No.

鉱工業プロジェクト形成基礎調査

フィリピン国

CDM事業推進のための情報･体制整備支援調査

調査報告書

平成15年11月

独立行政法人国際協力機構
鉱 工 業 開 発 調 査 部

鉱調資
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「フィリピン国 CDM 事業推進のための情報・体制整備支援調査」

調査報告書目次

付属資料

第1章　調査の概要

1.1　背景及び経緯

途上国においてCDM（Clean Development Mechanism）プロジェクトを推進していくためには、プロジェクトに承認を与える政府組織（DNA: Designated National Authority）の運営を円滑化し、投資家等への正確な情報提供が重要とされている。

フィリピン国は気候変動枠組条約（UNFCCC）の締約国であり、京都議定書の批准については国会へ提出する段階にある。これまで天然資源環境省環境管理局（DENR-EMB）が中心となって気候変動枠組条約の対応を実施しているが、京都議定書の批准および発効が近い将来行われると想定される現時点において、DNAの体制はまだ構築されていない。天然資源環境省はDNAを所管することが想定されており、その運営等に対する支援を日本政府等（経済産業省のグリーンエイドプラン（GAP））へ要望していることから、JICAはGAPと連携を図りながら支援内容を検討しているものである。

なお、これまでUNDP等のドナーによりCDM関連のセミナーは実施されているが、DNA体制整備、投資環境整備等にかかる体系的な支援は十分に行われていない。

1.2　調査目的

本プロジェクト形成基礎調査では、フィリピン国のCDMを取り巻く状況を踏まえつつ、カウンターパート機関と想定している天然資源環境省環境管理局（DENR-EMB）の技術協力ニーズに関する現況調査、および関係機関からの情報収集を行い、本格調査に向けての要請内容及び調査事項の確認を行うことを目的とする。

1.3　団員構成

蔵方　宏　（団長／総括）	:JICA鉱工業開発調査部資源開発調査課長
下川　徹也（技術協力行政）	:経済産業省地球環境対策室国際係長
後藤　光　（調査企画）	:JICA鉱工業開発調査部資源開発調査課職員
近藤美智子（調査計画）	:JICA鉱工業開発調査部資源開発調査課職員
湯本　登　（DNA運営）	:プロアクトインターナショナル（株）
青山　道信（GHGデータ整備）	:日本工営（株）

1.4 調査日程

日時		行程
10 月 21 日(火)	AM	出国(JL741:成田 0945 発～マニラ 1300 着)
	PM	日本大使館面談
10 月 22 日(水)	AM	JICA フィリピン事務所、国家経済開発庁(NEDA)面談
	PM	天然資源環境省環境管理局(DENR-EMB)、JETRO、JBIC 面談
10 月 23 日(木)	AM	気象水文庁(PAGASA)、DENR-EMB 面談
	PM	公共事業道路省(DPWH)面談
10 月 24 日(金)	AM	UNDP、DENR-EMB、DENR 森林管理局(FMB)、科学技術省(DOST-ITDI)面談
	PM	運輸通信省(DOTC)、オランダ大使館、貿易産業省投資委員会(DTI-BOI)面談
10 月 25 日(土)		団内協議
		下川団員帰国(JL746:マニラ 0930 発～成田 1445 着)
10 月 26 日(日)		休日
10 月 27 日(月)	AM	アジア開発銀行(ADB)面談
	PM	エネルギー省(DOE)面談、DENR-EMB 協議録(M/M)署名
10 月 28 日(火)	AM	アジア開発銀行(ADB)面談
	PM	エネルギー省(DOE)面談、DENR-EMB 協議録(M/M)署名
10 月 29 日(水)		フィリピン開発銀行(DBP)面談
		蔵方団長、後藤団員帰国(JL746:マニラ 0930 発～成田 1445 着)
10 月 30 日(木)		気候変動情報センター(CCIC)面談
10 月 31 日(金)		資料整理
		近藤団員帰国(JL742:マニラ 1420 発～成田 1935 着)
11 月 1 日(土)		湯本団員、青山団員帰国(JL746:マニラ 0930 発～成田 1445 着)

