

# Information for the Commercialisation of Renewables in ASEAN (ICRA)



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## Carbon Finance and Renewable Energies in ASEAN

Background Paper

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## **1. INTRODUCTION**

One of the significant events at the beginning of 2005 is the entry into force of the Kyoto Protocol. The Protocol sets a legally binding requirement for Annex-1 countries to reduce their greenhouse gas emissions to an average of 5.2% below their 1990 emissions levels during the period 2008-2012. To assist these countries meet their obligations in a cost effective manner, the Protocol establishes three flexible mechanisms, and these are: i) Emissions Trading (ET), ii) Joint Implementation (JI), and iii) Clean Development Mechanism (CDM). The Clean Development Mechanism (CDM) assists industrialized countries in meeting their emissions reduction obligations at lower cost and at the same time promotes investments on sustainable development in developing countries.

The Clean Development Mechanism (CDM) is one of the main drivers of the surge of renewable energy investments in the ASEAN. The carbon asset in the form of certified emission reductions (CERs) generated by CDM projects improves project viability and attracts capital to finance the development of these projects. The entry into force of the Kyoto Protocol creates real demand for CERs from Annex 1 countries and the current policies of many Annex 1 countries, particularly European countries, to supplement emissions reductions from domestic actions with CERs from projects in developing countries result in the creation of carbon funds dedicated to CER procurement. These funds, in turn, leverage equity and debt financing that are necessary to develop the project.

In addition to the Kyoto Protocol, the beginning of the year sees the launching of the EU Emissions Trading Scheme (EU ETS). The EU ETS is independent from the Kyoto Protocol but its Linking Directive, which entered into force in November 2004, allows CER conversion into EU allowances. This could increase the demand for CERs from the ASEAN and could potentially lift the CER prices.

This background report synthesizes the Kyoto Protocol and CDM process, analyses the impact of CERs on project viability, reviews CDM development in ASEAN, presents the EU Emissions Trading Scheme (EU ETS) as potential market for CDM, and summarizes the current European demand for carbon credits. This report forms as the basis for the policy orientation paper being developed for the Renewable Energy Sub-sector Network (RE-SSN) of the ASEAN.

The report is one of the background reports prepared under the project **Information for the Commercialization of Renewables in the ASEAN** (ICRA) co-financed by the EC-ASEAN Energy Facility. The main objective of the project is to contribute towards the further mainstreaming of RE applications in the region in collaboration with the RE-SSN by, i) updating and expanding on the range of ACE RE information resources available, ii) contributing European experience and approaches to the regional dialogue on 4 key policy themes: framework conditions and policy instruments for fostering mainstreaming of renewables; harmonisation of PV standards; promotion of biomass technologies for electricity production; the potential role of carbon credits – looking specifically at the opportunities offered by the European trading scheme.

## **2. KYOTO PROTOCOL AND THE CLEAN DEVELOPMENT MECHANISM**

### **2.1. Kyoto Protocol**

The Clean Development Mechanism (CDM) is one of the flexible mechanisms established under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) to assist industrialized countries meet their emissions reduction obligations at lower cost and at the same time stimulate investments that promote sustainable development in developing countries. The UNFCCC is an international treaty formulated in 1992 and entered into force in 1994, which sets a goal of stabilizing atmospheric concentration of greenhouse gases at safe levels. The UNFCCC's supreme body, the Conference of Parties (COP), supervises the activities towards the achievement of the Convention's goals. In its first meeting in Berlin, Germany, the body decided that the post-2000 commitments to reduce emissions would only be set for industrialized countries, also known as Annex 1 countries. During the body's third meeting in Kyoto, Japan, the supreme body set a legally binding requirement for Annex-1 countries to trim down their greenhouse gas emissions to an average of 5.2% below their 1990 emissions levels during the period 2008-2012. This legally binding commitment is also known as the Kyoto Protocol. In order for the Kyoto Protocol to enter into force, it requires ratification of at least 55 parties to the convention, which accounts 55% of Annex 1 emissions in 1990. With Russia's ratification of the Protocol in November 2004, it raises the number of Parties to 127 and accounts 61.6% of the Annex 1 1990 emissions. The Protocol entered into force on February 16, 2005.

Greenhouse gases covered under the Kyoto protocol are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. The Protocol requires Annex 1 countries to engage in domestic activities that reduce emissions or absorb emissions such as afforestation and reforestation. To help these countries reduce the costs of meeting their obligations, the Protocol establishes three flexible mechanisms, and these are: i) Emissions Trading (ET), ii) Joint Implementation (JI), and iii) Clean Development Mechanism (CDM). In Emissions Trading, Annex 1 countries are allowed to exchange among themselves parts of their assigned amount units (AAUs); in Joint Implementation, Annex 1 countries are allowed to claim emission reductions units (ERUs) arising from their investments in another Annex 1 country; and in Clean Development Mechanism, Annex 1 countries are allowed to claim certified emissions reductions (CERs) from their sustainable development investments in developing countries.

### **2.2. Clean Development Mechanism**

#### ***Eligibility and participation***

The Clean Development Mechanism is a project-based mechanism where Annex 1 countries can purchase or claim CERs from projects implemented in developing countries (non Annex 1 countries) to be used for meeting their emissions reduction targets. Projects that qualify for CDM include the following: end-use energy efficiency, supply-side energy efficiency, renewable energy, fuel switching, agriculture, industrial processes, solvent and other product use, waste management, and sinks (afforestation and reforestation).

These projects must also satisfy two main conditions set by the protocol: additionality and contributions to sustainable development. The additionality condition states that projects must result in reductions in emissions that are additional to any that would occur in the absence of the project activity, and that the projects must lead to real, measurable and long term benefits. The sustainability condition states that the projects must assist developing

countries in achieving their sustainable development goals. There is however no guideline provided by the Protocol except that each country must develop its own criteria and assessment procedures.

The CDM process is governed by the CDM Executive Board. The Board accredits independent operational entities that will validate proposed CDM projects, verify and certify emissions reductions. It also maintains a CDM registry, which issues CERs, manage the CER levy, and maintain CER account for each developing country hosting a CDM project. For developing countries to participate in CDM, the Protocol requires that each country must establish a national authority responsible for CDM, ratify the Kyoto Protocol and participate voluntarily.

### ***Project Bundling***

Investors may prefer large-scale projects in developing countries since these projects generate large quantity of CERs at lower transaction cost per unit of emissions reduction. In order to remove the bias towards large-scale projects, the Executive Board has developed simplified modalities and procedures for small-scale projects to reduce transaction costs. Small-scale CDM projects are defined as the following: i) renewable energy project activities with a maximum output capacity equivalent of up to 15 MW; ii) energy efficiency improvement project activities which reduce energy consumption on the supply and/or demand side, by up to the equivalent of 15 GWh per year; or iii) other project activities that both reduce anthropogenic emissions by sources and directly emit less than 15 thousand tonnes of carbon dioxide equivalent annually.

