CDM in Thailand: Status and Policy Issues

by Jessie L. Todoc[**]

Abstract

Thailand made world headline late last year when the local press reported that the government is rejecting CDM. The government later clarified that it was only rejecting CDM forestry projects and is encouraging CDM energy projects, which hold the largest potential in the country for GHG reduction. This, however, did not remove the cloud of uncertainty that has enveloped CDM projects in particular and national climate change policy in general since that press report last year.

The main objective of the paper will be to identify and discuss the key issues raised by key CDM stakeholders. The present paper, however, will limit these issues to those raised by the public and private sector, and the international development agencies. Moreover, the discussion will focus on CDM opportunities in the energy sector.

Introduction

Motivation for the paper

The main motivation for this paper came when Thailand made world headline late last year after the local press reported that the government is rejecting CDM. The government later clarified that it was only rejecting CDM forestry projects and will consider other CDM investments on project-by-project basis. Until recently, the risks for undertaking CDM projects in Thailand had been aggravated by the uncertainties regarding the institutional framework for CDM. However, this issue has been settled in large part by the establishment of CDM DNA last July. The issue remaining as far as institutional framework is concerned relates to the establishment of sustainable development criteria that are essential for approving CDM projects.

Scope of the study

The study will review the status of CDM in Thailand and look at the perspectives of different stakeholders that help to shape the future of CDM in the country. Thailand is interesting from CDM perspective because it is certainly one of the countries in the developing world with large potential for GHG emission reduction or mitigation. This is coupled by very friendly investment policies in the country, which already attract huge amounts of foreign direct investments.

Status of CDM in Thailand and policy perspective

Thailand in the international climate change scene

Thailand has been actively participating in the international climate change debates and agreements since the 1992 United Nations Conference on Environment and Development

[**] Senior Project Coordinator, Centre for Energy Environment Resources Development, Foundation for International Human Resource Development (CEERD-FIHRD), Tel +66 2 235 5817, Fax +66 2 236 9574, E-mail j.todoc@ceerd.net/ jessie_todoc@hotmail.com.

(UNCED) in Rio de Janeiro. Thailand signed the Convention on Climate Change at UNCED in June 1992. Following this signing, it established the National Committee on the Convention on Climate Change in June 1993. A year and a half later, in December 1994, Thailand ratified the Convention, which entered into force in March 1995.

The first Conference of the Parties to the UN Framework Convention on Climate Change was also held in 1995. In 1997, the Kyoto Protocol, which enforces binding obligations for Annex 1 countries to reduce GHG emissions to 1990 levels and has introduced mechanisms for meeting this obligation, was adopted during the third COP to the UNFCCC. Thailand and other non-Annex 1 countries, however, have non-binding obligations under the Kyoto Protocol and following the principle of "common but differentiated responsibilities." One of these is the submission of National Communications. Thailand submitted the Initial National Communications on 13 November 2000. Like other Initial National Communications, Thailand's reports:

- 1994 greenhouse gases inventory;
- GHG projection and identified mitigation options;
- existing assessments on vulnerability and adaptation;
- policies and measures; and
- other issues related to financial resources, technology transfer, capacity building and public education and awareness.

To enter into force the Kyoto Protocol must be ratified by the parties to the Convention including Annex I countries that are responsible for at least 55% of global GHG emissions[1]. Thailand signed the Kyoto Protocol on 2 February 1999 and ratified it on 28 August 2002 during the 10th Anniversary of UNCED or the WSSD in Johannesburg. The significance of the ratification for Thailand is that it could eventually claim the full benefits from CDM projects when the Kyoto Protocol enters into force. The world is now waiting for Russia's ratification for this to happen.

Institutional framework for climate change and CDM

Immediately following the ratification of the UNFCCC, the government of Thailand also set up a National Climate Change Committee (NCCC) and a Climate Change Expert Committee (CCEC). The Permanent Secretary of the Ministry of Science, Technology and Environment (MOSTE) chaired the NCCC. The CCEC was headed by the Secretary General of the then Office of Environmental Policy and Planning (OEPP), which in turn is the Secretariat to the National Environmental Board, the highest decision making body on all matters relating to the environment chaired by the Prime Minister.

