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CDM-ASEAN: Implementation of the Clean Development Mechanism CDM in the ASEAN Energy Sector

Improving the Competitiveness of Southeast Asia on the Global CDM Market

Regional Cooperation in ASEAN on CDM in the Energy Sector

Discussion paper

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1 Introduction

The Clean Development Mechanism (CDM) under the Kyoto Protocol aims to facilitate the implementation of additional renewable, alternative and energy efficiency projects in developing (non-Annex I) countries through the sale of Certified Emission Reduction Units (CERs). CDM can contribute to achieving the economic and sustainable development objectives of CDM host countries.

The recent first registration of a CDM project with the Executive Board almost coincided with Russia's ratification of the Kyoto Protocol, providing a significant milestone in the continuously growing global trade in CERs. Southeast Asia is one of the regions where a significant number of CDM projects are being developed, although many stakeholders share the opinion that its potential is not yet exploited enough to secure a sustainable competitive position in the global market.

The objective of the CDM-ASEAN project, therefore, is to support the successful implementation of CDM in ASEAN countries through regional institutional capacity building and by improving the competitive position of ASEAN among CDM host countries for investments in the energy sector[1]. The main priority of the project is to facilitate the exchange of experience between ASEAN countries on the implementation of the CDM. The target group are the national governments and relevant CDM agencies of ASEAN countries, as well as regional organisations, particularly the Association of Southeast Asian Nations ASEAN.

The main project activities are the organisation of two regional CDM seminars, the organisation of a side event at UNFCCC meetings, the publishing of common discussion papers on topics of ASEAN-wide interest and the development of a CDM website specifically for interested parties in the region. The project will result in concrete recommendations on the co-ordination of CDM implementation in ASEAN and on the institutional implementation in ASEAN member countries. The project will be concluded with a two-day regional CDM seminar in Kuala Lumpur on 23 and 24 February 2005[2]. This paper reports on the interim results of the CDM-ASEAN project.

[1] The project partners of CDM-ASEAN:

- Indonesia: Pelangi. Climate change and energy NGO. www.pelangi.or.id.
- Malaysia: PTM Pusat Tenaga Malaysia (Malaysia Energy Centre). www.ptm.org.my.
- Philippines: Preferred Energy Incorporated (PEI). www.pei.net.ph.
- Thailand: Center for Energy Environment Resources Development (CEERD). www.ceerd.net.
- CAP SD Energy and climate consultants, the Netherlands. www.capsd.nl.
- The Hamburg Institute of International Economics (HWWA), Germany. www.hwwa.de/climate.htm.
- Ecosecurities Ltd, UK. www.ecosecurities.com.

[2] See http://cdmasean.pelangi.or.id for the announcement.

2 Taking stock of CDM in ASEAN countries

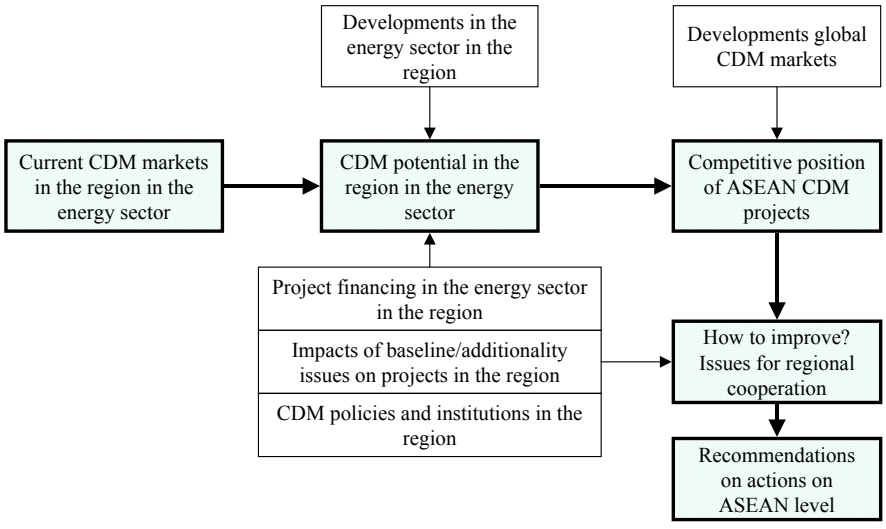
The ten potential CDM host countries in the region (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam[3]) show significant differences in both CDM project development and in establishing the related policy and institutional framework. These differences can be partly explained by the country-to-country differences in the potential for CDM, for instance resulting from the structure of the energy sector and the investment climate. Nevertheless, the overall region's potential is probably not yet exploited well enough to secure a sustainable competitive position in the global CDM market. Given the relatively small size of the countries compared to key competitors in the global CDM market, particularly China and India, a rationale exists for exploring the potential benefits of increased regional cooperation among the countries.

This paper focuses on the energy sector, given the large share of potential CDM projects as well as the regional relevance of the sector. The central question to be addressed, therefore, is the following:

How can a regional perspective in both problem analysis, finding solutions and actions complement the country perspective in enhancing the potential for CDM in the energy sector in South-East-Asia?

The Association of South-East Asian Nations (ASEAN) provides an established regional framework for cooperation in both energy and environmental issues. The paper will, therefore, address the future role of ASEAN in regional cooperation on CDM in particular. The analytical approach adopted in addressing this question is illustrated in Figure 1.

Figure 1: Analytical approach



[3] Brunei has not yet ratified the UNFCCC. Singapore has repeatedly indicated that it does not want to participate in the CDM and has not ratified the Kyoto Protocol. Therefore, these two countries are not assessed in detail in this paper.

First, the current CDM market in South-Asian countries in terms of project development will be put into the perspective of the global CDM markets (Chapter 3). This will provide insight in the current competitive position of the region. Second, an analysis of development in the energy sector will identify the potential for future CDM projects (Chapter 4). As the final step in the analysis, three issues will be addressed in detail because they strongly influence the future CDM potential and because they can potentially benefit from regional cooperation. First, baseline determination and additionality requirements are still a significant hurdle for project developers to overcome (Chapter 5). Second, CDM host countries need to establish policies, institutions and procedures to evaluate and approve CDM projects (Chapter 6). Finally, attracting core finance – project debt and equity - for CDM projects remains a major hurdle to the efficient execution of the CDM potential (Chapter 7). The analysis will result in the identification of issues that could be addressed at a regional level and recommendations on actions and activities by ASEAN (Chapter 8). Finally, Chapter 9 summarises the findings in a discourse on ASEAN's competitive position in the global CDM market.

3 CDM Market Trends

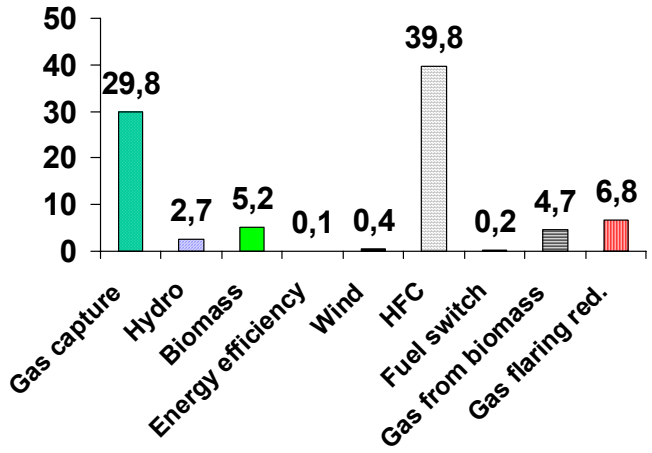
3.1. The Global CDM Market

CERs from CDM projects are an entirely artificial commodity, created by policy and used strictly in a policy compliance context. It is little wonder than institutions surrounding the CDM are of paramount importance to the development of this commodity – without them, the commodity simply does not exist. Despite years of lead-up, in latter 2004 there are few countries that can truly demonstrate a seamless CDM project development, approval and financing process. Nonetheless, Russian ratification of the Kyoto Protocol represents the real beginning of the CDM's transition from a policy concept to an international market.

As with any new market, there are significant ranges estimated regarding demand, pricing and delivered volumes of the CER commodity. There is also some degree of numerical imbalance between supply and demand of the commodity. For example, Point Carbon – the leading information source on the emissions market -- tracks well over a thousand CDM projects in development. To counter, the direct level of active buyers – to date -- numbers well less than fifty.. However, the number of buyers is expected to jump significantly over the next several years, with the solidifying of various emission policy requirements.

By November 1, 2004 more than 40 project proposals using officially approved methodologies have been opened for comments for validation. Large-scale technologies such as reduction of HFC-23 and N_2O from adipic acid production that may supply millions of CERs per year per project have emerged Technologies seen as attractive for the CDM since its inception, such as landfill gas collection and renewable energy, also get developed. Fig. 2 shows the distribution of the expected CERs from these projects according to project types

Figure 2: Amount of CERs differentiated according to project types (million)

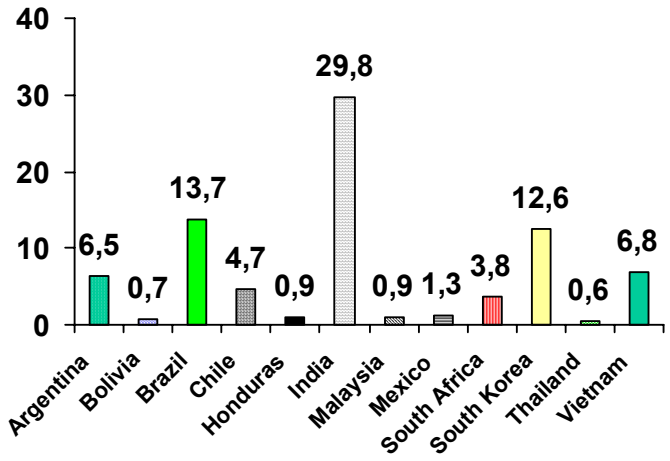


Source: CDM project documentations on UNFCCC CDM website, Nov. 1, 2004

This supply is distributed among a rather small number of host countries, as shown in Figure 3. Despite years of lead-up, there are few – if any - countries that truly demonstrate a seamless CDM project development, approval and financing process. Even countries that once seemed well ahead –

such as Brazil and Costa Rica -- have recently demonstrated sticking points in their project approval process'. Despite a tremendous pipeline and a highly aware population of project developers, few deals out of Brazil have actually been consummated.

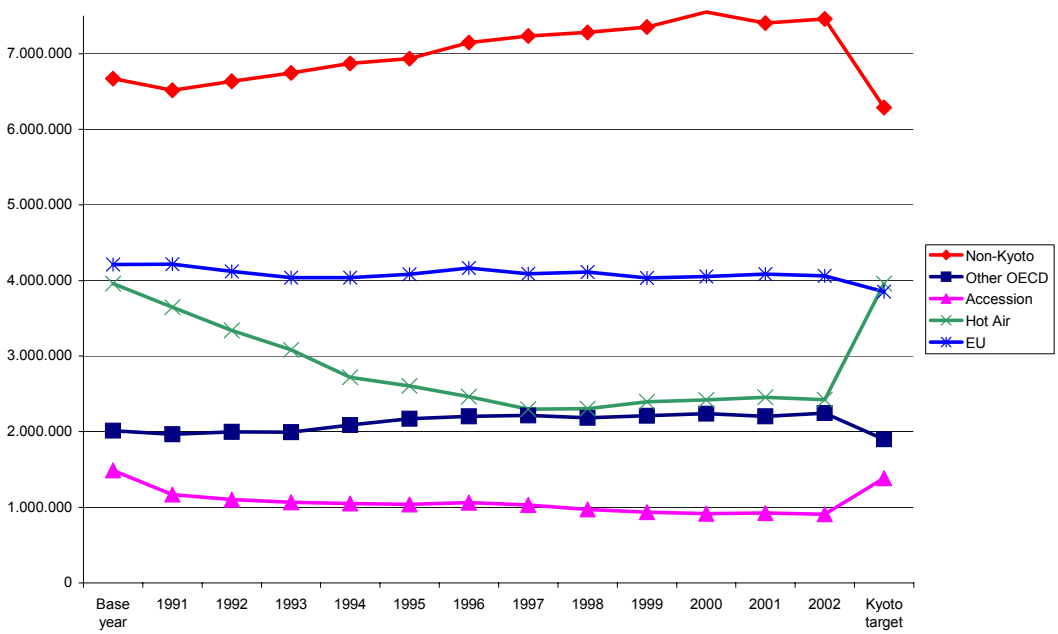
Figure 3: Amount of CERs differentiated according to host countries (million)



Source: CDM project documentations on UNFCCC CDM website, Nov. 1, 2004

On the demand side, the entry into force of the Kyoto Protocol has taken away a large barrier. The current demand situation is characterised by a strong divergence of emission trends according to country groups (see Figure 4). The biggest gap exists for the countries refusing to ratify Kyoto.