Bundling of smaller projects to reduce transaction costs are also allowed by the Board as long as the total size of the bundled project satisfies the small-scale project criteria. On the other hand, de-bundling of a large-scale project into smaller scale projects is prohibited by the Board. A de-bundling test was developed by the Board as the following: small-scale projects are deemed de-bundled components of a large-scale project when the application to register another small-scale project shows that i) participants are the same with the previous project, ii) the project category and technology/measure are also the same, iii) the previous project was registered in the previous 2 years, and iv) the project boundary of the previous project is within 1 km of the proposed new project.

### **3. IMPACTS OF CARBON FINANCE ON RENEWABLE ENERGY PROJECT VIABILITY**

CDM projects produce both conventional project output and carbon benefits (CERs). The value of carbon benefits and its impact on project viability are influenced by several factors such as the amount of CERs generated by the project, the price of CER and the transaction costs involved in securing CERs.

#### **3.1. Quantity of CERs**

The amount of CERs generated by the project depends on the greenhouse gas displaced by the project and the crediting period selected.

Renewable energy and energy efficiency projects displace carbon intensive electricity and/or heat generation. Grid-based or off-grid projects that displace more carbon intensive coal and diesel fuels generate more CERs than those that displace natural gas. Projects that capture methane and other greenhouse gases produce more CERs since the global warming potential (GWP) of methane and other gases are several times higher than that of carbon dioxide. Methane's GWP is 21 times, nitrous oxide is 310 times, hydrofluorocarbons (HFCs) range from 140-11,700 times, perfluorocarbons (PFCs) is on average 6,770 times and sulfur hexafluoride is 23,900 times higher than carbon dioxide.

The total CER generated is determined by the selected crediting period. The Marrakech accords specify two options for project developers: 7 years with twice the option of renewal (totalling 21 years) or, 10 years without renewal.

#### **3.2. Price of CERs**

The price of CERs is determined in the carbon market. The CER market is one of the fragmented carbon markets. The global carbon market consists of diverse greenhouse gas reduction transactions and can be broadly classified as follows: i) project-based or baseline and credit system. Emission reductions are created and traded through a given project or activity. CDM and JI are examples of the project-based system where CERs and ERUs are generated respectively ; ii) allowance market or cap and trade system. Emission allowances are defined by regulations at the international, national, regional or firm level. Examples of allowance market include the Emissions Trading under the Kyoto Protocol (global), EU Emission Trading System or EU ETS (regional), the UK and the Danish trading systems (national), and BP and Shell internal trading (firm).

Most of market volume transactions are project-based, and the emissions reductions credits are intended either for Kyoto Protocol or non-Kyoto compliance. Buyers have various motives in engaging transactions in the global carbon market. Risk minimization objectives could be classified as follows: i) immediate compliance in the national markets where buyers seek to comply with existing legislative obligations and constraints; ii) Kyoto pre-compliance where buyers expect the project to be registered under either JI or CDM; iii) voluntary compliance where buyers aim to use the emission reductions to meet part of their voluntary targets; and iv) retail schemes where buyers wish to be climate-neutral in order to demonstrate their social responsibility or promote particular brand. In addition to risk minimization, other objectives include the following: i) learning by doing, ii) experimenting with diverse contract structures, iii) influencing policy, iv) broadening the envelope of flexibility, v) public relations, and vi) goodwill (PCF, 2003).

The fragmented nature of the global carbon market generates differentiated prices for emissions reductions as shown in Table 3.1. Allowance markets generate high emission reduction prices since the delivery risks are believed to be minimal. Though JI and CDM are both project-based, PCF pays higher prices for ERUs since JI are supported by Host Country Agreements and Assigned Amount Units, which reduces PCF's exposure to risks. ERUPT however in its January 2003 tender for JI projects have specified a price range similar to C-ERUPT tender for CDM projects.

Table 3.1. Carbon Emission Reduction Prices (per TCO<sub>2e</sub>)

Project-Based		Allowance Markets
Clean Development Mechanism	Joint Implementation	
<p><b>PCF<sup>1</sup></b></p> <ul style="list-style-type: none"> <li>• US\$3.0-3.5</li> <li>• premium of US\$0.5 per ton of CO<sub>2e</sub> for projects with developmental components (Colombia Wind Farm)</li> </ul> <p><b>C-ERUPT<sup>2</sup></b> (maximum prices)</p> <ul style="list-style-type: none"> <li>• renewable energy - €5.5</li> <li>• biomass energy - €4.4</li> <li>• energy efficiency - €4.4</li> <li>• fuel switch and methane - €3.3</li> <li>• average price - €4.7<sup>3</sup></li> </ul> <p><b>Finish Government<sup>4</sup></b></p> <ul style="list-style-type: none"> <li>• small-scale - €2.47-3.2</li> </ul>	<p><b>PCF<sup>5</sup></b></p> <ul style="list-style-type: none"> <li>• US\$ 3.5-4.0</li> </ul> <p><b>ERUPT<sup>6</sup></b></p> <ul style="list-style-type: none"> <li>• First tender average price - €8.46 (closed in April 2001)</li> <li>• Second tender average price - €4.78 (closed in March 2002)</li> <li>• Third tender - expected price range - €3.0-5.0<sup>7</sup> (closed in January 2003)</li> </ul> <p><b>Denmark-Romania JI<sup>8</sup></b></p> <ul style="list-style-type: none"> <li>• estimated price range €5.40-8.10</li> </ul>	<p><b>Regional</b></p> <ul style="list-style-type: none"> <li>• EU-ETS<sup>8</sup> €5.0-7.0 (indicative price); €13.05<sup>9</sup> (forward price in Jan 2004); €7.17<sup>10</sup> (forward price in Apr 2004)</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• UK-ETS<sup>11</sup> - Bid price £1.75, offer price £2.25</li> </ul> <p><b>Firm</b></p> <ul style="list-style-type: none"> <li>• BP Emissions Trading Scheme<sup>12</sup> (Scheme discontinued in 2001) average in 2000 - US\$7.6 average in 2001 - US\$39.63</li> </ul>

<sup>1</sup>PCF Annual Report 2002; <sup>2</sup>C-ERUPT Tender Document 2002; <sup>3</sup>Carbon Market Europe (March 21 2003); <sup>4</sup><http://global.finland.fi>; <sup>5</sup>PCF Annual Report 2002; <sup>6</sup>Environmental Finance (February 2003); <sup>7</sup>GHG Market Trends 2/2003; Carbon Market Europe (March 7, 2003); <sup>8</sup>Carbon Market Europe (May 2 2003); <sup>9</sup>Evolution Markets LLC (Jan 2004); <sup>10</sup>Carbon Market Europe (April 15 2004); <sup>11</sup>Carbon Market Europe (August 15 2003); <sup>12</sup>[www.bp.com/files/15/Climate\\_Change\\_2001\\_performance\\_1541.pdf](http://www.bp.com/files/15/Climate_Change_2001_performance_1541.pdf)

The pricing of CER is highly speculative. The PCF considers several parameters in determining its price in the PCF's carbon purchase agreement. Moreover, certain project parameters command price premiums under the PCF program. These include: i) the existence of government guarantees, ii) project generation of social benefits, and iii) the exclusion of preparation costs in the total project cost. Among the CDM projects being contracted by PCF, a price premium of US\$ 0.5 per TCO<sub>2e</sub> has been offered to the Colombia Jepirachi Wind Farm sponsors for the delivery of activities that improve the social conditions of the local indigenous population that hosts the project.