The bureaucratic reforms and restructuring late last year sort of abolished the NCCC and CCEC and in turn left a vacuum as far as the institutional framework for climate change and CDM is concerned. For sometime, climate change watchers in Thailand were left to guess about the institutional framework for CDM and climate change. The slowness of the government to clarify and put in place this framework was in contrast to its very active role and participation in the international climate change negotiation process. However, the void has been filled and the issue on institutional framework for CDM has been resolved. The government of Thailand issued a Cabinet Resolution on 1 July 2003

[1] At this writing, 119 Parties have ratified the Protocol, including Annex I countries accounting for 44.2% of global GHG emissions. The world is waiting for Russia's ratification to seal the international climate change agreement. Russia accounts for 17% of global GHG emissions.

establishing the MONRE as the CDM designated national Authority (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 DNA will in fact be a unit under a newly created department of MONRE called the National Office of Climate Change that will be directly under the Office of the Minister of MONRE. The DNA unit will look at CDM projects with respect to satisfying sustainable development criteria, environmental impact assessment, and public participation. The DNA unit will also have an information center that will cater to CDM investors and other stakeholders. At this writing, MONRE is looking for the person who will head the National Climate Change Office, whose staff will come from different existing units of MONRE.

The MONRE implements climate change and CDM policies. Policy decisions, however, are made by inter- or multi-agency bodies or committees, as seem to be the case in all energy and environment policy decisions in Thailand. Immediately above MONRE or the National Office on Climate Change is the National Committee on CDM or the National CDM Advisory Board, which is chaired by the Permanent Secretary of MONRE. The NCAB comprises 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.

Prior to the Cabinet resolution of 1st July 2003 and after the public sector re-organization in October 2002, the focal point for climate change and CDM issues was MONRE's Office of International Cooperation on Natural Resources and Environment under the Office of the Permanent Secretary.

GHG emissions and opportunities in the energy sector

More than two-thirds of the total net GHG emissions are carbon dioxide emissions (CO2), with methane accounting for 27%, based on 1998 data (see Table 1). CO2 emissions come mainly from the energy sector, which in turn are responsible for half of the 1998 total net GHG emissions. The energy sector's GHG emissions in fact increased both in relative and absolute terms from its 1990 levels (see Table 2). These trends only indicate that huge opportunities for GHG mitigation are found in the energy sector[2].

[2] Table 1 also shows that opportunities for GHG mitigation are important in the agriculture and forestry sector, though to a lesser extent than in the energy sector. The agriculture sector in fact is responsible for most of the methane emissions, which accounts for a significant amount of GHG emissions and making methane an important GHG after CO2.

Table 1: National net GHG emissions, 1990 and 1998

Greenhouse gases*	Emissions in CO2e, million tonnes		Percentage of total emissions	
	1990	1998	1990	1998
CO_2	164	204	73	68
CH_4	58	80	25	27
N_2O	3	14	2	5
Total	**225**	**298**	**100**	**100**

Source: ADB, 1998; MONRE, 2002.
*The emissions of other greenhouse gases are negligible compared to total.

Table 2: National net GHG emissions by sector, 1990 and 1998

Sector	Emissions in CO2e, million tonnes		Percentage of total emissions	
	1990	1998	1990	1998
Energy	79	152	36	51
Industrial Processes	10	12	4	4
Agriculture	54	68	24	23
Land-use Change and Forestry	78	51	35	17
Waste	3	15	1	5
Total	**225**	**298**	**100**	**100**

Sources: ADB, 1998; MONRE, 2002.

1990 estimates showed that power generation and transport combined for more than two-thirds of GHG emissions from the energy sector (see Table 3). ADB ALGAS projected that by 2020 the share of power sector would have increased to about 50%, while that of transport would have declined to 14%. Industry's share was also projected to increase to 28% in 2020.

Table 3: GHG emissions from energy sector, 1990

Energy sector	GHG emissions, CO2e Gg	%
Power generation	28,282	36
Transport	28,143	35
Industry	12,877	16
Small combustion*	8,095	10
Fugitive emissions	2,263	3

Source: ADB, 1998.
*…in the residential, commercial and agriculture sectors.

