

# CDM Financing

**Support of Technology Transfer**  
**2003.11.4**  
**ICETT**

Clean Energy Finance Committee  
Mitsubishi Securities



# Mitsubishi Securities Clean Energy Finance Committee

- a) Operating unit specializing in environmental financial services related to clean energy
- **Financial advisory services** - equity, debt, and CDM finance
  - **Assistance with CDM process**
  - **Production of Project Design Document** (baseline setting, etc.)
- b) Team of professionals dedicated solely to energy CDM projects in Asia

# Some of Our Experiences in CDM Projects

## 1) Renewable energy

- a) Thailand - 22MW power plants using rice husk as fuel  
Baseline Methodology was approved by CDM EB
- b) Thailand - 20MW power plant using emission-neutral biomass fuel
- c) Malaysia - 6MW power plant fueled by empty fruit bunches  
Informally approved by Malaysian DNA

## 2) Methane capture

- a) Philippines – anaerobic treatment of municipal waste to capture methane; the methane will be used to fuel power generation.
- b) Philippines - Anaerobic treatment of factory wastewater
- c) Malaysia - Methane recovery from wastewater at palm-oil plantation: the biogas will then be used to generate power, replacing fossil-based electricity

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# 1 What is a carbon credit?

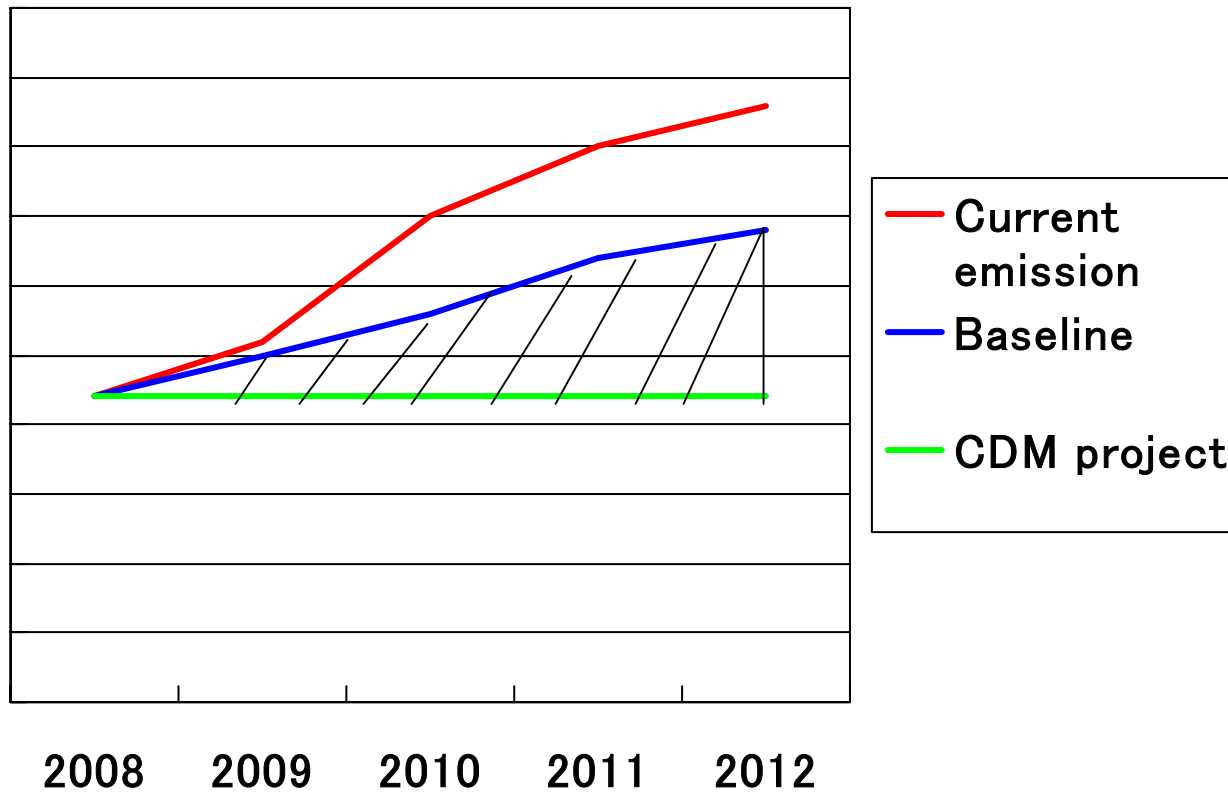
1) Amount of reduction of greenhouse gas emissions, from an emissions source, in an approved project, under the Kyoto Protocol.