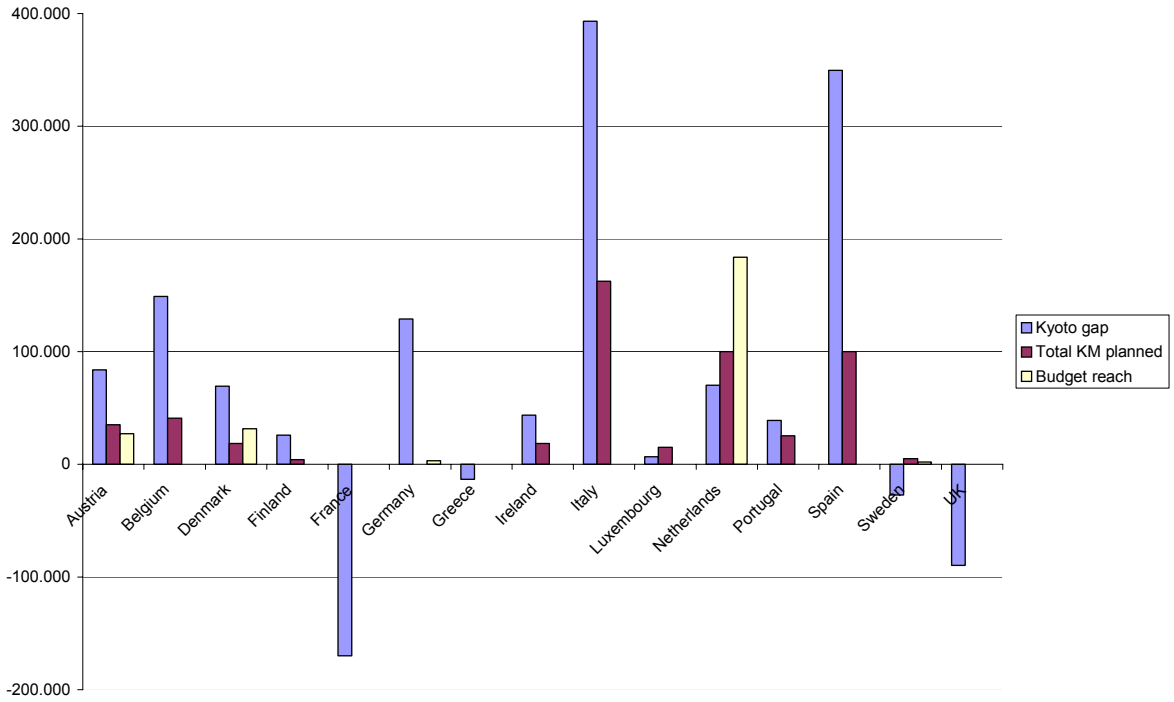
Figure 4: Emission trends of industrialised countries (kt CO_{2eq})



It can be seen that the current gap of Canada, the EU and Japan can be more than covered by the surplus of Russia, Ukraine and Eastern Europe. This would mean that there is no demand for CERs. However, the political willingness to buy "hot air" is currently rather low and thus a real chance for the CDM exists.

In the context of the EU emission-trading scheme, governments have defined volumes of purchases of emission credits from the project-based Kyoto Mechanisms. While the gaps will by no means be fully closed, total volumes are substantial and the committed budgets are increasing (see Figure 5). Governments are using tender programmes (Austria, Denmark, Finland, Sweden) or dedicated World Bank funds (Italy, Netherlands, Spain). The Dutch programme is the most differentiated one. Four million CERs shall be acquired through three multilateral World Bank funds (PCF, CDCF, BioCF), 24 million through two bilateral funds with the World Bank (IFC and INCaF). Ten million CERs each are to be procured through the public CERUPT tender, a contract with the Latin American regional development bank CAF, and with the private Rabobank. The latest portfolio addition is a bilateral government purchase agreement negotiated with Indonesia aiming at five million CERs.

Figure 5: EU Kyoto gaps, CDM/JI purchase plans and reach of allocated budgets (kt CO_{2eq})



Source: National allocation plans, budget reach calculated at CER/ERU prices of 4 €/t CO_{2eq}

Beyond this government-led demand, there will be some, albeit limited, private sector CDM demand from the EU due to the so-called "Linking Directive" that allows use of CERs in the EU emissions trading scheme from January 2005. The Linking Directive is the first large-scale incentive for private companies to participate in CDM projects. While being revolutionary from an institutional point of view, the scheme's actual impact on emissions is likely to be relatively limited because industry lobbies managed to convince policymakers to grant them a lenient allocation of emissions allowances for the initial compliance period 2005-2007. The 14 published allocation plans of the EU-15 allow an

annual emissions increase of over 50 million tonne compared to levels of the early 2000s and the plans of 5 new member states from Central and Eastern Europe generate an aggregated increase of 45 million tonne. However, while letting pass the first round of allocation plans relatively unscathed, the European Commission has rejected eight plans of the second round in October 2004 requesting a slashing by 12.6 million tonne of which 6 million concern the accession countries but also the allocation plans of France and Belgium have been rejected. Despite this decision, industry will not have to achieve large reductions. On the contrary, many companies will own a bank of emissions allowances. Obviously, the allocation for the 2008-2012 period may become more stringent, but the principles laid out in many allocation plans for that period make it relatively unlikely.

In contrast to the EU, private sector demand from Japan is vibrant. Large utilities such as Tepco, J-Power and Tohoku Power are buying millions of CERs and are even investing in equity of CDM project developers. Despite the Canadian government's intent to set up an emission-trading scheme for large private emitters, CER demand from those remains relatively lacklustre, probably due to a feeling that the allocation will be relatively lenient.

Currently, there is almost no demand for CERs accruing after 2012. This is surprising inasmuch as a majority of researchers on long-term climate policy agree that the CDM will be part of any climate policy regime that could follow the Kyoto Protocol. The lack of demand for post-2012 CERs reduces the scope for development of CDM projects with long lead times.

3.2. Breaking Down Buyers to Date

As described above, several types of buyers are active in the CDM market currently. It is worthwhile to briefly note their respective perspectives and activities in the market:

- Private purchasers who are acquiring CERs for there own account to meet national compliance objectives.
- Government purchasers who are acquitting CERs for compliance with Kyoto objectives.
- Purchasers who are acquiring CERs for the account of others, who are presumably seeking compliance with either domestic or Kyoto objectives (carbon funds).
- Purchasers who are acquiring CERs on a speculative basis, with the presumed intention of selling such later at a profit.

Private Purchasers

It is fully expected that the largest part of the market will eventually be individual concerns seeking lower-cost compliance options. As noted, there are well over 12,000 entities that have received emission allocations under the EU ETS and all of them are potentially consumers of the CER commodity, though it is far more likely that only a small fraction will directly engage the market. Key, well-known acquirers of CERs to date have been principally in the electric utility industry, led by large firms like Tokyo Electric Power and Chubu Electric (Japan), Trans-Alta (Canada) and Nuon (Netherlands). To date, however, they have been a relatively small segment of the market, though growing quite rapidly in latter 2004. An emerging sub-segment in this model are purchasers who seek to obtain CERs – or rights to CERs – via equity infusions into qualifying projects. Several Japanese corporate buyers active in ASEAN have been offering this transaction model, with different terms being offered under different situations.

Government Purchasers

Government purchase funds are a key part of the buyer side of the market. Led by the Netherlands, who committed sizeable emissions purchase commitments through the CERUPT programme, several European governments notably Austria and Denmark, have followed suit and launched purchase

tenders for CERs. Japan is also engaged in this market segment, though often via a series of grants (above and beyond ODA) and funds facilitations that have CER transfer requirements attached to them, managed by individual ministries. Government acquisition procedures tend to follow open tendering procedures and often have significantly greater information provision requirements, as compared to purely private sector transactions.

Carbon Funds

As of late 2004, it is estimated that there is well over US$ 1 billion committed to centralised CDM purchase funds. These are led by the multiple funds run by the World Bank (Prototype Carbon Fund, Community Development Carbon Fund, Netherlands Carbon Development Fund, Italian Carbon Fund, Bio-Carbon Fund and the Spanish Carbon Fund), the emerging Japan Carbon Fund and a variety of other intermediating agencies, including purchase facilities led by financial institutions such as CDC-Ixis, KFW, Andean Development Bank and the European Bank for Reconstruction and Development. These purchasers tend to have more open timelines for considering projects, but are fairly rigid in the manner in which projects will be considered.

While the earliest of these funds were designed to help seed the market (by creating a genuine buyer for qualifying Kyoto credits where none had previously existed) there is evidence that the newer funds are more margins oriented. This will likely mean that certain benefits of working with the funds – such as their taking up all early stage transaction costs – will not be the case with the newer iterations.

Speculators and Traders

To date, the market has been insufficiently certain and insufficiently liquid for speculative investments in the CER commodity. While it is too early to say for certain whether this is changing, as discussed above, there are examples of project equity investors seeking to control the eventual CER stream, though in general they will not value such in the investment *pro-formas*. This is a form of speculation. Whether carbon eventually attracts the market participants that other pollution markets occasionally have – large hedge funds seeing significant value gaps that can be exploited – is another question altogether. Nonetheless, it is highly unlikely that such investors would be engaged in developing project finance solutions for CDM projects.

To some degree, the active participation of Japanese trading firms, such as Sumitomo, Mitsui, Toyota Tsusho and Mitsubishi, represents a speculation model. To date, however, evidence indicates that their transaction participation has been largely undertaken in a “back to back” fashion where any commitment already has an identified buyer (and therefore only represents fairly small balance sheet risk). As the demand side of the market matures, one would expect that these firms – and others – will engage in greater speculative behaviour when given the opportunity to acquire CERs below their projected forward trading price curve.

3.3. Overview of Energy CDM Projects in ASEAN

Within ASEAN, CDM projects developed so far fall into similar categories. Table 1 and 2 show type-wise distribution of publicly available project ideas in ASEAN.

Table 1: Sector Distribution of Energy CDM Project Ideas from ASEAN Countries

Country	Biomass /waste	Energy efficiency	Hydro	Geo-thermal	LFG	Fuel switch	Gas flaring reduction	Wind	Total
Cambodia	2	0	1	0	1	0	0	0	**4**
Indonesia	12	1	3	8	1	1	1	0	**27**
Malaysia	8	1	0	0	1	0	0	0	**10**
Philippines	4	2	1	1	1	0	0	2	**11**
Thailand	14	0	0	0	0	0	0	0	**14**
Vietnam	1	7	1	1	3	1	1	2	**17**
Total ASEAN	**41**	**11**	**6**	**10**	**7**	**2**	**2**	**4**	**83**

Sources: UNFCCC CDM website, presentations at South East Asia Greenhouse Gas Market Forum October 2004, personal communication Agus Sari, DNV. Overlaps cannot be excluded.

Table 1 shows that a few categories concentrate most of the CDM project ideas. The majority are biomass power projects.

Table 2: CDM Project Activities within ASEAN Countries Submitted for Registration

Project Title	Country	Project Category	Methodology
Bumibiopower Biomass Power Plant Project	Malaysia	Electricity Generation	AMS-I.D.
Kunak Bio Energy Project	Malaysia	Electricity Generation	AMS-I.D.
Bio-diesel Fuel Production Project in Indonesia	Indonesia	Fuel Switch	AMS-III.B.
Krubong Melaka LFG(Landfill Gas) Collection and Energy Recovery CDM Project	Malaysia	Fugitive Emissions (Landfill gas)	AM0003

These two tables show that there is still a big difference between the CDM potential and the projects to be registered under the CDM. The potential of ASEAN countries is still widely under-deployed. The countries that are most advanced in the CDM process are Malaysia and Indonesia, followed by Thailand, Vietnam and the Philippines. Further, three methodologies proposed for project activities within ASEAN have so far been approved by the Executive Board:

1. AM0004 – Grid-connected biomass power generation that avoids uncontrolled burning of biomass (A.T. Biopower rice husk power project, Thailand).
2. AM0009 – Recovery and utilization of gas from oil wells that would otherwise be flared (Rang Dong Oil Field Associated Gas Recovery and Utilization Project, Vietnam), and,
3. AM0013 – Forced methane extraction from organic wastewater treatment plants for grid connected electricity supply (Bumibiopower Methane Extraction and Power Generation Project, Malaysia).

Another fugitive methane methodology – AM 0041 – based on the case of cassava wastewater processing in Thailand – is currently under review.

3.4. Breaking Down ASEAN Sellers to Date

As noted at the outset, there are already well over 1000 CDM projects in development around the world. These originate from a huge variety of sources, including governments, NGOs, multilateral organizations, development agencies, corporations and individual developers. It is expected that a very large percentage of these projects will never create CERs that can be transacted, for a variety of reasons. Nonetheless, the sheer breadth of potential CER sources is a good indication of how ubiquitous the carbon economy is around the world.

There are three principal models around which private commercial grade suppliers can be categorized in the CDM market. "Commercial grade" implies that more "soft" forms of CDM suppliers are not considered, such as NGOs and development organizations. To briefly review, these are the models:

1. Corporations based in the developing world who are undertaking CDM using their own assets
2. Multinationals based in emissions capped Annex B nations, who are seeking CERs from their own, internal, operations in the developing world.
3. 3rd Party Developers who are developing CDM assets either on a greenfield basis or on the backs of existing assets (whose ownership can be either of the above).

Governments and government corporations are another potential source of CERs into the marketplace. While there have been several good size prototype programmes to supply emissions commodities (notable Costa Rica's multi-pronged forestry carbon programme back in the latter 1990's), recent years have shown relatively few government suppliers in the marketplace. This could, of course, change with the increased maturation of the market, particularly from countries where government participation in significant assets is substantial, such as China and – in ASEAN – Vietnam and Myanmar.

Fully developing projects to the point of engaging a transaction is a three-stage process – even prior to actually implementing an emission transaction. While there may be significant subsets of activities under each of these, the CDM experience can be broken down into the following requirements:

- Developing the full documentation required by the Project Design Document (PDD) process.
- Getting Designated National Authorities (DNA) to review and approve projects.
- Sourcing sufficient investment capital to move the overall project – not just the carbon component - to financial closure and execution.

All three components are vitally important to a successful CDM process – yet capacity building in most countries is focussed largely on the first two. This is because it is generally assumed that capital markets take care of their own business – if there is a business opportunity that makes sense, investments will occur. However, if capital markets are unable to properly assess the value of a CER stream, the natural responses of analysts is to discount the CER revenue stream to zero, thus making investment opportunities stand up on their other receivable streams in order to attract investment capital. This disadvantages CDM projects and provides a reasonable rationale to spend some time with local investment sources to help them understand the emerging emission market dynamics.

In Malaysia, the driving force – to date – behind the development of CDM assets appears to have been local corporations. Major palm oil producers such as Felda, Golden Hope, and ISI as well as local energy concerns such as Tenaga have been relatively active participants in the project development market. While there have been third party developers, they have less traction in Malaysia than in either the Philippines or Thailand, though one local firm (Bumipower) has engaged the CDM through biomass project development opportunities.