National "baseline"

The opportunities for CDM should be "in addition" to the present plans and programs of the government in the energy sector. It would not be an overstatement to say that Thailand's plans and programs in sustainable energy development are probably more advanced than those of many other ASEAN countries, particularly in the areas of energy efficiency and green independent power production (IPP) or electricity production from new renewable energy sources[3].

Thailand has introduced incentive and enforced mandatory measures to facilitate the implementation of the 1992 Energy Conservation Promotion Act. Following this Act, Thailand is the first country in Asia to design and implement a demand-side management and energy efficiency programs, including standards and labeling program (Wantawin, 2003).

Thailand started the first phase of the DSM program in 1993. It originally targeted a reduction of 238 MW peak demand, some 1,427 GWh of electricity generation, and 1.16 million tons of CO2 emissions in the next five years. By 30 September 1998[4], the program resulted in reductions of 468 MW of peak demand, 2,194 GWh of electricity generation, and 1.64 million tons of CO2 emission. By September 2001, the overall program resulted in 651 MW peak demand cut and 3,665 GWh energy reductions[5]. The DSM Program Phase I consisted of six major sub-programs. These are the Residential Program, Commercial/Governmental Building Program, Industrial Sector Program, Load Management Program, Energy Conservation Attitude Promotion Program, and Program Monitoring and Evaluation. The first three programs focused on energy-efficient appliances, particularly lighting equipment, high-efficiency refrigerators and air-conditioners, and high-efficiency motors.

The government formulated another five-year (2002-2006) DSM Master Plan for the second phase of the DSM operation. Additional strategies for Phase II include promotion of energy efficiency and load management technologies like cost reduction in small and medium enterprise (SME) and standardization of energy use in corporations and social sector. The total savings targeted for Phase 2 is 632 MW peak demand and 2,508 GWh of energy. This will translate to a reduction of more than 1.85 million tons of CO2 by the end of 2006.

As part of the standards program, minimum energy performance standards will be enforced for six electrical appliances, namely, refrigerators, air conditioners, motors, CFLs, fluorescent lamps, and ballasts. If MEPS is enforced as planned (that is, by 2004), it is estimated that 3,200 GWh and 660 MW of electricity would be saved. At the same time, the government is studying guidelines and incentive schemes for more effective energy efficiency labeling of these products.

In the area of electricity from renewable energy sources, biomass and biogas are the priority areas. For example, Thailand has allocated THB 3,060 million (USD 76.5 million) in 2001 to provide price support to “small power producers”—IPPs with capacity less than 90 MW—using biomass residues and wastes. Thus far, 31 new SPPs with combined capacity of more than 500 MW have been selected to receive subsidy pending public or community acceptance of their projects[6]. The SPP program also started in 1992 and provides incentives to small power producers employing cogeneration from natural gas or using renewable energy sources. The government also launched in 2002 the very small renewable energy power producers program (VSREPP) to allow capacity sales of

[3] Including solar, wind, small and mini-hydro, and biomass.
[4] The first phase of the DSM program officially closed on 30 June 2000.
[5] Information on CO2 reductions is not available.
[6] In fact, some of these SPPs have applied for CDM pre-validation.

less than 1 MW (mostly biogas and small scale biomass) to distribution utilities[7]. Yet even before this biogas systems have been installed in pig farms and food processing industries. Moreover, during 2002-2004, it is anticipated that 46,000 cubic meters of biogas systems will be installed nationwide. In fact, the Strategic Plan for Energy Conservation 2002-2011 targets the use of biogas systems to replace about 38 ktoe per year by 2006 and about 125 ktoe per year by 2011 (Wantawin, 2003). The government targets to increase the share of renewable energy in the generation mix from 19.8% in 2001 to 20.81% in 2006 and 21.21% in 2010.

"Additional"mitigation options

ADB's *Asia Least-cost Greenhouse Gas Abatement Strategy* (ALGAS) study[8] identified the least-cost options in the energy sector that will contribute to further reductions in GHG emissions. These mitigation options are classified into three categories, and Table 4 below indicates their desirability and feasibility in the energy sub-sectors of Thailand.

