ for CDM and New Mechanism ~

Ministry of the Environment, Japan

Global Environment Centre Foundation

November 2012

MOEJ/GEC MRV Demonstration Study & Feasibility Study Programme on GHG Mitigation Projects in 2012

- For CDM and New Mechanism -

Ministry of the Environment, Japan (MOEJ)

Global Environment Centre Foundation (GEC)

November 2012

Table of Contents

23 CDM Feasibility Studies (FS) in 2012

Introduction

The Ministry of the Environment, Japan (MOEJ) and Global Environment Centre Foundation (GEC) launched "Feasibility Study (FS) Programme on New Mechanisms" in 2010, in order to solicit GHG mitigation projects/activities supposed to be implemented under the New Mechanisms in the post-2012 framework. This Programme is the succeeding programme of CDM/JI Feasibility Study Programme that started in 1999.

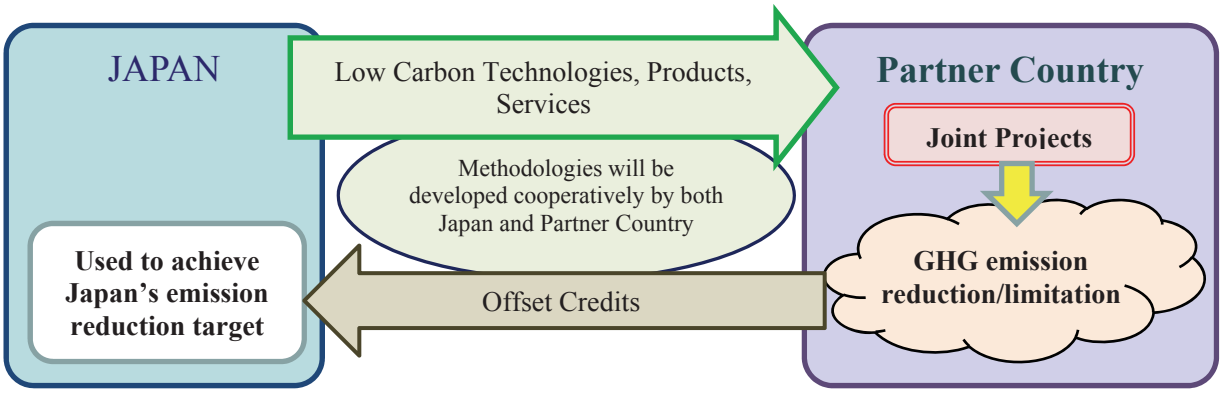
In FY2011, the MOEJ and GEC undertook the New Mechanism FS Programme to investigate the feasibility of Bilateral Offset Credit Mechanism (BOCM) project/activities and how to measure, report and verify (MRV) the GHG emission reduction effects of the BOCM projects/activities. Through the studies in FY2011 it became clear that specific MRV methodologies for GHG emission reduction effects of the projects/activities are necessary, and that such methodologies and BOCM scheme should be streamlined in the comparison of the CDM's for the scheme's practicality.

In this context, in FY2012, the studies under the MOEJ/GEC Programme focuses on the development of the MRV methodologies applicable to BOCM projects/activities. Namely, a new category of "MRV Demonstration Studies (DS) using Model Projects" is introduced to create workable MRV methodologies. The MOEJ/GEC Programme in FY2012 includes: 1) MRV DS, 2) BOCM FS, and 3) CDM FS. Following brief introduction of the BOCM, and each category of studies is explained below.

Bilateral Offset Credit Mechanism (BOCM)

The BOCM is a new mechanism to promote the transfer of advanced low-carbon technologies, products and services from Japan to developing countries in order to achieve net reductions of global GHG emissions. The major purposes of the BOCM are:

- To contribute to the ultimate objective of the UNFCCC through promotion of mitigation activities globally.
- To facilitate the bilateral cooperation in the field of climate change in such a way that best suits each country's national circumstances.
- To contribute to the sustainable development of developing countries.
- To appropriately evaluate the contribution to GHG emission reductions or removals.
- To facilitate diffusion of low carbon technologies, products and services and enhance capabilities to utilise them.



The BOCM should be an approach to complement the existing mechanisms, such as the CDM, and lead to the global net reduction of GHG emissions, through the promotion of the application of advanced low carbon technologies, products, and services.

MRV DS using Model Projects

Recognizing the challenges that the CDM projects tend to stop due to the lack of capacity and financial resources for monitoring activities, the MOEJ/GEC newly started the programme of MRV Demonstration Studies (DS) using existing GHG mitigation projects/activities under operation (model projects). The main purpose of the MRV DS is to develop a MRV methodology, which is easy-to-use and simple, and to investigate the feasibility of MRV process (including monitoring) in host countries. (See next section for more details about the MRV methodology.)

For the BOCM scheme design and establishment, ensuring the realistic and reasonable implementation and operation of projects/activities is important. Hence, the MRV DS is considered as the most important initiative at the schematic design phase.

BOCM FS

In order to increase the variety of MRV methodologies for the early operationalisation of the BOCM scheme, the MOEJ/GEC continues to solicit the BOCM FS. The BOCM FS is aimed at investigating the feasibility of the proposed projects/activities, as well as developing draft MRV methodologies applicable to the proposed projects/activities under the BOCM.

Based on the concrete project idea, the FS investigate the local situation, including the availability of various data, which should be the foundation for the development of the MRV methodology.

CDM FS

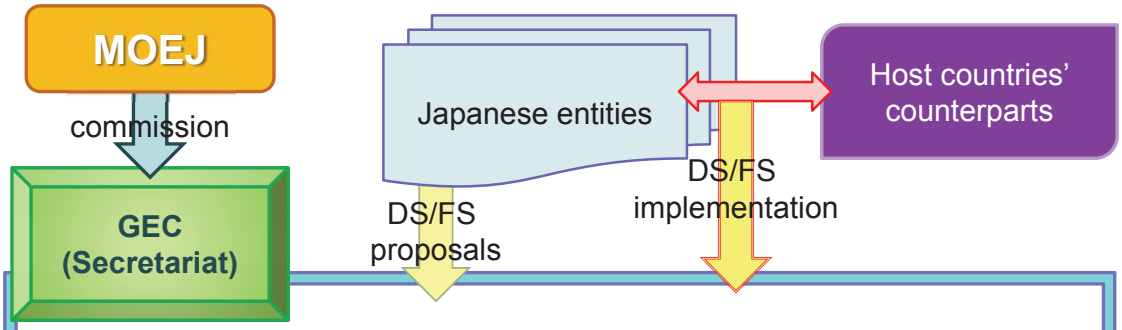
The MOEJ and GEC solicit FS on CDM projects which can contribute to the improvement of the uneven regional distribution. Under this category, only the proposed projects in countries with less than 10 registered CDM projects are eligible to submit proposals. This initiative helps contribute to the UNFCCC and its parties' efforts for the equitable regional distribution of CDM projects.

Since the CDM continues to take an important role for the future, the accumulation of experiences and know-how in the underrepresented host countries is vital. From this point of view, our initiative of CDM FS is helpful for the further development of the CDM scheme.

For more information (including DS/FS reports and draft MRV methodologies to be made publicly available in March 2013), please visit GEC website: **http://gec.jp/**

Global Environment Centre Foundation

Overview of BOCM DS/FS Programme



- Invite public proposals on DS/FS from Japanese entities (private companies and NGO/NPOs)
- Select the proposals to be officially adopted as qualified DS/FS (funded to implement studies)
- Provide advice and supervision to the qualified DS/FS
  - Through an expert committee and task force teams
- Consult with host countries to promote cooperative relationships
  - Through meetings with host countries' governments and stakeholders
- Outreach the DS/FS results
  - Through GEC website, UNFCCC Side Events, etc.

Global Environment Centre Foundation

Purposes of BOCM DS/FS

- To develop MRV methodologies applicable to BOCM projects/activities:
  - Eligibility criteria (positive list)
  - Minimized monitoring items and frequencies
    - As many default values and/or specific fixed values as possible should be found and set.
    - The default values should lead to conservative calculation results.

  → Actual monitoring activity is practically workable for a project/activity owner in a developing country.
  - Quantifications of reference emissions, project/activity emissions, leakage emissions (if any), and emission reduction effects

  ➔ ***BOCM MRV Methodology equips Spreadsheet with automatic calculation functions, which easily show the ER calculation results.***

- [DS] – To demonstrate the MRV process would be complete:
  - Based on existing project/activity
  - Through the practice of MRV process, with the application of abovementioned BOCM MRV methodology
  - Actual **M**onitoring activity → Creation of monitoring **R**eports → **V**erification by a third-party verifier (in the host country)

General Concept of MRV methodology for BOCM project/activity

The BOCM is considered to adopt the simplified monitoring process by using the MRV methodology with as many default values as possible. Many parameters are necessary to be identified in a quantitative manner to quantify GHG emissions on the reference scenario as well as on the project/activity scenario, but it is burdensome for project participants in host countries. Too much burden the project participants bear often halt the implementation of GHG mitigation projects, which gives a negative impact to global climate change mitigation. On the other hand, GHG reduction effect occurred in developing countries must be strictly evaluated, in particular, in the case that such GHG reduction effect is used to offset GHG emissions in developed countries.

The most important thing is to promote GHG reduction projects for the global climate change mitigation. In this context, the burdens for project implementation and monitoring activity should be eased, and at the same time, the calculation method should be conservative to ensure environmental integrity. In the BOCM MRV methodologies, such concept is to be materialised with preset default values applying to some parameters.

Another important aspect is to ensure the additional GHG reduction by the implementation of the GHG reduction projects. Under the CDM, the concept of "additionality" is crystalised, which sometimes leads to the difficult situations; some project owners cannot demonstrate financial "additionality" based on the indications provided by designated operational entities and/or CDM Executive Board, then some projects are rejected for registration as eligible CDM projects. Building upon the lessons learnt from the "additionality" demonstration process of the CDM, the BOCM is intended to avoid imposing the obligation to demonstrate the "additionality" of the proposed project on project participants. An alternative method which the BOCM would take is that the eligibility criteria in a MRV methodology applicable to a proposed project should be set to secure the additional GHG emission reductions due to the implementation of the proposed project. The possible options could be a positive list and/or the use of a benchmark (or benchmarks), which can demonstrate the proposed project (or the technology adopted by the proposed project) cannot be implemented/introduced in the absence of the BOCM scheme. Therefore, the eligibility criteria would involve a kind of technology "additionality" clause, which indicates highly advanced level.