In Indonesia, up to now multinationals have been very visible but the picture starts to change. Early proponents of CDM projects in Indonesia have been led by the American multinational, Unocal, seeking to gain value for its existing and prospective geothermal portfolio in the country. Other major energy multinationals, such as ChevronTexaco, Statkraft and Sumitomo, have also been engaged in early stage Indonesia projects, though none have yet been fully developed. There are other prospective projects involving local developers in Indonesia similar to the Malaysian situation, but they have not been as high profile. As Indonesia only ratified the Kyoto Protocol in the summer of 2004, the extent to which this paradigm will remain dominant is still to be determined.

Similarly to Indonesia, in Vietnam large flagship projects have been multinational focused. The Rang Dong gas flare reduction project represents a highly industrialised level project and has been executed with the assistance of the ConocoPhillips and the Japan-Vietnam Oil Corporation. Similarly, both BP and Sembcorp looked closely at whether the Phu My combined cycle generation facilities would qualify for CDM activities (the conclusion was that it would not). Vietnam has great potential across a

wide range of other energy provision and energy management activities and it would be unlikely if the large scale, multinational-driven paradigm turned out to be dominant.

In Thailand and the Philippines, the driving force would appear to be third party, smaller scale, developers. In the Philippines, the UK project development firm, BronzeOak, has made significant progress in developing CDM projects for bagasse waste on the island of Negros and in other locales. Philippines BioSciences - a US-Philippine company – has developed a series of CDM projects on waste streams throughout the Philippines, most notably in energy recovery from sugarcane liquor wastes from a distillery in Tarlac Province and in piggery waste management throughout Luzon.

In Thailand, the first project approved by the CDM Executive Board (indeed, in the region) was the rice husk IPP, called AT Biopower. AT Biopower will begin operations in early 2005 as a 22 MW facility, with the potential of expansion to 88 MW, over time – entirely from the use of residue rice husk. Clean Technologies Thailand, another small developer, has furthermore developed a pipeline of waste to energy projects within both the cassava starch processing and burgeoning ethanol production business. All of these projects are being undertaken in a project finance structure, rather than with existing corporate sponsors. A third significant development -- the Mitr Phol rubberwood waste project -- was undertaken by the underlying company in an on-balance sheet fashion, but seems to have stalled since early negotiations.

4 ASEAN Energy Sector Overview and CDM potential

4.1. Overview Energy Sector

The ASEAN region is richly endowed with oil, gas, coal, hydropower and renewable energy resources, which are unevenly distributed in its member countries. Brunei, Indonesia, Malaysia, Thailand and Vietnam are rich in oil and gas resources, with the first three countries being major exporters in the region. Coal resources abound in Indonesia and Vietnam, the region's top coal exporters, while significant coal deposits are found in Thailand and the Philippines. Hydropower is abundant and already being used in most ASEAN countries, excluding Brunei, Cambodia and Singapore. Meanwhile, the Philippines and Indonesia have huge geothermal resources making them the second and fourth geothermal power producers in the world. Other renewable energy like biomass is abundant in the region and is a major fuel particularly in the rural areas and in the industrial sector.

4.2. Electricity Generation in ASEAN

Electricity generation in ASEAN countries differs considerably according to the availability of energy sources and the overall level of economic development. Overall levels vary by a factor of 1000 between individual countries. Table 3 brings out some of the basics of the current electricity situation in the region.

Table 3: Electricity generation in ASEAN 2001 (TWh)

Country	Hydro	New Renewables	Coal	Gas	Oil	Total
Brunei	0	0	0	2.5	0	2.5
Cambodia	0	0	0	0	0.1	0.1
Indonesia	10.1	2.4	33.2	30.1	20.0	95.9
Laos	1.3	0	0	0	0	1.3
Malaysia	7.2	0	3.0	46.9	12.2	68.3
Myanmar	3.4	0	0	2.2	0.5	6.1
Philippines	7.9	12.2	12.5	9.5	3.2	45.3
Singapore	0	0	0	30.5	0	30.5
Thailand	6.2	2.3	16.4	68.2	4.5	97.6
Vietnam	16.8	0	3.1	7.4	2.5	29.8
Total ASEAN	**52.9**	**16.9**	**73.2**	**197.3**	**41.0**	**377.3**

Source: US DOE Energy Information Administration (2004), thermal fuel shares estimated according to various documents (ASEAN energy website, EGAT) and normalised according to summary “thermal” value of DOE.

Natural gas remains the backbone of the region’s fossil power generation, while hard coal and lignite play important roles in Indonesia and Thailand respectively. Hydropower has historically been important due to the mountainous character and high precipitation throughout the region, however; its market share has been declining due to high capital cost and increasing difficulties in finding acceptable sites. Bunker oil and diesel are comparatively minor parts of the energy mix across the region, with the exception of Malaysia and Indonesia where these comprise approximately 20% of the electricity supply market. Geothermal power has been on the rise for the last two decades in the Philippines and Indonesia but is very capital intensive and therefore suffers from a continuing cost differential to thermal power.

CDM in the electricity sector can involve renewable and alternative energy, fuel switching and efficiency improvement of power plants and - potentially - end use applications. Most CDM projects proposed in the electricity sector address renewable energy, primarily biomass waste from agriculture,

geothermal and hydro. Across the region, in general wind potential is limited, though there are isolated areas which may have commercial potential. In the longer run, as wave and tidal technologies mature towards cost competitiveness, it could be expected that these would be an important component of the regions renewable energy potential, given the extremely significant littoral zones of Indonesia, the Philippines and Malaysia, and to a lesser extent, Thailand, Myanmar and Vietnam.

4.3. Renewable Energy for Power Generation in ASEAN

In the ASEAN region, biomass is an important source of energy because fuel wood is still the dominant source of energy in almost 50 percent of the region. The share of biomass in the TPES of the ten ASEAN Member Countries in 1998 was about 40 percent. By country, the share of biomass in the primary energy supply in 1999 was: Myanmar - 86 percent; Lao PDR - 86 percent; Cambodia - 83 percent; Vietnam - 48 percent; Indonesia - 29 percent; Philippines - 21 percent; Thailand - 17 percent; and Malaysia - 8 percent[4]. Biomass energy is largely used in the household sector and in small-scale industries. Recently, its use in combined heat and power generation is increasing. The role of biomass is presently limited in power generation, but opportunities exist for increasing its share.

Biomass resources such as wood and agricultural residues are abundant in ASEAN countries and have strong potential as fuels for green power generation, and thus for CDM project development. The amount of residues produced from bagasse, rice hulls, palm oil waste and wood waste in five ASEAN countries, namely Indonesia, Malaysia, the Philippines, Thailand, and Vietnam is about 108 million tons. Of this total, bagasse accounted for 32 percent, palm oil waste 27 percent, rice hulls 23 percent, and wood waste 18 percent[5]. In practice, about half of agricultural residues is utilized for energy generation. It contributes 20% of the primary energy demand of industries. Similarly, the ASEAN wood industry converts about half of the raw wood into residue during the production process.

In 2000, the total installed ASEAN capacity of renewable energy for electricity generation, both captive and on-grid, was 20,943 MW (Table 4). Biomass power accounted for 9%, geothermal 11%, large hydro 77%, mini/micro hydro 2.4%, and solar PV and wind 0.19% [6].

Table 4. Renewable Energy Capacity for Power Generation (in MW)

Country	Biomass	Geothermal	Hydro	Mini / micro-hydro	Solar	Wind	Total (MW)
Brunei D.	-	-	-	-	0.0024	-	0.0024
Cambodia	n.d.	-	18	0.96	0.13	-	19
Indonesia	302	363	4,246	21	8	0.4	4,940
Lao PDR	n.d	-	621	6	0.16	-	627
Malaysia	213	-	2,225	6	2.19	0.15	2,446
Myanmar	-	-	340	83	0.24	-	423
Philippines	21	1,960	2,480	230	0.44	0.06	4,692
Singapore	220	-	-	-	-	-	220
Thailand	1,230	0.3	2,886	94	8	0.17	4,219
Vietnam	n.d	-	3,294	62	0.11	0.15	3,356
ASEAN-10	1,986	2,323	16,110	503	19.3	0.93	20,943

Source: Green IPP Project (www.asem-greenippnetwork.net)

[4] Source: FAO-RWEDP, 2000
[5] Source: EC-ASEAN, Cogen 2003 and UN-ESCAP, 2000.
[6] Source: ACE, 2003

In ASEAN, the potential of biomass for power generation is promising: about 50,000 MW for all biomass resources in Indonesia[7]: 3,000 MW in Thailand[5]; about 1,117 MW in palm oil industry of Malaysia[8]; about 60-90 MW from bagasse and 352 MW from rice hulls in the Philippines[7]; and 250 MW from bagasse in Vietnam[9]. About 920 MW in installed capacity could be expected from over 19 million tons of residues in ASEAN wood industry[9]. Much of this potential could be developed through cogeneration. However, in order to tap the estimated potential, the following key challenges have to be addressed:

1. Establishment of a level playing field for biomass power in competition with the often subsidized centralized power generation.
2. Establishment of mechanisms to compensate for the avoided external costs of biomass power generation – for example through a so-called environmental "adder" on top of the normal buy-back rate, or through Certified Emission Reductions (CERs) revenues from CDM project.
3. Access to power grid under clear and fair terms and conditions, and
4. Development of a market for biomass waste resources.

Biomass energy could achieve the global targets for the reduction of CO_2 emissions, through the development of CDM projects in the ASEAN region in particular.

The way ahead is for governments of the ASEAN countries to mobilize the market forces by setting up policies, regulatory framework, and appropriate incentives to address the above-mentioned challenges. In ASEAN countries, the development of renewable energy for power generation is basically a policy issue. In many countries, appropriate policy framework is therefore developed to ensure that national energy policy goals are met. For biomass power, planning and programme implementation for grid power capacity installation vary among ASEAN countries.

In Indonesia, the national energy policy aims to reduce dependence on oil and gas and to diversify the energy mix to include other energy resources such as renewable energy. The Ministry of Mines and Energy published the tariff for purchase of electricity under the Small-Scale Renewable Energy Power programme which aims to ensure the availability of electricity and to provide business opportunities for small-scale power investors[10].

In Malaysia, the energy policy promotes renewable energy as the fifth fuel source. Under the Third Outline Malaysia Plan (OPP3 2001-2010) and the Eighth Malaysia Plan (8MP – 2001-2005), the Government will intensify and accelerate the development and use of renewable energy. The strategies of the 8MP for RE are: 1) promotion of RE resources such as biomass, biogas, municipal waste, solar, and mini-hydro; 2) in-house biomass-based cogeneration; 3) demonstration projects; 4) commercialisation of research; 5) extension of financial and fiscal incentives; 6) promotion of cooperation between public and private sectors; and 7) R&D on palm diesel and use of alternative sources such as fuel cell, hybrid cell, and hydrogen fuel[8].

In the Philippines, appropriate policies, regulatory conditions, and incentives have been put in place to increase power generation from indigenous resources, which will have positive impacts on the market for biomass technologies. The Omnibus Investment Code, the amended Executive Order 226 which allows the private sector to participate in power generation, Build-operate-transfer Law, and the Electricity Power Industry Reform Act are the relevant laws that will support the development of the renewable energy industry (DOE, 2003).

[7] Source: NRSE-SSN Report, 2001
[8] Source: PTM, 2003.
[9] Source: UN-ESCAP, 2000.
[10] Source: DJLPE, 2003.

In Thailand, the national energy policy promotes renewable energy to address key issues on energy security, to reduce energy import, and to reduce greenhouse gas emissions. The Energy Conservation Promotion Fund is the government's tool to implement, among others, power purchase and subsidy programmes for Renewable Energy Small Power Producers (SPP) and Very Small Renewable Energy Power Producers (VSREPP)[11]. Thailand's target is to increase the share of renewable energy from 0.5% of the commercial final energy in 2002 to 8% by 2011. One of the measures to achieve this target is to establish regulation or legal enforcement of the renewable portfolio standard for new power plants requiring 5% of their generation capacity be generated by renewable energy such as solar, wind or biomass.

In Vietnam, the 10-year Renewable Energy Action Plan, which will soon be adopted by the Government, will set the policy framework for the development of renewable energy systems for on-grid and off-grid options[11].

4.4. Other Potential Areas of Energy CDM

Besides electricity generation, considerable CDM potential exists in increasing the overall carbon efficiency of fossil fuel production. Avoidance of gas flaring could play an important role in Indonesia, Malaysia, Myanmar and Brunei; the first project of this type has been submitted to the CDM Executive Board by Vietnam.

There is also significant potential for liquid biofuel production. Thailand, for example, has launched an aggressive ethanol projection campaign, with the intent of displacing up to 30 million litres per day of conventional fuels with ethanol. This could well be replicated in the Philippines and Vietnam, with their similarly significant sugar industries. With their major palm oil assets, Malaysia and Indonesia would furthermore have strong potential for development of biodiesel production.

Indeed, the high population densities and large agriculture base of the ASEAN nations means that one of the most important areas of CDM potential is in alternative energy – capturing and using biogas produced in landfilled municipal solid waste and creating active managements systems of liquid effluent residues agricultural production. Several of the most advanced projects in the region come from these areas, with projects in distillery slops, cassava wastewater and palm oil effluent already advanced in various parts of the CDM process. These projects are especially salient to the benefits of the CDM, because of the so-called "methane multiplier" that means that potential carbon trading revenue. More conventionally, the solid biomass from agriculture – bagasse, rice husk, empty palm oil fruit bunch and forestry -- is another key exploitable resource that is likely to economically benefit from the CDM.

End-use energy efficiency in industry, transport and households so far has not been addressed to a significant extent by ASEAN, within a CDM context. This may be due to the fact that attention of managers to these issues has been limited due to the challenges of the financial and economic crisis of the late 1990s. However, countries like Indonesia, Thailand and the Philippines have significant potential in this field.

