CDM/JI Feasibility Study Scheme

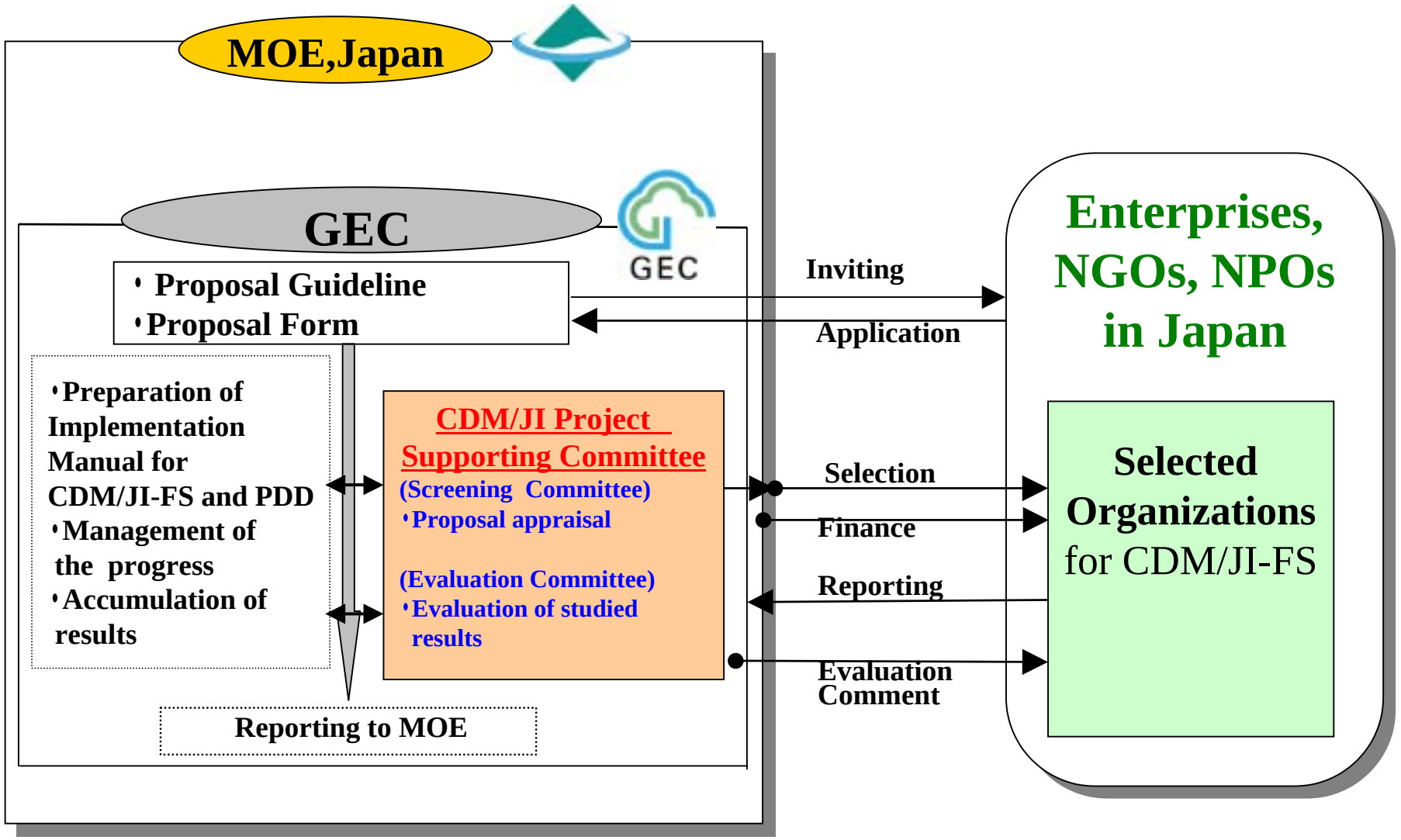
September 21-24, 2004 in SYDNEY, AUSTRALIA