## 2) GHG (Green House Gases)

Defined by the Kyoto Protocol that qualify for the aforesaid carbon credits are:

Carbon Dioxide, Methane, Nitrous Oxide, Perfluorocarbons  
Hydrofluorocarbons, Sulphur Hexafluoride

### 3) Carbon credits (CERs) calculation



# 2 Who is a buyer?

## 1) Annex I Countries

- a) Countries which have accepted GHG emission targets under the Kyoto Protocol  
(Mostly OECD countries)
  
- b) **help to** achieve compliance with their reduction commitments  
(by obtaining CERs from their investment in GHG mitigation projects in non-Annex I countries)

## 2) Total planned carbon credit purchase , 1<sup>st</sup> Kyoto commitment period (2008-12)

Austria	20-30 MtCO <sub>2</sub> (JI&CDM)
Canada	50MtCO <sub>2</sub> (CDM, JI&ET)
Denmark	6.25MtCO <sub>2</sub> , but ~120mil.EURO to be invested in JI-CDM
Italy	At least 60MtCO <sub>2</sub> (JI&CDM)
Netherlands	67MtCO <sub>2</sub>

Source: Point Carbon

### 3) Japan's perspective to achieve the 6% target

CO2 from non-energy sources	- 0.5%
Technology Innovation	- 2.0%
HFC/PFC/SF6	2.0%
Sinks	- 3.9%
Kyoto Mechanism	- 1.6%
Total	- <u>6.0%</u>

Emission in 2001 was 5% up from 1990

120mil.tones-CO2 Net reduction required (-11%)

#### 4) Japan's CDM project applications endorsed

Country	Entity	Project Name	Amount of Carbon Credits
Brazil	Toyota Tsusho	V&M Tubes do Brazil Fuel Switch	1,130,000ton-CO2/year
Thailand	J-Power	Rubber Wood Residue Power Project	60,000ton-CO2/year
South Korea	INEOS Japan	HFC Decomposition Project	1,400,000ton-CO2/year
Bhutan	KEPCO	Mini Hydro Project	500ton-CO2/year
Kazakhstan (JI)	NEDO	The efficient use of energy using a gas turbine cogeneration system	62,000ton-CO2/year

## 5) Voluntary emissions trade transactions in Japan

Entity	Transaction	Date
PCF	8 Japanese companies, JBIC	1/2000
Chubu Elec. Tomen	Purchase of ER* from Australia	3/2001
Cosmo Oil	Purchase of sequestration rights call option from forestry in Australia	6/2001
Tohoku Elec.	Purchase of Carbon neutral coal w/ ER	10/2001
Shikoku Elec.	Purchase of ER from DuPont Canada	12/2001
Mitsubishi Corp.	Purchase of ER from Hydro power project in Chile	6/2002
Toyota Tsusho	Purchase of ER of iron project in Australia	10/2002

(Note: ER= emission reduction)

# 3 Who is a seller (supplier)?

## 1) Host country privilege

It is the host party's privilege to confirm whether a CDM project assists it in achieving sustainable development.

(Marrakech Accords P68)

2) Project organizers can acquire and sell carbon credits.  
Not a loan.