4.5. ASEAN's CDM Opportunities in the Energy Sector

As noted above, large-scale clean energy projects will face challenges in entering the pre-2012 CDM market, due to time lag that occurs between project conception and operation. ASEAN nations are

[11] Source: ASEAN Energy Bulletin, 2002.

impacted less by this than other regions because the relative potential for current large-scale clean energy technologies is somewhat on the low side. While it is inadvisable to generalize, ASEAN nations have comparatively low potential for utility-scale wind power, while large-scale hydro may have limited attractiveness due to CER import restrictionsin the EU . Outside of Philippines, Indonesia and potentially Vietnam, there is comparatively little geothermal potential in the region as well. While geothermal projects in Indonesia that have been in the pipeline and trying to add a CDM component for quite some time have market potential few if any large new or add-on facility(s) would be able to move to completion quickly enough to participate. Wave and tidal power potential – while significant in the region and under early stage investigation - is similar to solar technology in not being cost effective under current technology prices.

As noted above, ASEAN's principal, accessible, conventional renewable energy source is waste biomass, of which there is a significant resource, principally from agricultural crops (palm, sugar, rice, cassava) and wood residue from timber mills. These types of projects will generally be on existing sites and have a fairly good chance of qualifying under the small-scale procedures of the CDM. This in turn reduces transaction costs and accelerates delivery to market. Some of these assets will be able to move to execution quite rapidly, as they will displace increasingly high priced and high carbon intensity diesel or grid power. Providing on-site power means fewer requirements for external Power Purchase Agreements, though correspondingly greater complexities in establishing appropriate internal tariff rates in the case of BOT operations that are not financed directly by the project host.

Given projected forthcoming gap(s) between energy supply and demand in many of the ASEAN nations, energy efficiency is both a highly plausible and highly positive CDM strategy. Efficiency projects can be executed relatively rapidly and provide immediate bottom line results. These activities in turn can help lower - or at least defer - capital requirements of energy generation, which helps maintain balance sheet integrity of local electric utilities. Borrowing ability is a key consideration in many jurisdictions for local utilities, particularly since the Asian crisis of the latter 1990's.

Countering the general positive impacts of energy efficiency financing, however, is the fact that energy pricing in developing nations is often well below true market rates because of government subsidies. Indeed, many local utilities and energy officials often still discourage Demand Side Management (DSM) programmes. Again, the degree to which CDM based revenue flows can overcome these institutional barriers within ASEAN, remains an open question.

ASEAN's widest and most immediate potential is in fugitive methane capture. ASEAN's population density means that there are large streams and pools of relatively unmanaged waste. Proper management of the methane rich biogas from these waste streams can potentially generate very significant financial benefits from CER trading. In the areas of landfill gas, wastewater treatment and agricultural effluent management, there is immediate potential for rapid CDM market participation via these assets. Unlike conventional energy projects, emissions value truly drives this asset class. The business risk of undertaking most methane projects does not match typical investor requirements without the additional revenue flow potentially provided by emissions trading. Many of these projects are, therefore, strongly dependent on carbon trading to move towards execution. An additional advantage of these project types is that they can move from concept to execution very rapidly, meaning that they can potentially participate in Phase 1 of the EU Emissions Trading Scheme.

5 Baseline Determination in the ASEAN Energy Sector

5.1. Importance of Baselines for CDM

CERs are calculated by comparing emissions of the CDM project with emissions of a hypothetical baseline scenario that reflects the business-as-usual scenario. There is a strong international discussion as to whether the CDM project should have to prove if reductions occur based solely on the extra incentives given by the possibility to generate and sell CERs. This is known as the "additionality" question. Both the host and the investor have an incentive to overstate the amount of emission reduction achieved by the CDM project as they can then enhance revenues. If CERs will be created that represent emission reductions that would have happened anyway, these "fake" reductions will undermine the integrity of the Kyoto Protocol. On the other hand, extremely strict interpretations might mean that the CDM will not harness ongoing efforts to develop clean energy assets within developing countries. The international community has taken these fears seriously and developed a complex international process to determine baselines and have them independently checked. This check involves a test of project additionality. Due to the fact that so far only one CDM project has been officially registered, the degree of stringency of baselines and additionality determination remains to be seen.

As shown above, within ASEAN, CDM energy projects developed so far fall into similar categories, mainly biomass or waste-based electricity generation. Thus project developers could profit from a regional approach in developing electricity baseline emission factors and arguments to use for the additionality test.

International Rules and Procedures

Developing baseline methodologies and applying approved methodologies correctly are two major challenges for CDM project developers. The experience of the past year has shown that this hurdle is difficult to be overcome. The Marrakech Accords have set three baseline approaches but did not specify how to choose between them:

1. Existing actual or historical emissions.
2. Emissions of an economically attractive course of action, taking into account barriers to investment.
3. The average emissions of similar projects undertaken in the previous five years, in similar circumstances, and whose performance is among the top 20 percent of their category.

While it is specifically stated in the Marrakech text regarding CDM that baselines shall be established on a project-specific basis, there has been an increasing tendency to standardise baselines.

5.2. Small-scale Baseline Methodologies

For small-scale projects under the thresholds defined in the Marrakech Accords, baseline rules have been fixed by the Executive Board in January 2003 and revised twice with the last revision occurring October 2004. These rules had a strong impact on the development of large-scale project rules that are developed using a bottom-up procedure[12]. Energy project types were differentiated strongly and for each type, a methodology was defined. In some cases, project proponents can choose between several methodologies. For CDM projects providing renewable electricity to a grid, the rules are as follows:
For a system where all fossil fuel fired generating units use fuel oil or diesel fuel, the baseline is the annual kWh generated by the renewable unit times an emission factor defined by the Executive Board

[12] For example, they have introduced tools such as the operating and the build margin for electricity grids.

for three load factor ranges and five size classes. They range from 0.8 to 2.4 kg CO_{2eq}/kWh. In these cases no data needs be collected. For grids with different fuels, the emission factor calculation is relatively complex and needs up-to-date data. There are several options:

1. The average of the "approximate operating margin" and the "build margin", which is known as the combined margin (CM), where:
    a. The "approximate operating margin" is the weighted average emissions (in kg CO_2eq/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.
    b. The "build margin" is the weighted average emissions (in kg CO_2eq/kWh) of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the five most recent plants.
2. The weighted average emissions (in kg CO_2eq/kWh) of the current generation mix.

It is obvious that the calculation of the CM is more complex than the one of the grid average. Yet, it cannot be concluded that it is also more conservative. In the case of a grid with a high share in sources which would be excluded by the CM approach, the grid average may even lead to a lower baseline emission factor.

As the simplified approach requires less detailed data, the cost barrier for small-scale project activities has decreased. For instance, in Vietnam the required data is very well documented and available up to 2003. For the BM calculation, expansion plans of Energy of Vietnam (EVN) are available. Tuyen and Michaelowa (2004) present the data required for the SSc baseline calculation of electricity generating project activities in Vietnam[13]. Nevertheless, other countries cannot yet rely on such a well-documented data set. In order to prevent a situation in which poorer countries with badly documented data will suffer from receiving little CDM project funding, standardised data could be made openly accessible through the DNA.

5.3. Large-Scale Baseline Methodologies

This section will summarise the results of various approved baseline methodologies from the CDM executive board and analyse the consequences for the baselines of the project types in the electricity sector with the largest potential in the ASEAN countries.

Large electricity projects

As of November 2004, 84 methodologies had been submitted to the Executive Board of which 16 were accepted. See Table 5 and 6.

Table 5: Approved CDM Methodologies

Number of Approved Methodology	Title of the Methodology (Including Baseline and Monitoring Methodologies)	Sectoral Scope
AM0001	Incineration of HFC 23 Waste Streams	11
AM0002	Greenhouse gas emission reductions through landfill gas capture and flaring where the baseline is established by a public concession contract	13
AM0003	Simplified financial analysis for landfill gas capture projects	13
AM0004	Grid-connected biomass power generation that avoids uncontrolled burning of biomass	1
AM0005	Small grid-connected zero-emissions renewable electricity generation	1
AM0006	GHG emission reductions from manure management systems	13, 15
AM0007	Analysis of the least-cost fuel option for seasonally-operating biomass cogeneration plants	1, 4

AM0008	Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility	4
AM0009	Recovery and utilization of gas from oil wells that would otherwise be flared	10
AM0010	Landfill gas capture and electricity generation projects where landfill gas capture is not mandated by law	1, 13
AM0011	Landfill gas recovery with electricity generation and no capture or destruction of methane in the baseline scenario	13
AM0012	Biomethanation of municipal solid waste in India, using compliance with MSW rules	13
AM0013	Forced methane extraction from organic waste-water treatment plants for grid connected electricity supply	13
AM0014	Natural gas-based package cogeneration	1, 4
AM0015	Bagasse-based cogeneration connected to an electricity grid	1
AM0016	Greenhouse gas mitigation from improved animal waste management systems in confined animal feeding operations	13, 15

Table 6: Sector Scopes

Scope Number	Sectoral Scope
1	Energy industries (renewable - / non-renewable sources)
2	Energy distribution
3	Energy demand
4	Manufacturing industries
5	Chemical industries
6	Construction
7	Transport
8	Mining/mineral production
9	Metal production
10	Fugitive emissions from fuels (solid, oil and gas)
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride
12	Solvent use
13	Waste handling and disposal
14	Afforestation and reforestation
15	Agriculture

The results show that energy-related baselines have already been accepted but that different methodologies are approved for the same project types due to the fact that they are heavily circumscribed. Therefore, the Methodology Panel has consolidated methodologies submitted for "landfill gas project activities" as well as for "grid-connected electricity generation from renewable sources" to avoid methodology proliferation (see Table 7). Nevertheless, for an interim period, the consolidated methodologies and the original approved methodologies will co-exist and thus, diverse standards will be applied to project activities.

Table 7: Approved Consolidated CDM Methodologies

Number of Approved Methodology	Title of the Methodology (including baseline and monitoring methodologies)	Sectoral Scope
ACM0001	Landfill gas project activities	13
ACM0002	Grid-connected electricity generation from renewable sources	1

What do methodologies for large electricity projects look like? While the approaches differ, they often involve the operating / build margins that have been defined for the small-scale projects. Dispatch modelling, also known as the production cost model, is the most sophisticated approach. It can be applied ex-post for verification or ex-ante if a model is used to simulate the complex operations of the interconnected grid system responding to a volatile demand. Taking into account both short term marginal costs and long term marginal costs (also called marginal capacity costs), this approach covers

adjustments of the current system as well as impacts on capacity addition. However, its implementation is costly and data requirements are high. Dispatch modelling was a favourite in the initial submissions to the EB but suffered serious setbacks as two methodologies using it in a "black box" fashion were rejected outright.

Given these differing approaches, it is worthwhile to briefly describe several examples.

- The AT Biopower project methodology in Thailand was the first renewable electricity methodology to be approved (AM0004). It uses a simple grid average and forecasts the emission factor for the entire crediting period. If, however, the actual emission factor proves to be lower, the latter has to be used. In this respect, the developer shot himself in the foot, as he still will have to collect the actual data without a chance to enhance CER generation. He should have stuck to the ex-post approach from the outset. The methodology can only be used for plants where the biomass supply is at least twice the demand from the project.
- The second electricity methodology, developed for the El Gallo hydro project in Mexico (AM0005), uses a combined operating and grid margin on the basis of ex-post activity and grid data. It can only be used for projects below 60 MW.
- The Vale de Rosario bagasse cogeneration methodology (AM0015) is special inasmuch as it uses a combined operating and grid margin for the first crediting period and switches to a pure build margin for the remaining two 7-year crediting periods. Hydro is included in the operating margin as long as the load is fully covered by hydro. The methodology is restricted to cases where more than 80% of installed capacity is hydro.

In the consolidated methodology ACM0002, the Methodology Panel has established criteria for the choice of operating / build margin. Following ACM0002, four alternative approaches to calculate the Operating Margin (OM) are eligible: the Simple OM, the Simple Adjusted OM, the Dispatch Data Analysis OM, and the Average OM.

1. The Simple OM emission factor is calculated as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. The Simple OM method may be applied to grids, which are not dominated by low-cost/must run resources. A grid is considered to be dominated by a source, when its share in the total grid mix reaches 50% or higher.
2. The Simple Adjusted OM emission factor is a variation on the previous method, where the power sources (including imports) are separated into low-cost/must-run power sources and other power sources. This approach includes a fraction of low-cost/must-run power sources in order to take into account the number of hours per year for which low-cost/must-run sources are on the margin.
3. The Dispatch Data OM emission factor is determined by using the hourly generation-weighted average emissions per electricity unit (tCO_2/MWh) of the set of power plants in the top 10% of grid system dispatch order during each hour. As the Dispatch Data analysis constitutes the most accurate approach, it should be the first methodological choice, whenever the required data is available at a reasonable cost.
4. The Average OM emission factor is calculated as the average emission rate of all power plants, such as in the case of the Simple OM, but including low-operating cost and must-run power plants. Fossil fuel fired power plants may be excluded if they represent a must-run resource in the grid. The Average emission rate method can only be used in grids which are not dominated by low-cost/must run resources and where detailed data to apply the Simple adjusted OM or the Dispatch Data Analysis OM is not available.

The Built Margin (BM) can be calculated following three alternative approaches described in ACM0002:

1. Option 1: The Build Margin emission factor is calculated ex ante based on the most recent information available on plants already built [or under construction] for a sample group at the time of PDD submission.
2. Option 2: For the first crediting period, the Build Margin emission factor must be updated annually ex-post for the year in which actual project generation and associated emissions reductions occur. For subsequent crediting periods, the emission factor should be calculated ex-ante, as described in option 1 above.
3. Option 3: For all crediting periods, the Build Margin emission factor is updated annually ex-post for the year in which actual project generation and associated emissions reductions occur.

For all three options, the sample group consists of either the five power plants that have been built most recently (including plants under construction, if option 1 is used), or the power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently (including plants under construction, if option 1 is used). Project participants should use from these two options the sample group that comprises the larger annual generation. Power plant capacity additions registered as CDM project activities should be excluded from the sample group. Despitethis first consolidation, project developers are encouraged to propose new approaches to the Executive Board.