Table 4: Least-cost GHG mitigation options for Thailand

Mitigation options	Energy and transformation	Industry	Residential and commercial	Transportation
Improving efficiency of existing facilities		X	X	
Adopting more energy efficient techniques in new capital stock	X	X	X	X
Utilizing low/zero emissions energy sources	X			

Source: Adapted from ADB, 1998.

In the short-term (until 2005), the following mitigation options were found to have net economic benefits and significant mitigation potential:

- cogeneration in industrial sector;
- increase in oil boiler efficiency in industrial sector;
- application of efficient motors in industrial sector;
- lighting efficiency program in residential and commercial sectors;
- air conditioner efficiency program in residential and commercial sectors;
- refrigerator program in residential sector; and
- increase in fuel economy of automobiles.

Utilizing or switching to cleaner fuels are also least-cost options and offer higher mitigation potential.

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[7] DANIDA is also funding a 2-1/2 year project to commercialize small scale renewable energy technologies from biomass and biogas.
[8] More on this project in a latter section.

Table 5: Least-cost GHG mitigation options for Thailand

Option	Accumulated CO2 mitigation (million tonnes)	Abatement cost (USD/ton of CO2)
DSM-Lighting program in residential sector	2.0	-323.1
DSM-Lighting program in commercial sector	24.6	-204.5
Increase in fuel economy of automobiles in the transport sector	29.4	-139.0
DSM-Cooling program in commercial sector	49.0	-136.4
Increase in oil boiler efficiency in industrial sector	60.0	-83.3
DSM-Refrigerator program in residential sector	64.1	-46.1
Application of efficient motors in industrial sector	141.7	-20.8
Cogeneration options in industrial sector	188.8	-8.3
Fuel switching from coal to natural gas: 52% coal, 44% natural gas	266.6	1.8
DSM-Air condition program in residential sector	275.0	3.6
Fuel switching from coal to natural gas: 22% coal, 73% natural gas	430.5	9.1
Fuel switching from gas to nuclear: 8% coal, 45% natural gas, 45% nuclear	663.6	43.4
More electricity generation from nuclear: 3% coal, 10% natural gas, 80% nuclear	974.5	69.6

Source: ADB, 1998

New renewable energy sources do not come into the picture, as these technologies remain less competitive than conventional or fossil-based technologies. However, they offer higher mitigation potential because of zero or low CO2 emissions. For example, CEERD estimates that by 2015, 22% of CO2 emissions under a business-as-usual scenario will be reduced if biomass-based technologies are aggressively pushed in the energy mix.

(Potential) CDM projects and private sector perspective

CDM candidates

One theory about the clean development mechanism (CDM) is that it has been conceived to offer financing relief for energy projects that mitigate GHG emissions but are otherwise unattractive for private financing. Through the CDM and international emission trading (IET)[9] schemes, emission reductions generated from energy projects can be sold and carbon sales would provide additional cash inflows to the project to cover a portion

[9] Along with CDM and joint implementation, international emission trading is among the market-based mechanisms for meeting Annex I obligation to reduce GHG emissions.

of the financing requirements. In principle, emission reduction sales from CDM projects, depending on the price of carbon credits[10], can improve the financial performance or viability of a project.

In Thailand, several renewable energy projects that are strong CDM candidates are already in the pipeline. The strongest candidates are green IPP projects, or power plant projects that are using renewable energy sources or wastes and designed to sell to the grid. Two projects have made public their project design document (PDD), a requirement under the CDM process. One has prepared at least a project idea note (PIN), which is required by the prospective carbon credit buyer.

Table 6 summarizes the features of these three projects[11].

The immediate and main motivations, however, for these projects are not the financial benefits of CDM.

Project developers perspective

From the financial point of view, project developers and equity sponsors in Thailand look at CDM as a bonus as it does not significantly improve the financial performance of the project. Because of the remaining uncertainties of CDM (and the Kyoto Protocol at large), project developers add the CDM component in their projects only for a strategic reason: to learn from early CDM experience. Project developers don't expect financial benefit from CDM because of the uncertainty surrounding its implementation and the relatively low price of CERs.