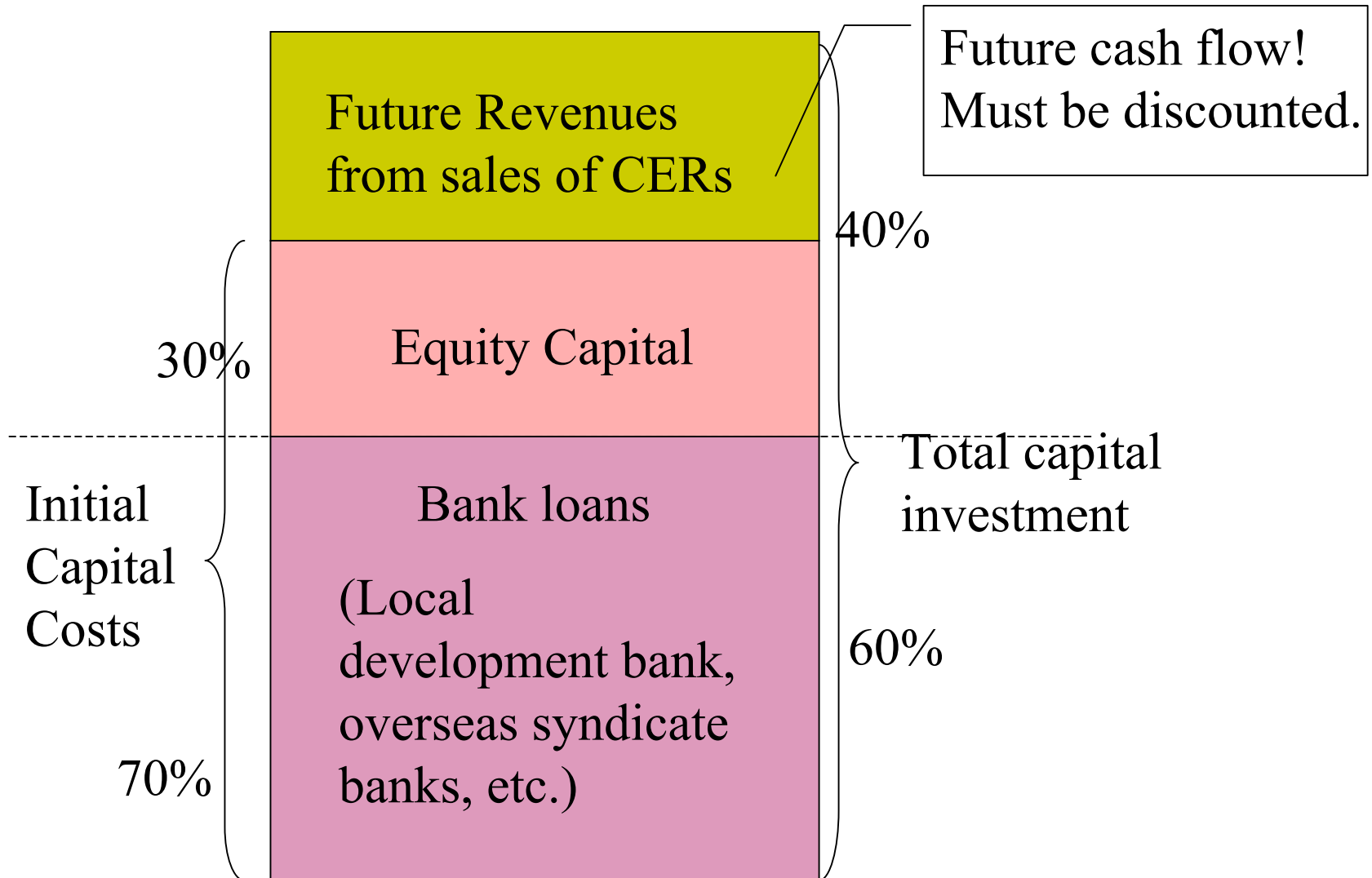
3) The payment for CERs will be made in a hard currency by very creditworthy buyer(s).

# 4 How Will CDM Help Project Financing?

Direct	Revenues from CDM projects
Indirect	Higher project status as a result of CDM designation <ul style="list-style-type: none"><li>• Publicity value</li><li>• Will increase the project's attractiveness to both equity investors and lenders</li></ul>
Financial contribution	<ul style="list-style-type: none"><li>• Increase in ROE*</li><li>• Potentially an important source of funding</li></ul>

Note: ROE = Return On Equity

# CDM Project Financing Case



# 5 CDM Finance Terms

## 1) Banking

- a) Kyoto Protocol commitment period is 2008-2012
- b) For CDM projects, reductions prior to 2008 are counted and can be banked for use during 2008-2012. (Kyoto Protocol, Article 12, 10)

## 2) Price

- a) Determined by supply/demand
- b) Current market
  - Soft after the U.S. withdrawal from Kyoto
  - US\$3-5/CO<sub>2</sub> depending on project quality and investment circumstances
  - Option trading
  - Forward Trading
- c) Long-term forecast: US\$5-15/CO<sub>2</sub>

### 3) Payment

- a) “Payment against delivery” is the principle.
- Project starts operation
  - Reduction accomplished
  - CERs issued
  - Payment made when the CERs are transferred
- b) Partial prepayment is negotiable, but usually expensive. De facto prepayment is often obtained in the form of equity investment.