14th Asia-Pacific Seminar on Climate Change

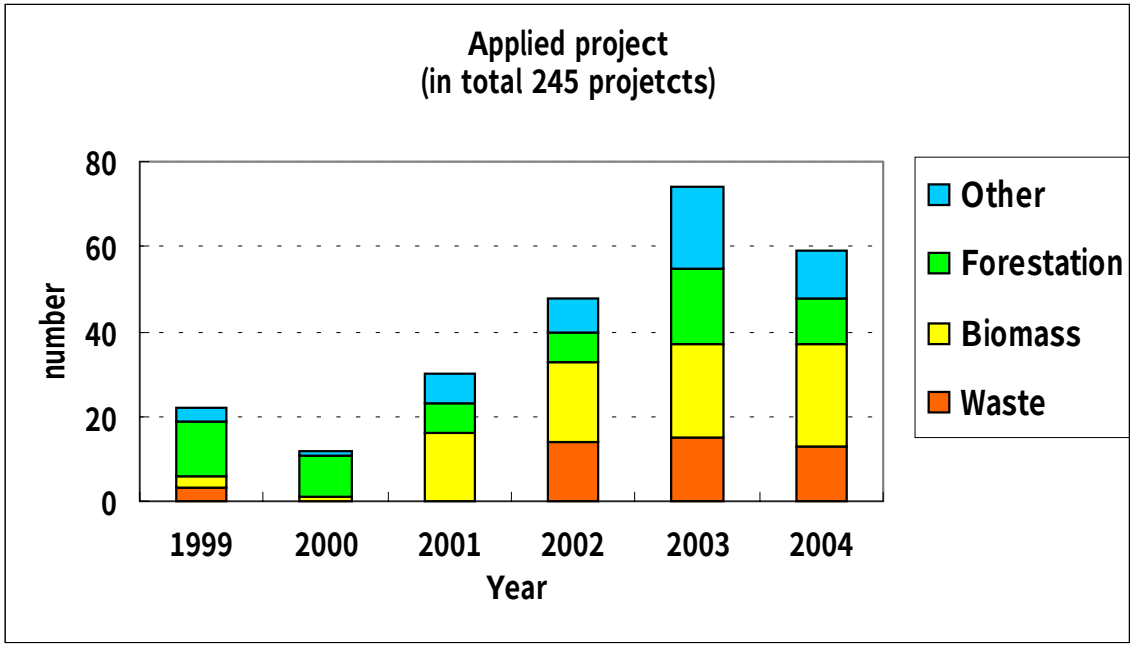
Kunihiro Ueno

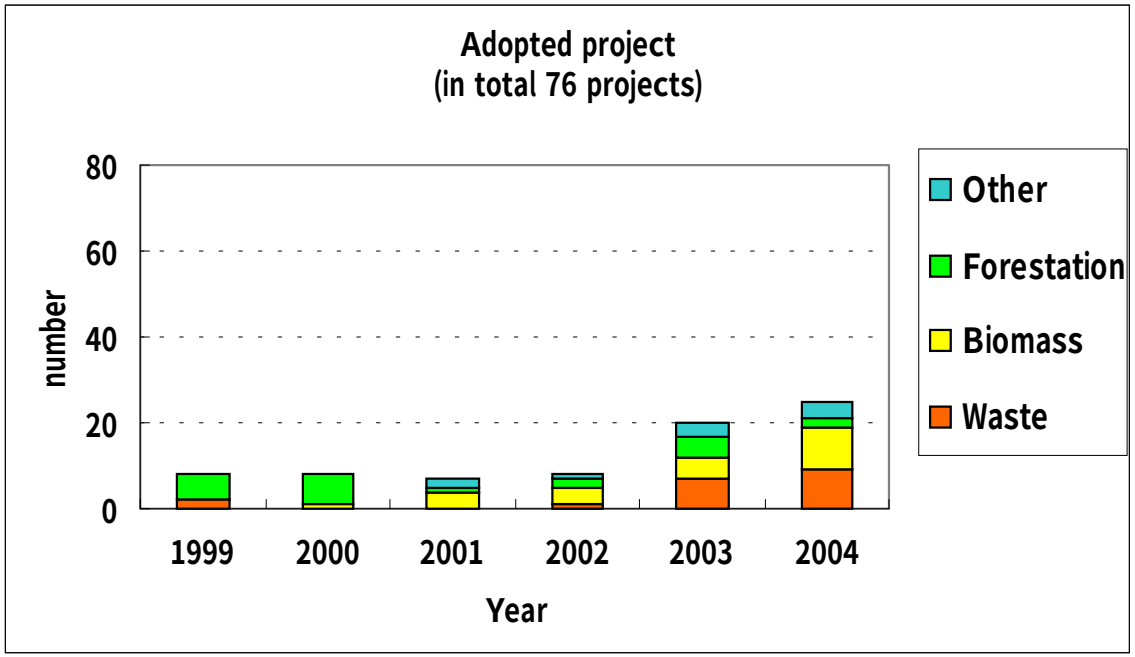
Global Environment Centre Foundation, Japan

Project Scheme of CDM/JI Feasibility Studies



History of Selection (FY1999-2004)