1.5 対処方針

主として以下の事項に配慮したうえで、開発調査の必要性及び実施可能性を確認し、先方機関との協議内容を M/M(Minutes of Meeting)に取りまとめることとする。

(1) 先方の本プロジェクト実施にかかる取組状況について

1) 開発調査サイクルの説明

本調査はプロジェクト形成基礎調査であり、本格調査をコミットするものではない点を先方に対し明らかにした上で、本格調査の流れを I/A(Implementation Agreement:他国における S/W と同じ)の素案を提示しつつ説明し、先方の理解を得ることとする。なお I/A の締結は案件採択決定後

に派遣される事前（予備）調査団に委ねることとする。

2） 本格調査実施に向けた意識

本件にかかる日本への協力要請については、これから為されるとのことであり、先方政府内の具体的な実施体制、計画及び高いプライオリティを有しているかを確認するとともに、要請書（ToR：Terms of Reference）記載内容の協議を行う。また要請書(ToR)の提出窓口となる NEDA（国家経済開発庁）への説明も実施する。

3） フィリピン国における関連機関の役割の明確化とカウンターパート機関の確認

想定している本格調査について、関連するフィリピン側国内機関は以下のとおりである。

- 天然資源環境省（DENR：Department of Environment and Natural Resources）
  環境管理局（EMB）、森林管理局（FMB）
  （IACCC（Inter Agency Committee for Climate Change）−事務局は DENR）
- エネルギー省（DOE：Department of Energy）
- 気象水文庁（PAGASA）
- 貿易産業省投資局（DTI−BOI）
- 運輸通信省（DOTC）
- 科学技術省（DOST）
- 公共事業道路省（DPWH）

これまでに得た情報によると、天然資源環境省環境管理局（DENR−EMB）が DNA を所管していく可能性が高く、カウンターパート機関としてM/M及びI/Aの署名者になることを想定しているが、GHG（温室効果ガス）排出源を監督するエネルギー省や統計、運輸、投資、交通分野等を所掌する各省庁の状況を踏まえる必要があるため、今次調査にて情報収集を行う。また、本格調査の実施に当たっては関連機関でステアリングコミッティの構成を提案する等適宜密接に連携していくこととする。

4） 本格調査スケジュール、上位計画等との整合性

京都議定書の批准準備状況を確認するとともに、本格調査のスケジュールに影響を与える上位計画等（国会審議等）の時期・有無について確認する。なお、本格調査は内容により 2〜3 年の期間を想定している。

5） 本格調査内容の協議

図1−1に基づき、本格調査内容について協議を行う。今次プロ形調査においては、DENRと主に協議することとする。調査対象として鉱工業（エネルギー）セクターを主に実施することとし、植林セクター等他セクターの扱いについてはあまり関与しないことを想定するが、セクターに関係しない共通的な事項については調査対象に含めることとしたい。