## 4) Crediting Period

Two options

- 7 years with an option for renewal at most two times  
(each renewal must be reviewed by a \*DOE for validity)
- A maximum of 10 years with no option of renewal

Note: DOEs =Designated  
Operational Entities  
Designated by the U.N. (COP9?)

# 6 CER Revenues

## Case 1 Renewable energy

A 20MW biomass plant

Capital Investment	US\$30 million
Emission-free power generation	$20\text{MW} \times 24\text{h} \times 365\text{d} \times 80\% = 140,000\text{MWh/year}$
Carbon emission of connected grid	50% combined-cycle (CEF = $0.40\text{kgCO}_2\text{e/KWh}$ ) 50% fuel oil (CEF = $0.72\text{ kgCO}_2\text{e/KWh}$ )
Carbon intensity of replaced electricity	$50\% \times 0.40\text{ kgCO}_2\text{e/KWh} + 50\% \times 0.72\text{ kgCO}_2\text{e/KWh}$ $= 0.56\text{ t-CO}_2\text{e/MWh}$
Carbon credit amount	$140,000\text{MWh/year} \times 0.56\text{t-CO}_2\text{e/MWh}$ $= 75,000\text{t-CO}_2\text{e/year}$

# Case 1 Carbon Credit Revenues

$$75,000\text{tCO}_2\text{e/year} \times \$5 = \mathbf{\$0.38\text{million/year}}$$

(US\$million)

Crediting Period Price	Annual	7 years	10years	21years
US\$5/CO2	0.38	2.7	3.8	8.0
US\$10/CO2	0.76	5.4	7.6	16.0

(cf.) Investment amount = US\$30million

## Case 1 Upside Potential

- Displacement of more carbon-intensive energy use.

(e.g. bunker oil-fuelled on-site power generation)

- Methane emission in baseline

(e.g. some fuel sources are left is decay clearly emitting methane and no regulations likely to change the situation)

# Case 1 ROE (Return on Equity) enhancement by CER

Capital Cost	\$30million
Debt/equity ratio	2:1
Equity Investment	\$10million
Carbon Credit Revenues	0.38million/year at @\$5
Increase in ROE	$\$0.38\text{million}/\$10\text{million} = 3.8\%$  Can be more than 5% if: 1) The project displaces a heavily carbon-intensive mode of power generation, e.g. on-site diesel 2) The price rises above US\$7

## Case 2 Methane Capture

A facility to capture 4,000 tCH<sub>4</sub>/year from wastewater

Capital Investment	US\$4 million
Methane Gas GWP*	1 CH <sub>4</sub> = 23CO <sub>2</sub> as GHG It has a GWP 23 times that of carbon dioxide
Baseline	Normally 60% of captured methane amount, due to aerobic reaction in the baseline
Carbon intensity of replaced electricity	Combusting 1 ton of methane yields about 3 tones of CO <sub>2</sub>
Carbon credit amount	4,000 tCH <sub>4</sub> /year x 60% x (23-3) = 48,000 t-CO <sub>2</sub> /year

Note: GWP= global warming potential

## Case 2 Upside potential

- Additional credits for displacement of fossil fuel in steam/electricity generation (Typically a 10%-15% increase in the CER amount.)
- In the case of landfill methane recovery projects, baseline emissions can be equal to the amount of methane captured.

## Case 2 Carbon Credit Revenues

48,000 tCO<sub>2</sub>e/year x \$5 = \$0.24 million/year

(US\$million)

Price \ Crediting Period	Annual	7 years	10years	21years
US\$5/CO <sub>2</sub>	0.24	1.68	2.4	5.04
US\$10/CO <sub>2</sub>	0.48	3.36	4.8	10.08

- A significant part of the initial investment of US\$4million can be recovered through CERs, even on a present value basis.
- But CERs alone cannot finance the project.

## Case 1 Carbon Credit Revenues

$$75,000 \text{tCO}_2\text{e/year} \times \$5 =$$

**\$0.38million/year**

(US\$million)

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Investment amount = US\$30million

A significant part of the initial investment of US\$4million

# **7 Requirements of CDM**

- 1) GHG reduction - real and measurable**
- 2) Contribution to the sustainable development of the host country**
- 3) Many of the host countries expect technology transfer from Annex I countries**

## 4) Additionality

### - A CDM project must achieve

- a) Reductions in emissions that are **additional** to any that would occur in the absence of the certified project activity.