Experiences of Feasibility Studies

FS for Landfill gas project

LFG Capture for energy supply

Russia (Tyumen Province)
Shikoku Electric Power Co.,Inc.
2004 0n-going

LFG Capture for energy supply

Viet Nam (around Ho-Chi Minh)
Nippon Mining Research & Technology Co., Ltd.
2004 0n-going

Semi-aerobic landfill type

China (Beijing and Guangzhou)
Kyushu Environmental Evaluation Association (NPO admitted)
1999

LFG Capture for energy supply

Ukraine (Lugansk)
Shimizu Corporation
2004 0n-going

LFG Capture for energy supply

China (Nanjing)
CHUBU Electric Power Co.,Inc.
2004 0n-going

LFG Capture for energy supply ⑤

Rumania (Timisoara)
Power Development Co.,Ltd **2003**

LFG Capture for energy supply

the Philippines (Metro Manila)
OISCA (NPO admitted) **1999**

LFG Capture for energy supply ①

Thailand (Nonthaburi)
Obayashi Corporation
2002～2004 0n-going

LFG Capture for energy supply ④

Brazil (Sao Paulo)
Toyota Tsusho Corporation
2003

LFG Capture ②

Cambodia (Phnom Penh)
Japan Waste Research Foundation
2003

LFG Capture for energy supply

Indonesia (Bekasi)
KAJIMA CORPORATION
2004 0n-going

③

LFG Capture for energy supply

the Philippines (Metro Manila)
Mitsubishi Securities Co., Ltd. **2003**

Model Project for IGES ICS-CDM

Landfill gas capture and power generation -through FS①-⑤

●FS Projects

①:Nonthaburi,Thailand　2002-2004 On-going
②:Stung Mean Chey Disposal Site in Phnom Penh, Cambodia　2003
③:Payatas Landfill Site in Metro Manila, the Philippines　2003
④:São João Landfill Site in São Paulo, Brazil 2003
⑤:Parta-Sag Landfill Site in São Paulo, Timisoara, Rumania 2003

●Contribution for SD of host countries

□ Energy supply
□ **Environmental improvement**
Waste disposal, offensive odor, **early stabilization of landfills**, water pollution