In C-ERUPT program, prices are also differentiated according to technology type. CER from renewable energy project forms the reference price (maximum price of EUR 5.5 per CER). CERs from sustainable grown biomass projects as well as from energy efficiency projects are priced 20% lower (maximum price of EUR 4.5) while those from fuel switching and methane recovery projects are 40% cheaper (maximum price of EUR 3.3).

At present there is no single CER price but differentiated according to risks, technology type and social development components. The current PCF CER rate ranges from US\$3 to 4 per ton of CO<sub>2</sub>; under the C-ERUPT program, it revolves around US\$ 4 to 4.5 per ton of CO<sub>2</sub>. The CER price differentiation could evolve into the following categories: i) CERs from projects that fulfil the WWF Gold Standard, ii) CERs from projects with community development features, iii) CERs from standard projects, and iv) long-term and temporary CERs from forestry projects (Michaelowa, A., CDM Monitor, March 11, 2004).

Several economic models forecast a single carbon price since these models assume a competitive and unfettered markets. With the US presence in the GHG market, these models projected a very high carbon prices. After the Bonn Agreement and Marakkech Accords, and

with the absence of the US in the market, these models projected low carbon prices. In reality, the carbon markets are fragmented and prices generated by these markets are differentiated. In a recent GHG market analysis, Natsource (2002) forecasts prices for project-based carbon emission reductions (both JI and CDM markets) to vary from US\$3 to 5 for the period 2002-2005, US\$2.5 to 9.0 during 2005-2007, and US\$5 to 11 from 2008-2012.

### 3.3. Transaction Costs

Transaction costs are those that arise from initiating and completing transactions to secure CERs. These consist of pre-operational costs (or upfront costs), implementation costs (i.e. costs spread out over the entire crediting period), and trading costs (Table 3.2). Pre-operational costs include direct expenses for search, negotiation, validation, and approval. Implementation costs are those incurred for monitoring, certification, and enforcement while trading costs are those incurred in trading CERs such as brokerage costs and costs to hold an account in national registry.

Table 3.2. CDM Transaction Costs

	Transaction Cost Component	Description
Pre-implementation phase	Search Costs	Costs incurred by investors and hosts as they seek out partners for mutually advantageous projects
	Negotiation Costs	Includes those costs incurred in the preparation of the Project Design Document that also documents assignment and scheduling of benefits over the project time period. It also includes expenses in organizing public consultation with key stakeholders.
	Baseline determination	Development of a baseline
	Approval costs	Costs of authorization from host country
	Validation Costs	Costs incurred in reviewing and revising the Project Design Document by operational entity
	Review Costs	Costs of reviewing a validation document
	Registration Costs	Registration by UNFCCC Executive Board/JI Supervisory Committee
Implementation Phase	Monitoring Costs	Costs to collect data
	Verification Costs	Costs to hire an operational entity and to report to the UNFCCC Executive Board/Supervisory Committee
	Review Costs	Costs of reviewing a verification
	Certification Costs	Includes costs in the issuance of Certified Emission Reductions (CERs for CDM) and Emission Reduction Units (ERUs for JI) by UNFCCC Executive Board
	Enforcement costs	Includes administrative and legal costs incurred in enforcing transaction agreements
Trading	Transfer Costs	Brokerage costs
	Registration Costs	Costs to hold an account in national registry

Source: Michaelowa, A., Stronzik, M., Eckerman, F., and Hunt, Alistair, 2003.

PCF's pre-operational transaction costs amounts 229 thousand Euros (265 thousand dollars) while EcoSecurities (2002) estimates the minimum up-front transaction cost at around 70 thousand Euros (£42,000) (Table 3.3).

The CDM Executive Board has recently determined the registration fee for CDM projects. Fees for small-scale projects are fixed at US\$5,000 while those for large-scale projects are between US\$10,000 – 30,000. The registration fees are the following: i) = 5,000 annual CO<sub>2</sub> equivalent reduction - US\$ 5,000; ii) >15,000 and = 50,000 annual CO<sub>2</sub> equivalent reduction - US\$ 10,000; iii) >50,000 and = 100,000 annual CO<sub>2</sub> equivalent reduction - US\$ 15,000;



iv) >100,000 and = 200,000 annual CO2 equivalent reduction - US\$ 20,000; and v) >100,000 annual CO2 equivalent reduction - US\$ 30,000. This rate also applies for bundled projects.

Several studies show that the transaction cost per ton of CO2 for large projects is very small or even negligible while that for small-scale projects is quite significant. Given this, it is obvious that investors would prefer large-scale projects. Fast-tracking small-scale projects (simplifying the procedures and standardizing the information and reporting requirements) not only reduces transaction costs but also improves project financial viability. According to EcoSecurities (2002), fast-tracked procedures lead up to around 67% reduction in transaction costs.

Table 3.3: CDM Transaction Cost Estimates

	Project Cycle	EcoSecurities, 2002 (£)	PCF (US \$)
Pre-operational Phase Design	Preparation and review		40,000
	Baseline Study	12,000 – 15,000	20,000
	Monitoring Plan	5,000 – 10,000	20,000
	Environmental Assessment	-	
	Stakeholder Consultation	-	
	Approval	-	
	Validation	10,000 – 20,000	30,000
	Consultation and project appraisal		105,000
	Legal and Contractual Arrangements	15,000 – 25,000	50,000
Operational Phase	Sales of CERs	5% - 15% of CER Value	
	Adaptation Levy <sup>1</sup>	2% of the CER value annually	
	Risk Mitigation	1%-3% of CER value annually	
	Verification	5,000 per audit	25,000 (initial) 10,000-25,000 (periodic) 10,000-20,000 (periodic supervision)
	Executive Board Administration	To be determined (X% of CER value)	

<sup>1</sup> Projects in least developed countries are exempted from the 2% adaptation levy.

Sources: EcoSecurities, 2002; PCF presentation COP 8, Side Event, New Delhi, 24 October 2002.

### 3.4. Impact of CERs on Project Feasibility

The net financial gain derived from the sale of CERs is the difference between the project CER value and the transaction costs. There are three elements that influence the net impact of CERs on project profitability: value of CERs (low CER value implies low net benefits), overall transaction costs (high transaction costs yield low net benefits), and up-front transaction costs (high upfront payments could also result in low benefits). Project developers generally expect *up-front* transaction costs within the range of 5 to 7% of the net present value of the revenue or *total* transaction costs around 10 to 12% of the net present value of revenue (EcoSecurities, 2002).

A positive net financial gain means that CER revenues improve the financial viability of the project. Table 3.4 presents the impacts of carbon financing to the proposed 60 MW Wind Farm project in Zafarana, Egypt. For the CER price scenarios of US\$3 and 10 per ton of CO2 equivalent, the project's net present value increases by 173% and 588% respectively. The project's internal rate of return increases by 1.04 and 3.38 percentage points while the return of equity rises by 2.73 and 8.24 percentage points for the respective CER price scenarios.