(Kyoto Protocol, Article 12.5(c))

A CDM project activity is **additional if** anthropogenic emissions of greenhouse gases by sources are **reduced below those that would have occurred in the absence of the registered CDM project activity.**

(Marrakech Annex Article 43)

b) More strict interpretation: CERs are

- The CDM status will be given only to those projects that cannot be implemented without it.
- Those projects that can/will be carried out in the course of regular business (Business-As-Usual (=BAU) projects) are disqualified.

c) Barriers to BAU implementation include

- High risk investment barrier
  - Economic uncertainty
  - New technology
  - Other barriers (regulatory barriers, competitive disadvantage barriers, etc.)
- Low return

d) It is advisable not to start construction until the major part of the validation process is finished.

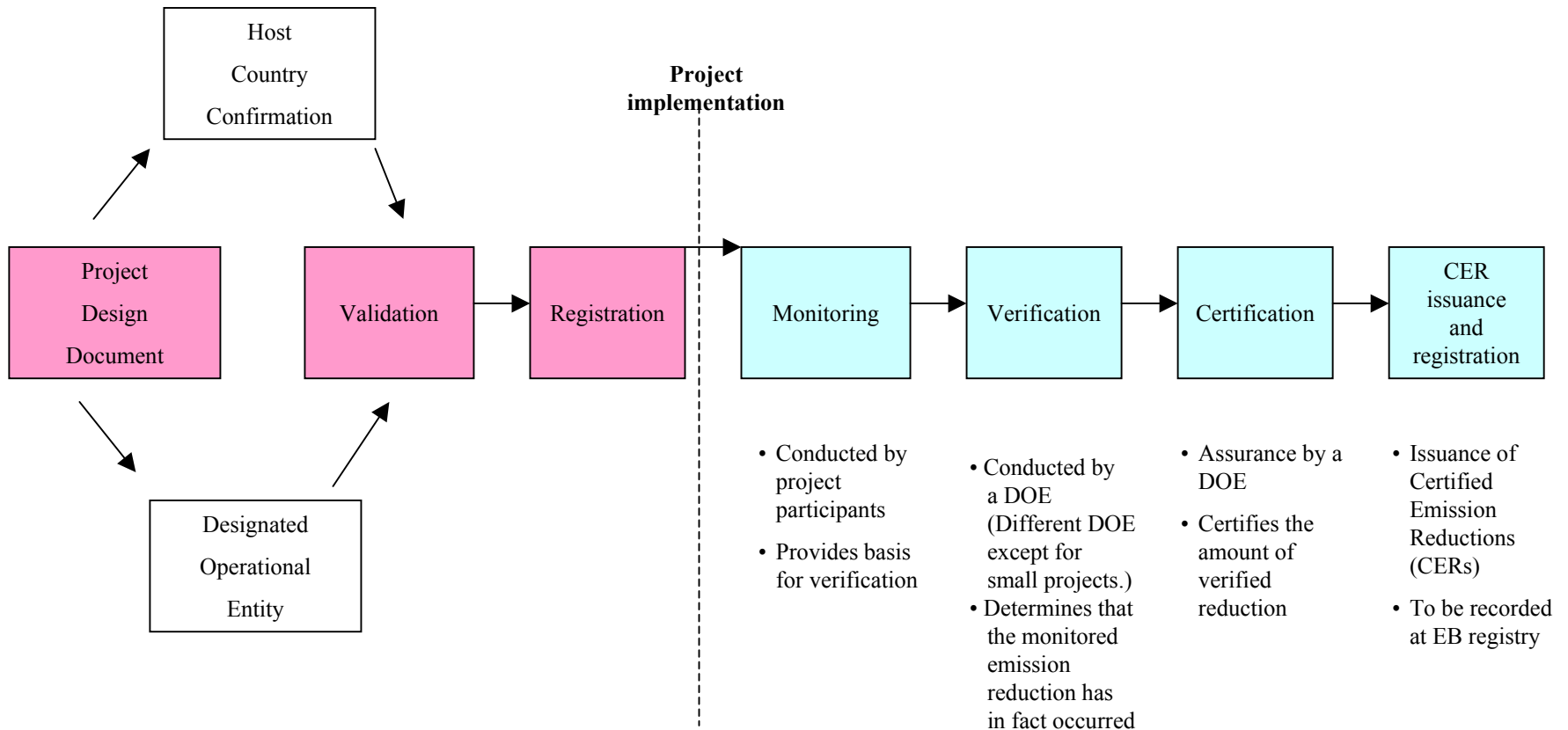
- Avoid being confused as a BAU project
- Allow professional observation and recording of the current situation, making it available in baseline setting.