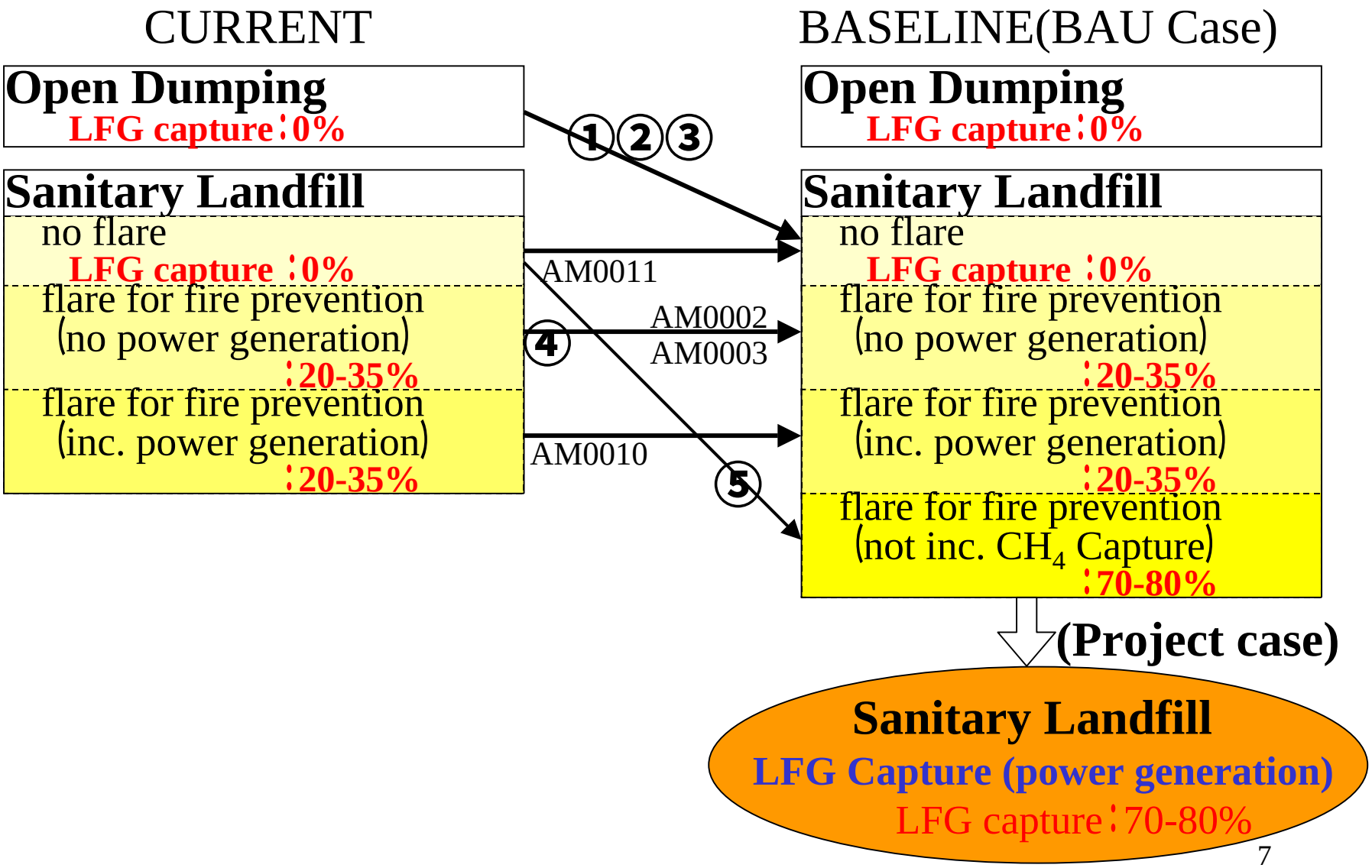
●Technical problems

□Treatment of Hydrogen sulfide（maintenance of power plants）
□Purified gas（if utilized as city gas）

to be continued⇒

Landfill gas capture and power generation -through FS①-⑤

●Baseline - Comparison FS and Approved Methodologies by CDM-EB



to be continued⇒

Landfill gas capture and power generation -through FS①-⑤

●Additionality of the project activities

□Investment Analysis

⇒Not economically attractive (Baseline approach: CDM M&P para.48 (b))

⇒IRR: <15% (inc. profit by selling electricity, but exc. CER)

⇒lower than a government bond rate of host countries

⇒High GWP with CER ⇒High IRR with CER(ex.5US$/ton-$CO_2$)

□Regulatory Analysis

⇒Currently not required by a Party's legislation/regulations

□Common Practice Analysis

⇒LFG capture system is not common practice

to be continued⇒

Landfill gas capture and power generation -through FS①-⑤

São João landfill Site in São Paulo, Brazil FS④

Flaring for fire prevention
(Methane capture：20-35%)

to be continued⇒

Landfill gas capture and power generation -through FS①-⑤

●GHG Emission Reduction

☐Amount of methane captured

First Order Decay Model (IPCC)

$$ER\_CH4_y = CH4_{flared,y} - CH4_{baseline,y}$$

$$CH4_{projected,y} = k * L_0 * \sum_{t=0,y} WASTE_{contract,t} * e^{-k(t-y)}$$

⇒Uncertain the captured amount

⇒Unsure for anticipated CERs

☐Displace electricity in grid by generating power

the electricity supplied to the grid by the project activity (MWh/y)
×carbon emission coefficient of displaced electricity(ton-CO2/MWh)

⇒less than 15MW : calculate the carbon emission coefficient of displaced electricity by weighed average efficiency (SSC guideline)

to be continued⇒

Landfill gas capture and power generation -through FS①-⑤

●FS toward CDM/JI project

①:Nonthaburi,Thailand

⇒*not yet planned for CDM project（FS on-going）*

②:Stung Mean Chey Disposal Site in Phnom Penh, Cambodia

⇒*no plan for CDM project*

③:Payatas Lnadfill Site in Metro Manila, the Philippines

⇒*under discussion for CDM project*

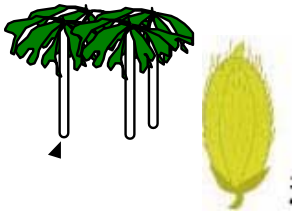
④:São João landfill Site in São Paulo, Brazil

⇒*not yet planned for CDM project*

⑤:Parta-Sag Landfill Site in São Paulo, Timisoara, Rumania

⇒*not yet planned for JI project（depending on accession to the EU）*

FS for Biomass energy use project



Waste wood

Bulgaria (Haskovo)
Overseas Environmental Cooperation Center, Japan
2002

Waste wood

Poland (Elblag)
The Kansai Electric Power Co., Inc.
2003

Beet, Grass

Poland
Fuji Research Institute Corporation
2004 0n-going

Rice husk

⑥

Thailand (5 central urban areas)
Mitsubishi Securities Co., Ltd.
2001

Rice husk

Cambodia
Mitsubishi Securities Co., Ltd.
2004 0n-going

Trash of Sugar cane

Thailand (Ratchaburi)
Kansai Environmental Engineering Center Co., Ltd.
2003～2004 0n-going