Table 3.5 shows the impact of CERs on IRRs in selected projects. The effect of CER cash flow on project IRRs vary by project type. The impact of CERs on wind power project IRR is relatively small (few percentage points increase) while it is substantially important for

fugitive methane capture projects. More CERs are generated by methane capture projects since the global warming potential of methane is 21 times higher than carbon dioxide. This makes methane capture projects relatively attractive to CDM project developers. In fact, for the first 45 projects submitted to the CDM Executive Board for methodology review, 27% (12 projects) are methane gas capture projects.

**Table 3.4: Impact of carbon financing on the proposed 60-MW Zafarana Wind Farm Project in Egypt**

Economic Indicators	Without carbon finance	With carbon finance	
		US\$3 per ton CO <sub>2</sub> eq	US\$10 per ton CO <sub>2</sub> eq
Internal Rate of Return	5.63%	6.67%	9.01%
Net Present Value	US\$2,954,117	US\$8,065,191	US\$20,320,777
Return on Equity after taxes	19.10%	21.83%	27.34%

Note: Financial and economic data are given in Appendix 3.1

Source: Ringius, L., Grohnheit, P.E., Nielsen, L.H., Olivier, A., Painuly, J., and Villavicencio, A. (2002)

**Table 3.5: Impact of CERs on project IRR**

Country	Project	IRR without carbon finance (%)	IRR with carbon finance (%)	Change in IRR (%)
Costa Rica	wind power	9.7	10.6	0.9
Jamaica	wind power	17.0	18.0	1.0
Morocco	wind power	12.7	14.0	1.3
Chile	Hydro	9.2	10.4	1.2
Costa Rica	Hydro	7.1	9.7	2.6
Guyana	Bagasse	7.2	7.7	0.5
Brazil	Biomass	8.3	13.5	5.2
India	solid waste	13.8	18.7	5.0

Source: PCF Annual Report 2001

### 3.5. Sources of Project Funds

CDM projects require upfront investments that are normally obtained from different sources such as loans, equity, grants, and upfront payments for emission reductions.

- Loans or debts refer to funds lent to CDM project owners by financiers. Debt can be obtained through public markets (bonds) or private placements (bank loans and institutional debt).
- Equity<sup>1</sup> refers to funds funneled to the CDM project by company shareholders. Equity may be sourced from internal sources (sponsors) or external investors (public or private markets). The return on equity is obtained either from dividends or from sale of shares.
- Grants<sup>2</sup> are funds provided by institutions and governments to CDM project owners and developers who contribute to donors' objectives. Grants need not be repaid and oftentimes, cover only a percentage of project costs.

<sup>1</sup> Equity fund providers that target carbon credits include: Dexia-FondElec Energy Efficiency and Emission Reduction Fund (71 million Euros, since 2000). FondElec Latin American Clean Energy Services Fund (US\$ 31 million, since 2001). Global-Asia Clean Energy Services Fund, FE Clean Energy Group (US\$100-150 million) (seeking for 20-25 % returns). Private-public partnerships that provide upfront financing to CDM projects include Climate Investment Partnership.

<sup>2</sup> The Danish Government offers grants to firms in Thailand to kick start CDM projects. In addition, The European Investment Bank intends to launch a Transaction Assistance Facility which will help in project identification and preparation and carbon credit marketing. The facility will provide a grant, which is repayable from the revenue generated by the sale of carbon.

- Upfront payment for CER purchase. The carbon purchase agreement often stipulates payment on agreed price upon delivery of CERs but CER buyers sometimes provide upfront payment upon purchase. For example, the PCF provides upfront payment up to 25% of the total CER value. However, to compensate for increased risk, upfront payments are discounted.

Like conventional projects, financing CDM projects can be arranged either through corporate or project financing. These are described as follows:

- In project financing, a project company is formed and investments are viewed as assets of the company. Investment funds are sourced either from equity or debt. Assets and cash flow secure debts. Creditors do not have recourse to the other resources of sponsors.
- Under corporate financing, new projects are undertaken as extension of assets of the existing company. Capital investments and borrowing are not placed under the project account. Loans are considered as company debts and lenders have full recourse to all the assets and revenues of the company over and above those generated in the new project.

Additional project revenues (i.e. CER) could be used to service debts and leverage debt financing. Guest et al (2003) presents that the carbon cash flow can help increase debt carrying capacity: The carbon revenues could help increase debt leverage of project by increasing the debt service coverage ratio (DSCR) levels of the project. In addition to improving debt capacity, there are other options to debt service through the carbon cash flow. These include: pre-paying debt based on Forward Emission Reduction Purchase Agreements (ERPAs); depositing carbon cash flow directly with banks for credit against debt service thereby lowering liability on electricity cash flow; and using ERPAs and/or forward carbon sales as collateral for loans (this is the case for Plantar project in Brazil where the CER purchase agreement with the PCF was used as collateral for commercial bank financing).

## 4. CDM DEVELOPMENT IN ASEAN

### 4.1 Institutional Development

ASEAN countries have recognized the potential role of CDM in their pursuit of sustainable development. To meet the CDM participation requirements set by the Kyoto Protocol, 7 ASEAN countries have ratified/acceded to the Kyoto Protocol. Cambodia was the first to do so in 2002 while Indonesia was the latest in 2004 (Table 4.1). As a key requirement for CDM participation, these countries also established Designated National Authorities (DNAs), and elaborated institutional frameworks for CDM (Table 4.2).

*Table 4.1: Kyoto Protocol Ratification and Designated National Authorities in the ASEAN*

Country	Signature	Ratification/Accession	Designated National Authority
Cambodia		22/08/02 (Ac)	Ministry of Environment (MoE)
Indonesia	13/07/98	12/12/04 (R)	to be named
Lao PDR		06/02/03 (Ac)	Science Technology and Environment Agency
Malaysia	12/03/99	04/09/02 (R)	Ministry of Natural Resources and the Environment
Philippines	15/04/98	21/11/03 (R)	Department of Environment and Natural Resources
Thailand	02/02/99	28/08/02 (R)	Office of Natural Resource and Environment Policy and Planning
Vietnam	03/12/98	25/09/02 (R)	International Cooperation Department Ministry of Natural Resources and Environment

*Note: Ac – Accession; R – Ratification*

Though CDM institutional arrangement may vary from country to country due to differences in the overall institutional traditions, structures and environment, common elements among ASEAN countries exist. Each country has: i) established a DNA to approve or disapprove CDM projects; ii) established a national body such as a climate change committee, steering committee, etc responsible for endorsing projects for approval or rejection by the DNA; iii) established a secretariat responsible for project processing and information dissemination, and; iv) created technical committees responsible for the evaluation of projects according to criteria set by the government. Moreover, despite the overall leadership of the environment ministries/departments in climate change and CDM, energy ministries/departments are represented in the DNA and have taken leadership in the energy technical working committees, which evaluate proposed energy projects for CDM.

