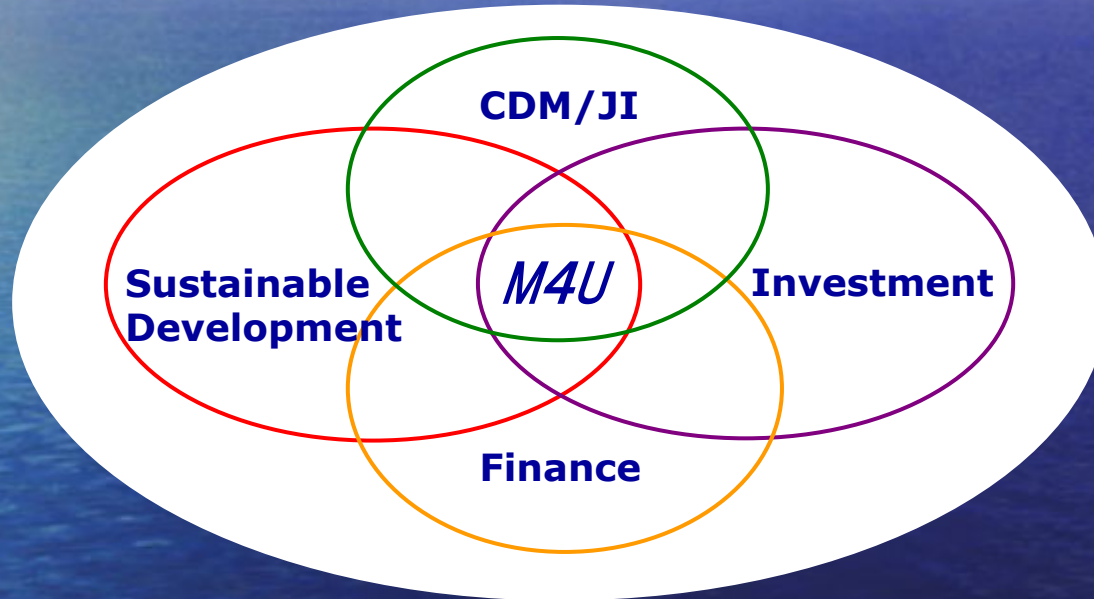


Barriers & Challenges to Financing for Energy Efficiency CDM Projects

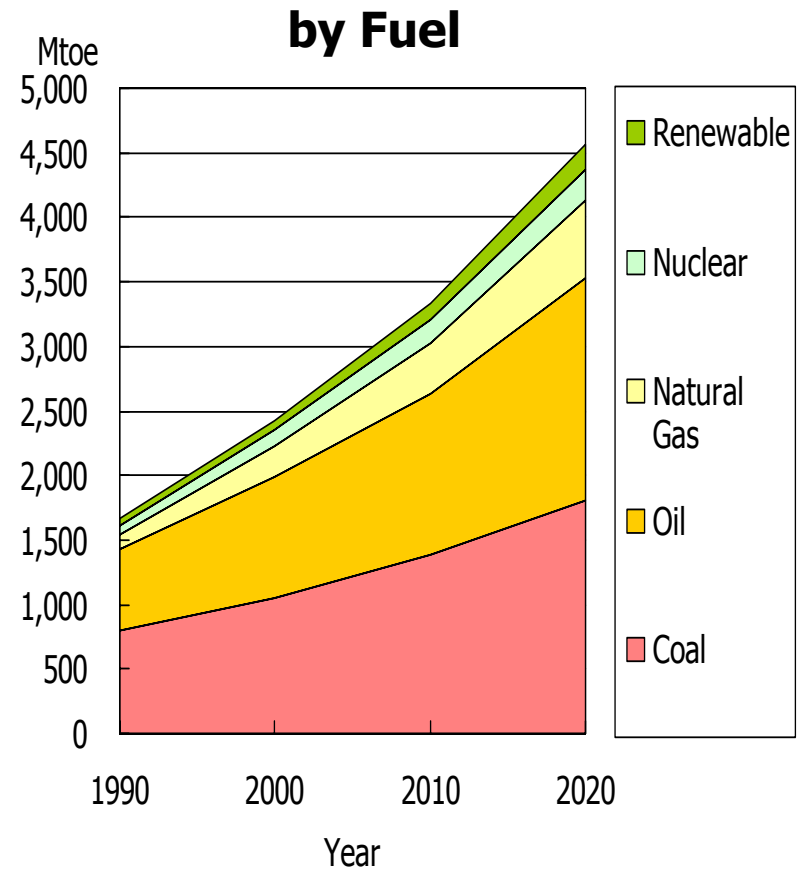
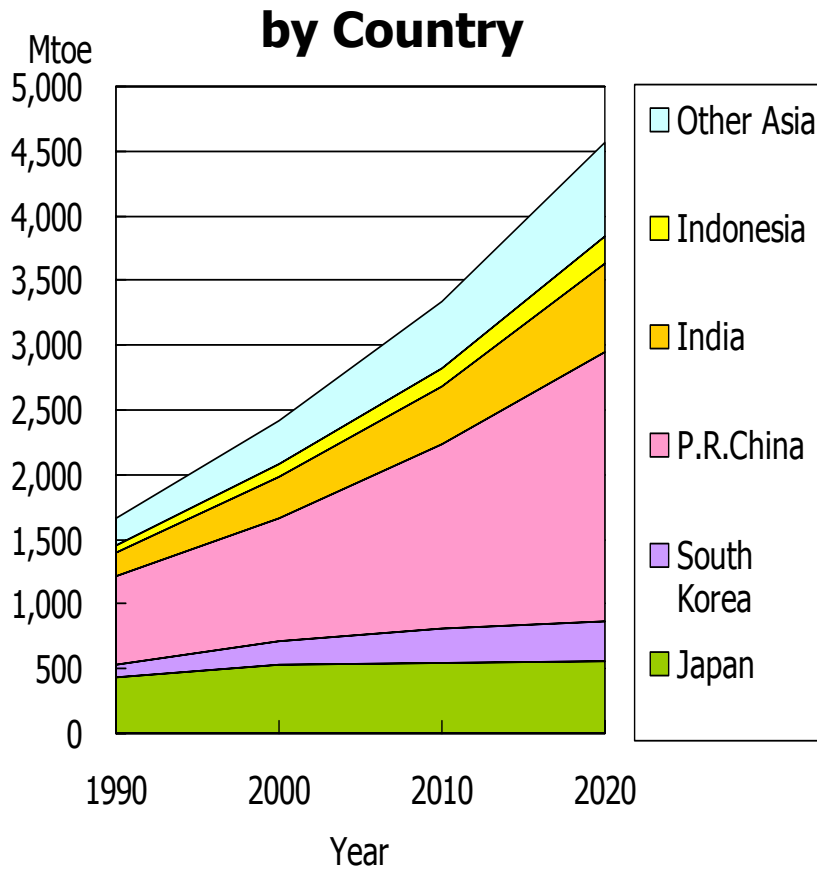


Advisory Service on Clean Development Mechanism and Financing for Sustainability

MASUDA, Masato President of M4U Limited,
Chief Counselor to the president of Japan Carbon Finance, Ltd.

on February 25, 2005 at CTI Industrial Joint Seminar on
Technology diffusion of Energy Efficiency in Asian Countries, Beijing, China