Waste wood

Viet Nam (Long An prpvince)
Sojitz Research Institute ,LTD
2004 0n-going

EFB of Oil Palm

⑦

Malaysia (Pantai Remis)
Mitsubishi Securities Co., Ltd.
2002

Waste wood

Indonesia (East Java ,Province, Central Jave Province)
Sumitomo Forestry Co., Ltd.
2003

Bagasse of Sugar cane

⑧

Brazil (Sao Paulo State)
Association of International Research Initiatives for Environment Studies
2003～2004 0n-going

EFB of Oil Palm

Malaysia (Johor Baharu)
JFE Engineering ,Inc.
2004 0n-going

Grid-connected Biomass power generation -through FS⑥-⑧

●**FS**

⑥:Rice husk power generation in Thailand 2001

⑦:EFB power generation in Malaysia 2002

⑧:Bagasse co-generation in Brazil 2004-2005 on-going

●**Contribution for SD of host countries**

□ **Energy supply**

□ Environmental improvement

Waste disposal

●**Problem**

□ Difficulty in collecting biomass constantly for steady supply of sources

to be continued⇒

Grid-connected Biomass power generation-through FS⑥-⑧

New Construction-1

		FS⑥⇒NM0019 approved by CDM-EB ⇒AM0004 reformatted by CDM-EB	FS⑦
TITLE		AT Biopower project	BumiBiopower (BBP) project
HOST COUNTRY		Thailand	Malaysia
PROJECT		□Build rice husk power plants generating 22-MW power. □Make a 25-year power purchase agreement (PPA) with the Electricity Generating Authority	□Build new 6-MW power plants useing empty fruit bunch(EFB) from palm oil mill. EFB : EFB:shreded→ dry→ fibers
BASELINE		□Displace electricity in grid by generating power Additional electricity supplied to grid (MWh/y) ×CEF of displaced grid (ton-CO2/MWh) □GHG emissions associated with biomass disposal or uncontrolled biomass. No count for CER←difficult to estimate	
	CARBON EMISSION FACTOR (CEF)	〔NM0019〕 Average Operating Margin (Average OM) ⇒Weighted average grid emission factor, including hydro (0.548-0.635 tCO2/MWh) < OM ←no data to calculate low-cost/must-run power sources 〔AM0004〕 the lower of the grid average CO2 emission factor or the operating margin CO2 emission factor calculated ex post for the year.	Weighted average grid emission factor ← Indicative simplified baselie and monitoring methodologies for Small scale CDM

to be continued⇒

Grid-connected Biomass power generation-through FS⑥-⑧

New Construction-2

	FS⑥⇒NM0019 approved by CDM-EB ⇒AM0004 reformatted by CDM-EB	FS⑦
TITLE	AT Biopower project	BumiBiopower (BBP) project
HOST COUNTRY	Thailand	Malaysia
ADDITIONALITY	□Investment barrier (ROE) □Technological barrier ・suspension-fire technology ←Rice husk ash(RHA) is used in lieu of the same amount of Portland cement, it would effectively displace GHG emission-intensive cement manufacturing process □Barrier due to prevailing practice □Institutional barrier	□Technological barrier □Investment barrier □Barrier due to low penetration
LEAKAGE	No leakage: adequate rice husk supply (Ratio for rice husk in Thailand⇒ supply : demand=4:6)	No leakage: no usage of EFB
TOWARD CDM	in progress ○Validation (Public Cosultation) ⇒Need approval of host country and validation report by DOE	in progress ○Validation-SSC (Public Cosultation) ⇒Need approval of host country and validation report by DOE

to be continued⇒

Grid-connected Biomass power generation -through FS⑥-⑧

Expansion or Replacement

	NM0001rev (approved but not yet reformated by CDM-EB)	FS⑧
TITLE	Vale do Rosário Bagasse Co-generation (VRBC) Project	Bagasse Co-generation Project
HOST COUNTRY	Brazil (Sao Paulo)	Brazil (Sao Paulo)
PROJECT	In sugar mill, □Installation and replacement of higher-efficiency steam turbines for for output expansion □Excessive electric power selling	
BASELINE	□Displace electricity in grid by generating power Additional electricity supplied to grid (MWh/y) ×CEF of displaced grid (ton-CO2/MWh) □GHG emissions associated with disposed and discarded biomass. No CER count← difficult to estimate	
CARBON EMISSION FACTOR(CEF)	○CM (OM：BM=50:50)⇒CEF=0.604 tCO2/MWh ○Hydro dominated grid⇒OM includes hydro on the peak load : Simple Adjusted OM.	
ADDITIONALITY	□National policy⇒ promote natural gas usage for the future energy demand □Investment barrier and others	□Technological barrier ：Not easy to demonstrate additionality ⇒Some bagasse power generation projects have been already implemented for sale in Brazil. ⇒No claim for CER when some high-efficiency steam turbines would start to be installed in
LEAKAGE	No leakage: during the not-harvest time utilize bagasse stored in the harvest time	
TOWARD CDM		not planned yet (FS:on-going) →Preparing PDD and planning for pre-validation in 2004

to be continued⇒

Grid-connected Biomass power generation -through FS⑥-⑧

Sugar mill in non-harvest time
（A sugar production line is closed）

Bagasse stored in the harvest time

MOE Scheme for next step

Financial Support for:

1. Model projects for preliminary practice of Validation

   (Capacity Building program for AE)

   - Japanese OEs
     – experience the validation process
   - Japanese private sectors
     – prepare PDD and be validated

2. An initial cost for starting CDM/JI project

Model projects for Preliminary practice of Validation in FY 2003

Technical adviser⇒Pacific Consultants Co., Ltd.
Secretariat⇒GEC

Armenia (Yerevan)
"Yerevan City Landfill Gas Utilization Project"
PDD preparation：Shimizu Corporation
ＡＥ（DOE)：Japan Quality Assurance Organization (JQA)

the Philippines (Metro Manila)
"PNOC EC Payatas Landfill Gas to Energy Project in the Philippines"
PDD preparation：Mitsubishi Securities Co., Ltd.
ＡＥ：TÜV Rheinland Japan

Malaysia(Negeri Sembilan)
"Methane Recovery and Renewable Electricity Generation Project at Palm Oil Mill in Malaysia"
PDD preparation： EX Corporation
ＡＥ：AZSA & Co

the Philippines (Hacienda Luisita, Tarlac Province)
"CAT Waste to Energy (CWTE) Anaerobic Digestion Project"
PDD preparation：Toyota Tsusho Corporation
ＡＥ：JCI CDM Center, Japan Consulting Institute (JCI)

Indonesia (Central Jave Province)
"The RPI Biomass Project in Central Java"
PDD preparation： Sumitomo Forestry Co., Ltd.ＡＥ：
ＡＥ：Japan Audit and Certification Organization for Environment and Quality (JACO)

Implementation Manual for CDM/JI-FS and PDD

-Contents-

- **Kyoto mechanism**
- Detailed explanation for **CDM**
  - Validation and Registration
  - A/R CDM rules determined by COP9
  - Simplified methodologies for small scale CDM project activities
- Decisions in **CDM-EB meeting**
  - PDD(ver.02) preparation
  - Approved Baseline and Monitoring methodologies
- **Experiences through FS**
  - LFG Capture project for energy supply
  - Methane fermentation project from organic wastes and sewage sludge for energy supply
  - Grid-connected Biomass power generation project
- **Eligibility Criteria** for sustainable development

  Brazil, India and Malaysia

Thank you for

your Attention !

http://www.unep.or.jp/gec/

E-mail：kunihiro@unep.or.jp

Annex

FS for reducing Wastes project

CH4 Fermentation
Kazakhstan(Astana)
Tohoku Electric Power Co.,Inc.
2004 0n-going

CH4 Fermentation
China (Dalian)
Shimizu Corporation
2003

CH4 Fermentation
Thailand (Chon Buri)
Hokkaido Electric Power Co.,Inc.
2004 0n-going

Compost
Malaysia (Johor Baharu)
Japan Environmental Consultants, Ltd.
2003

Slagging type Incineration
Indonesia (Sidoarjo)
PACIFIC CONSULTANTS INTERNATIONAL
2004 0n-going

Methane fermentation project from organic wastes and sewage sludge for energy use

●Contribution for SD of host countries

- □ Energy supply
- □ **Environmental improvement**
  Waste disposal, offensive odor, lengthening use life of landfills, water pollution
- □**Technology transfer for CH_4 fermentation**

●Advantages for CDM

- □ Additionality of the project activity
  (Investment barrier, Technological Barrier)
- □ Large amount of GHG reduction (CH4：GWP=21)