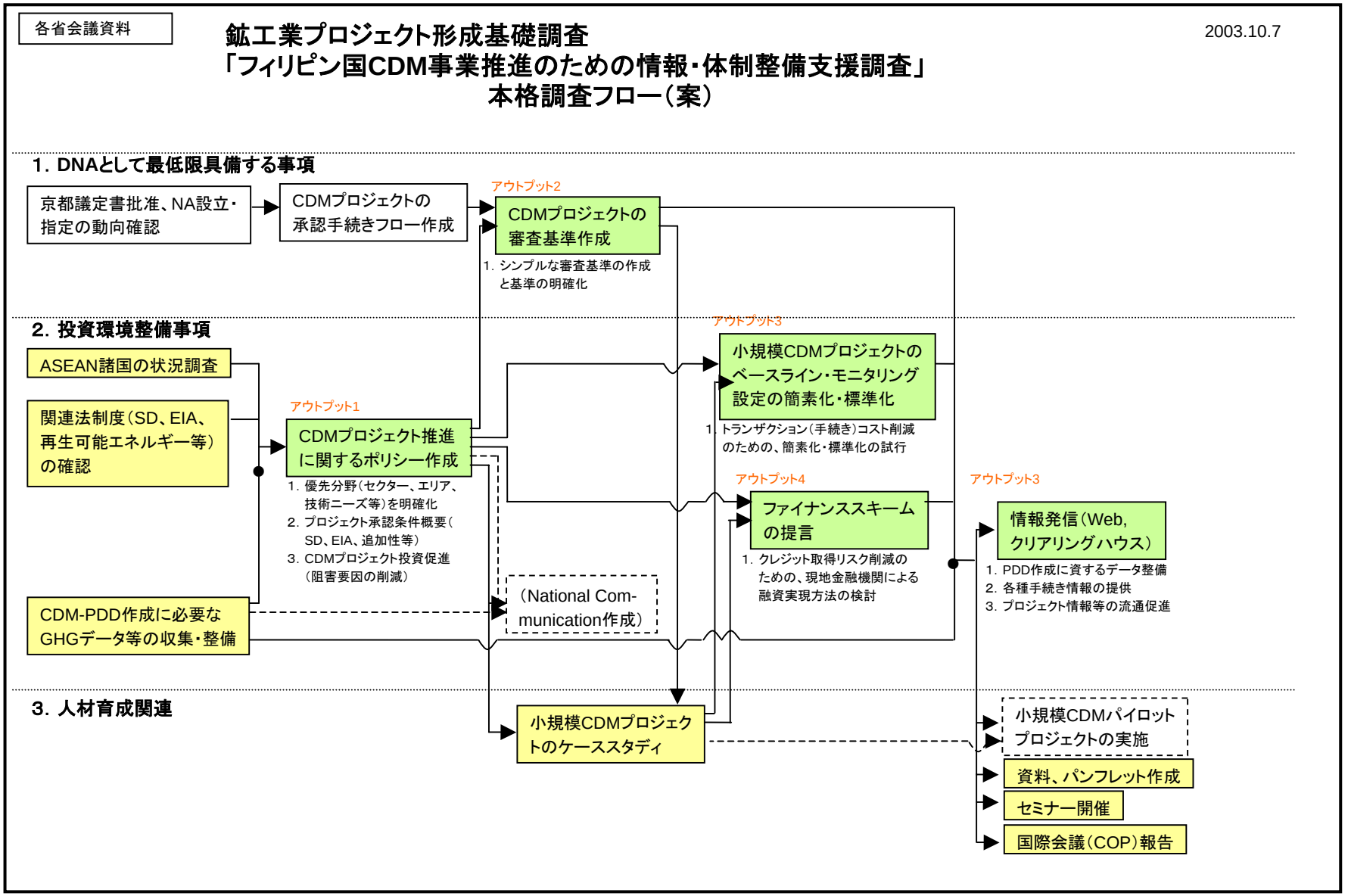
6） 既存データ・情報の確認

GHG 排出データや関連法制度等について情報を入手する。

7） 本格調査時の再委託の必要性の確認

本格調査の実施にあたって、再委託実施の必要性の有無について協議する。

図 1-1　本格調査内容（案）


各省会議資料
鉱工業プロジェクト形成基礎調査
「フィリピン国CDM事業推進のための情報・体制整備支援調査」
本格調査フロー（案）
2003.10.7
1. DNAとして最低限具備する事項
京都議定書批准、NA設立・指定の動向確認
CDMプロジェクトの承認手続きフロー作成
アウトプット2
CDMプロジェクトの審査基準作成
1. シンプルな審査基準の作成と基準の明確化
2. 投資環境整備事項
ASEAN諸国の状況調査
関連法制度（SD、EIA、再生可能エネルギー等）の確認
アウトプット1
CDMプロジェクト推進に関するポリシー作成
1. 優先分野（セクター、エリア、技術ニーズ等）を明確化
2. プロジェクト承認条件概要（SD、EIA、追加性等）
3. CDMプロジェクト投資促進（阻害要因の削減）
CDM-PDD作成に必要なGHGデータ等の収集・整備
（National Communication作成）
アウトプット3
小規模CDMプロジェクトのベースライン・モニタリング設定の簡素化・標準化
1. トランザクション（手続き）コスト削減のための、簡素化・標準化の試行
アウトプット4
ファイナンススキームの提言
1. クレジット取得リスク削減のための、現地金融機関による融資実現方法の検討
アウトプット3
情報発信（Web, クリアリングハウス）
1. PDD作成に資するデータ整備
2. 各種手続き情報の提供
3. プロジェクト情報等の流通促進
3. 人材育成関連
小規模CDMプロジェクトのケーススタディ
小規模CDMパイロットプロジェクトの実施
資料、パンフレット作成
セミナー開催
国際会議（COP）報告