The uncertainties and corresponding risks of CDM projects are known (PCF, 2001 and 2002):

- *Baseline risks* relates to the creditability of the emissions reductions (ERs). Is the project's baseline robust and will its assumptions remain valid, enabling it to generate the expected level of certifiable ERs on schedule? Will the Executive Board[12] (EB) clear the baseline? Will the crediting period be renewed after 7 and 14 years?
- *Regulatory risk* relates to the Kyoto Protocol and host countries' compliance with their obligations under the Protocol. Will the Kyoto Protocol enter into force? Will the ERs generated by the project eligible for crediting? Will the host country ratify the Kyoto Protocol and maintain compliance with it?
- *Market or price risk* refers to uncertainties how the market for ERs will evolve over time and the price that ERs will carry in this market.
- *Project specific risks* are the normal risks of the project notwithstanding CDM. These include performance risk, construction risk, counter-party risk, country risk, financial and regulatory risk, contract risk, and country risk.

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[10] For CDM projects, these carbon credits are called CERs or certified emission reductions.
[11] A fourth project on waste-to-energy conversion is also being seriously considered for CDM, but information is not available at this writing.
[12] The Executive Board of the United Nations Framework Convention on Climate Change approves CDM project to earn credits and their baseline.

Table 6: CDM candidates in Thailand

Name or title of project	**AT Biopower Rice Husk Power Project**	**Yala Rubber Wood Residue Power Plant**	**Dan Chang Cogeneration Project**
Description	The project will build five 22 MW rice husk power plants in central Thailand.	The project will build a 23 MW rubber wood residue power plant in southern Thailand.	The project will build a 36 MW bagasse-fired thermal power plant, with 25 MW sold to the grid.
Sponsor	n.a.	▪ Gulf Electric Co. (Thailand) ▪ Electric Power Development Co. (Japan) ▪ Electricity Generating Co. (Thailand) ▪ Asia Plywood Co. (Thailand)	Mitr Phol Sugar Corp.
Developer	AT Biopower	Gulf Yala Green Co.	Mitr Phol Sugar
Electricity generation	730,000 MWh/year	158,750 MWh/year	
PPA	25 years; EGAT	25 years; EGAT	20 years; EGAT
Fuel supply	715,000 tonnes of rice husk per year	660 tonnes per day of rubber wood residues	Mitr Phol Sugar Corp.
FSA	8 years	25 years with Yala Waste*	20 years
Number of fuel suppliers	100 rice millers	6 primary suppliers; 5 back-up suppliers	one
CERs (CO2e)	430,000 tonnes annually; around 3 million tonnes for the entire crediting period	60,000 tonnes annually	89,000-141,000 tonnes annually
Crediting period	7 years	7 years (preferred)	
Commissioning	2005-2006	2004	?
Total project cost	USD 160 million	USD 33 million	USD 60 million

Sources: Project design documents, PIN

*Yala Waste will negotiate FSA with the individual sawmills.

A candidate CDM project cannot earn emission reduction credits if it does not satisfy the *additionality* criteria, which in turn depends very much on how the baseline is defined. While measures such as careful baseline study, reasonable and conservative estimate of ERs, and rigorous monitoring can reduce baseline risk (PCF, 2002), the fact that the baseline final approval rests with the EB make this as the most important risk for CDM (and JI) projects upon ratification of the Kyoto Protocol.[13]

Will the Kyoto Protocol enter into force? This is the number one question right now as Russia takes time to contemplate whether to ratify the Kyoto Protocol or not. The biggest stumbling block for CDM projects will fall when Russia ratifies and the Protocol enters into force. Yet this is just one part of regulatory risk. Uncertainties with regards to host country's compliance to its obligations under the Protocol remain. Thailand ratified the Kyoto Protocol in August 2002 and announced a month later that it was rejecting CDM (forestry) projects.

Analysts are upbeat about the market for GHG emission trading and consequently the prospect for selling CERs from CDM projects. Many analysts call it a buyer's market, justifying the current low price of CERs. NGOs complain and counter that it should be a seller's market, and thus the price of CERs should be higher. How the market evolves over time will take its toll on the price of CERs (or ERUs[14]), which in turn determines the revenues from carbon sales.