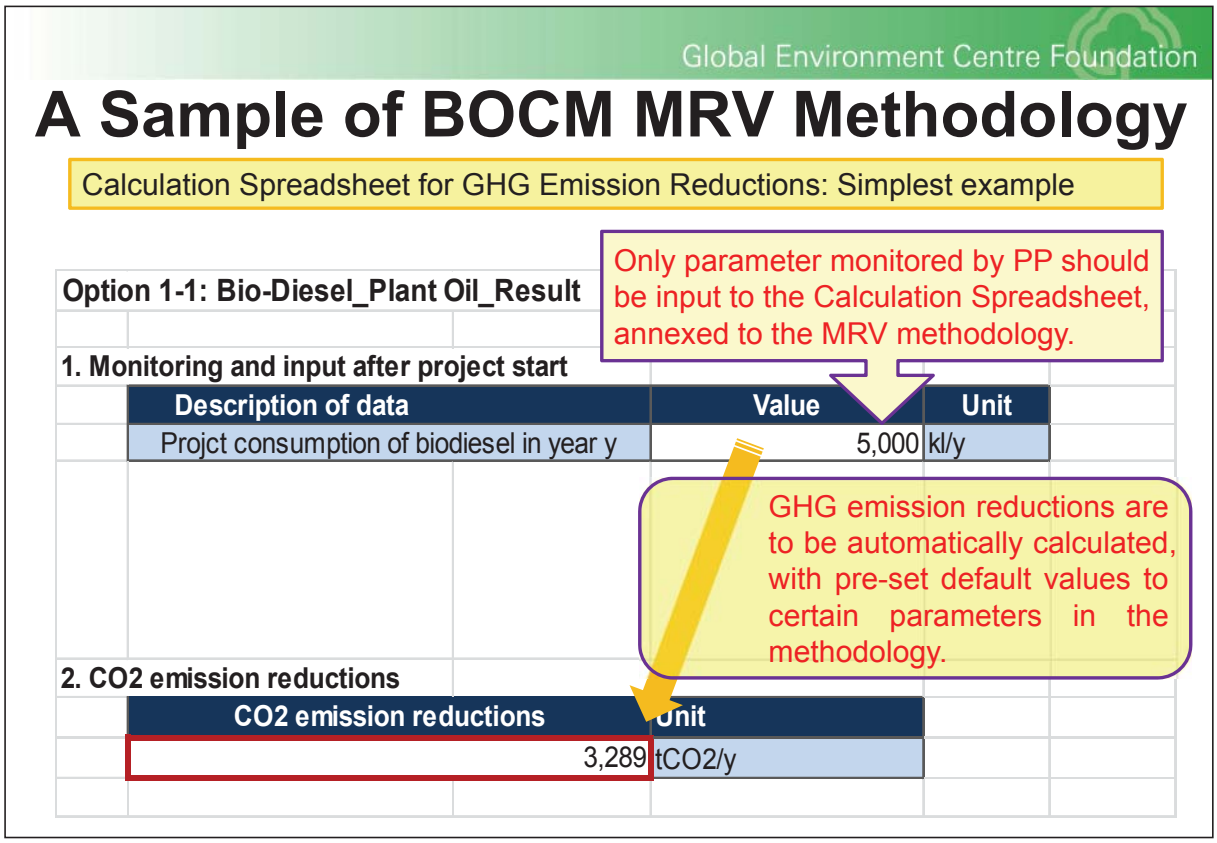
The tentative sections described in a BOCM MRV methodology is follows:

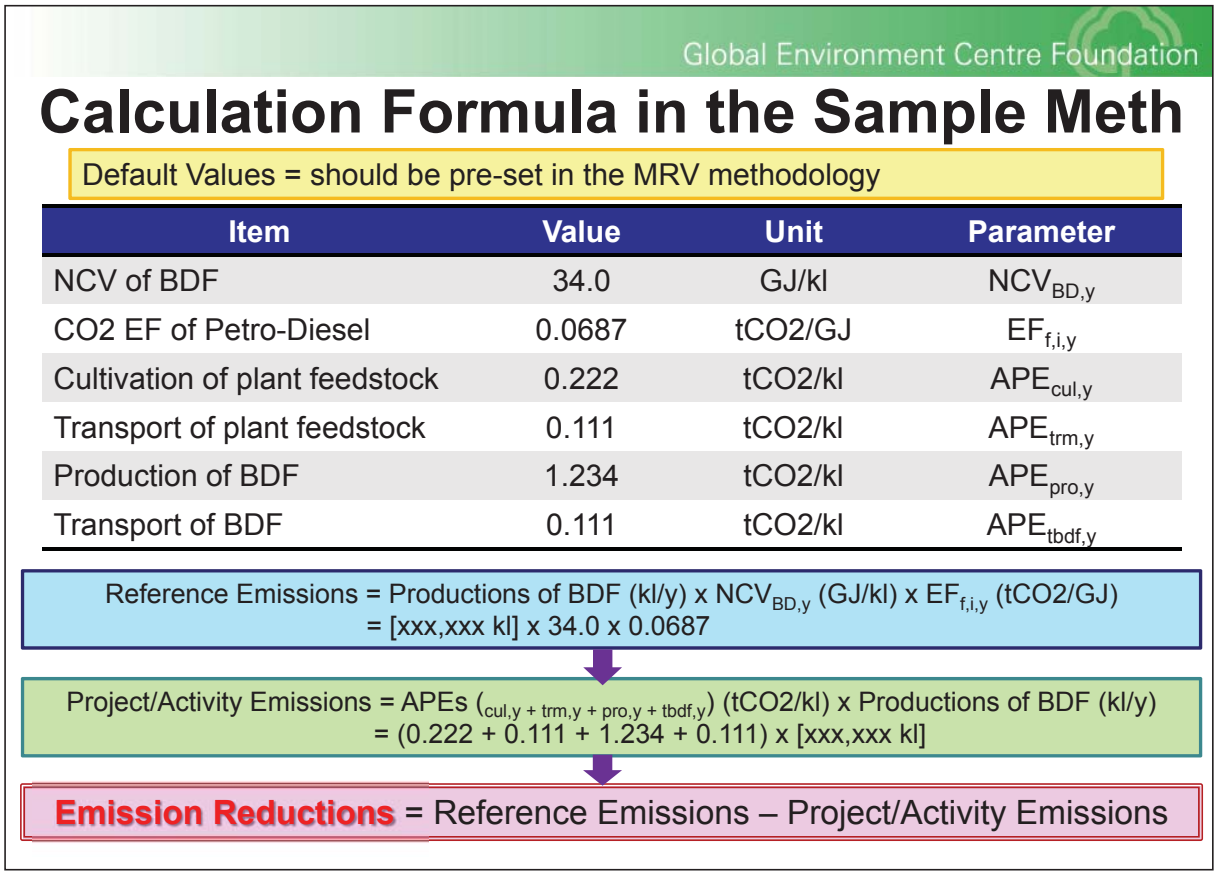
1. Title of Methodology
2. Summary of the Methodology for the Project
3. Eligibility Criteria
4. Selecting a Calculation Method
5. Necessary Data for Calculation
6. Terms and Definitions
7. Project Boundaries
8. Reference Scenario
9. Reference Emissions and Calculation
10. Project Emissions and Calculation
11. Leakage emissions and Calculation
12. Calculating Emission Reductions

Annex: Information on the calculation tool

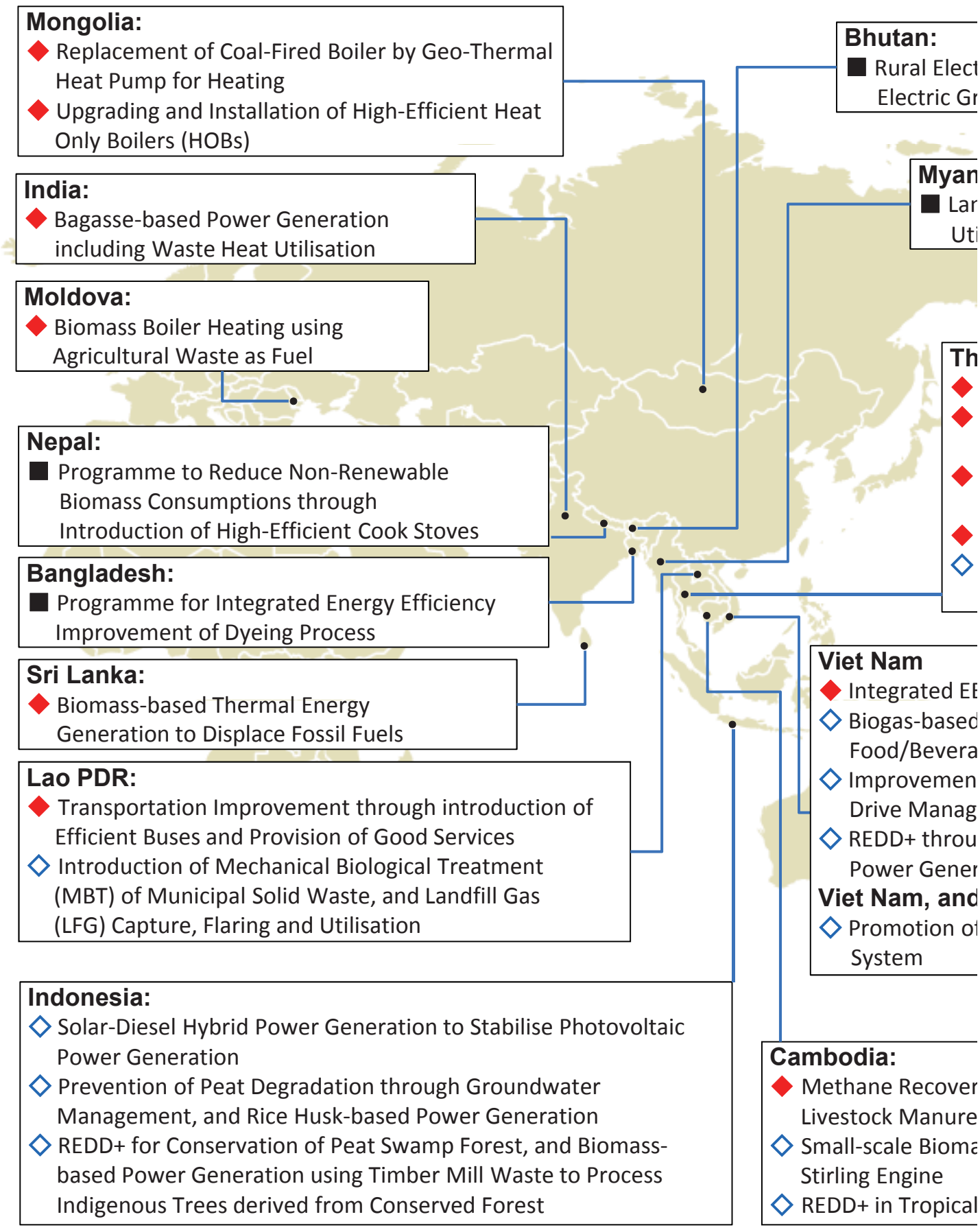
One innovative point in the BOCM MRV methodology is the annex: Information on the calculation tool. This is an automated calculation spreadsheet prepared by the scheme owner. Preset default values are installed in the tool, and are used in the calculation process of GHG emission reductions. The users only fill in the monitored values, then can quantify how much GHG emissions are reduced (See next page for this automated calculation process).