By consolidating the methodologies, the uncertainty regarding baseline development for electricity generation project activities has been reduced. Nevertheless, data requirements still signify a significant barrier for ASEAN project developers. The data needed for the approved electricity methodologies are often not publicly available, especially when it comes to the emission factors of specific power stations. For a rough estimate of the average operating margin see Table 8.

Table 8: Fuel shares and average operating margin for ASEAN (kg CO_2/kWh)

Country	Renewable	Coal	Gas	Oil	Average operating margin
Brunei	0	0	100%	0	0.6
Cambodia	0	0	0	100%	0.8
Indonesia	14.1%	34.6%	31.4%	20.9%	0.69
Lao PDR	100%	0	0	0	0
Malaysia	10.5%	4.4%	68.7%	17.9%	0.6
Myanmar	55.7%	0	36.1%	8.2%	0.28
Philippines	44.8%	27.6%	21.0%	7.1%	0.46
Singapore	0	0	100%	0	0.6
Thailand	8.7%	16.8%	69.9%	4.6%	0.63
Vietnam	56.4%	10.4%	24.8%	8.4%	0.31
Total ASEAN	**18.5%**	**19.4%**	**52.3%**	**10.9%**	**0.6**

A factor of 1 kg CO_2/kWh is used for coal, 0.8 for oil and 0.6 for gas-fired power plants. With the growing introduction of combined cycle plants, the latter factor will decrease.

Data collection causes high transaction costs and in ASEAN countries, centralised data are not yet collected. The data availability varies considerably from country to country, influencing the competitive position of the project developers.

For instance, it is necessary to apply much more data-intensive and complex methodologies for grids with a hydro/geothermal share above 50%. Recently, the share of hydroelectricity in the Vietnamese

grid has fallen under 50%[13], which is why the average emission rate method may be applied. In countries, however, which are still dominated by hydroelectricity, such as in Laos, project developers have to pay a higher effort.

Tuyen and Michaelowa (2004)[13] have compiled the data required for the baseline calculation of large electricity generating project activities in Vietnam. This data set is intended to help project developers construct baselines reducing their transaction costs and shortening the lead-time for baseline development. The consolidated methodologies will help ASEAN countries put into practice centralized data collection as they specify the required data. It should however be taken into account that many ASEAN countries have several regional and island grids which leads to higher data collection requirements. For example, the Malaysian Sabah grid is strongly oil-based whereas the peninsular grid has a predominance of gas.

5.4. Additionality Testing

The CDM Executive Board has decided that small-scale projects must show how they overcome one of the following barriers:

- Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions.
- Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions.
- Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions.
- Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organisational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

For large projects, the EB stated in July 2003 that an explanation shall be made of how -- through the use of the methodology -- it can be demonstrated that a project activity is additional and therefore not the baseline scenario. Acceptable tests would be:

- Flow-chart / series of questions that lead to a narrowing of potential project options.
- Qualitative / quantitative assessment of different potential options and an indication of why the non-project option is more likely.
- Qualitative /quantitative assessment of one or more barriers facing the proposed project activity. Investment barriers can include political risks that drive up required IRR, high cost of capital or even lack of access to capital. Technology barriers can occur if the technology has not yet been applied in the host country – a first-of-its kind project would have a fairly good case.
- The project type is not common practice in the proposed area of implementation, and not required by recent/pending legislation/regulations.

The problem with these tests is that their stringency depends on how they are implemented. Concerning the flow-chart/series of questions, the stringency depends on the type of questions. It is only a framework for a test. The answer to the question "Why is the project option more likely?" should essentially be the outcome of all tests applied. While barrier assessment can become a robust test, the key issue is to determine how important barriers are for the project activity under

[13] See Tran Minh Tuyen and Axel Michaelowa. CDM baseline Construction for Vietnam National Electricity Grid. HWWA Discussion Paper 295. October 2004

consideration. There will be some barrier(s) for every project. Usually barriers and constraints are the pre-condition for the working of market competition. Otherwise everybody would start projects every day. The crucial issue is whether a barrier consists in a market failure. This is the case when the market is not able to allocate resources efficiently, i.e. when a feasible project activity developed by a capable developer is prevented. In this sense, the barrier is "decisive" for not undertaking a project. However, can this be captured objectively? What level of barrier is prohibitive for a project activity? The common practice and legislative test is the only test which is objective, but it only specifies a necessary, not sufficient condition for additionality. In all times, prevailing practice has been overcome by new, economically more attractive technologies (horse to car, lightbulb to CFL). Naturally, the emerging technologies initially have a low market share, regardless of their attractiveness. Any innovation has to overcome barriers; and therefore, a barrier is not a criterion for additionality per-se.

The approved methodologies treat additionality very differently:

- For one landfill gas methodology (AM 0011), long run marginal costs of the cheapest alternative are to be determined if electricity generation is included.
- For AM 0005, technology penetration below 5% of sector is deemed to fulfill the non-common practice rule.
- For fuel switch methodology AM 0008, the test has to show that fossil fuel used so far is less expensive than the new fuel per unit of energy in the host country and sector.
- AM 0004 uses the barrier analysis as defined in the small-scale CDM project rules.

Therefore, the Executive Board has published an official tool to harmonise additionality testing of proposed project activities (EB 16, Report, Annex 1, page 1). This additionality test involves five steps:

1. Identification of alternatives to the project activity.
2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive.
3. Barriers analysis.
4. Common practice analysis, and
5. Impact of registration of the proposed project activity as a CDM project activity.

Project developers can choose whether they want to do the investment or barriers analysis.

Three alternative approaches for an investment analysis are provided:

1. The simple cost analysis (for projects without economic benefits other than CDM related income).
2. The investment comparison analysis (using financial indicators such as the IRR, the NPV, the cost benefit ratio, or the unit cost of service) and
3. The benchmark analysis (government bond rates increased by a suitable risk premium, estimates of the cost of financing and required return on capital, as well as company internal benchmarks).

For the investment analysis, project, sector and/or country specific data (e.g. investment risk) as well as project-specific data (e.g. project cost structure) is required. The last option, the company internal benchmark, is not very convincing as it can be easily manipulated. Even if the investment can only be undertaken by the company itself, e.g. in the case of a retrofit, the money could be invested differently at the capital market.

The barrier analysis mentions three main barriers: investment barriers, technological barriers and barriers due to prevailing practice. It is clearly stated what the result of the barrier analysis has to be: "Provide transparent and documented evidence, and offer conservative interpretations of this

documented evidence, as to how it demonstrates the existence and significance of the identified barriers." However, guidance is very vague and information is lacking on how to proceed in detail, just providing "inter alia" recommendations.

With this additionality testing tool, the common practice test has become a binding element, which unnecessarily complicates the assessment procedure. It has to be taken into account that the costs associated to the common practice test are not negligible, while it does not exercise a strong influence on the outcome of the additionality assessment. The fact that a project activity is not common practice does not lead to any final conclusion concerning its additionality. As a last step, project participants are required to show how the CDM helps them to overcome the examined difficulties the project is facing. This section is very useful as it checks for credibility of the project participants' argumentation and gives insights into their decision-making. Thanks to the guidance provided, the risks associated with the proposal of a project activity are reduced; however, the remaining uncertainties and the costly common practice test make the tool still difficult to use for project developers.

5.5. Finding a Common Approach in ASEAN

Data Availability and Reducing Transaction Costs

A host country will become more competitive for grid-connected CDM electricity projects if it has the relevant electricity data publicly available. This avoids each project developer having to start anew to collect these data. The DNA should arrange for a continuous updating of these data and publish them on its website. While this has not yet been done anywhere by a DNA, the Indian Ministry of Non-Conventional Energy Sources recently has posted a study on grid electricity emission factors on its website. In countries with several grids, the data should be available for each sub-grid. Emphasis should be on those grids that are likely to see many CDM projects. A rough estimate of the CDM potential of each grid should be the starting point.

As soon as standardised baselines have been decided by the EB for other energy projects, DNAs should also provide information for those. Previous experience shows that the lack of availabile data to calculate baseline emission factors is a significant barrier for CDM project developers. A centralised collection of such data and their continuous updating and publication on the web would remove this barrier. The ASEAN Secretariat for the ASEAN Centre for Energy (ACE) would be an obvious candidate. The DNAs could then subsequently publish the data on their respective websites.

A regional economic integration organisation such as ASEAN could reduce transaction costs further by providing data for the entire region. As it has to collect data anyway, the additional burden would be lower and consistent quality standards could be achieved. With an increasing integration of the electricity grid in ASEAN, this would become increasingly important and useful.

Additionality Arguments

Arguments supporting the existence of barriers could be published by the DNA on its website:

- Risk rating of country (corruption perception index of Transparency International, ranking on the Institutional Investor list).
- Penetration rates of renewable energy technologies.
- Fuel and electricity prices.
- Subsidies.
- Availability of skilled manpower.
- Current interest rates for bank loans.

Project developers could then use these arguments for all projects of a specific type. This would reduce the amount of time needed to scrutinise the argumentation by the validator and reduce the risk of failures.

6 CDM policies, institutions and procedures

6.1. International Rules and Procedures

To participate in the CDM, a country has to have ratified the Kyoto Protocol. Currently, all ASEAN countries except Brunei and Singapore have ratified the Protocol; Brunei has not even yet ratified the Convention. All potential host countries in ASEAN, however, have formally expressed their willingness to host CDM projects. In some occasions, however, Singapore suggests that CDM will not be a priority as its potential for hosting projects is not significant.

In addition to ratification of the Kyoto Protocol, a country needs to designate a national authority. The main functions of this designated national authority (DNA), according to the Marrakech Accords, are to certify that the projects hosted in the country (1) is based on voluntary arrangement, and (2) supports sustainable development in the country. This role is crucial since CDM is expected to serve a dual role, i.e. to assist the industrialized countries to meet their Kyoto commitments and to assist the developing countries in fostering sustainable development. How the CDM is considered supporting sustainable development in the host countries depends solely on the perception of the host countries themselves, as reflected in their approval of CDM projects by the DNA.

At the time of the writing of this paper, however, information on the institutional arrangements for CDM in Myanmar was not complete, and therefore it is not reviewed in this chapter.

6.2. DNA Structures

Within the last two years, most countries in the region have been able to set up their Designated National Authority (DNA) which is a necessary condition for hosting CDM projects. They thus were able to substantially close the policy gap that has separated them – and most of the rest of the world - from the Latin American countries that had been the first non-Annex B countries to wholeheartedly embark on the CDM. In Singapore, no process has been started for establishing a DNA as the potential for CDM is considered too low.

Indonesia

Indonesia has established a National Committee on Climate Change. The Ministry of Environment coordinates the committee, which comprises related government agencies. The Ministry of Environment is the national focal point for the UNFCCC in Indonesia. The Ministry of Environment also took initiative to establish Indonesia's Designated National Authority (DNA). A decree of the Minister of Environment is expected shortly, after which the DNA can start working immediately as detailed rules and procedure have been developed.

The Indonesian DNA has a two-tier structure: the "Board", which is called the National Committee on the Clean Development Mechanism, NCCDM, and a Technical Team. The NCCDM will consist of first echelons of eight most relevant governmental Ministries and Agencies. The Technical Team largely reflects the technical aspects of the NCCDM at the lower echelons to undertake the technical works of appraising the proposals. The NCCDM is assisted by a Secretariat. In the first years, the Ministry of Environment will host the Secretariat of the NCCDM, with a possibility in the future of setting up an independent, private sector-run secretariat. When there is a need to invite additional expertise in specific project appraisl, the NCCDM can call on Experts from the Roster of Experts.

And upon arising needs, when there are credible and representable complaints from affected communities, the NCCDM can also hold a Stakeholder Forum to resolve them.[14]

The Indonesian DNA has also put together a procedural cycle and a list of criteria and indicators to appraise proposed CDM projects. The list of criteria and indicators, and other information regarding CDM in Indonesia, are widely published including through the NCCDM website under the Ministry of Environment's website domain (dna-cdm.menlh.go.id).

Malaysia

The national institutional arrangement for the CDM is fully in place[15]. On 31 May 2002, the National Steering Committee on Climate Change chaired by the Secretary General of the Ministry of Science, Technology and the Environment (MoSTE)[16] agreed on the establishment of a two-tiered organisation for CDM implementation in Malaysia. The two-tiered institutional set-up comprises the National Committee on CDM (NCCDM) and two Technical Committees. The role of the National Committee 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 implementation of CDM projects at the national level. Formally, the DNA is housed at the Conservation and Environmental Management Division at MoSTE. The roles of the Technical Committees are (i) to provide policy guidance on CDM projects in the sector concerned (ii) to ensure that the proposed CDM projects comply with national development strategies and guidelines and (iii) to recommend evaluated CDM project proposals to the NCCDM for national approval. Pusat Tenaga Malaysia (PTM) was appointed as Secretariat to the Technical Committee on Energy. The Forest Research Institution of Malaysia (FRIM) has been appointed the Secretariat to the *Technical Committee on Forestry*. The main roles of PTM as the CDM Energy Secretariat are to assist the Technical Committee in evaluating CDM proposals, to provide policy input on CDM to the Government, to conduct CDM outreach activities and to provide advisory services to potential local and foreign CDM investors in the energy sector.

In Malaysia, CDM procedures and initial criteria have been fully adopted and applied to six CDM proposals. A comprehensive administrative guideline for project approval as well as a guidebook for project developers have also been developed. In the other countries with a working DNA, procedures are still being worked on and DNAs have been asking donors to support their development. The national criteria on CDM and the national CDM criteria for small-scale energy projects were endorsed by NCCDM in August 2003.

Philippines

In June 2004, the Department of Environment and Natural Resources (DENR) was designated as Philippine DNA. Its tasks are to formulate and develop a national CDM policy, to develop the criteria, indicators, standards, systems and procedures, and evaluation tools for the review of CDM projects; and to monitor the implementation of CDM projects. It is authorized to create Technical Evaluation Committees. It is envisaged to have a committee on energy, on waste and on forestry. The actual rules are being developed under a project funded by the Dutch Government.. The Department of Environment and Natural Resources (DENR) is currently the host of the DNA, assisted by a Steering committee that consists of people from other Departments.