Financing institutions perspective

Most, if not all, green IPP projects in Thailand that strong candidates for CDM are structured as project finance. This is not surprising considering that Thailand and the rest of Southeast Asia has been the largest markets for project finance, accounting for 21% of the global project finance markets between 1994 and 2001. This is not all. Domestic banks in Thailand, along with those in Indonesia and Malaysia, lead in project finance deals. The power sector dominates the project finance market in the region, getting 20-22% of the total investments or number of projects under this scheme (UNIDO, 2002a).

Project finance is a means of raising fund in which the equity shareholders rely primarily on project revenues or project cash flows for their return on investment and creditors, for interest payments and recovery of principal. In principle, projects developed in the framework of project finance rely more on the creditworthiness of the project than the creditworthiness of the sponsors.

In principle, CDM should make projects more bankable as the flow of CERs will improve future cash flows and thus the ability of projects to meet its debt obligations (this is measured by the debt service coverage ratio or DSCR). However, Thai banks, at least, are not convinced.

Thai banks and other financing institutions in the country share the project developers' view that CDM should not be expected to generate returns. In fact, in the financial analysis of these projects, CDM according to them does not figure in the main financial spreadsheet, but is only part of the sensitivity analysis. In other words, CDM should not make or break a project. Banks continue to look at the creditworthiness of the equity sponsors after they consider the project viable without the CDM credit.

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[13] As of 3 October 2003, only six baselines have been approved but 20 remains pending approval by the Executive Board.
[14] ERUs or emission reduction units are the equivalent of CERs for joint implementation projects.

Another reason for the seemingly low acceptance of CDM among Thai banks is their lack or little knowledge and experience on CDM and climate change issues in general and in integrating carbon credits in the financial analysis of projects in particular. It is, therefore, important that local banks gain experience in CDM, as they will be the source of financing for these projects as they are now for most of the projects under project finance scheme.

CDM capacity building and international organizations perspective

Understandably, capacity building at the policy, sector, and project levels has been the focus of CDM interventions of international organizations and agencies in Thailand. Like other international cooperation efforts, the international activities on CDM maybe categorized in the framework of multilateral, bilateral, and economic cooperation initiatives. Some of the multilateral programs to build capacity on CDM that include Thailand are described here.

World Bank and the NSS program

The National Strategy Studies (NSS) program, launched by the World Bank and the Government of Switzerland in 1997, assists developing countries in assessing their role in the CDM, identify potential investment projects and develop national policies regarding the CDM. Later other bilateral donors join the nearly USD 8 million program: e.g. Australia, Germany, Finland, Austria and Canada. The World Bank serves as an advisor and facilitator, assisting more than 20 host country governments in discussing the terms of reference for the studies, making arrangements for donor funding, administering contracts with consultants and providing methodological guidance. The national strategy studies program aims at building local capacity. Host country experts, therefore, conduct the studies in collaboration with experts from donor countries and the World Bank.

Each National Strategy Study (NSS) is designed to emphasize the needs and interests of the participating country. The objective of each study is to provide the relevant national authorities and other stakeholders with an opportunity to better understand the issues and opportunities presented by potential international markets and other financing opportunities for greenhouse gas (GHG) offsets and to develop and analyze options.

In order to achieve this objective, each study will:

- Quantify the potential for GHG offsets and assess the related costs
- Analyze the country-specific choices in addressing climate change
- Highlight the opportunities created by a possible market for GHG offsets and other financing opportunities (e.g. the Global Environment Facility) for GHG abatement projects
- Assess potential for technology transfer and identify areas to its implementation, establishing with CDM countries the link to sustainable development targets.
- Flesh out possible issues and concerns with GHG offsets trading and possible trading mechanisms and develop policy options and strategies, and
- Develop a pilot pipeline of possible projects for different financing opportunities and available to all interested sponsors.

Indonesia, Thailand[15] and Vietnam are the countries in Asia that have participated in the NSS program. The NSS covered negotiation status, emission status and forecast, analysis of mitigation options for different sectors, study of market potential and institutional aspect, and proposals for strategy. For example, the NSS identified the following projects as the most promising for CDM in Thailand:

- biomass and biogas;
- afforestation;
- production process improvements;
- combustion efficiency improvements; and
- boiler, steam trap and chiller retrofits.