<Image of BOCM MRV Methodology:
by using a sample methodology "Replacing Fossil Fuel with Biofuel in 'country A'">

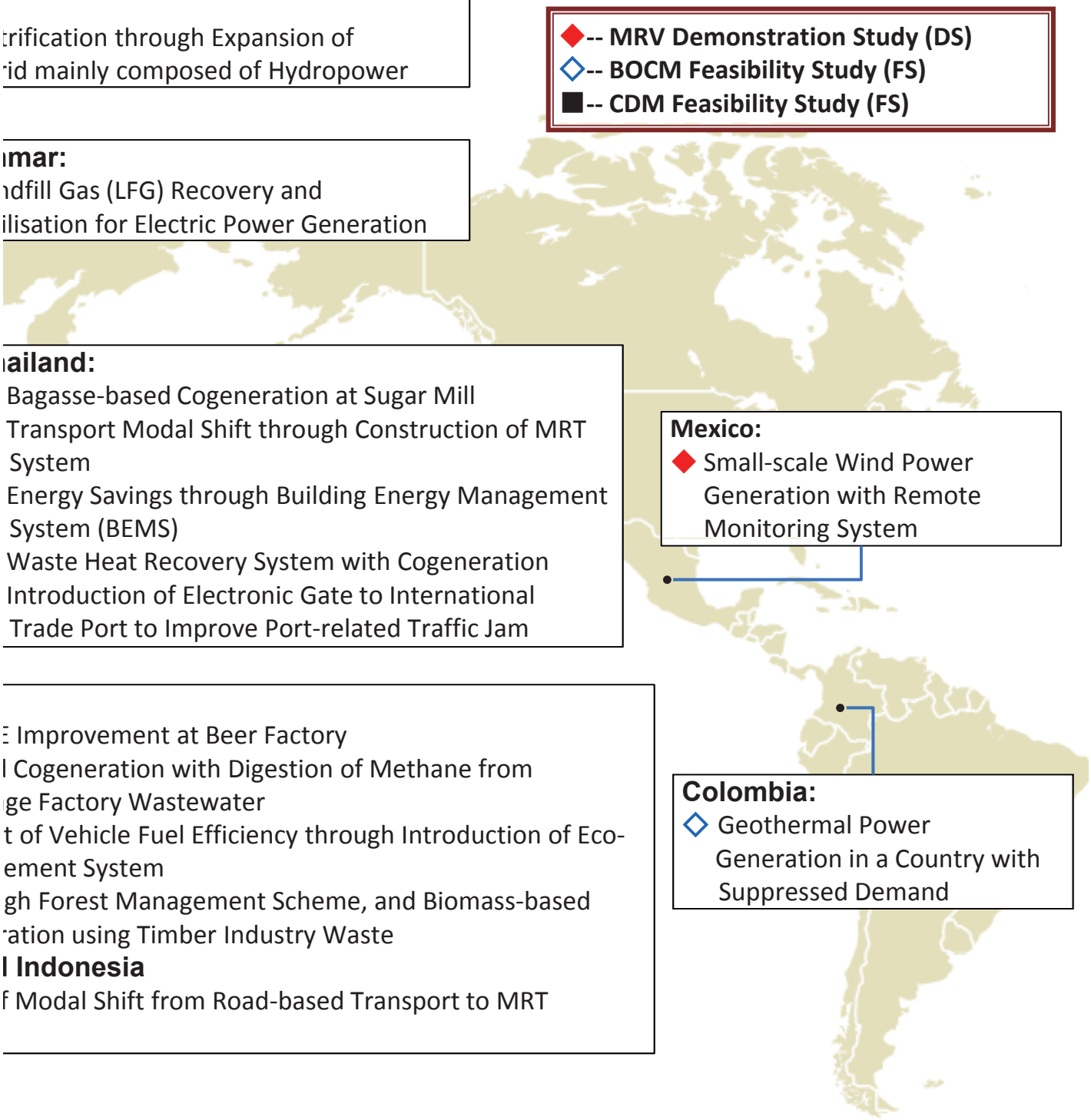




Overview of Demonstration/



/Feasibility Studies in 2012



◆-- MRV Demonstration Study (DS)
◇-- BOCM Feasibility Study (FS)
■-- CDM Feasibility Study (FS)

trification through Expansion of
rid mainly composed of Hydropower

mar:
ndfill Gas (LFG) Recovery and
ilisation for Electric Power Generation

ailand:
Bagasse-based Cogeneration at Sugar Mill
Transport Modal Shift through Construction of MRT System
Energy Savings through Building Energy Management System (BEMS)
Waste Heat Recovery System with Cogeneration
Introduction of Electronic Gate to International Trade Port to Improve Port-related Traffic Jam

Mexico:
◆ Small-scale Wind Power Generation with Remote Monitoring System

E Improvement at Beer Factory
l Cogeneration with Digestion of Methane from ge Factory Wastewater
t of Vehicle Fuel Efficiency through Introduction of Eco-ement System
gh Forest Management Scheme, and Biomass-based ration using Timber Industry Waste

l Indonesia
f Modal Shift from Road-based Transport to MRT

Colombia:
◇ Geothermal Power Generation in a Country with Suppressed Demand

y and Utilisation from
by using Bio-digesters
ass Power Generation with

l Lowland Forest

NOTE: EE= Energy Efficiency
MRT= Mass Rapid Transit

MRV Demonstration Studies (DS) using Model Projects in 2012

List of MRV DS using Model Projects 2012

#	Host Country	Mitigation Project/Activity	Category	DS Entity
1	Cambodia	**Methane Recovery and Utilisation from Livestock Manure by using Bio-digesters**	Waste Management	Japan NUS
2	India	**Bagasse-based Power Generation including Waste Heat Utilisation**	Biomass Utilisation	Nippon Koei
3	Lao P.D.R.	**Transportation Improvement through introduction of Efficient Buses and Provision of Good Services**	Transportation	Katahira & Engineers International
4	Mexico	**Small-scale Wind Power Generation with Remote Monitoring System**	Renewable Energy	Komaihaltec
5	Moldova	**Biomass Boiler Heating using Agricultural Waste as Fuel**	Biomass Utilisation	Mitsui Consultants & Japan Environmental Consultants JV
6	Mongolia	**Replacement of Coal-Fired Boiler by Geo-Thermal Heat Pump for Heating**	Renewable Energy	Shimizu Corporation
7	Mongolia	**Upgrading and Installation of High-Efficient Heat Only Boilers (HOBs)**	Energy Efficiency Improvement	Suuri-Keikaku
8	Sri Lanka	**Biomass-based Thermal Energy Generation to Displace Fossil Fuels**	Biomass Utilisation	EX Research Institute
9	Thailand	**Bagasse-based Cogeneration at Sugar Mill**	Biomass Utilisation	Mizuho Information & Research Institute
10	Thailand	**Transport Modal Shift through Construction of Mass Rapid Transit (MRT) System**	Transportation	JWA & Almec Consortium for MRV Demonstration Study
11	Thailand	**Energy Savings through Building Energy Management System (BEMS)**	Energy Efficiency Improvement	Pricewaterhouse Coopers
12	Thailand	**Waste Heat Recovery System with Cogeneration**	Waste Heat Utilisation	Smart Energy
13	Viet Nam	**Integrated Energy Efficiency Improvement at Beer Factory**	Energy Efficiency Improvement	Recycle One

Outline of the study content and the model project of each MRV DS is shown from next page.

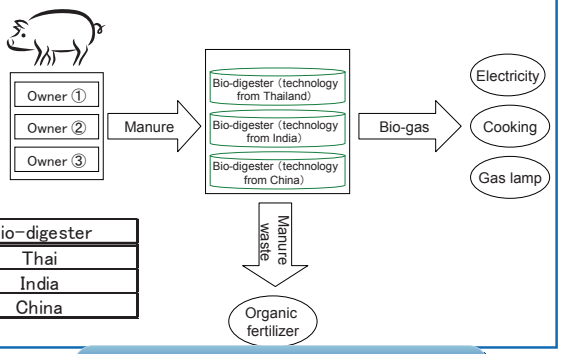
MRV Demonstration Study using Model Project — Host Country: Cambodia

Methane Recovery and Utilisation from Livestock Manure by using Bio-digesters

DS Entity: Japan NUS

Outline of GHG Mitigation Activity

Methane from livestock manure by anaerobic digestion through bio-digesters is utilised for electricity, cooking stoves, and gas lamps, to reduce fossil fuel consumed for these, leading to GHG reduction.
At three typical livestock farms in Cambodia, shown in table below, where bio-digesters already installed, the GHG reduction effects will be demonstrated.



	livestock	Bio-digester
Owner①	Pigs;4000	Thai
Owner②	Cows;8, Pigs;3	India
Owner③	Pigs;12	China

Draft Simple MRV Methodology

CDM Methodologies – ACM0010 and AMS-III.D – could be taken into account, but these methodologies request many parameters difficult to be monitored on the ground. Under the draft simple MRV methodology, default values cited from IPCC 2006 Inventory Guidelines and so on will be applied, to achieve easy calculation of GHG emissions. Concretely, parameters to be monitored should limit to ones easily monitored such as types and numbers of livestock, for the MRV methodology to be more widely applicable to any installation of bio-digesters.

Site of MRV Model Project

Site of MRV model project is placed in Kampong Speu province, about 50km west of the Phnom Penh.

Expected GHG Reductions

・Pig per head : 0.45tCO_2/yr
・Cow per head : 18tCO_2/yr
→ In case of Owner1: **1,800tCO_2/yr**
→ In case of the application to all livestock in Cambodia nationwide: **117.3MtCO_2/yr**

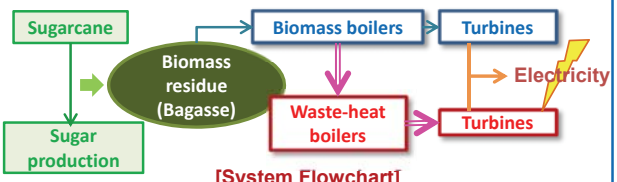
MRV Demonstration Study using Model Project — Host Country: India

Bagasse-based Power Generation including Waste Heat Utilisation

DS Entity: Nippon Koei

Outline of GHG Mitigation Activity

Power generation based on bagasse emitted from sugar factories will achieve GHG emission reductions. In addition to it, waste heat from the bagasse boilers will be utilised for further power generation through high-pressure boilers and turbines, and/or for thermal energy supply, to result in more GHG emission reductions.
The generated electricity will be used on-site (within the factory), and/or supplied to electric grid.



[System Flowchart]

Draft Simple MRV Methodology

The MRV methodology to be developed should be applicable to bagasse-based power generation, heat supply, as well as co-generation projects, and also eligible to newly installation, upgrade/replacement, and retrofit of the plant(s). Under the simplest calculation option, the generated electricity by the bagasse power generation project, or the generated thermal energy by the heat supply project, should be monitored. When the emission factor of fossil fuel to be replaced (including the grid emission factor) is set as a default value, the GHG emission reduction effect can be quantified.
In principle, actually monitored should be **only the energy generations** that is the amount of the activity by the project.

Site of MRV Model Project

Dhampur sugar mill factory: located in Bijnor area of Uttar Pradesh state in north part of India. The state is the major sugar production area.

Expected GHG Reductions

97,344tCO_2/yr of GHG emission reductions are expected in the model project at Dhumpur sugar mill factory, which should be caused by the replacement of grid electricity and other energy.

MRV Demonstration Study using Model Project | Host Country: Lao PDR

Transportation Improvement through Introduction of Efficient Buses and Provision of Good Services

DS Entity: Katahira & Engineers International

Outline of GHG Mitigation Activity

The GHG mitigation activity is the public bus procurement assisted with JICA.

Old bus vehicle

Grant of new bus vehicles (42 cars)

Operation of new bus vehicle

Improvement in bus operation

Improvement in fuel efficiency

Improvement in bus service

Modal shift for mass transit

Reduction of GHG reduction

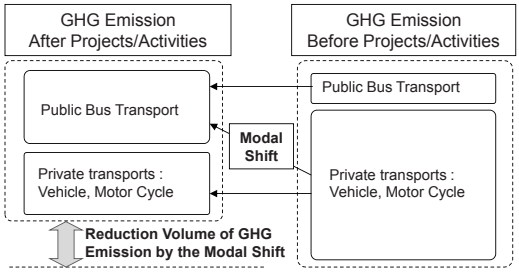


Image of GHG reduction resulted from modal shift

Draft Simple MRV Methodology

The GHG reduction of the activity includes "fuel efficiency improvement" by the introduction of new bus vehicles and "modal shift" by the improvement of the bus services.