1. Outlook for Primary Energy Consumption in Asia



from The Institute of Energy Economic, Japan, March 2004

2. Heavy Reliance on Fossil Fuels might cause:

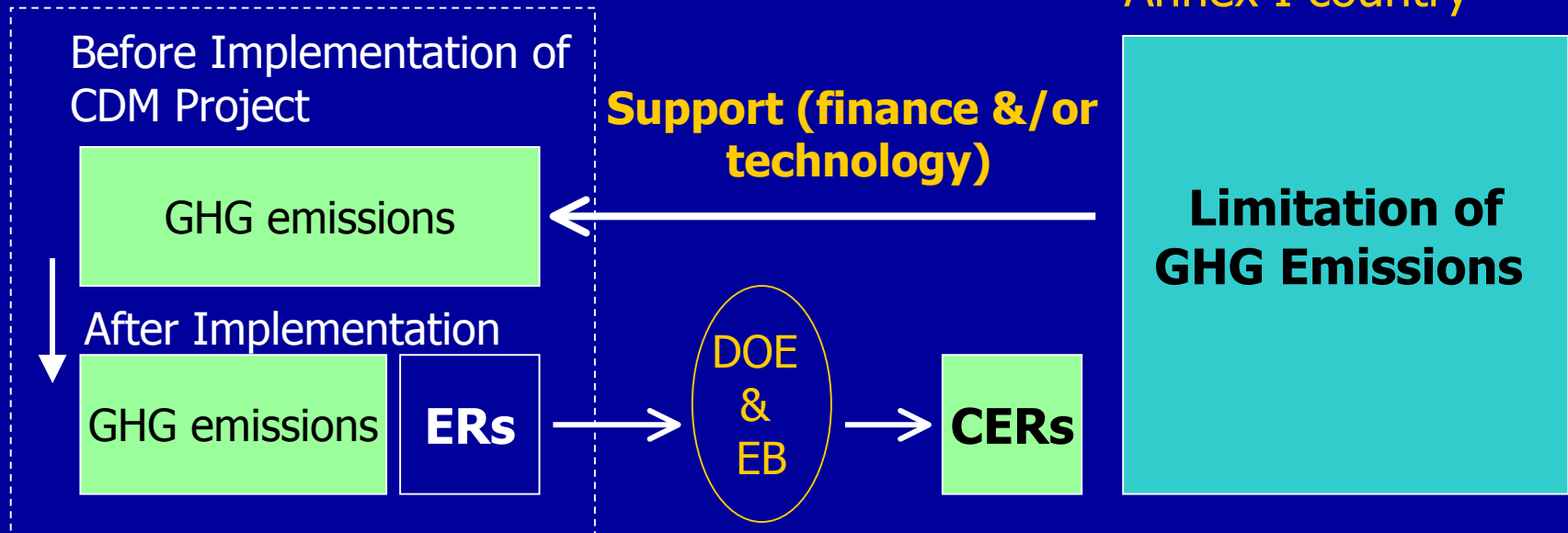
- **Uncertainty of Economic Growth** due to bottleneck of energy supply
- **Tension among Countries** due to strengthening energy security
- **Domestic Environmental Problems** caused by emissions of SO₂, NO_x, etc.
- **International / Global Environmental Problems** such as transborder pollution, climate change, etc.

3. CDM is expected to improve Energy Efficiency in Developing Countries

- CDM shall assist **Non-Annex I countries** in **achieving Sustainable Development**, and assist Annex I countries in achieving compliance with their Kyoto commitments

Non-Annex I country as Host Country

Annex I country



4. Difficulties for Energy Efficiency CDM

- Reality is far from the expectation:
 - (a) Only 2 methodologies for Energy Efficiency CDM have been approved (as of Feb.18, 2005)
 - (b) None of Energy Efficiency CDM project has been registered
- Main Reasons are:
 - (a) Methodological Difficulties
 - (b) Financial Difficulties

5. Methodological Difficulties for Energy Efficiency CDM

- **Baseline Determination**

- (a) Actual or historical trend at retrofit project: volatility of performance, expansion of capacity, etc.
- (b) Investment analysis for new project: how to define alternatives, benchmark for a single alternative, etc.
- (c) Control group analysis based on common industrial practice: how to select plants, confidential data, etc.

- **Additionality Justification**

- (a) Barrier analysis: what are sufficient grounds
- (b) Investment analysis: cash-inflow /opportunity income from saved energy, uncertainty of capital expenditure, energy prices, etc.