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[14] Pelangi and HWWA. Draft Final Report to the Ministry of Environment of CDM Institutional Building in Indonesia. December 2004.

[15] See the website of the Malaysia CDM Energy Secretariat http://www.ptm.org.my/CDM_website/index.htm

[16] Ministry of Natural Resources and the Environment(NRE) (the newly formed Ministry) has now taken over the role of focal point for UNFCCC replacing the Ministry of Science, Technology and the Environment which has been restructured.

Thailand

Immediately following the ratification of the UNFCCC, the government of Thailand set up a National Climate Change Committee (NCCC) and a Climate Change Expert Committee (CCEC). The bureaucratic reforms and restructuring of 2002 de facto abolished the NCCC and CCEC and in turn left a vacuum as far as the institutional framework for climate change and CDM is concerned. To rectify this issue and eliminate the uncertainty caused through the events of autumn 2002 (see above), the government of Thailand issued a Cabinet Resolution on 1 July 2003 establishing the Ministry of Natural Resources and the Environment (MONRE) as the DNA. Also included in this resolution are the establishment of the National Committee on Climate Change (NCCC) and the National CDM Advisory Board (NCAB). The NCAB originally comprised two technical working groups: one for advising CDM energy and industry projects and another for forestry and agriculture projects. Above the NCAB is the National Committee on Climate Change (NCCC), which is chaired by the Minister of MONRE and a Cabinet-level body that will make the final recommendations on CDM projects. Final approval of CDM projects are made by the National Environment Board, which is a Cabinet-level body chaired by the Prime Minister. Since 2003, the names of some institutions have changed. The procedure in October 2004 was as follows: First, a project has to be submitted to the CDM Cooperation Centre under the Office of Natural Resources and Environmental Policy and Planning (ONEP) MONRE which then forwards it to either the Energy and Industrial or the Agricultural and Resources Working Group. Moreover, a "EIA and Public Health Working Group" looks at each proposal. After passing these working groups, each proposal has to be submitted to the National Committee on UNFCCC, the National Environment Board and finally to Cabinet.

Cambodia

Despite its status as LDC, Cambodia ratified the Kyoto Protocol in August 2002 and established its Climate Change Office (CCCO) in the Ministry of Environment (MoE) in June 2003. The MoE serves as interim Designated National Authority (DNA) by decree of July 2003. CCCO's budget is completely financed through foreign donors, the government only funds the building, electricity and water. CDM activities of CCCO are funded through participation in UNEP-Risoe's CD4CDM (see below). The CCCO works in a very professional manner and its staff is enthusiastic. They have already provided capacity building to the one-man Laotian DNA. However, a lot of this enthusiasm depends on a very energetic Australian volunteer with a thorough background in renewable energy policy. Moreover, it is unclear when the final decision on the DNA status is taken. Criteria for the assessment of sustainable development are currently being developed. What is interesting is that the sustainable development criteria is based largely on the Gold Standard structure.

Laos

In Laos the Science Technology and Environment Agency at the Prime Minister's Office has been notified as DNA. However, a recent workshop in Laos showed that this decision was taken thinking that the DNA was just another name for the climate change focal point and that no decision-making competencies would be linked to the DNA function. It has now been agreed that a formal request for "grafting" the DNA on an existing committee has to be made and that procedures need to be adopted. The main difficulty is the lack of project proposals, which prevents the DNA staff from gaining experience.

Vietnam

Vietnam was one of the first countries in Asia to establish its Designated National Authority (DNA). Official document 502/BTNMT-HTQT issued on March 24, 2003 specifies that the International Cooperation Department of the Ministry of Natural Resources and the Environment (MONRE) is the DNA. Decision 553/QC-BTNMT of 29 April 2003 defined the CDM National Executive and

Consultative Board (CNECB) with representatives of the following ministries: MONRE (three members), Ministry of Trade, Ministry of Science and Technology (MOST), Ministry of Foreign Affairs (MOFA), Ministry of Finance, Ministry of Planning and Investment (MOP), Ministry of Agriculture and Rural Development, Ministry of Industry, Vietnamese Union of Science and Technology Associations (VUSTA) which is a Government-established NGO.

CNECB meets twice a year (April and September). There is a rough set of sustainability criteria but MONRE staff has not yet operationalised them. The spring meeting 2004 shall discuss criteria for energy projects, the autumn meeting the general legal framework. Project Design Documents in Vietnamese and English have to be submitted one month before a CNECB session together with an approval letter of the relevant line ministry. Ministries with a seat on the DNA will give comments to their CNECB members. CNECB decides with three-fourth majority voting. Rejected proposals can be resubmitted an unlimited number of times. A Vietnamese language document on the project cycle will be issued shortly.

6.3. DNA Procedures

Application of procedures and sustainable development criteria

Only in few countries, projects have been evaluated using the procedures and criteria currently in place:

1. In Indonesia, before the establishment of Indonesia's Designated National Authority (DNA), the Ministry of Environment's Climate Change Unit, has made initiative to provide recommendation for Wayang-Windu, Sarulla Geothermal, Bandarjaya, and Pangkalan Brandan Projects to submit these projects to CERUPT. Wayang Windu was selected by CERUPT, but later on it was dropped due to some critical internal problems surrounding the project proponents. In the meanwhile its implementation is in doubt.
2. In Malaysia, the first CDM energy project proposal was submitted for national approval in July 2002. To date, three CDM projects proposals from the energy sector have been recommended by the CDM Technical Committee on Energy and were given conditional approval by the DNA. These projects have capacities below 15 MW and utilise oil palm residues for heat and power generation. Two of these projects are grid-connected and have received approval under the Small Renewable Energy Power Programme (SPEP) introduced by the Government of Malaysia in 2001. However, submission of these projects to the CDM Executive Board is slow.
3. In Vietnam, the Rang Dong gas flaring reduction project was submitted for approval in March 2004.
4. Thailand applies general criteria for appraisal of projects. These projects are evaluated on a case-by-case basis at the cabinet level.
5. In other countries in ASEAN, the submission and approval of CDM projects is somewhat behind these three countries. In Thailand, a couple of PDDs should be submitted as many projects are already submitted internationally for validation. In the Philippines, several PINs have been submitted.

6.4. Criteria for Sustainable Development

The second main objective of CDM is to contribute to sustainable development in the host country. The assessment of this is the responsibility of the host country, and therefore the procedure for appraising whether the proposed CDM projects will actually foster sustainable development in the host countries remain the priviledge of the host countries themselves. While there is no standardized and stipulations on this matter, many countries chose to apply certain criteria and indicators against

which projects are evaluated. Two countries in ASEAN have already developed methodologies to evaluate of the project's contribution to sustainable development (Indonesia., Malaysia). It is expected that other countries will follow suit, however.

The formats and substances of the sustainable development criteria and indicators vary from one country to another in the ASEAN member countries.

Malaysia
In Malaysia, the National Committee on CDM approved national CDM criteria in August 2003. The five criteria are:

1. The project must be in accordance with the sustainable development policies of the government;
2. Project must fulfil all conditions underlined by the CDM Executive Board as follows:
    a) Voluntary participation
    b) Real, measurable and long-term benefits related to mitigation of climate change; and
    c) Reductions in emissions that are additional to any that would occur in the absence of the certified project activity;
3. Implementation of CDM projects must involve participation between Malaysia and Annex 1 Party/Parties;
4. Project must provide technology transfer benefits and/or improvement in technology; and
5. Project must bring direct benefits towards achieving sustainable development.

A set of criteria for small-scale projects was also approved. A process is ongoing to develop operational interpretations of the criteria in order for project developers to be able to predict the outcome of the decision process.

Indonesia
The indicators used in Indonesia are largely process-based, instead of outcome-based. This implies that the evaluation of the indicators will test only whether the project proponent has taken initiative in a certain field, and will include a quantitative assessment whether a specified threshold or standard has been achieved. Obviously, a process-based evaluation is in most cases easier to comply with.

The following list shows Indonesia's criteria and indicators for sustainable development. There are four criteria, and a number of indicators for the criteria.

1. Environmental sustainability, consisting of two criteria, namely (1) environmental sustainabilility (such as natural resource conservation and diversification) and (2) local community health and safety.
2. Economic sustainability, which has a criterion, namely local community welfare.
3. Social sustainability, which has two criteria, namely (1) local community participation and (2) local community social integrity.
4. Technological sustainability, which highlights the presence of technology transfer.

It is interesting to note that both the Malaysian and the Indonesian approaches differ from many of the methodologies for the evaluation of sustainable development that have been developed over recent years, which are mainly (semi-) quantitative and standard/threshold based.

Vietnam

The indicators for sustainable development in Vietnam follows the structure in its Agenda 21 document, as follows:

1. Economy, which includes the following criteria: maintaining rapid and stable economic growth; changing patterns of production and consumption; implementing "clean industrialization"; developing sustainable agriculture and rural development; and sustainable development practices in local communities.
2. Society, which includes the following criteria: decreasing the population growth rate; hunger eradication and poverty reduction; directing the urbanization and migration process; the quality of education; and working and living condition and health care services.
3. Environment, which includes the following criteria: land quality and sustainable use of land and underground minerals; water resources, protect sea, coastal and island environments; and development of forests, and preservation of bio-diversity; reduction of air pollution, and managing solid wastes; and reduction of climate change impacts, prevent and control natural disasters

Cambodia

Cambodia applies sustainable development criteria and indicators based on the South-South-North / Gold Standard, a quality standard initiated by the South-South-North Project, adopted and developed further by the World Wide Fund for Nature (WWF) International and has been endorsed by most non-governmental organizations worldwide. Key elements in the criteria and indicators are: environmental, social, economic and technology transfer. Each indicator in the sustainable development criteria is scored from -3 to +3 (-3 means serious negative impact, 0 means no impacts, neutral or impacts. From the sustainable development criteria, Cambodia appears to strive for hosting high-quality CDM projects.

The Philippines

Sustainable development criteria in the Philippines appear to be rather general. In summary, CDM projects in the Philippines must be consistent with the national, local, sectoral plans and programmes on eco-social development, contribute to protect sustainable environment, reduce GHGs emissions, ensure high feasibility with new technology and eligible finance, result in real, measurable and long-term benefits related to the mitigation of climate change, it should be approved and registered and the 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).

Thailand

Similarly with the Philippines, Thailand appears to have rather general sustainable development criteria for CDM project approval. To be approved, the CDM projects should meet the following eligibility criteria:

1. Renewable Energy, Energy Efficiency, Energy Reduction and Greenhouse Gases;
2. Project Operation must be consistent with Thailand National Development Strategy;
3. Project is voluntary and must be agreed by all parties involved;
4. Project contribute to capacity building, technology transfer and know-how;
5. Project is consistence with Thai Legislations and Regulations;
6. There shall be Environment and Technical Assessment of the project as it should involve Public Participation;

As mentioned above, Thailand may have the most cumbersome procedure for project approval that requires cabinet level approval for each and every proposed CDM project. The above criteria therefore are indicative, while the cabinet will make the decision on a case-by-case basis.

6.5. Conclusions and recommendations

Good practices in institutions and procedures

There are principles that make good institutional arrangements. For example, the procedures must be clear, simple, and rigorous. Sometimes, one would add participatory and transparency as key to a good institutional arrangement.
Clarity means that there are no possibility for misinterpretation for what is expected from a proposed CDM project so that it is deemed as fostering sustainable development in its host country. Process-based criteria means that there is a process-oriented documentation that needs to be provided, whereas outcome-based criteria means that a certain set of outcomes – represented by some, usually quantitative, indicators – are expected to be demonstrated by the proposed CDM project. Simplicity means that it is relatively easy and inexpensive to fulfill all the requirements for the documentation submissions, It also means that it requires relatively short time to get through the project approval cycle. Rigor means that the result of the appraisal process does reflect the most realistic representation of how the CDM projects are deemed to foster sustainable development in the host country.

Moreover, participatory means that the decision-making process is not subjective and takes into account the views of relevant stakeholders. Meanwhile, transparency means that the appraisal process itself, and the reasons for its decisions, are open and contestable.

Unfortunately, the majority of the DNAs in ASEAN have relatively cumbersome procedures. The Malaysian DNA seems to be the one with the clearest procedures, but even there the multi-level nature may lead to some delays, and the two-secretariat structure may be inferior compared with the one-stop shop structure in most other countries. The Thai multi-level procedure, especially with the requirement for cabinet approval for every single project is possibly the most complex one that exists globally. When it comes to the number of projects approved, the record is extremely sketchy.

Capacity and resource requirements for the DNA

Generally so far, no DNAs in the ASEAN region have dedicated staff in place. In practice, Ministry officials or staff of government agencies devote a part of their time for DNA activity. It would appear that this will have to change once volume of projects increases.

A German capacity building project for the Indonesian DNA estimatred that the an annual cost of operating a private sector-led secretariat would comprise US$180,000, although a possibility of a DNA-light of less than $50,000 has been considered for a secretariat under the Ministry of Environment. This would engage a full-time staff of three, provide resources for four annual DNA meetings support the development of relevant reports by technical committees. Based on the proposed action plan for the Energy Secretariat in 2004, Malaysia tentatively estimates that the operation of the CDM energy secretariat requires 44 man-months of resources be year, but depending on the available resources, these can be either reduced or increased that may potentially reduce the overall capacity of the secretariat.

The financing of the DNA and its activities needs to be secured, preferably in such a way that the continuity over several years is guaranteed. In all countries in the region, a sole contribution from the state budget is very difficult to obtain, therefore the following three financing schemes are being discussed:

1. Donor grants
2. Fixed administrative fee to be paid by the CDM project proponent
3. Share of the values of the CERs
4. State Budget

Currently, donor grants play a large role. In Indonesia, the German GTZ plays an important role in establishing the DNA. In the first years of its operation, it is also expected that the GTZ will still play a role. In Malaysia, a number of capacity building projects, notably that supported by Denmark, have helped increase capacity of the DNA, its secretariat, and some potential project developers. In Thailand, however, the Danish capacity building project was considered not as successful as that in Malaysia. In the Philippines, significant assistance from the Netherlands have been recognized as being helpful. The Capacity Building for Clean Development Mechanism initiative (CD4CDM) by the United Nations Environment Program (UNEP) Collaborating Center in Denmark plays a major role in smaller countries in the region such as Laos and Myanmar. More recently, the Japanese Institute for Global Environmental Strategy (IGES) commenced capacity building projects in a number of countries in the region.