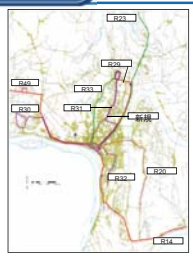
◆ **GHG reduction of Fuel Efficiency Improvement:**
calculated by multiplication of deference between fuel efficiency of the old and one of new bus vehicles, and VKT (vehicle kilometers travelled) of the bus vehicles.

◆ **GHG reduction of Modal Shift:**
In-person survey is implemented to grasp information on the previous transport modes of the current bus users/passengers. GHG reduction is calculated on the modal shift effects based on the in-person survey results.

Site of MRV Model Project

Center of Vientiane Capital

Congestion on commuting time in Vientiane Capital



Subject Area (Bus routes)

Expected GHG Reductions

Approximately 1,400tCO_2/yr (for modal shift)

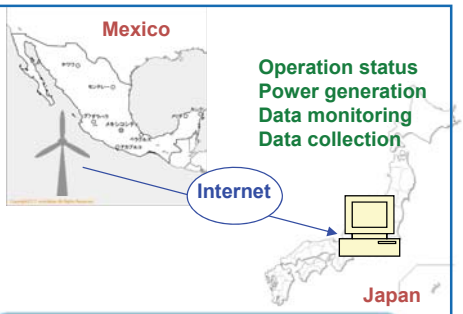
MRV Demonstration Study using Model Project | Host Country: Mexico

Small-scale Wind Power Generation with Remote Monitoring System

DS Entity: Komai Haltec

Outline of GHG Mitigation Activity

The installation of small-scale wind power generation systems leads to the reduction of GHG emissions. The wind turbine is equipped with a remote monitoring system, so that the data of generated electricity can be collected easily, to ensure MRV of GHG emission reductions.
The proposed activities are expected to enhance the small-scale wind energy development for captive consumptions or at remote areas, with less MRV costs. While such small-scale wind power generation is not the main stream, it will be of more importance for smart grid systems and/or distributed energy systems.



Draft Simple MRV Methodology

Since the GHG emissions due to wind power generation should be zero, the GHG emission reductions are equal to the reference emissions. The reference emissions are calculated as the multiple of the amount of electricity generated by the project and the emission factor of the displaced electricity.
The emission factor should be set as a default, and the only monitoring parameter should be the amount of electricity generation.

Thermal power generation

Wind power generation

Site of MRV Model Project

CERTE, located in La Ventosa, Oaxaca

Expected GHG Reductions

- **334tCO_2/year/unit** (unit capacity is 300kW)
- 6,680tCO_2/unit for 20 years of lifetime
- 33,400tCO_2/year for 100 units

MRV Demonstration Study using Model Project — Host country: Moldova

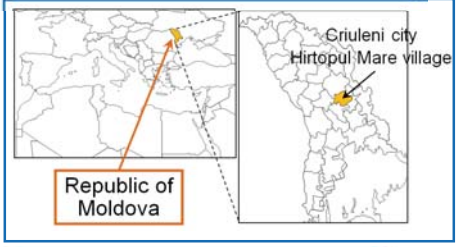
Biomass Boiler Heating using Agricultural Waste as Fuel

DS Entity: Mitsui Consultants & Japan Environmental Consultants JV

Outline of GHG Mitigation Activity

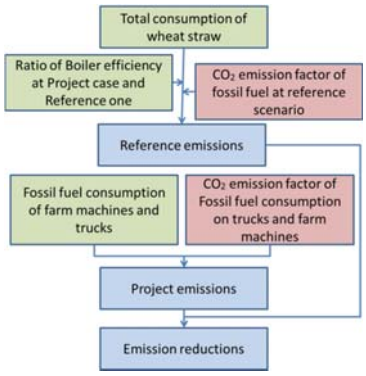
The fuel switch of boilers to supply thermal energy for heating, from fossil fuel (coal, or natural gas) to biomass (agricultural waste such as wheat straw), achieves the CO_2 emission reductions, derived from fossil fuel combustion at the boilers.
The biomass boilers to be mainly surveyed for MRV demonstration have been installed at Hirtopul Mare village.

Site of MRV Model Project



Draft Simple MRV Methodology

The right-hand flowchart shows the basic concept of MRV methodology applicable to the project.
Green parameters should be monitored, and red parameters should be set as default.
The validity of such default values will be reviewed, based on the result of the actual monitoring activity.



Expected GHG Reductions

[GHG emission reductions]
= [reference emissions] – [project emissions]
= 198.35 tCO_2/yr/site - 1.4 tCO_2/yr/site
= 196.95 tCO_2/yr/site

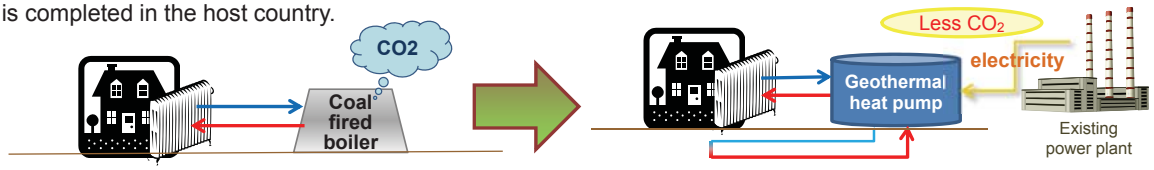
MRV Demonstration Study using Model Project — Host Country: Mongolia

Replacement of Coal-Fired Boiler by Geo-Thermal Heat Pump for Heating

DS Entity: Shimizu Corporation

Outline of GHG Mitigation Activity

Geothermal heat pump technology is installed to replace coal-fired boilers for building/district heating systems. For future BOCM projects, a specific target sector will be public buildings such as local governmental offices, schools, kindergarten, and hospitals, where some model projects could be identified.
In this study, a model project – a kindergarten already equipped with geothermal heat pump system for heating – demonstrates that the proposed MRV methodology is applicable and feasible and that the entire MRV process is completed in the host country.



Draft Simple MRV Methodology

The central concept for the proposed MRV methodology is “degree-day” theory. The “degree-day” is defined as the annual integral value of multiplications of the difference between outdoor and indoor temperature and the duration (hours). Thanks to “degree-day” theory, the only monitoring item should be **outdoor temperature** in a climate zone, based on the Meteorological Agency’s data. Coal-fired boiler efficiency is defaulted. Standard emission is calculated ex-ante taking into account standard meteorological data, building’s heat-insulation characteristics, soil characteristics, and heat pump performance. Real emission is calculated by correcting standard emission and based on monitored degree-day.

Site of Modeled MRV Project

Expected GHG Reductions

- **80tCO_2/year** (for a model project (1 unit))
- **Potential: 113,000tCO_2/year** (estimated from 1.3 million m² of total floor area of all public buildings in entire Mongolia)

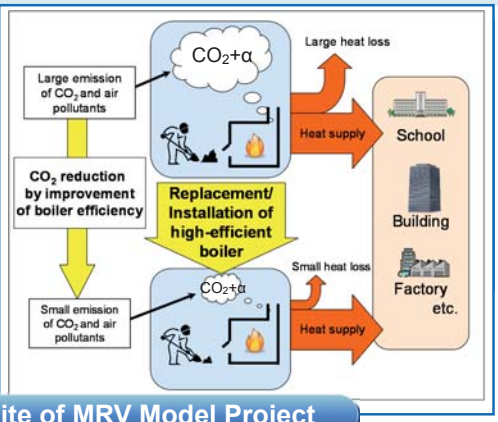
MRV Demonstration Study using Model Project — Host Country: Mongolia

Upgrading and Installation of High-Efficiency Heat Only Boilers (HOBs)

DS Entity: Suuri-Keikaku

Outline of GHG Mitigation Activity

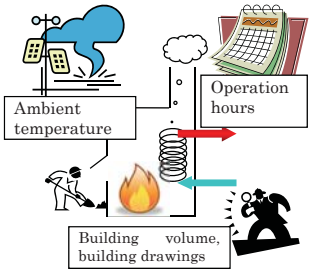
The replacement of low-efficiency old-type boilers with **high-efficiency latest model boilers** leads to the reduction of coal fuel consumptions to mitigate emissions of CO_2 as well as air pollutants. The target boilers to be replaced under this activity should be heat only boilers (HOBs) to generate thermal energy for district heating systems. JICA's Two-Step Loan (TSL) is used for the introduction of the high-efficiency HOBs. In addition to the replacement, the newly installation of high-efficiency HOBs should be also eligible.



Draft Simple MRV Methodology

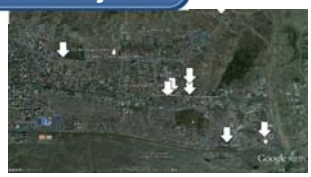
Neither the coal consumptions nor the amounts of heat supply of the small-scale HOBs are supposed to be easy to monitor. However, the heat supply is assumed to depend on the boiler capacity, building volume, ambient temperature, operation hours, etc.

Therefore, the monitoring items under the draft simple MRV methodology are building volume, ambient temperature, and operation hours, which should be backed up by building drawings, specifications of ambient temperature, etc.



Site of MRV Model Project

Arrows indicate distributions of HOBs in Ulanbaatar



Expected GHG Reductions

- **200tCO_2/year** per one HOB unit
- **26,000tCO_2/year** is expected to be reduced, if the efficiency of all HOBs in entire Ulanbaatar improves by 10%

MRV Demonstration Study using Model Project — Host Country: Sri Lanka

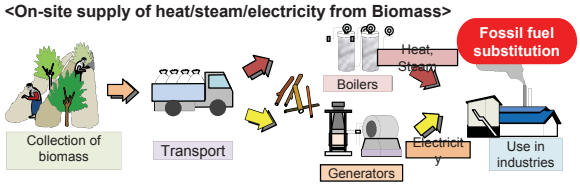
Biomass-based Thermal Energy Generation to Displace Fossil Fuels

DS Entity : EX Research Institute

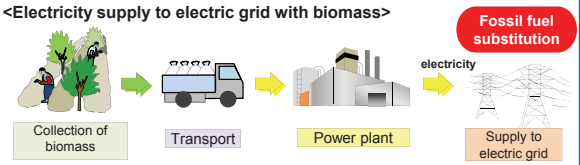
Outline of GHG Mitigation Activity

The utilisation of biomass fuel for the generation of heat and electricity (for on-site industrial use or for grid connection) achieves GHG emission reduction, by replacing fossil fuel currently used. In the case of its implementation in Sri Lanka, it promotes the utilisation of biomass resources such as Gliricidia (*Gliricidia sepium*) and other agricultural residues which are locally available and abundant.

<On-site supply of heat/steam/electricity from Biomass>



<Electricity supply to electric grid with biomass>



Draft Simple MRV Methodology

Following two calculation formula are to be employed for the MRV methodology, referring to CDM methodologies of AMS-I.C, and AMS-I.D.

<On-site supply of heat/steam/electricity>

$$RE_y = EG_y * EF_{CO2,FF} / \eta_{BL}$$

<Electricity supply to electric grid>

$$RE_y = EG_y * EF_{CO2,Dey}$$

Only EG_y (heat/electricity supply by the project (MWh/yr)) should be monitored, while 2 EFs are to be set as default values.