The *Cambodian* government acceded to the Kyoto Protocol in August 2002, and appointed the Ministry of Environment (MoE) as interim DNA in July 2003. Cambodia's Ministry of Environment (MoE) is the national focal point for the UNFCCC and the Kyoto Protocol. Within the Ministry, the Cambodian Climate Change Office (CCCO) coordinates and implements national climate change policies, greenhouse gas mitigation, CDM inventory, and climate change adaptation projects. The national agency governing the CDM process is the DNA Board, which at present is represented by the MoE. In the future, the Board will consist of representatives from different Ministries and other relevant agencies. Under the Board is the Secretariat, which is represented by the Cambodian Climate Change Office. Two technical inter-ministerial working groups, the energy working group and the forestry

working group were created. These technical working groups coordinate with the DNA Secretariat.

*Indonesia* ratified the Kyoto Protocol in December 2004 and the government is yet to appoint an organization to act as the DNA. The proposed National CDM Framework consists of the National Commission for CDM, which acts as the governing body, the Secretariat and the Technical Team. The Technical Team comprises representatives from government institutions, non-governmental agencies and local governments, which hosts a CDM project.

**Table 4.2: CDM Institutional Arrangement**

<p><b>Cambodia</b></p> <ul style="list-style-type: none"><li>• <i>DNA Board.</i> Currently represented by Ministry of Environment. Membership will include representatives from Ministry of Agriculture, Forestry and Fisheries; Ministry of Industry, Mines and Energy; Ministry of Planning; Cambodia Development Council; Ministry of Public Works and Transport.</li><li>• <i>CDM Secretariat.</i> Cambodia Climate Change Office.</li><li>• <i>Technical Inter-Ministerial Working Group.</i> Energy Technical Working Group; Forestry Technical Working Group; Other (if necessary)</li></ul> <p><b>Indonesia</b></p> <ul style="list-style-type: none"><li>• <i>CDM Steering Committee.</i> To be named</li><li>• <i>CDM Secretariat.</i> To be named</li><li>• <i>Technical Committee.</i> To be named</li></ul> <p><b>Malaysia</b></p> <ul style="list-style-type: none"><li>• <i>National Committee on Climate Change.</i> Chaired by the Secretary General, Ministry of Natural Resources and Environment (NRE); members from government and non-governmental organizations; Conservation and Environmental Management Division of NRE as Secretariat.</li><li>• <i>National Committee on CDM.</i> Chaired by the Deputy Secretary General, Ministry of Natural Resources and Environment (NRE); members from government and non-governmental organizations; Conservation and Environmental Management Division of NRE as Secretariat.</li><li>• <i>Technical Committees.</i> Energy – chaired by the Ministry of Energy, Water and Communications with Pusat Tenaga Malaysia as Secretary; Forestry – chaired by the Ministry of Natural Resources and Environment with Forest Research Institute of Malaysia as Secretary.</li></ul> <p><b>Philippines</b></p> <ul style="list-style-type: none"><li>• <i>CDM Steering Committee.</i> Department of Environment and Natural Resources – chair; Department of Energy; Department of Science and Technology; representatives from the Private Sector and civil societies</li><li>• <i>CDM Secretariat.</i> To be named</li><li>• <i>Technical Committees.</i> Energy and energy efficiency; waste management; LULUCF</li></ul> <p><b>Thailand</b></p> <ul style="list-style-type: none"><li>• <i>Climate Change Board.</i> National Environment Board</li><li>• <i>National Climate Change Committee.</i> Chaired by the Minister of MONRE and Secretary-General of Office of Natural Resources and Environmental Policy and Planning as Secretary.</li><li>• <i>CDM Steering Committee.</i> Established by the National Committee on Climate Change with MONRE's Permanent Secretary as chair and the DNA as the secretary.</li><li>• <i>Technical Committees:</i> Energy and Industrial Working Group - chaired by Ministry of Energy; Forestry and Agriculture Working Group – chaired by Ministry of Natural Resources and Environment.</li></ul> <p><b>Vietnam</b></p> <ul style="list-style-type: none"><li>• <i>CDM National Executive and Consultative Board.</i> Director General of International Cooperation Department – Chair; representatives from MONRE, MOF, MPI, MOFA, MOI, MOST, MARD, MOET, MOT and Vietnam Union of Science and technology Associations.</li><li>• <i>CDM Secretariat.</i> National Office for Climate Change and Ozone Protection (NOCCOP)</li><li>• <i>Technical Committees:</i> Energy Technical Expert Group and Non-Energy Technical Expert Group</li></ul>
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*Sources: Cambodia – Sum Thy (2004); Indonesia – Wahyu Indraningsih (2004); Malaysia – Wahab, Idris and Ahmad (2004); Philippines – Joyceline Goco (2004); Thailand – Tummakird (2004); Vietnam – Tran Thi Minh Ha (2004)*

*Lao PDR* acceded to the Kyoto Protocol in February 2002 and the government designated the Science, Technology and Environment Agency (STEA) as the CDM national authority.

*Malaysia* ratified the Kyoto Protocol in September 2002. In May 2003, the Conservation and Environmental Management Division at the Ministry of Natural Resources and Environment was registered with the UNFCCC secretariat as the Designated National Authority. The national institutional arrangement for the CDM is two-tiered: i) the National Committee on

CDM (NCCDM), and ii) two technical committees – the Energy Technical Committee and Forestry Technical Committee. Pusat Tenaga Malaysia (PTM) was appointed as the Secretariat to the Energy Technical Committee while the Forest Research Institution of Malaysia (FRIM) was appointed as the Secretariat to the Technical Committee on Forestry. The NCCDM is chaired by the Deputy Secretary General of NRE and the role is to evaluate and endorse recommendations made by the Technical Committees regarding CDM project proposals. In addition, this Committee provides policy direction and guidelines for the implementation of CDM projects at the national level.

The *Philippines* ratified the Kyoto Protocol in November 2003. The Philippines Department of Environment and Natural Resources (DENR) was designated as the DNA through Executive Order 320 issued by the government in 25 June 2004. In the proposed CDM national institutional arrangement, a CDM steering committee will be responsible for project review and endorsement. The CDM Secretariat facilitates the processing of the proposed projects while three technical evaluation committees, the energy and energy efficiency, waste management, and LULUCF, evaluates whether the proposed projects meet the criteria set by the government.

*Thailand* ratified the Kyoto Protocol in August 2002 and in July 2003 the government appointed the Ministry of Natural Resources and Environment (MONRE) to be the country's national CDM authority. The Office of Natural Resources and Environmental Policy and Planning (ONEP) was in turn appointed by MONRE to act as the National Focal Point. The government exercises full control of the CDM process as it requires that all projects must be submitted to and approved by the Cabinet. The National Environment Board (NEB) act as the DNA Board. Two main technical committees were established: the Energy/Industrial Working Group (chaired by the Ministry of Energy) and the Forestry/Agriculture Working Group (chaired by the Ministry of Natural Resources and Environment) to evaluate whether the projects satisfy the criteria set by the government. In between the NEB and the technical working groups are the National Climate Change Committee and the CDM Steering Committee, which reviews and finally endorses projects.

The International Cooperation Department of the Ministry of Natural Resources and Environment (MONRE) was designated as *Vietnam's* DNA in March 2003, and the National Office for Climate Change and Ozone Protection (NOCCOP) under the Ministry was designated as the CDM Secretariat. Two technical committees, the Energy Technical Expert Group and Non-Energy Technical Expert Group, provide technical assistance to the Secretariat. On the other hand, the CDM National Executive and Consultative Board provide guidance to the CDM National Authority.