In this regard, the NSS may be considered as a follow-up or even an update of ADB's ALGAS project completed in 1998.

ADB and the ALGAS Project

The Asia Least-cost Greenhouse Gas Abatement Strategy Project was carried out in 1995-1998 by ADB and co-funded by the GEF through UNDP. The total budget for the ALGAS project that involved 12 Asian countries was over USD 10 million, which is ADB's largest technical assistance to date. The overall objective of the ALGAS project was to enable the participating countries carry out their commitments under the UNFCCC. Specifically, the project assisted the countries:

- prepare and report inventories of GHG sources and sinks;
- identify, formulate and analyzed GHG abatement options;
- prepare a portfolio of GHG abatement projects; and
- formulate a GHG abatement action plan.

The outputs of the project were 11 country studies[16] that report the results from each of these objectives. Some of the results for Thailand with respect to GHG inventories and least-cost mitigation options in the energy sector have been shown already earlier in this paper. In addition, ALGAS stresses that, among other factors, the "public sector has a vital role to play in implementing GHGs abatement." Thus, it recommends improvement in the following areas to strengthen the public sector:

- Monitoring and enforcement of environmental regulations and energy saving
- Public participation, especially that of local non-governmental organizations
- Environmental policies and standards, with specific enactment of new laws and regulations that induce compliance and encourage more active transfer of environment-friendly technologies
- Promotion of "green" financial measures and investment policies
- Cooperation with non-government agencies in the push for energy conservation, eco-labelling, promotion of cleaner technology, and adoption of environmental management policies

UNIDO and CDM capacity building for industry

UNIDO's "Capacity Mobilization to Enable Industrial Projects under the Clean Development Mechanism" aimed to increase industrial capacity of Indonesia, Malaysia,

[15] Thailand completed the study in 2001, but the publication of the NSS report has been delayed but will be available before end-2003.
[16] One of the countries participating did not submit its country report.

Philippines, Thailand and Vietnam by identifying potential industrial prototype projects for implementation under the Clean Development Mechanism (CDM). The project included country case studies that review existing climate change related activities, and identify stakeholders and barriers to the implementation of CDM projects. For Thailand, the study identifies two energy-intensive industries—cement and power—and considers the technical and collaborative potential of the identified industries. The study recommended establishing a separate climate change office and CDM authority under this office attached either to the National Environment Board or Office of the Prime Minister. To some extent, the newly created Climate Change Office of the Ministry of Natural Resources and Environment and the DNA unit under this office follow this recommendation. The study also recommended that to facilitate CDM implementation some of the existing laws, for example, BOI Investment Law and Industrial Estate Law, might have to be revised.

The study also identified sector-specific barriers that affect the uptake of CDM projects (Jesdapipat, 2002):

- Lack of premium financial incentives for climate-friendly projects
- Rigidity in project financing for climate-sound projects
- High initial investment requirements
- Low local capacity to appreciate the potential of CDM, which may result in ineffectiveness or sub-optimal results of project implementation
- Inadequate information could also result in faulty appraisal of project risks
- Lack of well-identified mitigation options and information on technologies suitable for industry
- Limited access to relevant information on the CDM
- Underdeveloped raw material (input) markets
- Various types of problems related to stakeholder participation in project scrutiny
- Persistent problems in inter-agency coordination

Multilateral and bilateral activities are also being supported by Japan[17], Australia, Canada, and Sweden. Denmark and Germany already have strong bilateral activities with Thailand on energy and environment, and are soon opening programs directly tackling climate change and CDM.