η_{BL} (efficiency of heat exchange of reference plant) is to be calculated by the multiplication of specific rated value claimed by facility supplier and the correction factor to be set by host country.

Site of MRV Model Project

Lalan Rubber (Pvt) Limited's factory (MAPA Lalan), located in Biyagama Industrial Area

A new facility was installed in 2011, to replace 1,800kL/yr of fuel oil with 8,400t/yr of biomass.

Expected GHG Reductions

- **4,587tCO2/yr** (for MAPA Lalan factory)
- Potential GHG reductions (entire Sri Lanka)
  - Supply to electric grid: 150MW →0.9MtCO_2/yr
  - On-site heat supply: 1,700Mil.L eq. to fuel oil →5.0MtCO_2/yr

MRV Demonstration Study using Model Project — Host Country: Thailand

Bagasse-based Cogeneration at Sugar Mill

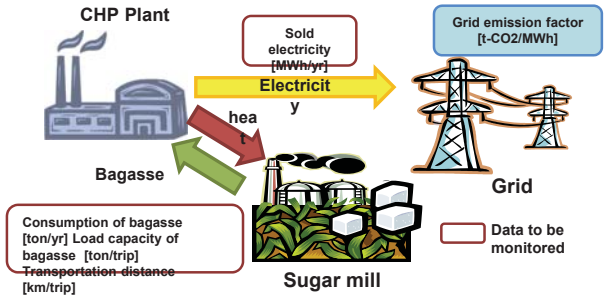
DS Entity: Mizuho Information & Research Institute

Outline of GHG Mitigation Activity

The installation of the 32MW Combined Heat and Power (CHP) system (cogeneration system) fueled by biomass residue (bagasse) generates electric power (250,000MWh/yr) to replace grid electricity consumptions, as well as thermal energy to replace equivalent fossil fuel-oriented heat. This results in the reduction of fossil fuel consumptions, to achieve GHG emission reductions.

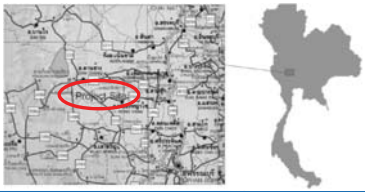
Draft Simple MRV Methodology

Only two items – electricity sold to grid, and volume of bagasse consumptions (including data about bagasse transport) – should be monitored. For the grid emission factor, necessary to calculate GHG emissions, official value publicised by national government is used.



Site of MRV Model Project

Mitr Phol Sugar Corporation (located at Dan Chang, Suphan Buri province, 150km northeast from Bangkok)



Expected GHG Reductions

77,000 tCO_2/yr

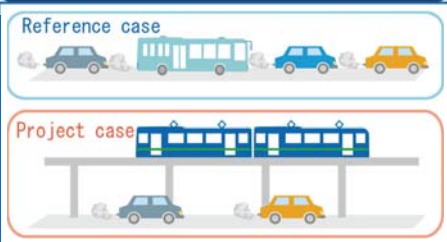
- Bagasse fueled electric power sold to grid : 150,000MWh/yr
- Consumptions of bagasse : 530,000 ton/yr

MRV Demonstration Study using Model Project — Host Country: Thailand

Transport Modal Shift through Construction of Mass Rapid Transit (MRT) System

DS Entity : JWA & Almec Consortium for MRV Demonstration Study

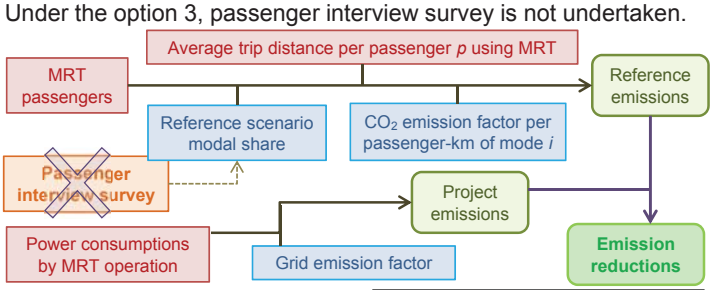
Outline of GHG Mitigation Activity



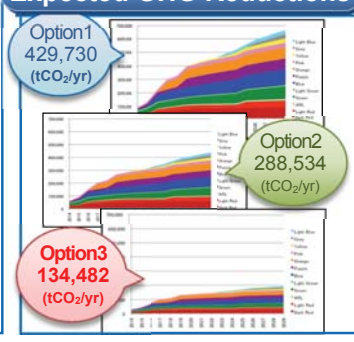
The MRT network development in BMA (1 capital and 5 prefectures) is expected to help to reduce GHG emissions, by the decline of fuel consumptions according to the modal shift from existing road traffic to MRT network, and the improvement of fuel economy according to the smooth traffic flow due to the traffic congestion improvement effect on neighboring area.
The Bangkok MRT network is currently under operation with 4 lines (85km in total). Based on the MRT expansion plan formulated by the Ministry of Transport, the construction for 495km of planned railroads is carried out (completion by 2029).

Draft Simple MRV Methodology

3 calculation options are considered:
Option 1 (strict); Option 2 (moderate); and **Option 3** (simplified).
Under the option 3, passenger interview survey is not undertaken.



Expected GHG Reductions



Site of MRV Model Project

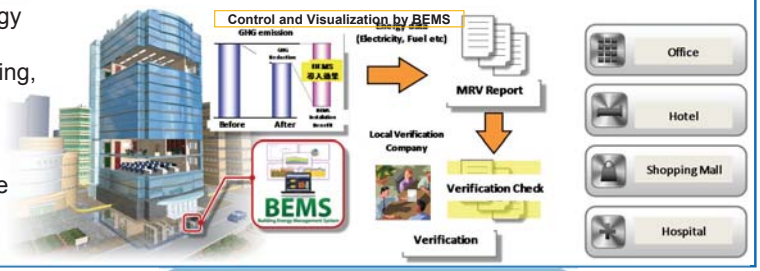
MRV Demonstration Study using Model Project | Host Country: Thailand

Energy Savings through Building Energy Management System (BEMS)

DS Entity: PricewaterhouseCoopers

Outline of GHG Mitigation Activity

The introduction of BEMS (Building Energy Management System) to commercial buildings in Thailand leads to energy saving, so that CO2 emissions due to energy consumptions are reduced.
BEMS is the system to visualise energy consumptions for buildings and to provide the optimum control and operation to equipped units in the buildling.



Draft Simple MRV Methodology

The reduction ratio of energy consumptions of buildings with BEMS should be set as **'default value'**, depending on the usage type of the buildings (such as office, hotel, shopping mall, and hospital). Based on the default value, the GHG emission reductions can be quantified when its energy consumptions under the project scenario are monitored.
Since BEMS itself has a function to measure automatically the energy consumptions of the whole building, the monitoring of energy consumptions are easily undertaken.

Expected GHG Reductions

- **11,538tCO$_2$/yr** will be reduced in the 12 model buildings
- Potential: **966,000tCO$_2$/yr** in entire Thailand (BEMS are installed in all buildings in Thailand)

Site of MRV Model Project

Bangkok

Study sample buildings for this activity

Building	Main	Sub
Office	1	5
Hotel	1	4
Shopping Mall	1	5
Hospital	1	5

Main: MRV verification model project
Sub: Non MRV verification project

MRV Demonstration Study using Model Project | Host Country: Thailand

Waste Heat Recovery System with Cogeneration

DS Entity: Smart Energy

Outline of GHG Mitigation Activity

The waste heat recovery system with cogeneration will generate electricity through gas turbines fueled by natural gas, which replace grid-oriented electricity, and, at the same time, will recover the unused (wasted) steam from the gas-turbines to utilise it in absorption chillers which supply thermal energy (including cold energy), which reduce the electricity consumptions of electric/centrifugal chillers. GHG reduction effects are due to the replacement of grid electricity with natural gas-oriented one, as well as the efficient energy generations through the waste heat utilisation.

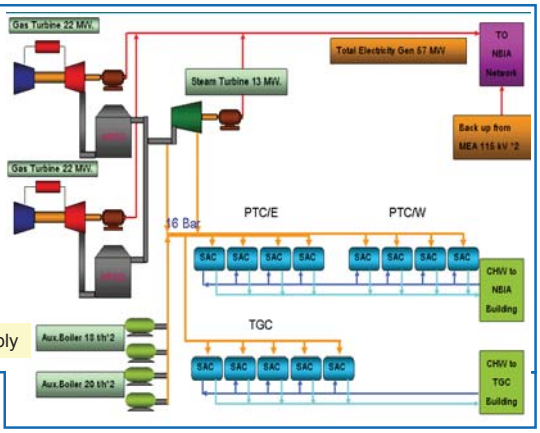


Figure: System of utilities supply

Draft Simple MRV Methodology

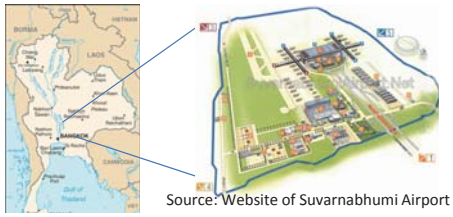
Difference of GHG emissions from the waste heat recovery system and ones from the general system with only grid-electricity is the reduction of GHG emission.
In the simple MRV methodology to quantify the emission reductions, **the default values of the grid emission factor, COP (coefficient of performance) of equipment, and facility's rated energy consumption are set**, to reduce monitoring items.

Expected GHG Reductions

Approx. 41,000tCO$_2$/yr

Site of MRV Model Project

Bangkok Suvarnabhumi International Airport



Source: Website of Suvarnabhumi Airport

MRV Demonstration Study using Model Project | Host Country: Viet Nam

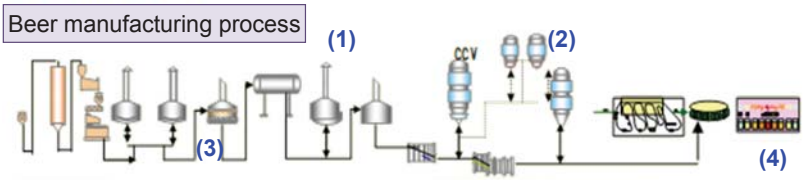
Integrated Energy Efficiency Improvement at Beer Factory

DS Entity: Recycle One

Outline of GHG Mitigation Activity

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.