A fixed fee implies that the administrative burden is for all project more-or-less the same. The scheme would, however, put smaller projects at a relative disadvantage, by siphoning off a larger percentage of the CDM revenue. For budgeting purposes, it must be predicted how many projects will be submitted, which in turn helps set the level of fees required to fund the DNA. However, if there are significantly fewer projects submitted for review, income – and subseuqnetly the viability of the DNA – will be threatened. Currently, it appear that the DNAs in the region are rethinking the idea of the application fee.

The long-term fiscal sustainability of the DNA is an issue that remains to be resolved in almost all host countries. The competitive nature of the CDM makes it difficult to implement approaches that lead financing DNA activities through CDM project fees. A strategy of having the same fee rate across ASEAN (e.g. 0.5% of CERs) might reduce some of the competitive pressure. Fees that are only assessed ex-post would furthermore reduce the incentive for project developers to go elsewhere. However, even if fees are levied in this manner, there remains the need to mobilise financing for the initial, crucial, years of operation. An option to survive this lean period would be to ask buyers to provide a loan for DNA operation that will then later be paid back in CERs. Reliance on the state budget as in many Latin American countries is a very insecure strategy as the cases of Paraguay and Argentina have shown. It is acknowledged, however, that in most countries, the administrative hurdle for instituting the fee may be rather cumbersome and may discourage countries to apply such a fee altogether, as in the case of Indonesia.

Project preferences

In all countries, the priorities for CDM energy projects focus on renewable energy, fuel switching and energy efficiency. It remains to be seen whether the competitive pressure coming from large-scale projects reducing industrial gases, gas and biogas will influence this priority. Several countries may also place priority on the development of domestically sourced liquid biofuels, such as ethanol and and biodiesel. Most countries within ASEAN have stressed the importance of small-scale projects. Only few have adopted specific criteria for those projects. Malaysia has adopted specific criteria for small-scale projects to fast-track the implementation of RE and EE CDM projects in Malaysia. In the future, requirements for project bundling will be developed in Malaysia.

7 Financing CDM Projects in the ASEAN Energy Sector[17]

7.1. Financing Renewable Energy Projects

In the opinion of some, CDM is only trying to accomplish the impossible – finance small scale clean energy projects that are highly capital intensive using unfamiliar technologies in countries where project finance is already highly challenging for even "normal" projects. CDM revenue is helpful, of course, but if it is wholly discounted by potential equity investors (considering RoE returns) or debt providers (considering appropriate debt service coverage ratios) it does little good.

The development of certain energy projects as assets able to claim and transact emission reduction credits for the improvement of their balance sheets is an emerging market fraught with process requirements and complexities. As discussed throughout, a comparative minority of energy developers understands these processes and complexities. An even smaller percentage of bankers and equity providers are competent to evaluate this revenue stream.

Renewable energy project financing can be an expensive undertaking. Project risk, inflexible tariff structures, and regulatory uncertainty all conspire to keep borrowing costs for renewable energy projects relatively high. When these projects are planned in developing economies, higher levels of political risk and economic uncertainty, as well as higher transaction costs only add to the cost of capital. Moreover, debt for renewable energy projects is typically non-recourse to the equity sponsors of the project, thus making it commensurately more risky and more expensive.

With revenue streams essentially fixed, higher borrowing costs could mean these projects will have greater challenges meeting debt service coverage ratios (DSCR) and therefore have difficulty securing debt financing. This leads to more equity-weighted capital structures that decrease the overall rate of return for equity investors. Obviously, lower expected equity returns resulting from low debt leverage will dissuade some investors from renewable projects making it hard to raise equity capital.

This problem is exacerbated because renewable energy generators characteristically have a higher ratio of capital expenditures against operating expenditures (owing to the lack of fuel procurement needs). This only intensifies the effect that increased debt leverage has on higher returns on equity (ROE), which makes the capacity to carry more debt very desirable for renewable energy developers. Therefore, carbon sales can generate free cash flow that can be readily applied to debt service obligations.

An Example: Financing a Wind Project

While our analysis can theoretically apply to any renewable energy project, a representative application can be generated for a wind energy asset, due to wind's attractive economics at an industrial scale. However, the argument posited also applies to other project types – geothermal, low head hydro and sustainable biomass for example that are located in countries with relatively high carbon coefficients which result in displacement of more emission-intensive energy sources. Therefore, the arguments made generally have applicability to a far wider range of project types.

The capital structure of most wind projects in industrial countries falls along traditional project financing lines, i.e. higher debt than equity. Wind projects in developing countries, however, tend to

[17] Portions of this chapter have been previously published "The Role of Emissions Trading in Asian Clean Energy Finance" by Marc Stuart, Justin Guest and Fred Wellington, Presented At PowerGenAsia, Ho Chi Minh City, Vietnam 23 September, 2003

be more equity intensive. This is in large part due to systematic risks outlined above. Debts to Equity ratios (D/E) of wind projects in DCs typically range from 40/60 to 70/30. While borrowing costs can differ dramatically depending geographic location -- they usually fall in the range of LIBOR plus 500 to 1000 basis points with terms to maturity generally in the range of 10 to 20 years. Consequently, for projects ranging in size from $50 million to $150 million, representative annual debt service costs can be between $2.7 million and $8.2 million, respectively (assuming a D/E leverage of 50%, 7.0% interest rate, 15 year term and "mortgage style" amortization schedule). Of course, each project will have its own intricacies and thus its own capital structure. For the purposes herein, a generalisation of the capital and operating structures for wind projects is appropriate. For the sake of simplicity, our analysis will focus on a hypothetical wind project with the following characteristics.

The hypothetical 100 MW wind facility has an initial capital outlay of $82 million, with borrowing costs of 7 per cent compounded annually over 15 years. Annual generation is roughly 300 GWh and EBITDA margins are set at 75 per cent. The ratio of CO_2 emissions to electricity generation (carbon coefficient) is set at 0.7 tonnes of CO_{2eq} per MWh, which represents an approximate average for countries with significant reliance on coal and bunker fuel for generation needs.. Monitoring and verification costs for the CER commodity are negligible at $10,000 per annum. The country of domicile is left out intentionally because the analysis isolates electricity rates as the independent variable. As such, depending on the regional location of the project, electricity revenues from our example can range from $10.5 million to $22.5 million (assuming electricity rates between US$35 and US$75 per MWh, respectively).

Based on these assumptions, the various DSCRs can be calculated for the first year's debt obligation relative to various D/E ratios and electricity rates. DSCR are defined as the cash flow available before taxes (EBITDA) divided by equal annual repayment of principal and interest, i.e. "mortgage style" amortization. With projects located in areas where electricity rates range from $35 to $75 per MWh and conservatively assuming prices per CER are $4.00, the supplementary cash flow from the sale of carbon credits can boost DSCRs between 5.0 and 10.5 per cent. Assuming minimum DSCR requirements of 2.0, and 50% debt leverage, this translates into roughly $4 million of additional debt carrying capacity, or approximately 10 per cent (given the aforementioned range of electricity tariffs). In other words, by monetizing emission performance, our hypothetical project requires up to $4 million less equity investment – thereby increasing RoE. If the price per CER is increased to $8.00 (current estimates project the price of carbon to be between $8 to $12 in 5 years), this figure could rise to as high as $8 million in additional debt capacity which translates to a full 20 per cent reduction of the required equity financing.

Carbon Cash Flow Can Support Debt Service

Once the intent to apply carbon cash flow to debt service has been established, there are a myriad of techniques that can be employed to achieve the same result – i.e. mitigating lending risk. These include, but are not limited to the following;

- Establishing a cash reserve account to be applied to debt service in the event of liquidity problems.
- Funding a cash reserve account that can hedge against variability of revenue streams.
- Prepaying 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.
- Using ERPAs and/or forward carbon sales as collateral for loans.

Most assuredly, the above suggestions involve all sorts of complexities. Yet this does not negate their utility as techniques to lower project debt service.

An often under-recognized point is that carbon transactions are denominated in hard currency, generally dollars or euros. For projects in which portions of the lending are in hard currency whereas receivables are in softer currencies, this also helps hedge debt service risk issues that many bankers are likely to bring up in lending discussions.

Types of Projects Appropriate for Carbon Financing

In renewable energy, transacted carbon projects have been undertaken in wind energy, low head hydropower (high head hydro with accompanying large reservoirs often produce significant fugitive methane from degrading biomass, limiting their effectiveness as emission reduction assets) waste biomass, dedicated biomass, solar power and fugitive methane projects. Fugitive methane encompasses a certain subset of project types, including landfill gas, anaerobic digestion of agricultural and/or municipal wastes and the use of methane vented from either active or retired subterranean coal mines.

CER Cash Flow Can Help Finance Renewable Energy Projects

CDM generated carbon credits are by no means the overall key driver of renewable energy finance in ASEAN or elsewhere. While carbon credits can help mitigate debt service burdens, the above analysis might only apply to projects in countries where borrowing costs are reasonable and electricity tariffs are high enough to support operating cost structures entities.

This analysis merely proposes that in CDM-related renewable energy projects, additional cash flow from the sale of CERs might be best applied to reducing the burden of servicing project debt. By linking carbon cash flow to debt payments, the project developer can increase net margins on electricity revenue, or positively enhance the average DSCR for the project. This can result in one of two things. It either allows the project to be financed because it increases the required DSCR past the predetermined threshold set by the lender, or it decreases the amount of equity investment required for the project – thereby increasing RoE. Either way, both the project developer and the project lender are significantly better off.

7.2. Overview of Project Financing in ASEAN

Attracting Core Financing Remains Main Hurdle

Attracting “core” finance – project debt and equity - for CDM projects remains the major hurdle to the efficient execution of the CDM potential within ASEAN. Throughout the developing world, prospective projects that are “quality” (in regards to predicted ability to deliver CERs) are consistently slowed or stopped because of the inability of either local or international markets to provide finance for the underlying assets. These shortcomings are due to a variety of factors. Chief among these is that clean energy remains a relatively new field in developing countries, and few sources of capital – on either side of the development divide - are comfortable with the perceived risk profile that they present. Few domestic or regional financial institutions are yet fully engaged with the CDM process, and therefore understand what it can do to positively impact cash flows and enable better investment risk coverage. While there is a growing pool of international project capital for clean energy projects, it should also be recognized that – generally - this is the most expensive form of finance of all.

The financing hurdle is particularly relevant for projects that are developed by third parties, in what is commonly referred to as non-recourse financing. This is not to say that in-house projects - financed on the books of local or multinational corporations will not also have challenges. Nonetheless, the efforts required to convince an internal CFO of the merits of any particular capital investment, are

comparatively more straightforward. Success (or failure) of such capital allocation efforts is far more immediately apparent than is the case in external capital raising.

For third party developers, the capital raising process can be an agonizingly slow and expensive process. Moreover, success is far from guaranteed and - even worse – failure can take an enormous amount of time to be truly confirmed. Developers, therefore, can find themselves stalled for months or years due to the capital raising process, leaving much hard work at risk. Nonetheless, financing for most of the early stage CDM projects – ASEAN and elsewhere- has been based on a project finance/ limited recourse model. An exception is Felda, which has financed its Sahabat project through internal capital and bank debt – a basic corporate finance model.

As such, much of the catalytic project finance for these early CDM projects (i.e. the AT Biopower rice husk project, CleanThai's Khorat Waste to Energy project, Bronzeoak's Negros Bagasse project) have come from international capital, with investments denominated in hard currency. While such capital pools are often necessary for larger infrastructure projects, smaller projects would be far better served by local financing. Local finance does not require currency risk hedging and - in theory – can be more comfortable with more moderate returns, as transaction costs for managing individual investments are far lower.

Improving the Local Financing Environment

One of the most profound ways to make the CDM more accessible to clean energy developers would be to develop greater capacity in local financing institutions. If these institutions were to grow comfortable with the positive revenue aspects of CDM - and adjust their enthusiasm for small-scale clean energy projects accordingly – this would represent significant assistance to the clean energy movement in ASEAN.

Nonetheless, the current reliance on international capital, despite the obvious costs, is easily explained. The CDM and most clean energy technologies are imported concepts and the vast majority of current expertise in these fields has come from expatriate developers and consultants. However, in the long term, such is neither wise, nor sustainable. For the CDM to firmly to take root across ASEAN, domestic institutions in finance and other support functions must be developed. In these early years, one manner to facilitate this would be the development of a dedicated regional "Clean Energy and CDM" fund, whose equity participation in CDM projects would accelerate local institutional participation in these types of projects.

Ease of financing is reflective of how comfortable investors are with individual opportunities, from both country and project type perspective. Whether there are regional companies that could readily engage the commercial aspects of the CDM is an area of investigation. Clearly, there are firms that engaged in cross border business opportunities throughout ASEAN. For these firms, understanding local business culture, accepting currency risk and developing in-country pools of management talent is already a normal course of their business activities.

Singapore companies and investments, in particular, have significant exposure in the region. Singapore's position as a centre for both regional firms and global multinationals makes it one logical hub for regional based expertise within CDM matters. This is already beginning. FE's Clean Energy Asia Fund is setting itself up in Singapore and there is significant discussion about the global REEEP initiative using Singapore as a regional centre. Singapore also has the most mature capital markets in the region, a boon both for project finance requirements as a possible regional trading point for the CER commodity in the future, and as a future listing point for clean energy assets as private equity seeks its exit strategies

In terms of external advisory capacities, most regional project finance support activities (banking, legal, engineering and accountancy) are based in Singapore, Bangkok and to a lesser degree, Hong Kong. CDM is another layer of expertise that these organisations can be expected to master as the market matures. While some of this is expatriate work from the large global institutions, for others these are more indigenous firms with strong ties to the region.