(2) その他関連情報について

1) フィリピン国における他の国際援助機関等の動向の把握

フィリピン国のエネルギー・環境セクターにおいて、他の援助機関(UNDP、ADB、オランダ大使館等)による CDM 関連の支援プロジェクトについて調査し、その動向を把握した上で本格調査の必要性、内容等を確認する。

2) 日本側関係機関等との情報交換

日本大使館、JETRO、JBIC 等を訪問し、情報交換を行う。日本大使館においては要請書(ToR)及び口上書の取扱いについて協議を行い、JETRO においては本格調査の実施における協力関係構築の可能性について情報交換を実施する。

3) 安全管理情報の収集

本件調査対象地域は主にマニラ首都圏であり、現時点では特筆すべき危険情報は得られていない。しかしながら本格調査移行時には調査団の長期滞在が予想されることから、現地大使館、先方関連機関等に対し、連絡体制等の安全管理に関する情報について確認する。

第 2 章　調査結果と協議概要

2.1 協議概要（団長所感）

今回のプロジェクト形成調査では、天然資源環境省環境管理局（DENR-EMB）を中心に、国家経済開発庁（NEDA）、UNDP、ADB、オランダ大使館等を訪問し、CDM に関する情報と意見交換を行った。その結果、10 月 27 日に DENR-EMB との間で、協議の内容を取りまとめた協議議事録（M/M）への署名交換を行うことができた。

以下本調査団の結果と協議概要を述べる。

（1）重要な事実の確認

・ フィリピン政府の京都議定書の批准については、10 月 21 日に上院にて決定された。
・ DNA は京都議定書が批准された後設立されることになるが、DENR（天然環境資源省）が所管する予定である。
・ DNA の設立に対し、オランダの資金援助を得て UNDP が支援の実施を決定している。具体的には、設立に必要な法律の整備と承認手続きの整備が 2003 年 11 月より 9 ヶ月間の予定で実施される。
・ CDM を活用すべき分野として、再生可能エネルギーを有望視している。

（2）調査の枠組みに関する協議

1）調査の枠組みの整理

オランダ政府の資金支援による UNDP のプロジェクト（Establishment of the Clean Development Mechanism National Authority, Operational Framework and Support Systems for the Philippines）の内容が明らかになったので、重複が予想される項目を整理し、調査の枠組みを再度構成し、DENR と協議を行った。

2）調査の枠組み

上記を踏まえ、双方の間で作成した調査の枠組みは次のとおり。

① タイトル

CDM 事業促進のためのキャパシティービルディング調査
（The Study on Capacity Building to Promote Clean Development Mechanism Project）

② 調査の内容

・ CDM 事業促進政策の立案
・ 小規模 CDM 事業のためのベースライン、モニタリング設定の標準化と簡素化
・ CDM 事業に関する情報の発信（クリアリングハウスの設立）
・ 調査を通じてのセミナー、ワークショップによる知識、技術の移転と普及

（3）I/A を協議する上での留意点

1） 今回提案した調査を実施する際、DNA を所管する予定の DENR を主たるカウンターパートとすべきではあるが、CDM 事業が多岐の分野にわたることから、関係省庁を取りまとめる調整機能を DENR に求める必要がある。I/A 協議においては、この調整機能を働かせるための体制構築に関する協議が

必要である。

2） 2003 年 11 月より UNDP による DNA 設立支援が DENR をカウンターパートとしてスタートすることになるが、同支援によりフィリピンにおける CDM 事業を進める際の基本的なルールを定められることになるので、同支援の進捗と問題点を把握することが重要である。また、本格調査開始後も、適宜情報交換すべきであることは言うまでもない。