e) No ODA diversion

- Unclear of the definition
- Can be used for covering a part of the capital cost without obtaining CERs

# 8 CDM Procedures

## 1) CDM Steps



**Process less difficult than it seems at first**

## 2) Approvals for CDM

Timing	Purpose	Detail
Before	<ul style="list-style-type: none"><li>• To determine whether proposed project meet requirements of the CDM</li></ul>	<ul style="list-style-type: none"><li>• Confirmation by the host country government</li><li>• Validation by a DOE</li><li>• Review and registration by the *EB</li></ul>
After	<ul style="list-style-type: none"><li>• To determine whether the monitored reductions in GHG emissions have actually occurred as a result of the registered CDM project</li></ul>	<ul style="list-style-type: none"><li>• Verification by a DOE</li><li>• Review by the host country government and the EB</li></ul>

(Notes) EB: Executive Board

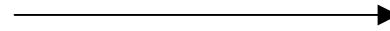
### 3) Validation

#### Project Design Document

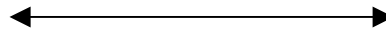
- 1 To encompass:
  - Propose purposes
  - Baseline
  - Additionality
  - Environmental impacts
  - Stakeholder comments
  - Monitoring plan
  - Reduction calculations
- 2 Prepared by:
  - Project participant(s) or
  - CDM finance specialist

(Cf) Producing financial statements

Submission



Conflict of  
interest



#### Validation

- 1 To encompass:
  - Review
  - Disclosure
  - Public comments
  - A request to EB  
for registration
- 2 Conducted by a  
DOE

(Cf) Auditing financial statements

## 4) Monitoring and Verification

Timing	Purpose	Detail
Before	<ul style="list-style-type: none"><li>• Develop an adequate plan</li><li>• Monitoring Plan must be included in the PDD and approved</li></ul>	<ul style="list-style-type: none"><li>• Project emissions</li><li>• Baseline emissions</li><li>• Environmental compliance</li><li>• Other</li></ul>
After	<ul style="list-style-type: none"><li>• To check whether the planned reduction has actually occurred</li></ul>	<ul style="list-style-type: none"><li>• Monitoring by the project participants</li><li>• Verification by a DOE</li></ul>

## 5) Applicant Operational Entities (As of 9/2003)

Japan Quality Assurance Org.	Asahi & Co.
Japan Audit and Certification Org. for Environment and Quality	SGS UK Ltd.
Det Norske Veritas Certification Ltd.	BVQ Holdings
ChuoAoyama PwC Sustainability Research Institute	Korea Energy Management
TUV Suddeutschland	PricewaterhouseCoopers Certification
Tohmatsu Evaluation and Certification Org.	TUV Anlagentechnik GmbH
Japan Consulting Institute	URS Verification Ltd.
KPMG Certification	Clouston Environmental Sdn. Bhd.

Source: <http://cdm.unfccc.int/DOE/CallForInputs>

# 9 Costs of CDM Finance

## 1) Monetary costs

### a) PDD Production

- Internal manpower cost or
- Outsourcing cost (Fixed fees + success fees)

### b) Validation

### c) Verification/certification (Monitoring)

### d) Registration fee

## 2) Non-monetary costs

### a) Disclosure

### b) Public comments

### **3) Subsidies for some transaction costs in Japan**

#### a) NEDO

- Feasibility study of the project
- PDD production, Validation
- Legal documentation
- (• 1/4 of the equity investment with upper limited)