## **4.2 CDM Policy**

As presented earlier, the Kyoto Protocol requires that the Clean Development Mechanism must assist developing countries achieve their sustainable development objectives. The CDM rulebook does not provide guidelines for sustainable development and countries are left to develop their own criteria and assessment procedures. As summarized in Table 4.3, it is evident that ASEAN countries formulated CDM policies in reference to their various sustainable development policies and consistent with the existing laws and regulations. Though expressed in various forms in each country, CDM criteria covers elements related to economic and social development, environmental protection, and technology transfer.

In most countries, the projects being promoted are those that are consistent with the recommendations of various emission mitigation studies undertaken in each country such as CDM National Strategy Studies, UNFCCC National Communication Studies, etc. This includes projects in the various economic sectors such as energy, industry, transportation, agriculture and forestry.

Table 4.3: Sustainable Development Criteria and Indicators

<p><b>Cambodia</b></p> <ul style="list-style-type: none"> <li>• SD criteria was developed based on Cambodia’s existing laws, regulations, sub-decrees, etc</li> <li>• SD assessment procedure is based on the SSN/WWF Gold Standard Procedure. SD Matrix consist of 4 categories: environmental, social, economic, technology transfer</li> </ul> <p><b>Indonesia</b></p> <ul style="list-style-type: none"> <li>• SD evaluation indicators are categorized into: economic, environmental, social and technological</li> </ul> <p><b>Malaysia</b></p> <p><i>National Criteria for CDM Projects</i></p> <ul style="list-style-type: none"> <li>• projects must be in accordance with the sustainable development policies of the government;</li> <li>• projects must fulfil all conditions underlined by the CDM Executive Board;</li> <li>• implementation of CDM projects must involve participation between Malaysia and Annex 1 Party;</li> <li>• projects must provide technology transfer benefits and/or improvement in technology;</li> <li>• projects must bring direct benefits towards achieving sustainable development.</li> </ul> <p><i>Criteria for Small-Scale CDM Projects</i></p> <ul style="list-style-type: none"> <li>• the project shall be in accordance with one or more of sustainable development strategies of the energy sector,</li> <li>• the project shall conform to the environmental regulations Malaysia,</li> <li>• the project proponent should justify that the project utilises the best available technologies, including local technologies</li> <li>• the project proponents must justify their ability to implement the proposed project.</li> </ul> <p><b>Philippines</b></p> <ul style="list-style-type: none"> <li>• being drafted</li> </ul> <p><b>Thailand</b></p> <p><i>Criteria for CDM Project Eligibility</i></p> <ul style="list-style-type: none"> <li>• consistency with the National Development Strategy;</li> <li>• contribution to capacity building, technology transfer and know-how,</li> <li>• consistency with Thai legislations and regulations,</li> <li>• should include environment and technical assessments, and</li> <li>• should involve public participation</li> </ul> <p><b>Vietnam</b></p> <p><i>Sustainable Development Criteria</i></p> <ul style="list-style-type: none"> <li>• sustainable development criteria are based on Vietnam’s Agenda 21 with indicators categorized into economy, society and environment</li> </ul> <p><i>CDM Project Criteria</i></p> <ul style="list-style-type: none"> <li>• meet the national, local, sectoral plans and programmes on eco-social development</li> <li>• contribute to protect sustainable development</li> <li>• reduce GHG emissions</li> <li>• ensure high feasibility with new technology and eligible finance</li> <li>• result in real, measurable and long-term benefits related to the mitigation of climate change</li> <li>• approved and registered</li> <li>• public funding for CDM projects from Annex 1 parties of the UNFCCC must not result in the diversion of funds for Official Development Assistance (ODA)</li> </ul>
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Sources: Cambodia – Sum Thy (2004); Indonesia – Wahyu Indraningsih (2004); Malaysia – Wahab, Idris and Ahmad (2004); Philippines – Joyceline Goco (2004); Thailand – Tummakird (2004); Vietnam – Nguyen Mong Cuong (2004)

As noted earlier, the energy sector is represented in the national CDM apex body. In most countries, energy agencies take the leadership of the energy technical working committee. With such representation, projects consistent with the government programmes on renewable energy and energy efficiency are in many instances being prioritised. Malaysia for example has spelt out that projects under its Small Renewable Energy Power Producers (SREPP) Programme are prioritised as CDM projects. In Cambodia, the Philippines and Vietnam, projects consistent with the energy sector development plans, particularly renewable energies and energy efficiency, are being promoted and supported.

Table 4.4 lists CDM projects being developed in ASEAN. Some projects in Malaysia, which are developed under the SREPP Programme, and some projects in Vietnam are already approved by these countries’ CDM national authority. Projects listed under Thailand are developed by the private sector. The approval of these projects by the Thai DNA is yet uncertain. Projects developed in Cambodia are mostly small-scale projects.