Beer manufacturing process



Preparation Brewing Fermentation Filtration Packaging

Employed technologies

(1) Vapor recompression system (VRC)
(2) Cascade cooling system
(3) Biogas recovery boiler
(4) Heat pump pasteurizer

Draft Simple MRV Methodology

GHG emission reductions are evaluated based on 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

$$ER_{,y} = (AEM_{RR,y} - AEM_{PJ,y}) \times PO_y$$

$ER_{,y}$	GHG emission reduction amount (tCO_2/year)
$AEM_{RR,y}$	Specific GHG emissions of Reference Scenario (tCO_2 /HL) *[to be defaulted]*
$AEM_{pj,y}$	Specific GHG emissions of Project Scenario ($t\text{-}CO_2$ /HL)
Po_y	Annual beer production volume (HL/year)

Site of MRV Model Project

Thanh Hoa Brewery as the pilot project, located at Thanh Hoa City, Thanh Hoa Province

Expected GHG Reductions

- 7,500 tCO_2/year (for the model project)
- 150,000 tCO_2/year (potential in entire Vietnam)

BOCM Feasibility Studies (FS) in 2012

List of BOCM FS 2012

#	Host Country	Mitigation Project/Activity	Category	FS Entity
1	Cambodia	Small-scale Biomass Power Generation with Stirling Engine	Biomass Utilisation	Pro-Material
2	Cambodia	REDD+ in Tropical Lowland Forest	Land Use Management	Conservation International Japan
3	Colombia	Geothermal Power Generation in a Country with Suppressed Demand	Renewable Energy	Mitsubishi Research Institute
4	Indonesia	Solar-Diesel Hybrid Power Generation to Stabilise Photovoltaic Power Generation	Renewable Energy	Hitachi Zosen
5	Indonesia	Prevention of Peat Degradation through Groundwater Management, and Rice Husk-based Power Generation	Land Use Management	Shimizu Corporation
6	Indonesia	REDD+ for Conservation of Peat Swamp Forest, and Biomass-based Power Generation using Timber Mill Waste to Process Indigenous Trees derived from Conserved Forest	Land Use Management	Mitsubishi UFJ Research & Consulting
7	Lao P.D.R.	Introduction of Mechanical Biological Treatment (MBT) of Municipal Solid Waste, and Landfill Gas (LFG) Capture, Flaring and Utilisation	Waste Management	EX Research Institute
8	Thailand	Introduction of Electronic Gate to International Trade Port to Improve Port-related Traffic Jam	Transportation	Chuo Fukken Consultants
9	Viet Nam	Biogas-based Cogeneration with Digestion of Methane from Food/Beverage Factory Wastewater	Waste Management	Tepia Corporation Japan
10	Viet Nam	Improvement of Vehicle Fuel Efficiency through Introduction of Eco-Drive Management System	Transportation	Almec Corporation
11	Viet Nam	REDD+ through Forest Management Scheme, and Biomass-based Power Generation using Timber Industry Waste	Land Use Management	Sumitomo Forestry
12	Viet Nam, and Indonesia	Promotion of Modal Shift from Road-based Transport to Mass Rapid Transit (MRT) System	Transportation	Mitsubishi Research Institute

Outline of the study content and the proposed project of each BOCM FS is shown from next page.

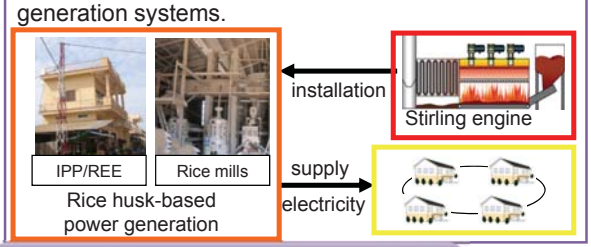
BOCM Feasibility Study (FS) Host Country: Cambodia

Small-scale Biomass Power Generation with Stirling Engine

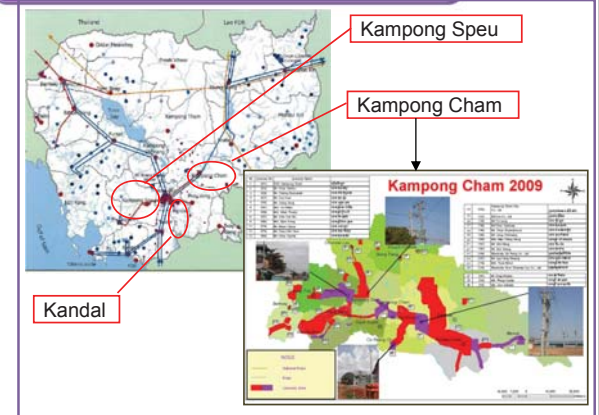
FS Entity: Pro-Material

Outline of GHG Mitigation Activity

The introduction of small-scale biomass electrical generating units with easy operaion type Stirling engine generators contributes to supply electric power at off-grid areas, to reduce GHG emission, by replacing diesel-based power generations. The diffusion of the Stirling engines to small-scale IPPs/REEs near biomass (such as rice husk) producing areas is aimed as distributed power generation systems.



Sites of GHG Mitigation Activity



Expected GHG Reductions

- **1,945 tCO_2/yr for 10 small-scale IPPs/REEs:** Calculated through Electricity generated by the activity (1,226,400kWh)
- Potential are expected to be 68,000tCO_2/yr, in the case that all IPPs/REEs in Cambodia employ the technology.

Draft Simple MRV Methodology

Referring to CDM methodology AMS-I.F. "Renewable electricity generation for captive use and mini-grid", the 24-hour/day operated mini-grid based on diesel power generation not connected to the national grid is supposed to be identified as the reference scenario. Under the simple MRV methodology, **only electricity generated by Stirling engine systems should be monitored**, and other parameters such as biomass calorific value be defaulted. All data monitored are remote managed and automatically archived with controllers attached to generators.

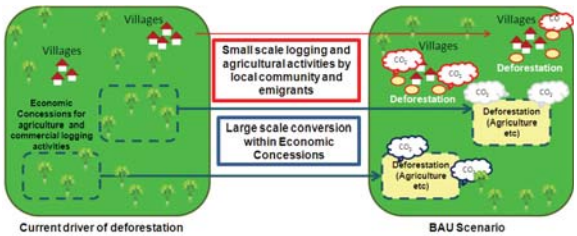
BOCM Feasibility Study (FS) Host Country: Cambodia

REDD+ in Tropical Lowland Forest

FS Entity: Conservation International Japan

Outline of GHG Mitigation Activity

As measures to reduce deforestation, the application of Conservation Agreement, the establishment of Protected Forest and the strengthening of governance will be conducted. GHG mitigation activities also aims conservation of biodiversity and improvement of local livelihood.



Sites of GHG Mitigation Activity

Expected GHG Reductions

216,667 - 1,404,000tCO_2/yr

* Assuming 15-year project period. The difference of expected GHG reductions is depend on the decision of reference level to apply for the project.

Draft Simple MRV Methodology

Under the MRV methodology, based on plot survey results, Landsat satellite images are used for monitoring activity.

Taking into account the consideration for the establishment of national-level MRV system in Cambodia, the MRV methodology for REDD+ project should be consistent with MRV system at national/sub-national levels. In addition, the MRV methodology will be drafted and developed with the reference of VCS where project-level and/or sub-national-level methodologies and rules are being developed.

The draft MRV methodology will be finalised based on feedbacks from Cambodian and Japanese governments against the provided GHG calculation options.

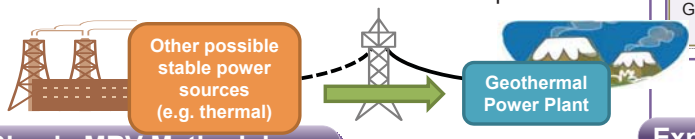
BOCM Feasibility Study (FS) | Host Country: Colombia

Geothermal Power Generation in a Country with "Suppressed Demand"

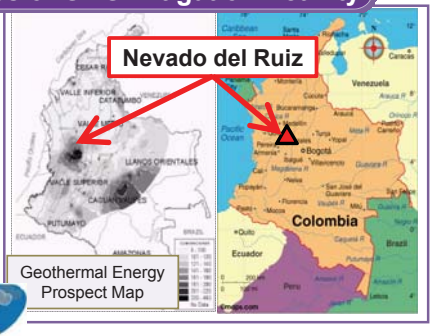
FS Entity: Mitsubishi Research Institute

Outline of GHG Mitigation Activity

A geothermal power plant with 50MW capacity, as a renewable energy project, will contribute to GHG emission reduction, in Colombia where hydropower makes up the largest proportion of its energy mix, causing unstable and short power supply during periods of draught/ El Niño. The proposed geothermal power generation is also expected to stabilise the power supply throughout the year. The grid emission factor in the reference scenario should be modified, taking necessary electricity demands into account. Under this condition, geothermal power generation with low GHG emissions should be introduced for further electric resource development.



Sites of GHG Mitigation Activity



Draft Simple MRV Methodology

The proposed MRV methodology will be developed taking into account the country's energy mix. This methodology is based on ACM0002 and can be applied to different scenarios including the "Suppressed Demand" scenario, where emissions reductions are calculated based on future development levels.

[Reference Scenario] The calculation approach for the emission factor is being developed for a country with over 50% hydropower and suffering a shortage of power supply.

[Project Scenario] Options are being set up according to the availability of data on CO_2 and CH_4 in non-condensable gas.

Expected GHG Reductions

GHG reductions
= Reference emissions(*1)
- Project emissions(*2)
= 251,335tCO_2/yr – 19,710tCO_2/yr
= **231,625tCO2/yr**

*1: Calculated using emission factors from other thermal power plants in Colombia.
*2: Based on data from existing geothermal plants of a similar size.

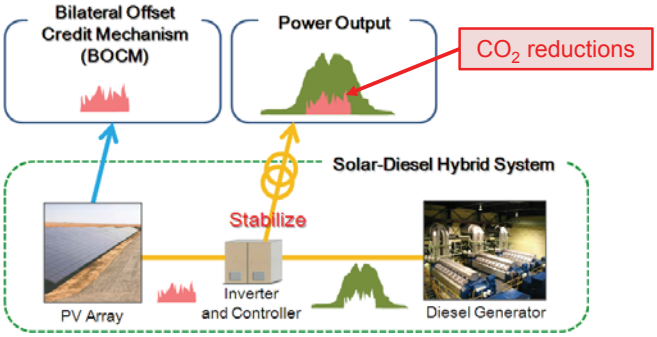
BOCM Feasibility Study (FS) | Host Country: Indonesia

Solar-Diesel Hybrid Power Generation to Stabilise Photovoltaic Power Generation

FS Entity: Hitachizosen Corporation

Outline of GHG Mitigation Activity

Solar power systems can reduce CO_2 emissions, but their power fluctuates in proportion to solar irradiation. Diesel engines have the advantage of continuous power output. By combining a diesel engine with solar power, utilising an inverter and a hybrid system controller, the total power output can be stabilized.



Site of GHG Mitigation Activity

The power supplying capability of power grid in Nias Island is only 20MW and the electrification rate is only about 10%.

Draft Simple MRV Methodology

If the solar-diesel hybrid system is introduced, the solar power output is regarded as the amount of the avoided consumption of fossil fuels in grids or off-grid power generators. Hence,
CO_2 emission reduction
= Solar power generation * CO_2 EF (emission coefficient)
CO_2 EF is to be set up in a practical and efficient way.

Expected GHG Reductions

- 4MW solar power system in Nias Island mini-grid:
  → **approx. 4,000tCO_2/yr**
- Potential (the technology spreading all over Indonesia):
  → **1.2 million tCO_2 by 2020**

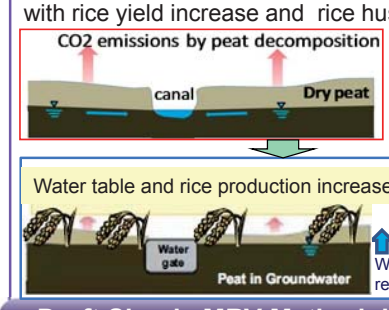
BOCM Feasibility Study (FS) Host Country: Indonesia

Prevention of Peat Degradation through Groundwater Management, and Rice Husk-based Power Generation

FS Entity: Shimizu Corporation

Outline of GHG Mitigation Activity

Restoration of groundwater table in the peatland with water gates upgrade and improved operation to inhibit peat decomposition and reduce CO_2 emission, associated with rice yield increase and rice husk power generation.