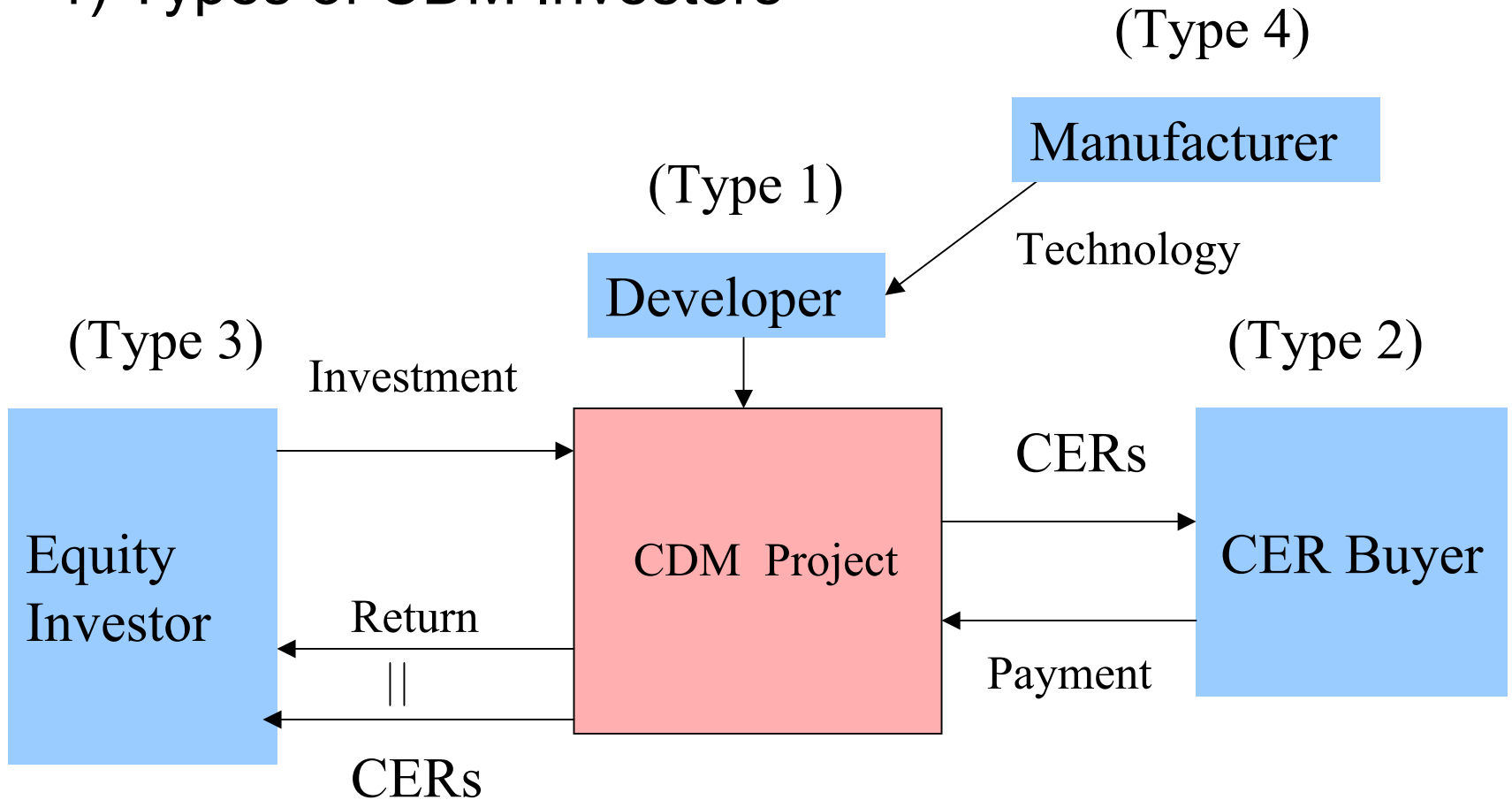
#### b) MOE (Ministry of Environment)

- Feasibility study of the project
- PDD production, Validation
- Legal documentation
- (• 1/3 of the equity investment with upper limited)

### **4) Find a Japanese partner! (the subsidies available for Japanese entities only)**

# 10 CDM Investors

## 1) Types of CDM Investors



## 2) Carbon funds by type

### a) Pure carbon funds

World Bank Prototype Carbon Fund (PCF)	\$180 mil.	6 governments, 17 private sectors
CERUPT	Total undecided	Dutch government
GTZ Fund	Total undecided	German government

### b) Equity plus carbon funds

FondElec Global-Asian Clean Energy Services Fund	Target \$150m-200m	2 anchor Investors	Energy efficiency, renewable energy, distributed generation
Asia Carbon Fund	Target \$120m	Private Investors	Renewable energy, energy efficiency, etc.

### 3) Carbon funds in Japan

#### a) Development Bank of Japan (DBJ)

“Carbon Fund of Japan” (METI, MOE)

- Launches in early 2004 to start operation in the spring 2004 w/ US \$100 mil.
- Pure Carbon Financing, No project finance
- Pays on delivery
- Focuses on Asia, especially the SE Asia

#### b) Japan Bank of International Cooperation (JBIC)

“Japan Carbon Fund”

- Launches in early 2004
- CER Purchase & Project Financing???