6. Challenges to Methodological Difficulties at COP10

- **Top-down Approach vs. Bottom-up Approach**

No consensus for Top-down Approach

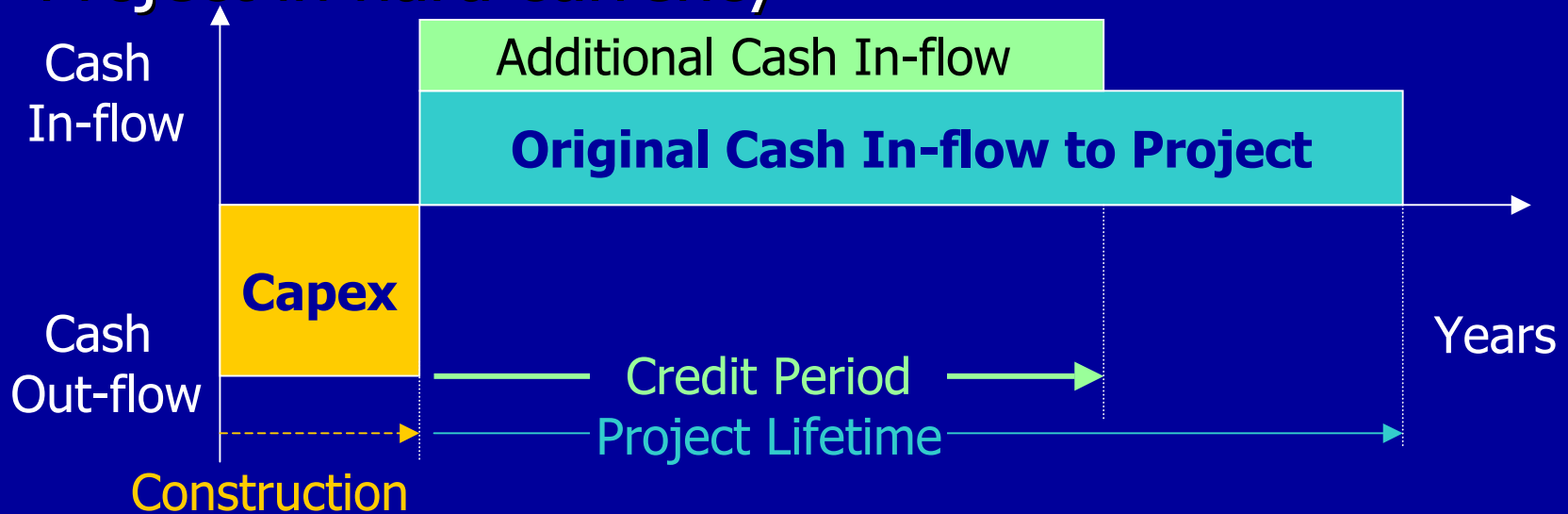
- **COP's Guidance relating to the CDM**

(FCCC/CP/2004/L.2, Para.15.)

“*Encourages* project participants to make proposals for new baseline and monitoring methodologies for types of projects activities . . . , such as transportation, **energy efficiency** and district heating, and the Executive Board to consider such proposals with priority and to continue its work on elaborating **consolidated methodologies** for new sectors”

7. Financial Difficulties for Energy Efficiency CDM

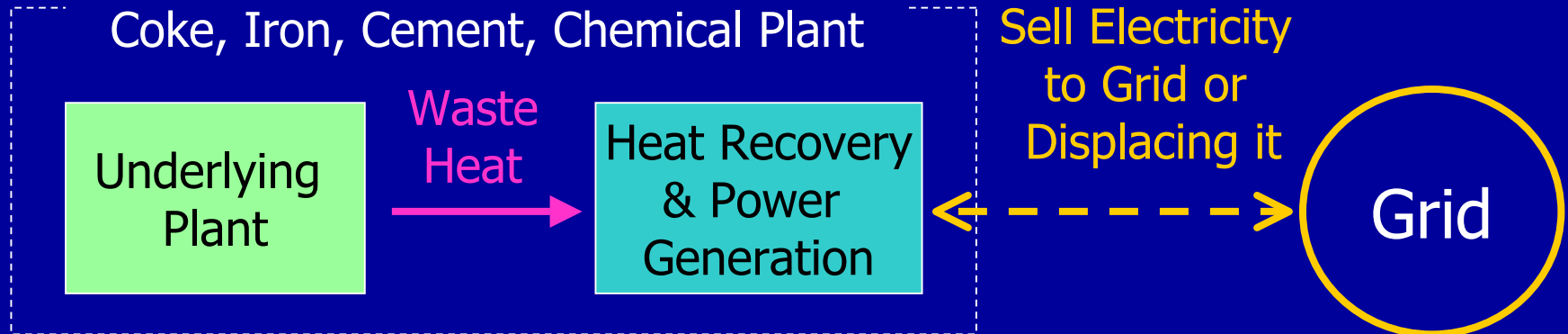
- Carbon Finance brings **Additional Cash In-flow** to Project in hard currency



- Energy Efficiency CDM is more difficult because of:
 - (a) **Big Capital Expenditure (Capex)**, and
 - (b) **Low Global Warming Potential (GWP)**