In terms of economic cooperation, the European Commission of the EU funds programs that can be used to develop capacity on CDM. CEERD will be participating in two new regional projects including Thailand funded by separate EC programs. One of the final aims of these projects is to build institutional capacity on CDM.[18]

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[17] For example, the Ministry of Foreign Affairs of Japan sponsors the "Asia CDM Capacity Building Initiative." Actions in the Program include: (1) strengthening expertise knowledge and fostering understanding on CDM; (2) cooperation on capacity building of the government sector; (3) joint research programs on CDM potential areas; and (4) case studies on model projects. China, India, Indonesia, Malaysia, Philippine, Thailand and Vietnam are the partners in this program that are among those registered as Type 2 (non-binding) partnership during the World Summit on Sustainable Development. Please see www.johannesburgsummit.org/html/sustainable_dev/p2_managing_resources/1508_asia_cdm_japan.pdf for details.

[18] One project is funded by the EC ASEAN Energy Facility; the other, which is pending final approval by the EC, is funded by the EC Synergy Programme.

Concluding remarks

Though less than general expectations, the recent establishment of a climate change office and a CDM unit under this office in the new Ministry of Natural Resources and the Environment (MONRE) indicates commitment of the Thai government to the objectives of the international climate change process. It dispels one important uncertainty faced by private sector stakeholders regarding the implementation of CDM in the country. It is also the country's next big step after its ratification of the Kyoto Protocol in facilitating the take up of CDM projects.

The next step would be to strengthen the capacity of this new institution in tackling climate change and CDM issues and dispensing its specific functions relating to approval of CDM projects. In this regard, the international development community should focus some of its efforts towards this end insofar as cooperation with Thailand is concerned. The process should continue to address the capacity building needs of other national stakeholders as well as resolve other policy issues that still impede the implementation of CDM in the country.

The present paper has not looked into the perspective of non-government organizations and the public in general. In Thailand, these sectors are forceful influences in the shaping of public policies. The public and private sector and the international development community should work hand-in-hand with them in resolving climate change and CDM issues.

References

1. Asian Development Bank (ADB), 1998a. *Asia Least-cost Greenhouse Gas Abatement Strategy: Summary Report*. ADB, Manila.
2. ADB, 1998b. *Asia Least-cost Greenhouse Gas Abatement Strategy: Thailand*. ADB, Manila.
3. Interview with Dr. Asdaporn Krairapanond, Chief of the Convention Group, Office of International Cooperation on Natural Resources and Environment, Ministry of Natural Resources and Environment
4. Janssen, Josef, 2002. *Financing Industrial CDM Projects in ASEAN*: *Report from the UNIDO project UC/RAS/01/107: Capacity Mobilization to Enable Industrial Projects under the Clean Development Mechanism*. UNIDO, Vienna.
5. Jesdapipat, Sitanon, 2002. *Thailand Case Study: Report from the UNIDO project UC/RAS/01/107: Capacity Mobilization to Enable Industrial Projects under the Clean Development Mechanism*. UNIDO, Vienna.
6. Ministry of Natural Resources and Environment (then Ministry of Science, Technology and Environment), 2002. "Presentation on the NSS," Regional Workshop on the NSS, World Bank and UNESCAP, May, Bangkok.
7. Mitr Phol Sugar Corp., 2001. Project Idea Note for Dan Chang Cogeneration Project.
8. Prototype Carbon Fund Annual Report 2001.
9. Prototype Carbon Fund http://www.prototypecarbonfund.org
10. Todoc, Jessie L. and Lefevre, Thierry, 2002. "Financing and Risk Management of Renewable Energy Projects in Southeast Asia," ASEM-Green IPP Network Knowledge Center, http://www.asem-greenippnetwork.net.

11. Todoc, Jessie L. et al., 2003. « Project Structure and Financing of Green IPPs in Southeast Asia, » *GrIPP-Net News*, May.
12. Tokyo Mitsubishi Securities, 2002. Project Design Document for a Rubber Wood Residue Power Plant in Yala, Thailand.
13. Tokyo Mitsubishi Securities, 2003. Project Design Document for A.T. Biopower Rice Husk Power Project.
14. UNIDO Climate Change Program http://www.unido.org/en/doc/3941.
15. Various interviews in Thailand between February and March 2003.
16. Wantawin, Sittichod, 2003. "Climate Change and CDM Activities in Thailand," *ASEAN Energy Bulletin*, second quarter.
17. World Bank National Strategy Studies http://lnweb18.worldbank.org/ESSD/envext.nsf/46ByDocName/NationalStrategyStudiesProgram