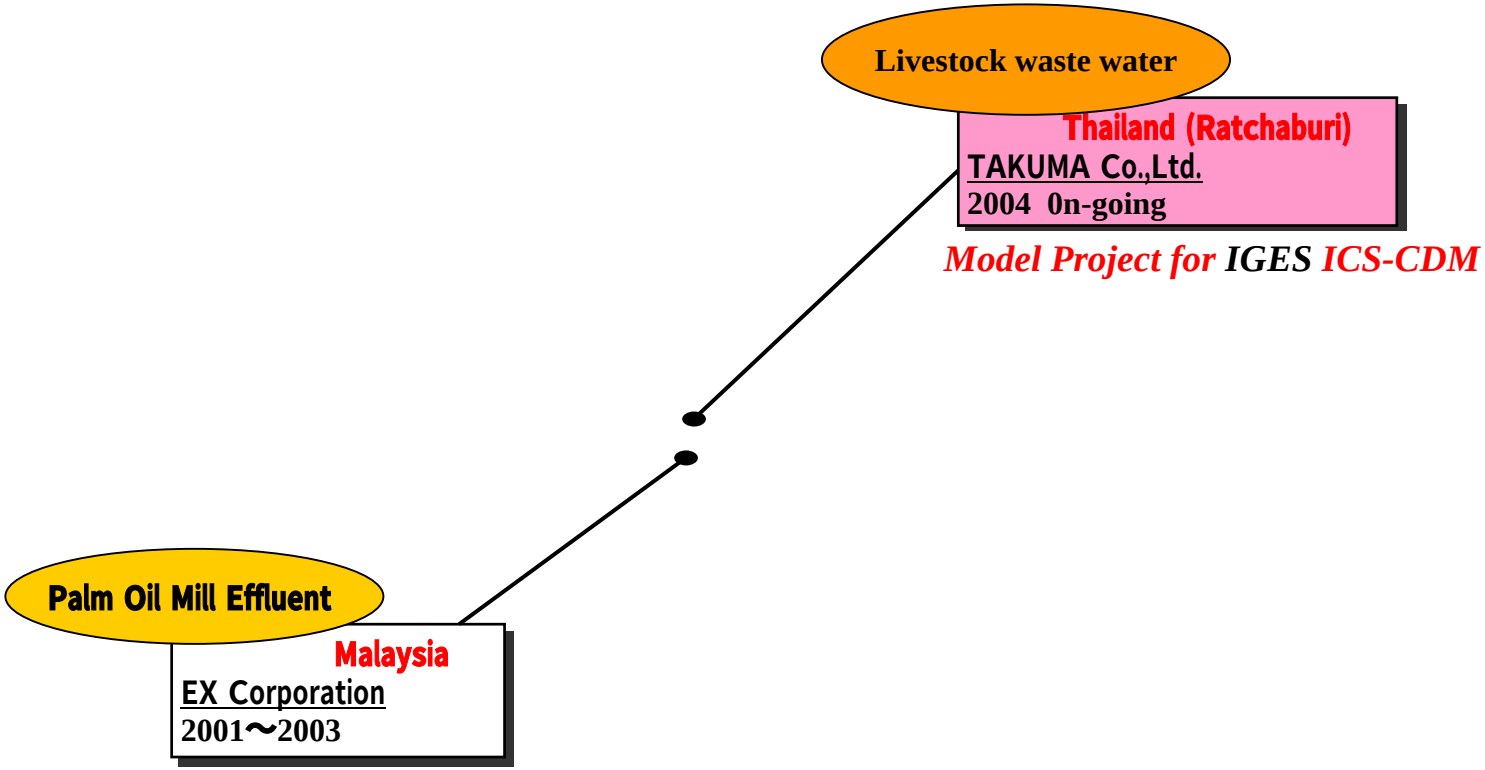
●Technical problems

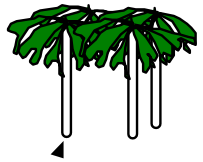
- □Residue treatment for further fermentation
  ⇒Compost in Aerobic fermenter
- □Control and maintenance for Methane fermenter)
- □Purifying biogas (if utilized as city gas)

●Difficulties for CDM

- □ Difficulty in setting the baseline

FS for Biogas energy use project





Biogas Power Generation
(Palm oil mill effluent , etc.)

● Contribution for SD of host countries

- ☐ Energy supply
- ☐ **Water pollution control**
- ☐ Contribution to local economy

● Advantages for CDM

- ☐ Large amount of GHG reduction (CH_4：GWP=21)
- ☐ Additionality of the project activity (Investment barrier)
- ☐ High sensitivity in CER value
  ⇒ CERs make cost- effectiveness high

● Difficulties for CDM

- ☐ Difficulty in setting the baseline

FS for manufacturing

Bio-diesel, Gasohol project for vehicle fuel

Ethanol Fermentation from oats

Lithuania (Kaunas)
Mitsui Engineering & Shipbuilding Co., Ltd.
2004 0n-going

Bio-diesel from Sunflower kernel

Thailand (Loei)
PowwowPool Co., Ltd.
2003～2004 0n-going

Ethanol Fermentation from Malasses and Bagasse

Viet Nam (Southern Part)
Nippon Mining Research & Technology Co., Ltd.
2002

Bio-diesel from Jatrapha Curcas

South Africa (KwaZulu Natal)
Mitsui & Securities Co., Ltd.
2004 0n-going

Ethanol Fermentation from Malasses and Bagasse

India (Koihapur)
Nippon Mining Research & Technology Co., Ltd.
2002

Bio-diesel, Gasohol project for vehicle fuel

●Contribution for SD of host countries

- ☐ Energy supply
- ☐ **Measures for lead pollution by leaded gasoline**
- ☐ **Measures for Air pollution by Diesel (NOx, SOx, PM)**