Draft Simple MRV Methodology

Emission reduction by peat decomposition inhibit:

$$\Delta CO_2 = \sum_{i=1}^{N} A_i * EF_{PEAT} * \Delta WT_i$$

where,

A_i : Hydrotopographic unit area (N=number of units)
EF_{PEAT} : Emission factor of peat decomposition
ΔWT_i : Average water table recovery of a unit

Sites of GHG Mitigation Activity

Site :Tanjung Jabung Timur Regency, Jambi Province
Area: About 10,000ha (=100km^2)

Expected GHG Reductions

345,000tCO$_2$/yr will be reduced when water table in peatland of 10,000 ha be raised 0.5m.
69tCO$_2$/ha/m/yr x 10,000ha x 0.5m = 345,000tCO$_2$/yr

2,500tCO$_2$/yr will be reduced by rice-husk based power generation (0.4MW supply).
0.4MW x 8,400h/yr x 0.743tCO$_2$ = 2,500tCO$_2$/yr

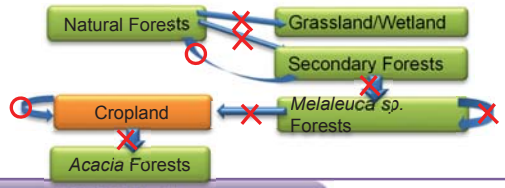
BOCM Feasibility Study (FS) Host Country: Indonesia

REDD+ for Conservation of Peat Swamp Forest, and Biomass-based Power Generation using Timber Mill Waste to Process Indigenous Trees derived from Conserved Forest

FS Entity: Mitsubishi UFJ Research and Consulting

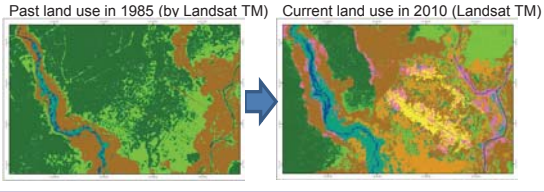
Outline of GHG Mitigation Activity

The activity aims to prevent deforestation and forest degradation located in peatland, taking into account the actual situation and possible practices, shown in before figure. In addition, as the result of the REDD+ activity, woody biomass from a timber industry for Melaleuca will be utilised for electric power generation.



Draft Simple MRV Methodology

For estimation of carbon stock, a methodology based on integration between remote-sensing (shown as below images) and field survey will be applied to the REDD+ activity. In case of the projects which do not have site-specific emission factors, the proposed simple methodology using IPCC default values is applied.



Sites of GHG Mitigation Activity

Our target site is Paduran Mulia Village, Sebangau Kuala Sub-District, Pulang Pisau District, Central Kalimantan Province (around 28,000 ha). The target site is faced to Sebangau National Park which is known as most important habitat of orangutans.

Expected GHG Reductions

REDD+ implementation will bring GHG emission reduction of about **467,000 tCO$_2$/yr.** In addition, water level management and/or other REDD+ activity[ies] would have some co-benefits of livelihoods improvement and bio-diversity conservation.

BOCM Feasibility Study (FS) | Host Country: Lao PDR

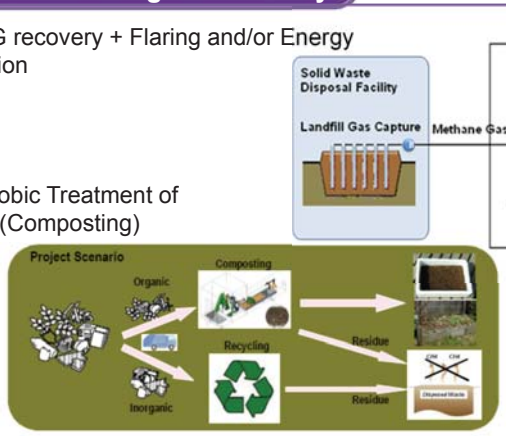
Introduction of Mechanical Biological Treatment (MBT) of Municipal Solid Waste, and Landfill Gas (LFG) Capture, Flaring and Utilisation

FS Entity: EX Research Institute

Outline of GHG Mitigation Activity

(1) LFG recovery + Flaring and/or Energy Utilization

(2) Aerobic Treatment of Waste (Composting)



Sites of GHG Mitigation Activity

Draft Simple MRV Methodology

(1) Amount of methane within LFG to be combusted is most important parameter. This parameter would be easily grasped by defaulting the methane conversion factor (MCF) applicable to the host country. In addition, energy generations should be monitored when the activity includes LFG energy utilisation.
(2) As same as (1), estimated methane emissions will be easily grasped through the application of the MCF default value. In addtion to this, amount of wastes to be aerobically treated should be monitored.

Expected GHG Reductions

28,000tCO_2/yr (annual average):
In the case that all the municipal solid waste currently disposed at the existing anaerobic landfill site in Vientiane will be treated under the aerobic condition through composting,

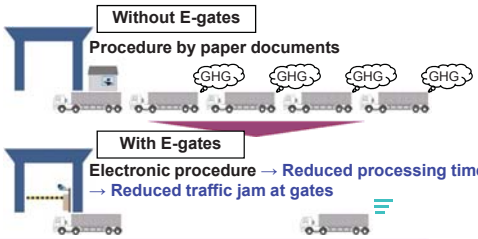
BOCM Feasibility Study (FS) | Host Country: Thailand

Introduction of Electronic Gate to International Trade Port to Improve Port-related Traffic Jam

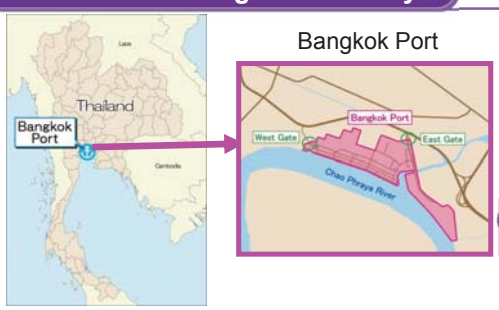
FS Entity: Chuo Fukken Consultants

Outline of GHG Mitigation Activity

The introduction of E-gates and the promotion of E-gate uses reduce the processing time at gates, so that traffic jams before the gates are eased. It results in the reduction of GHG emissions caused by idling vehicles.

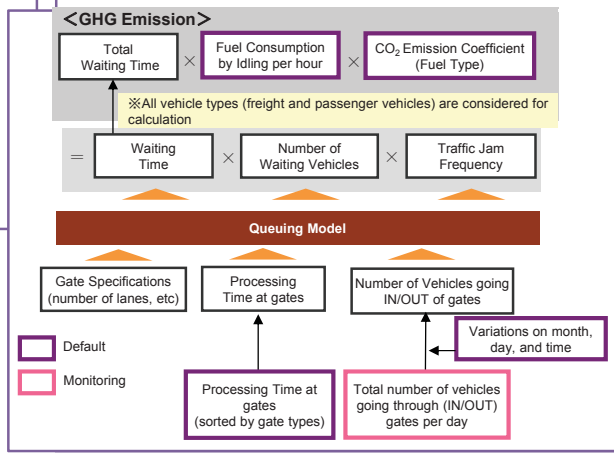


Sites of GHG Mitigation Activity



Draft Simple MRV Methodology

The only parameter of the total number of vehicles (sorted by vehicle types) going IN/OUT of gates per day is monitored to quantify GHG emission reductions through the 'Queuing Model'.



Expected GHG Reductions

In the case that all vehicles use E-gates,
500tCO_2/yr will be reduce for all gates at Bangkok Port

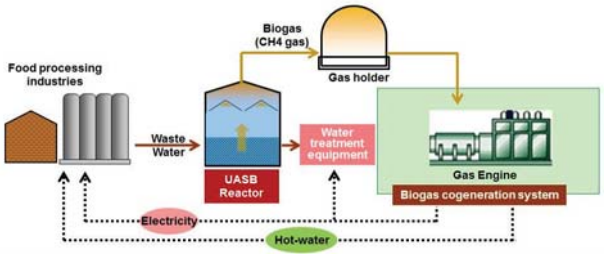
BOCM Feasibility Study (FS) Host Country: Viet Nam

Biogas-based Cogeneration with Digestion of Methane from Food/Beverage Factory Wastewater

FS Entity: Tepia Corporation Japan

Outline of GHG Mitigation Activity

Highly concentrated organic wastewater discharged from food-processing plants (breweries and tapioca plants) is treated by UASB reactors, to generate electricity and hot water (thermal energy) from biogas occurred in the process, through biogas-based cogeneration systems. It will replace the considerable amount of fossil fuels and grid electric power consumed in the plants, to reduce GHG emissions.



Sites of GHG Mitigation Activity

Draft Simple MRV Methodology

For cogeneration, GHG emission reductions are to be calculated from calorific values and CO_2 emission factors of both fossil fuel and grid power, applying specs (power generation efficiency and hot water recovery efficiency).
For methane avoidance, GHG emission reductions are to be calculated based on the monitoring results of wastewater amount and input COD, with COD removal ratio preset by research.

Expected GHG Reductions

- **3,900tCO_2/yr** (for one factory with 1,000m^3/day of wastewater)
- **Potentials: 390,000tCO_2/yr** (for 100 factories)
  ← 10 factories employ the technology annually = 100 factories involved during 10 years

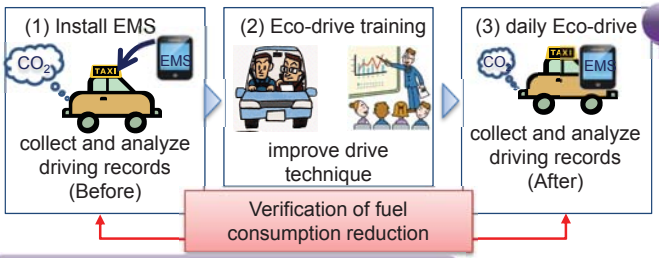
BOCM Feasibility Study (FS) Host Country: Viet Nam

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.



Sites of GHG Mitigation Activity

◆Vehicle traffic volume in Hanoi increase 30 times in past 10 years.
◆Economical loss and increasing GHG emission due to traffic congestion is the issue.

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

REDD+ through Forest Management Scheme, and Biomass-based Power Generation using Timber Industry Waste

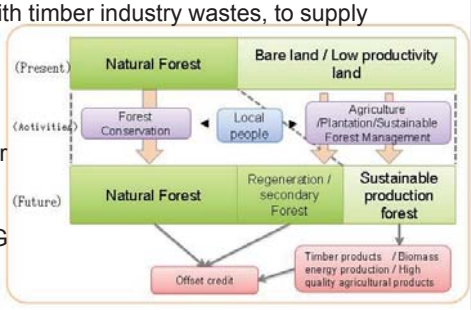
FS Entity: Sumitomo Forestry

Outline of GHG Mitigation Activity

As countermeasures against deforestation and forest degradation in the northwest area of Vietnam,

(1) Development of community forests and production forests for the purpose of timber sales,
(2) Conservation and regeneration of reserve forests through low-cost methods such as natural regeneration, and
(3) Provision of guidance on sustainable agricultural techniques to replace slash-and-burn methods.

Through the establishment of agricultural and forestry business, pressures on existing natural forest will be decreased to curb deforestation, and carbon stock will be enhanced at the plantation areas, to reduce GHG emissions from deforestation and forest degradation.
In addition, biomass-based power generation will be undertaken with timber industry wastes, to supply electricity otherwise provided through thermal power generation, thereby reducing GHG emissions.