**Table 4.4: Pipeline of Projects**

<p><b>Cambodia</b></p> <p><i>Projects with completed feasibility studies</i></p> <ul style="list-style-type: none"> <li>• Rubber Tree Afforestation, 7600 hectares, Mondolkiri Province, Marubeni Corporation of Japan; Recovery of Methane Discharge from Waste Disposal Site, Phnom Penh, Japan Waste Research Foundation; Dispersed Power Generation Systems, 70 kW micro-hydro solar PV hybrid, New Energy and Industrial Technology Development Organization, Japan</li> </ul> <p><i>Projects with feasibility studies under development</i></p> <ul style="list-style-type: none"> <li>• 1.4 MW micro-wind/hydro hybrid, Marubeni Corporation; 1.5 MW rice husk cogeneration project, Angkor K.R. Co.; 13 MW mini-hydro project, Celtic International; 10 MW woodwaste rehabilitation, Mai woodwaste; Household biogas dissemination, CFSP</li> </ul> <p><b>Indonesia</b></p> <p><i>Projects being assisted by SSN-PELANGI</i></p> <ul style="list-style-type: none"> <li>• The greenhouse gas emission reduction program for urban buses in Yogyakarta - YUPTA (Yogyakarta Urban Public Transport Alliance: UGM, KOPATA, PEMDA); Sarulla ,Sumut Geothermal Development Project Unocal (UNSG) - PLN dan PERTAMINA; The Bandarjaya, Lampung, Rice Husk Power Project PT Catra Nusantara Bersama – Bronzoak; Utilization of Combined Solar, Wind and Biomass Energy for Small Processing Unit - CREATA-IPB; Lumut Balai , Sumsel Geothermal Energy Conversion to Electricity - PERTAMINA, PLN</li> </ul> <p><b>Malaysia</b></p> <p><i>Projects that received conditional approval from DNA</i></p> <ul style="list-style-type: none"> <li>• grid-connected 14 MW CHP Plant; off-grid 7 MW CHP Plant; grid-connected 6 MW biomass power plant</li> </ul> <p><i>Projects presented to the technical committee on energy and NCCDM</i></p> <ul style="list-style-type: none"> <li>• grid connected 9 MW biomass power plant, grid-connected 2 MW gas power plant and methane recovery, methane abatement through composting</li> </ul> <p><b>Philippines</b></p> <p><i>Potential Projects</i></p> <ul style="list-style-type: none"> <li>• 25 MW Northwind Bangui Bay Project Phase I; 40 MW North Luzon Wind Power Project; 50 MW Victorias Bagasse Cogeneration Plant; 30 MW First Farmers Bagasse Cogeneration Plant; 25 MW Bogo-Medellin Bagasse Cogeneration Plant; Central Azucarera de Tarlac Distillery Waste to Energy Plant; Boracay ReStore Waste to Energy Project; 1 MW Payatas Waste to Energy Project</li> </ul> <p><b>Thailand</b></p> <p><i>Projects with CER buyers</i></p> <ul style="list-style-type: none"> <li>• Korat Waste to Energy Project (the Netherlands), Rubber Wood Residue Power Plant (Japan), Green Power for Pig Farm (Denmark), Thai Agro energy ethanol and biogas plant (Denmark), Natural Palm Oil electricity and biogas plant (Denmark), Siam Cement biomass gasifier (Denmark), and Ratchasima small power producer expansion project (Denmark).</li> </ul> <p><i>Project with CDM EB approved methodology</i></p> <ul style="list-style-type: none"> <li>• AT BioPower Rice Husk Power Plant</li> </ul> <p><b>Vietnam</b></p> <p><i>Potential projects under consideration</i></p> <ul style="list-style-type: none"> <li>• RangDong Oil Field gas recovery (approved); Thuong Ly Landfill (endorsed); HoChiMinh City Landfill (endorsed); HaNoi Landfill (endorsed); Energy efficiency in a brewery (under consideration); Thu Duc Power Plant fuel switching (under consideration); Wind-diesel hybrid (under consideration)</li> </ul> <p><i>Potential projects</i></p> <ul style="list-style-type: none"> <li>• 440 MW Coal-fired thermal plant upgrading (EVN); 20 MW wind power plant (Quang Tri Electricity Company); 50 MW geothermal power plant (ORMAT); 14 MW hydro power (RCEE); 6.4 MW Cogeneration (RCEE); 3 MW Rice-husk power plant (IOE); pulp and paper company oil-fired burner improvement (Dong Nai Paper Company); energy efficiency in cement factory (SongDa cement factory); efficient public lighting (Institute of Material Science); advanced sedimentary brick kiln (Institute of Thermal Engineering); reforestation (SNV Farmer Union of Aluoi).</li> </ul>
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*Sources: Cambodia – Sum Thy (2004); Indonesia – DGEEU (2005); Malaysia – Wahab, Idris and Ahmad (2004); Philippines – Joyceline Goco (2004); Thailand – Tummakird (2004), Sutiratana (2005); Vietnam – Nguyen Mong Cuong (2004)*



## **5. EU EMISSIONS TRADING SCHEME**

Another interesting development for developing countries is the launching of the EU Emissions Trading Scheme (EU ETS) on January 1, 2005. The EU ETS is a mandatory greenhouse gas trading scheme in the European Union sanctioned by the European Commission. This regional allowance market is independent from the Kyoto Protocol, though its linking Directive, which entered into force in November 2004, allows conversion of CDM and JI emissions reductions into EU emissions allowances (EUAs).

The EU ETS entered into force in summer of 2003. The first compliance phase starts from 1 January 2005 to 31 December 2007 and the second phase coincides with the Kyoto Protocol compliance period, 2008 to 2012. The scheme applies to 25 EU countries (including the 10 accession countries who joined the EU last year).

### *Trading Scheme*

The EU ETS is a cap and trade system covering CO<sub>2</sub> emissions during the first phase and all greenhouse gases in the second phase. The sectors concerned are power and heat generation; crude oil refineries and coke ovens; production and processing of ferrous metals including metal ore, pig iron and steel; production of cement clinker, glass, tiles, bricks and porcelain, and; production of pulp and paper. These consist of 12,000 installations covering around 46% of EU CO<sub>2</sub> emissions.

Each EU member sets the cap and designs a national allocation plan (NAP). Each country NAP must be approved by the European Commission to ensure they are consistent with the trading Directive. As of mid January 2005, 21 NAPs have been approved. The missing 4 are from Czech Republic, Greece, Italy and Poland. The 21 NAPs have an aggregate cut of 17.4 million tonnes per year (Mt/yr) for the period 2005-2007. 13 of these NAPs are from the EU-15 countries and the cuts amount only to 6.6 Mt/yr while the remaining 8 are from new Member States with an aggregate reduction of 10.8 Mt/yr.

The fine for non-compliance is set at €40 per tonne during the first period and €100 per tonne in the second phase. In addition, non-complying companies must purchase the allowances in the market. Companies can meet their cap by i) actually reducing CO<sub>2</sub> emissions at their installations, ii) purchasing EU allowances from other companies in the scheme, and iii) purchase credits from CDM and Joint Implementation (JI) and convert these into EU allowances (this is discussed further below).

### *Linking Directive*

The European Commission recognized the fungibility of carbon credits (CERs from CDM and ERUs from JI) and EU allowances (EUA), and proposed the linkage between the EU ETS and project-based emissions reductions. The European Parliament adopted the linking Directive in April 2004 and was entered into force in November 2004. The Directive allows CER conversion into EUA from 2005 and ERU conversion from 2008.

Limitations of projects eligible in EU ETS are also specified in the Directive. Nuclear and sinks are not allowed though there is a possibility that sinks may be allowed after 2008. Large hydro projects will only be allowed if it satisfies the rules set by the World Commission on Dams.

There is no cap set on imported CERs and ERUs but it is expected that each Member State will source 50% of the reductions from domestic actions rather than imported emissions.

*Implications on CER Markets and Prices*

The linking Directive is seen as a boon to CDM. The possibility of the conversion could translate into increased demand for CERs hence more project-based investments in developing countries. Point Carbon observes that after the start-up of EU ETS in January, EU companies' interest on CERs have built-up. It also guessed that 50% of issued CERs will go to the EU ETS in 2005-2007. Not all CERs however can be converted to EU allowances since some projects such as sink projects are not eligible in EU-ETS. This may create a two-tier CERs: for imports and not for imports in the EU ETS.

The forward price for EUAs at the beginning of 2004 was around €12 per tonne of CO<sub>2</sub> equivalent. It has fallen to below €7 per tonne at the end of the year due to generous NAPs being filed by some EU member states. The mid-February 2005 forward price of EU allowance hovers around €7 per tonne while the forward price of CER were in the price range of €5.0 – 5.5 per tonne. This reflects the risks associated in the issuance of CER such as registration risk, political and country risk, and project risk. Several CER buyers in fact prefer the price difference due to perceived risks between EUA and CER to be more than €1 per tonne.

CERs however have better advantage than EUAs since they can be banked to the second phase period of the EU-ETS while EUAs during the first period (2005 – 2007) cannot be banked to the second period (2008-2012). A secured CER (through various instruments such as performance bond, insurance, letter of credits or another hedging instrument) therefore can fetch a price similar or even higher than that of EUA.