8. Investment Analysis of Energy Efficiency Project

- **Waste Heat Recovery Project** is assumed as Model



- **Key Assumptions for Model Project**

Capex: US\$33 M including 10 % VAT/Import Duty

Net Electricity Generation: 150,000 MWh/y, Tariff: US\$0.05/kWh

O&M Cost: US\$2.0 M, Income Tax: 30 %

Construction : 2 yrs, Operational Lifetime: 20 yrs from Completion

Depreciation: by 10-yr straight-line installments up to 5 % scrap value

Carbon Emission Factor of Grid: 0.9 t-CO₂/MWh

9. IRR of Model Project

- **Equity IRR = 11.6%** (Project IRR = 11.6%)
- Cash Flow Projection

US\$, Million

Year	1	2	3	4	5	...	12	13	...	
	0.0	0.0	7.5	7.5	7.5	...	7.5	7.5	...	7.5
	0.0	0.0	2.0	2.0	2.0	...	2.0	2.0	...	2.0
	0.0	0.0	3.1	3.1	3.1	...	3.1	0.0	...	0.0
	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	...	
	0.0	0.0	2.4	2.4	2.4	...	2.4	5.5	...	5.5
	0.0	0.0	0.7	0.7	0.7	...	0.7	1.6	...	
	0.0	0.0	1.7	1.7	1.7	...	1.7	3.9	...	
	0.0	0.0	3.1	3.1	3.1	...	3.1	0.0	...	0.0
	16.5	16.5	0.0	0.0	0.0	...	0.0	0.0	...	0.0
	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	...	0.0
= Cash Flow	-16.5	-16.5	4.8	4.8	4.8	...	4.8	3.9	...	3.9

10. Impact of Incentive Policies on Energy Efficiency Project

- **Incentive Policies by Host Country** with the same budgetary amount (US\$3.0M) is assumed:
 - (a) Exemption of VAT/ Import Duty (US\$3.0M)
Equity IRR = 11.6% → 12.9% (+1.3%)
 - (b) Reduction of Income Tax (US\$0.6M × first 5 yrs)
Equity IRR = 11.6% → 12.6% (+1.0%)
 - (c) Subsidy for On-grid Tariff (US\$0.15M × 20 yrs)
Equity IRR = 11.6% → 11.9% (+0.3%)
- **Upfront Incentive** seems most attractive for Investors

11. Impact of Carbon Finance on Energy Efficiency Project

- **Carbon Finance** (US\$5.0/t-CO₂ x 5 yrs) is assumed:
 - (a) Pay on Delivery:
Equity IRR = 11.6% → 12.4% (+0.8%)
 - (b) Upfront Payment (discounted at 7% p.a.):
Equity IRR = 11.6% → 12.9% (+1.3%)
- **Upfront Payment** is more attractive for investors

12. Bank Loan & Carbon Finance

- Indicator for Bankability: **Loan Life Coverage Ratio**

$$\text{LLCR} = \frac{\text{Present value of cash flow available for debt service during loan life}}{\text{Total loan commitment amount}}$$

- **Bank Loan** (Debt : Equity = 40% : 60%, 8 yrs maturity with 2.5 yrs grace period at 7% interest rate) :

$$\text{LLCR} = 1.7 \text{ times}$$

$$\text{Equity IRR} = 11.6\% \rightarrow 13.1\% (+1.5\%)$$

- **Bank Loan + Carbon Finance** (US\$5.0/t-CO₂ x 5 yrs) :

$$\text{LLCR} = 1.9 \text{ times}$$

$$\text{Equity IRR} = 11.6\% \rightarrow 14.1\% (+2.5\%)$$

13. Japan's Challenges to Financial Difficulties for CDM

- **Upfront Carbon Finance**

Japanese Government is to provide **Upfront Payment Budget for CDM/JI Projects** (tentative name) including but not limited to Energy Efficiency CDM Projects

- **Bank Loan + Carbon Finance**

Japan Carbon Finance, Ltd. (JCF) provides Carbon Finance and **Japan Bank for International Cooperation (JBIC)** provides Underlying Finance to CDM/JI Projects in close collaboration with JCF

Thank You !
多谢 !

M4U Limited

Advisory Service on
Clean Development Mechanism & Financing for Sustainability

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