Sites of GHG Mitigation Activity

Dien Bien province, Northwest area of Vietnam.

Draft Simple MRV Methodology

Easy-to-use for project proponents:

- REDD+: Referring to existing methodologies (e.g. VCS), the use of statistical data such as Vietnamese national forest inventory and remote sensing image analyses are considered.
- Biomass power generation: CDM methodology AMS-I.A will be modified, based on experiences.

Expected GHG Reductions

- REDD+: 1.3MtCO_2 (for 20 years)
- Biomass power generation: 1.6MtCO_2 (for 20 years)

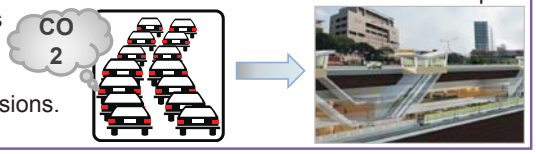
BOCM Feasibility Study (FS) | Host Country: Viet Nam and Indonesia

Promotion of Modal Shift from Road-based Transport to Mass Rapid Transit (MRT) System

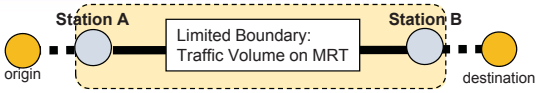
FS Entity: Mitsubishi Research Institute

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.



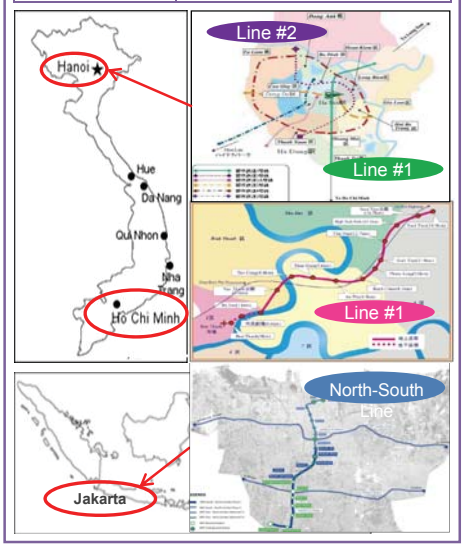
Draft Simple MRV Methodology



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_2 emission factor (unit: tCO_2/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_2/year
Hanoi Line#2	Approx. 105,000 tCO_2/year
HCMC Line#1	Approx. 114,000 tCO2/year
Jakarta N-S Line	Approx. 116,000 tCO2/year



CDM Feasibility Studies (FS) in 2012

List of CDM FS 2012

#	Host Country	Proposed Project Activity	Category	FS Entity
1	Bangladesh	Programme for Integrated Energy Efficiency Improvement of Dyeing Process	Energy Efficiency Improvement	PEAR Carbon Offset Initiative
2	Bhutan	Rural Electrification through Expansion of Electric Grid mainly composed of Hydropower	Renewable Energy	Mitsubishi UFJ Morgan Stanley Securities
3	Myanmar	Landfill Gas (LFG) Recovery and Utilisation for Electric Power Generation	Waste Management	Mitsubishi UFJ Morgan Stanley Securities
4	Nepal	Programme to Reduce Non-Renewable Biomass Consumptions through Introduction of High-Efficiency Cook Stoves	Energy Efficiency Improvement	Tepia Corporation Japan

The CDM FS in 2012 aim at the contribution to the improvement of regional distribution of CDM projects. Each proposed project activity is located in a host country with less than 10 registered CDM projects. In fact, all host countries for the CDM FS in 2012 are categorised as least developed countries (LDCs), who are in particular encouraged to develop CDM projects.

Outline of the study content and the proposed project of each BOCM FS is shown from next page.

CDM Feasibility Study (FS) | Host Country: Bangladesh

Programme for Integrated Energy Efficiency Improvement of Dyeing Process

FS Entity: PEAR Carbon Offset Initiative

Outline of CDM Project

The programmatic CDM (PoA) targets dyeing process consuming lots of water and energy in textile industry. The PoA promotes energy saving through the introduction of "chemical" energy efficiency technology (cleaner production-type technology) which can save water consumptions and the employment of Japanese "physical" energy saving technology (mainly composed of soft methods such as operation control), to reduce CO_2 emissions. The PoA aims to expand textile factories all over Bangladesh, under the coordinating/managing entity of Grameen Knitwear, whose factory will be the first CPA.

Project site

CPA#1: Grameen Knitwear textile factory located at suburban of Dhaka
PoA: Bangladesh nationwide textile factories

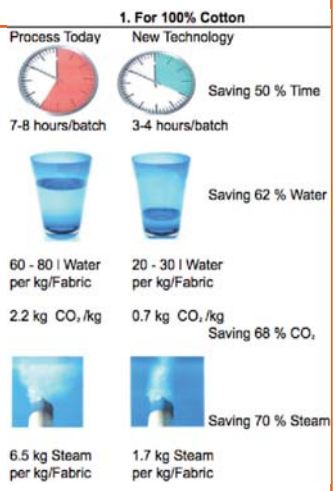
Methodology to be applied

AMS-II.D will be applied, and the following points need careful consideration upon its application.

- Requirements of monitoring of component processes
- Possibility of determining the baseline energy consumption with the monitoring of baseline "campaign" periods
- Determination of default values for increasing in production

Expected GHG Reductions

The first CPA under the PoA will be Grameen Knitwear textile factory (a typical medium-sized factory). The CPA#1 is expected to reduce **7,300tCO₂/year** through cutting both of natural gas and electricity consumption.



<energy efficiency improvement by "chemical" technology>

CDM Feasibility Study (FS) | Host Country: Myanmar

Landfill Gas (LFG) Recovery and Utilisation for Electric Power Generation

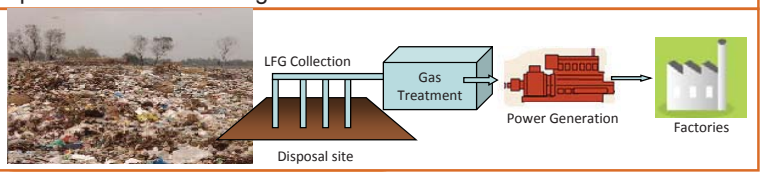
FS Entity: Mitsubishi UFJ Morgan Stanley Securities

Outline of CDM Project

The proposed project aims to collect landfill gas (LFG) from the solid waste disposal sites located in Yangon, the capital of Myanmar. The LFG will be utilized for the electricity generation, which will be distributed to the factories located around the disposal sites. The project is expected to mitigate the problems of municipal waste, environment, and sanitation caused by rapid urbanisation in Yangon.

Project site

3 disposal sites in Yangon are considered for CDM projects.



Methodology to be applied

AMS-III.G. (Ver.07) "Landfill methane recovery", and AMS-I.F. (Ver.02) "Renewable electricity generation for captive use and mini-grid" are applied to the project.

Expected GHG Reductions

[Baseline emissions]

1. Methane (CH_4) emissions from the solid organic wastes at the disposal sites: 16,046tCO₂/yr
2. CO_2 emissions from the fossil fuel combustion at the factories: 2,803tCO₂/yr

[Project emissions] CO_2 emissions due to electricity and fossil fuel consumptions for the project: 0 tCO₂/yr

[GHG emission reductions]

7 years total: **131,941tCO₂** Average: **18,849tCO₂/yr**

CDM Feasibility Study (FS) Host Country: Bhutan

Rural Electrification through Expansion of Electric Grid mainly composed of Hydropower

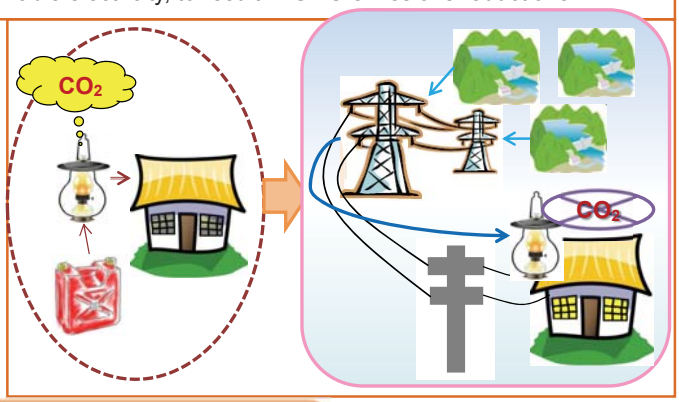
FS Entity: Mitsubishi UFJ Morgan Stanley Securities

Outline of CDM Project

The proposed project aims to achieve rural electrification in Bhutan through the expansion of electric grid composed mainly of hydropower. The fossil fuel such as kerosene which would have been consumed at unelectrified rural area will be replaced by renewable electricity, to result in GHG emissions reductions.

Project site

The project site encompasses approximately 30,000 unelectrified households in rural regions throughout Bhutan.



Methodology to be applied

AMS-III.AW. "Electrification of rural communities by grid extension" will be applied.
This methodology was developed specifically for rural electrification through expansion of electricity grid in Bhutan.

Expected GHG Reductions

The project will distribute approximately 24.4GWh of renewable electricity to unelectrified area in Bhutan. With this, the proposed project will reduce GHG emissions by **19,532 tCO_2 annually**. Deducting the leakage emissions associated with forest tree cutting for grid expanding engineering, the average GHG emission reductions by the proposed CDM project will be **6,367 tCO_2/yr** throughout 21-year crediting period.

CDM Feasibility Study (FS) Host Country: Nepal

Programme to Reduce Non-Renewable Biomass Consumptions through Introduction of High-Efficiency Cook Stoves

FS Entity: Tepia Corporation Japan

Outline of CDM Project

The replacement of TCS (traditional cook stove) which is the popular cooking appliance around Nepal, with HCS (high-efficiency cook stove), will cut down the consumptions of NRB (non-renewable biomass), to reduce GHG emissions. The introduction of HCS with CDM benefit is highly expected to contribute to improving not only the people's living standard but also the sustainable development in Nepal.

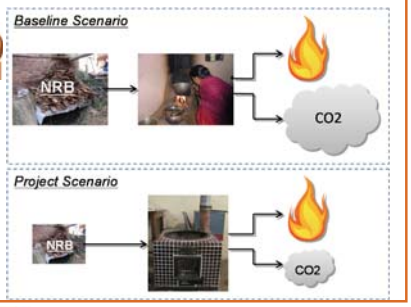
Project site

PoA boundary: urban, Terai and hilly areas throughout the whole Nepal, except for mountains;

CPA-1: Bhaktapur, located in Kathmandu basin.

Methodology to be applied

AMS-II.G(ver.03): Energy efficiency measures in thermal applications of non-renewable biomass.
The methodology has been also applied to the registered CDM project aiming at the introduction of HCS in Nepal.



Expected GHG Reductions

- GHG reductions of one *HCS*: **1.7624tCO_2/yr**
- Average GHG reductions of CPA-1: **4,406tCO_2/yr**
- Total GHG reductions during 10-year crediting period: **44,060tCO_2**

The efficiency of HCS is set at 30% and that of TCS is set at 10% according to AMS-II.G. In addition, the amount of annual consumption of woody biomass (NRB) per one TCS is supposed to be 2.7t referring to the registered CDM project (Ref. No. 4530) in Nepal; consequently, the NRB will be reduced 1.8t per appliance by the introduction of 1 HCS. Besides, the CPA-1 will install 2,500 HCS.