These positive aspects are significantly offset by the fact that Singapore has not yet ratified the Kyoto Protocol. While there is no formal reason that Singapore firms could not benefit from a general upswing in CDM related business in the region, it would seem unlikely that the effects would be maximized without a more encouraging home environment.

Successful development of the CDM within ASEAN will require the emergence of a variety of supporting mechanisms in the development, advisory, regulatory and financial fields. The latter should – most emphatically – not be discounted as a key component to this emergence. It is vital the sources of finance – whether domestic or international, debt or equity, external or corporate - understands that this novel revenue stream can have a positive cash flow effect on these assets. It can be expected that as the field matures and as increasing numbers of transactions are successfully executed, that this will be a self-evident. However, any help that can be offered to these sectors in the short run will likely accelerate the evolution of the market in the region.

8 The Role of ASEAN in CDM Implementation

This paper has addressed the benefits of a regional perspective in enhancing the potential for CDM in the energy sector in Southeast Asia focusing on CDM policies, institutions, baseline determination and financing. This chapter will discuss the potential role of the Association of South-East Asian Nations ASEAN and the ASEAN Centre of Energy (ACE).

Although ASEAN is primarily dedicated to political and economic cooperation, environment is one of the topics also covered by the ASEAN mandate and addressed in the ASEAN Strategic Plan of Action on the Environment. The ASEAN Working Group on Multilateral Environmental Agreements has recently taken the initiative to take up activities in the field of climate change, which has resulted in the organisation of a side event at COP10. A future ASEAN Climate Change Initiative is currently under discussion. The following potential fields of future activities will be discussed:

1. Improving the efficiency and quality of baseline determination and data availability.
2. Increasing the effectiveness and efficiency of CDM capacity building in the region.
3. Improving financing for CDM projects.

8.1. Improving Baseline Determination and Data Availability

Previous experience shows that the availability of data to calculate baseline emission factors is a significant barrier for CDM project developers. In Chapter 5 it is argued that a centralised collection of such data and its continuous updating and publication on the web would remove this barrier. This applies to both baseline emission factors for grid-connected projects as well as for the standard baselines for other energy projects approved by the EB. The ASEAN Secretariat and the ASEAN Centre for Energy would be obvious candidates to coordinate these activities. The country DNAs could then subsequently publish the data on their respective websites.

A regional economic integration organisation such as ASEAN could reduce transaction costs further by providing grid data for the entire region. As it has to collect data anyway, the additional burden would be lower and consistent quality standards could be achieved. With an increasing integration of the electricity grid in ASEAN, this would become increasingly important and useful.

8.2. Regional Capacity Building

Although many ASEAN countries have been very active in CDM implementation over recent years, a need remains for further strengthening their capacity, particularly in the following fields:

1. Operational skills of DNA.
2. Technical CDM project assessment, including baseline issues.
3. Establishment of local Operational Entities.
4. Project development, including the CDM life cycle/ preparing proposals and financing/transactions issues.

The ASEAN region has already attracted a large number of donor funded CDM capacity building projects. An evaluation of these projects leads to the following recommendations for increasing the effectiveness in capacity building particularly in the regional ASEAN perspective[18]. The evaluation of capacity building projects should address their effectiveness and efficiency.

[18] This section is based on the conclusions of the Skillshare Workshop: Regional Institutional Capacity Building in the Implementation of the CDM in ASEAN Member Countries Jakarta, March 18-19, 2004. See cdmasean.pelangi.or.id for the full proceedings.

By and large, these projects have been successful. They have significantly contributed to establishing CDM institutions in many countries in ASEAN. Some problems, however, have been identified by local stakeholders and beneficiaries, which limit the effectiveness and efficiency of the projects:

1. Some overlap exists in scope and content of the projects.
2. Projects do not sufficiently build on results of previous projects.
3. The target group is sometimes not specific enough. Each group has different capacity building needs, according to the role and activities in CDM implementation.
4. Capacity building should start by raising awareness on the general issue on climate change as most people have very limited knowledge on the issue, then relate it to the more specific CDM issues.
5. The project activities are often limited to workshops and do not involve on-the-job training. Capacity building should not limited to transfer of knowledge but also include transfer of skills, which is best done through experiencing real ground work.
6. The role of local government in CDM is not clear and not adequately targeted in the capacity building projects. Local government could advise on the location of the project, particularly for forestry projects. Capacity for local government could enable them to integrate the convention within local planning and create an enabling environment for the development of CDM projects, e.g. making sure that there was not any local regulation conflicted with CDM regulation. However, one cannot train all local officials on CDM-specific issues.

The effectiveness and efficiency of capacity building projects can, therefore, be further increased as follows:

1. Improving the evaluation of past projects.
2. Stricter assessing of proposals by the recipient country and beneficiary organisations beforehand.
3. Extending capacity building beyond transfer of knowledge by including transfer of skills (on-the-job training).
4. Improving coordination of activities. This is mainly the responsibility of the recipient (host) country.
5. Improving the exchange of information/results between projects.

The rationale for regional cooperation to exchange experience concerning CDM implementation is strong given the very similar tasks the individual countries face. It is not yet clear, however, what the best way is to facilitate this and how to secure the necessary resources. An existing regional body or cooperation, such as the ASEAN Secretariat, could play a role in CDM capacity building complementary to the activities on the national level. A future ASEAN Climate Change Initiative could facilitate the transfer of best practice and the exchange experiences within ASEAN[19]. This could be implemented under current ASEAN Working Group on Multi Lateral Agreements (MEA), for instance, in the form of a regional expert group on CDM, a regional forum for DNA staff, or the establishment of a regional website and Information Desk. The ongoing CDM-ASEAN project can be seen as a first step (or pilot) towards establishing a regional framework for exchange of experience. The CDM-ASEAN project has set up an ASEAN CDM information desk to facilitate any questions on CDM as well as an ASEAN CDM website.

[19] A Climate Change Initiative has been proposed by the Indonesian Ministry of Environment at the ASEAN Ministerial Meeting of Environment in Myanmar in December 2003

8.3. Financing CDM Projects

In chapter 7 of this paper, an overview of project financing in ASEAN is given and several priorities are identified in improving the availability of core finance for CDM projects. Below, a range of possible actions at a regional level is listed addressing these priorities:

1. Developing CER risk mitigation mechanisms, which are important in most ASEAN countries.
2. Improving the understanding of local debt and equity capital (working in local currencies) of the CDM process and increasing the willingness to invest – in part – based upon those receivables.
3. Establishing local support infrastructure, such as CDM Operational Entities (OEs), EPC Contractors and the like, lowering development costs and increasing local stakeholder involvement with project execution.
4. Increasing Singapore's involvement in CDM. The country has the most mature capital markets in the region with a potential for both for CDM project finance requirements and – potentially at some point in the future – as a possible regional trading point for the CER commodity.
5. As a longer-term option, establishing an ASEAN based fund to support CDM projects through either the purchase of credits, or through a dedicated facility to supply equity and debt to CDM projects, in part based upon the forward revenue flows that CDM assets project into the future.

9 Concluding Remarks: Can ASEAN Distinguish Itself in the Market Place?

In the last two years, ASEAN as a whole has caught up with the global CDM market but the real breakthrough has not been achieved. There is no country that combines a large energy CDM potential with a conducive approval process and a vibrant project development and consultancy sector. For example, Indonesia, Thailand and the Philippines have a large potential but suffer from institutional weaknesses and a generally lacklustre investment climate in the case of Indonesia. Countries with a well-established institutional process (Cambodia, Malaysia, Vietnam) suffer from limited project potential (Cambodia, Malaysia) or absence of private project developers (Vietnam). Unless a combination of all the success factors can be achieved, ASEAN countries will be able to attract some CDM niche investment but not be able to play in the CDM "champions' league" currently occupied by India, Brazil and Chile.

Rather than attempting a full comparison of ASEAN with its competitors, this section will go through those issues that influence the attractiveness of CDM host countries. Consider the following matrix for opportunities in the overall Asian region. While some could argue about the precise positioning of some countries, the matrix attempts to provide a quick glance at how external parties will view different countries in terms of opportunities and risk. Not surprisingly, the ASEAN countries are evenly distributed among the four segments.

Table 9: CDM volume – risk matrix for Asia

	Low Political Risk	**High Political Risk**
Low volume of executable CDM opportunities	**Singapore** Taiwan **Brunei** Bhutan	Pakistan Afghanistan North Korea **Cambodia** Nepal **Laos** **Myanmar**
High volume of executable CDM opportunities	**Thailand** **Philippines** India **Malaysia** South Korea	China **Indonesia** Bangladesh **Vietnam** Sri Lanka

On a *country level*, buyers and investors are attracted to countries where there are a significant number of opportunities and where overall investment risk appears manageable. Generally, the key concern is whether the country and/or project risk profile can support the underlying asset based on conventional analysis. This is particularly true with assets that do not benefit from the so-called "methane multiplier" – i.e. renewable energy and energy efficiency projects. For those ASEAN countries that are generally perceived as being less conducive to outside investment, developing a place in the CDM market will likely require some form of external subsidy, from either Official Development Assistance sources or potentially from particular buyers that may have their own strategic reasons for investments in such countries.

On a *project level*, buyers are attracted to project developments that offer CERs at a market competitive price and which involve credible counter parties as the project developer. It is probably true that large corporations will tend to be more comfortable with other large corporations as counterparties. Carbon funds – such as the PCF and the Japan Carbon Fund – are likely to have greater comfort with smaller developers.

The buyers' relative willingness to pay at the higher range of any current price band will generally reflect seller willingness to take on significant portions of the transaction based risk. For example, if a seller promises to deliver a particular volume of CERs even if the project under performs, that is very attractive to buyers, who can then choose to virtually ignore potential project performance risk in their evaluations. This is conditional upon the buyer's feeling that the selling counter party is sufficiently credible to stand by its obligations, often over many years. Further price distinguishing points include the willingness of sellers to cover their upfront costs of developing the CER commodity, without the overt financial assistance of buyers.

If the market indeed flips to being seller driven, it can be expected that buyers will become somewhat less risk sensitive in how they perceive different projects. However, given that few non-methane projects can be financed strictly on the basis of CER revenue, there will be a continued appetite for underlying project capital for investment into CER projects.

From a *national government perspective*, the desire for successfully implementing CDM projects (above and beyond desires to help achieve local sustainable development) is driven by both a desire for enhancing government revenue flows, as well as increasing foreign direct investment into the country. The balance of these two imperatives is quite important, because excessive "taxation" of CER revenues will in turn lower the incentives for participation in a particular country. Unlike other commodities, CERs do not have "natural" low costs producers, which means that the overlay of financial and policy restrictions on their creation and export are extremely important in determining a countries competitive position. Nonetheless, various suggestions have been made among various observers in regards to mechanisms by which non-Annex B governments can enhance revenue from the CDM. These have included at times:

- Refusal to sell CERs for less than a particular floor price. This is seen as a means of enhancing overall revenue.
- Credit sharing with governments – This is very much akin to a tax on CERs, which in some cases is earmarked for covering the local administrative costs. Considering that it is likely that the government will also tax gross revenues from the sale of CERs, this is arguably a form of double taxation. In any event, credit sharing is a means of enhancing government revenue.
- Imposing portfolio requirements – While not speculated on as widely, this would involve government forcing purchasers to support multiple projects in a package concept, some of which would be lower price, some of which would have higher sustainable development co-benefits.

From the viewpoint of project developers, all of the above could be considered negative market manipulations. Given the current fluid nature of the CDM market and the ethereal nature of the CER commodity, it seems highly unlikely that any form of trying to achieve market power would work for ASEAN nations, with the possible exception of projects undertaken by multinationals with further outstanding issues in the country in question. It is simply too easy for buyers of CERs and emission allowances to go to other countries and other regions – there simply are no natural low cost suppliers of the CER commodity (as is Saudi Arabia in oil, Australia in aluminium or Brazil in iron ore, for example). Any of the above tactics - or attempts to form cartels - to influence price for ASEAN CERs upwards would be highly likely to backfire and lower interest in ASEAN opportunities in general.

This is not to say that champions cannot emerge. ASEAN nations have historically been strong and successful recipients of FDI, economic growth rates in the region have again shown consistent strength and the underlying need for energy and waste management services in these relatively population dense countries is undeniable. There is also a very strong historic investment connection with both Japan and Europe, which could prove advantageous, particularly in the larger, more advanced countries such as Thailand, Malaysia and Indonesia. Whether the supporting factors can

come together to create those champions, remains to be seen, but the basic parameters of CDM within the leading ASEAN nations have the potential of being competitive with anywhere in the world.

It is very questionable, however, if ASEAN really can – or should - look at itself as a unified supplier of CERs. ASEAN member countries will invariably be competing between themselves as well as the outside world for a portion of this market and the investment capital it represents. In this paper, however; it is argued a rational exists for increased cooperation on CDM in ASEAN to facilitate the maximum participation of all its member countries in CDM in compliance with ASEAN's mission and mandate.

ASEAN-related CDM information sources on the Internet

Project website CDM-ASEAN	cdmasean.pelangi.or.id
ASEAN Centre for Energy ACE	www.aseanenergy.org
ASEAN Secretariat	www.aseansec.org
PTM CDM website Malaysia	www.ptm.org.my/CDM_website/Index.htm
DNA Indonesia	dna-cdm.menlh.go.id
CD4CDM Capacity building for the CDM (Cambodia, Philippines, Vietnam)	cd4cdm.org
Philippines CD4CDM country site	www.klima.ph/cd4cdm/index.htm
SouthSouthNorth CDM capacity building project (Indonesia)	www.southsouthnorth.org
Presentations of DNAs (October 2004)	http://cd4cdm.org/countries%20and%20regions/ Asia/Manila%20Forum/
CDM in Indonesia	http://www.cdm.or.id