## **6. EUROPEAN CARBON CREDITS DEMAND**

With the start of the European CO<sub>2</sub> Emission Trading Scheme (EU ETS) last January, interest in acquiring CERs is on the rise. In anticipation of the trading system, several countries have set up institutions and allocated funds to buy credits from CDM projects in 2004. Demand for CERs is on the rise and may be expected to sustain or increase, for several reasons:

- With the entry into force of the Kyoto Protocol, GHG reduction targets for EU member states become legally binding, and many countries will not be able to achieve the necessary reductions domestically;
- As required by the EU Directive on the ETS, member states had to develop a National Allocation Plan in 2004, which had to indicate how the Kyoto targets were going to be met. In case carbon credits from CDM or JI were planned to be acquired, clear plans and funding had to be indicated, a requirement which several countries had to quickly develop;
- Under the ETS, some 12,000 industries and power plants in 25 countries have been allocated emission rights, which can be traded for the period 2005-07. Where EU CO<sub>2</sub> price is higher than the average CER price, companies exceeding their emission ceiling may consider buying CDM credits instead of buying on the EU market. This option is allowed by the so-called Linking Directive. Though the CO<sub>2</sub> allocation for the next three years is generally considered to be rather generous and demand for credits low. The carbon market for the period 2000-2012 is expected to be more liquid. Buying of CERs by European companies may constitute a significant flow.

The following is a brief account of the activities of European countries on the international carbon market, notably CDM. Characteristics of programmes set up in order to contract carbon credits from greenhouse gas reduction projects will be discussed. Often, Annex-I countries first sign a Memorandum of Understanding (MoU) with a country from which they intend to buy CERs and those relevant to ASEAN are mentioned. In addition to governments, several companies in Europe (as well as Japan and Canada) are also involved in acquiring carbon credits - which they may use to compensate their own emissions or to sell on the international carbon market.

The Austrian CDM Small-scale Facility recently set up, focuses on small projects in Latin America. It intends to buy 1.25 million CERs up to 2012, preferably from 'high value' projects. Two JI projects in Eastern Europe have been contracted so far.

The Belgian government recently announced a tender for CDM/JI projects will be opened this year. It intends to purchase 12.3 Mton emission reduction units for the period 2008-2012.

The Danish government has contracted projects hosted by, among others, Malaysia and Thailand, with which it has signed MoUs. It is also focusing on Central Asia and Eastern Europe. In January 2005, Energi E2, Elsam and the Danish ministries of foreign affairs and environment established a carbon fund to be administered by the World Bank. It aims to purchase 5-6 million carbon credits through JI and CDM projects by 2012.

Finland started a programme in 2002 specifically focusing on small-scale JI and CDM projects. To date, it has contracted projects in Vietnam, India and Honduras.

Several French companies are involved in CDM projects, notable the Korean N<sub>2</sub>O destruction project - the largest to date. France is also an investor in the PCF.

As Germany appears to be on track for its Kyoto targets, the government's activity in the carbon market has been limited to involvement in a small number of CDM projects, mainly in Latin America. However, the Hessian Ministry of Environment together with KfW Bankengruppe has set a carbon fund aimed at procuring carbon credit from small-scale projects under the CDM or JI. In addition, several German companies are involved in contracting CERs. Under the ETS, several German companies are likely to be significant buyers.

Recently, the Italian Carbon Fund was established. In order to achieve its Kyoto target, the Italian government plans to buy 36 Mt carbon credits. The Fund focuses on regions such as Latin America, Balkan and China. 14 projects have been contracted so far. Some Italian companies are also active in the CER market, with one having contracted to buy credits from an Indian CDM project.

The Netherlands has been an active player in the CDM for over 5 years. It has contracted a range of CDM projects through the CERUPT programme, mainly in Latin America, and in Asia. It has an MoU with Indonesia (which has recently ratified the Kyoto Protocol). It is not likely that new CERUPT rounds are coming as the Kyoto target is within reach with the contracted projects (new JI project tenders are still active). However, the Dutch government is still funding CDM programmes such as Prototype Carbon Fund (World Bank), Netherlands Clean Development Facility (NCDF) and INCaF. Also, the Dutch Rabobank was requested by the government to buy 10 million CERs (up to 2012). Some Dutch companies intend to buy credits as well.

Norway is involved in the heavily disputed tree plantation project in Uganda. The country is to set up a national emissions trading programme in 2005, where it will be possible to utilize CERs for compliance.

In the process of developing an allocation plan for the ETS, the Spanish government has started to explore meeting its Kyoto commitments with help of the flexible mechanisms and has indicated to buy 100 Mt, mostly through CDM. Part of this will be managed by the World Bank. It has signed MoU with several countries in this Latin America though no projects have been contracted yet.

The Swedish government has a carbon fund in place and projects in India have been contracted by the Swedish Energy Agency. A study regarding the potential of CDM in Africa - which continent to date hosts a very small share of the projects - has been commissioned. Swedish companies are already involved in several CDM projects, and industries are expected to be net buyers of emission right under the ETS.

The so-called new member states of the EU are all well on track to meet their Kyoto targets, due to economic downturn in the 1990s. Most companies have also been allocated enough allowances to cover projected emissions in the coming three years.

The World Bank and the European Investment Bank have signed an MoU to set up the Pan-European Carbon Fund. This should be in place by mid-2005 and its budget for contracting JI and CDM projects may be up to 100 million €

European demand for carbon credits appears to be picking up. Most EU-15 governments and companies are quite active in the carbon market. Many programmes are in place and new policies are set up in anticipation of the EU ETS and the coming into force of the Kyoto Protocol.

## **7. CONCLUSION AND POLICY RECOMMENDATIONS**

The Kyoto Protocol, which entered into force in 16 February 2005, provides a new financing opportunity for renewable energy projects in developing countries. The Clean Development Mechanism (CDM) is an instrument to stabilize greenhouse gas emissions allowing participation from developing countries through investments on emission mitigation projects in these countries. Most of the ASEAN member countries are signatories and have ratified or acceded to the Kyoto Protocol. To take advantage of these investment opportunities for renewable energies, the ASEAN countries must further broaden the scope for carbon finance and strengthen their institutional frameworks.

- **Stimulate private investments on renewable energies through carbon finance.** The ASEAN countries must also consider carbon finance beyond CDM. Other carbon markets also offer investment opportunities for renewable energies. The EU-Emissions Trading Scheme (EU ETS) through its Linking Directive, for example, allows conversion of certified emissions reductions (CERs) from CDM into EU allowances (EUAs). In addition to EU ETS, a number of voluntary markets that target investments on sustainable energy projects in developing countries exist globally.
- **Establish frameworks required for carbon financing.** In addition to the Kyoto Protocol ratification, countries interested to participate are required to establish designated national authorities (DNAs) responsible for the evaluation and approval of projects and serve as the coordination body at the national and international levels. Moreover, CDM participation requires countries to formulate their own sustainable development criteria. These frameworks are also relevant to other carbon finance programmes (EU ETS, voluntary markets) since these programmes require the same stringent procedures as the CDM process.
- **Prioritise renewables for carbon finance.** To ensure that carbon financing is channelled to sustainable energy projects, governments could adopt policies to prioritise and align government renewable energy development programmes for carbon financing. These could be further supported with the issuance of technology, geographic and investment guidelines for carbon financing.

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