●Advantages for CDM

- ☐ Additionality of the project activity

(Investment barrier, Technological Barrier)

●Technical problems

- ☐Dewatering, Saccharification in case of using Bagasse (Gasohol)
- ☐Manufacturing technology (Bio-diesel)
- ☐ Difficulty in collecting raw materials constantly

●Difficulties for CDM

- ☐ Difficulty in setting **the project boundary** and baseline
- ☐ Low CER

FS for other project for biomass use

Recycle of Livestock waste "Green Mighty System "

Ukraine (around Khar'kov)
Non Profit Organization Japan PFI Association
2001

Carbonization

Indonesia (South Sumatra)
Kansai Environmental Engineering Center Co., Ltd.
2001

FS for A/R project

Social

Myanmar (South Shan)
KARAMOSIA(NGO admitted)
2000

Social

Mongolian (Tove and Selenge)
Hyogo Environmental Advancement Associatio
(NPO admitted)
1999～2000

Social

China (Datong, Shanxi)
Green Earth Network(NGO admitted)
1999～2000

Industrial

Viet Nam (Hue Province)
Nissho Iwai Research Institute ,LTD **2001**

Industrial

Malaysia (Sarawak)
Kansai Environmental Engineering Center Co., Ltd. **1999～2000**

Industrial

Cambodia (Mondul Kiri highlands)
Marubeni Corporation **2003**

Social

Tanzania (Dodoma)
Earth Greenery Activities Japan (NGO admitted) **1999**

Social

the Philippines
OISCA(NGO) **2003**

Social

Ecuador (Esmeraldas)
Conservation International
2004 0n-going

Industrial

Madagascar (Toamasina Province)
Oji Paper Co., Ltd. **2003**

Industrial

Indonesia(East Kalimantan,East Jawa Province and Central Jawa Province)
Sumitomo Forestry Co., Ltd.
1999～2004 0n-going

Social

Indonesia (West Nusa Tenggara)
Japan International Forestry Promotion & Cooperation Center (JIFPRO) (NPO admitted)
2000,2003

Social

Indonesia (Pontianak, West Kalimantan)
International Charcoal Cooperative Association (NGO) **1999～2000**

A/R project

●Contribution for SD of host countries

- ☐ Measures for Deforestation and improvement in ecological situation
- ☐ Promotion of forest industry (industrial forestation)
- ☐ Environment restoration (social forestation)

●Disadvantage

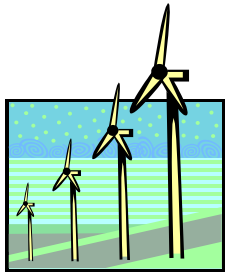
- ☐ Risk and Uncertainty
  (Forest fires, Diseases and pests, Leakage)
- ☐ Low cost-effectiveness(in case of social forestation)

●Difficulties for CDM

- ☐ Temporary-CER system (tCER, lCER)

⇒lower CER

⇒make up expired tCER(or lCER) with other type of CER



FS for Other project

Geothermal Heat Pump

Russia (Irkutsk)
Japan Metals and Chemicals Co., Ltd. **2003**

Fuel switching from coal to natural gas

Russia (Khabarovsk)
Toyota Tsusho Corporation
2004 0n-going

Wind Power Generation

Estonia (around Paldiski)
Overseas Environmental Cooperation Center, Japan (NPO admitted)
2001

Incineration of HFC 23 waste streams

Mexico (Monterrey)
UNICO International Corporation
2004 0n-going

Wind Power Generation

Hungary (Mosonmagyarovar)
Mizuho Securities Co., Ltd.
2003

Destruction of Hydrochlorofluorocarbon

South Korea (Monterrey)
Institute for Industrial Location CO.,Ltd.
2004 0n-going

Wind Power Generation and Solar panel

Cambodia (Mondul Kiri highlands)
Marubeni Corporation **2004 0n-going**

Model Project for IGES ICS-CDM

Destruction of Hydrochlorofluorocarbon

China(Shanghai)
Nissho Iwai Research Institute ,LTD
2003

Solar panel and others

the South Pacific Island Countries
Pacific Consultants Co., Ltd.
2001～2002