# 11 Potential Projects

## 1) Approved Baseline Methodologies

Ref. No.	Project Name	Proposed Methodology	Country
NM0004	Salvador da Bahia Landfill Gas Project	<b>Methane avoidance (Fugitive Emissions)</b>	Brazil
NM0005	NovaGerar landfill Gas to Energy Project	<b>Methane avoidance (Fugitive Emissions)</b>	Brazil
NM0007	HFC Decomposition Project in Ulsan	<b>HFC Decomposition</b>	Republic of Korea
NM0010	Durban Landfill gas to electricity project	<b>Methane avoidance (Fugitive Emissions); Displacement of grid electricity</b>	Republic of South Africa
NM0016	Graneros Plant Fuel Switching Project	<b>Fuel switch from coal (and other fossil fuel) to natural gas</b>	Chile
<b>NM0019</b>	<b>A.T. Biopower rice husk power project</b>	<b>Rice husk-fuelled electricity generation</b>	<b>Thailand</b>

Source:<http://cdm.unfccc.int/methodologies/process>

## 2) Potential CDM projects in Asian Countries

- a) Meet Host country's CDM criteria  
e.g. renewable energy such as biomass and wind, fuel switch from banker oil.
  
- b) The more Global Warming Potential (GWP), the more CER revenues.  
Biogas projects, Landfill gas recovery, etc.

<b>GHG</b>	<b>GWP</b>
Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	21
Nitrous Oxide (N <sub>2</sub> O)	296
Perfluorocarbons(PFCs)	5700~11900
Hydrofluorocarbons (HFCs)	120~12000
Sulphur Hexafluoride (SF <sub>6</sub> )	22200

Source: IPCC  
Third Assessment  
Report

# Questions

- 1) Do you have any idea of CDM projects?
- 2) Do you know the status of your government for CDM?
- 3) Have you ever talked about the CDM with a Japanese partner?
- 4) Do you think the CDM is useful for your project?

# About us

## 1) Mitsubishi Securities (MSCL)

- a) Investment banking arm of Mitsubishi Tokyo Financial Group. Subsidiary of Bank of Tokyo-Mitsubishi
  
- b) Full range of financial activities in equities, bonds, and derivatives. Both wholesale and retail.

## 2) Clean Energy Finance Committee

- a) Operating unit specializing in environmental financial services related to clean energy
  - Financial advisory services - equity, debt, and CDM finance
  - Assistance with CDM process
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# MSCL CDM Services

## A. Initial Project Assessment

1. The policy frameworks relating to the CDM
  - 1) The Kyoto Protocol
  - 2) The Marrakech Accords
  - 3) Decisions made, and Guidelines issued by the EB
  - 4) Host country national laws and policies relating to CDM projects
2. Preliminary assessment of the Project from the viewpoints of:
  - 1) Additionality
  - 2) Contribution to sustainable development
  - 3) Other CDM requirements
3. Estimated amount of CERs

## **B. Assistance in the Management of the Project for CDM Financing**

1. Revenue and cost estimates for the Project under the CDM
2. Scheduling
3. Presentations to the management, the board of directors, and other decision-making organizations
4. Advice on client workload and staffing for CDM finance

## **C. Development of the Project Design Document (PDD)**

1. Formal analysis of relevant factors including but not limited to:
  - 1) Additionality
  - 2) Contribution to host country sustainable development
  - 3) Baseline emissions
  - 4) Project emissions
  - 5) Leakage
  - 6) Expected GHG reduction (CER amount)
2. Assistance in the development of a Monitoring and Verification Plan (MVP) to be included in the PDD
3. Production of a PDD

## **D. Assistance in Obtaining Necessary Approvals**

1. Validation by a designated operational entity (DOE)
2. Confirmation by the host country
3. Registration with the CDM Executive Board (EB)

## **E. Structuring the Sale of CERs from the Project**

1. Advice on the various options for structuring the sale of CERs arising from the Project
2. Assistance in marketing including but not limited to:
  - 1) Producing a memorandum to be distributed to possible buyers of the CERs
  - 2) Assistance in identifying possible buyers for the CERs and assistance in negotiation on the sale of the CERs

# **Contact Information**

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