（4） 今後の予定

・ フィリピン側（DNER）からの NEDA を通じての正式要請の提出
・ 日本サイドでの採択会議

（採択された場合）

・ 正式通報、口上書の交換
・ I/A の締結
・ コンサルタント選定後、本格調査の開始

上記予定の中で、DENR から NEDA を通じて提出される予定の正式要請書の取り付けへの側面支援を、日本大使館、JICA事務所にお願いするつもりである。なお、要請書（Application Form）は、今回の DENR との協議において原案を作成済みである。

（5） 所感

1） 今回の調査は、京都議定書の批准の見通しが立ち、さらに UNDP による DNA 設立支援が決定されるという具体的な CDM 事業を推進するための活動がスタートしようとする時期に当たり、非常にタイミングが良かった。具体的には、基本的な体制とルールを UNDP が整備し、それを JICA が具体化するという連携が生まれることになり、非常に意義のあるプロジェクトが形成できた。

2） また、今後 CDM 事業の承認手続きが UNDP により整備されることにより、JICA は、一般論でなく具体的な事業実施のための技術やノウハウを提供することが可能となったと言える。

3） 本格調査実施に当たっては、DENR の調整機能が極めて重要であると考えられる。調整委員会の設立等、強力な実施体制の構築が調査を成功させるための重要なポイントになると感じた。

2.2 締結した協議議事録(M/M 等)

MINUTES OF MEETING

FOR

PROJECT FORMULATION STUDY

FOR

THE STUDY

ON

SUPPORTING INSTITUTIONAL AND INFORMATION CAPACITY BUILDING TO PROMOTE CDM PROJECTS IN THE REPUBLIC OF THE PHILIPPINES

The Project Formulation Study Team (the Team), organized by the Japan International Cooperation Agency (JICA) and headed by Mr. Hiroshi KURAKATA, visited the Philippines from Oct 21, 2003 to Nov 1, 2003. The purpose of the Team is to discuss the Study on Supporting Institutional and Information Capacity Building to Promote Clean Development Mechanism (CDM) Projects.

The Team had a series of discussions with the Philippines authorities concerning the feasibility of applying JICA's Development Study Scheme to the Study, which aims to strengthen the institutional and information capacity of the Department of Environment and Natural Resources (DENR) to promote CDM projects.

As a result of the discussion, both parties agreed to record the following points as summarized conclusions of the discussions.

MANILA, October 27, 2003

Mr. Hiroshi KURAKATA
Leader
Project Formulation Study Team
Japan International Cooperation Agency

Mr. Rolando Metin
Undersecretary
Management and Technical Services
Department of Environment and Natural Resources

The Philippines

1

1. Confirmation of the Facts

The Team confirmed the following facts.

(1) The Senate of the Philippines concurred the ratification of the Kyoto Protocol and the instrument of ratification will be deposited in the near future.

(2) The project, titled "Establishment of the CDM National Authority, Operational Framework and Support Systems for the Philippines," with financial assistance from the Government of Netherlands will be implemented through UNDP next month. DENR will be the executing agency, responsible for the overall management of the project.

2. Outline of the Study

Both parties drafted the outline of the Study as follows and shown in the Attachment 1, 2.

(1) Title of the Study

The Study on Capacity Building to Promote Clean Development Mechanism Projects

(2) Objective of the Study

The objective of the Study is to contribute to sustainable development by promoting CDM investments

(3) Scope of the Study

In order to achieve the objective, the Study will be composed of the following tasks.

- Information collection
- Development of CDM project promotion policy
- Case studies on small scale CDM projects
- Streamlined standard baseline and monitoring methodologies for small scale CDM projects
- Financial development for local CDM participants
- Web-based CDM information clearinghouse
- Preparing training materials and organizing CDM workshops

3. Undertakings of DENR

The Philippines side agreed that:

(1) DENR should be responsible for coordinating the Study as the representative of the Philippines and shall be the lead counterpart agency and shall coordinate with relevant agencies.

(2) DENR should decide a responsible organization for the clearinghouse based on consultation that will be conducted among stakeholders.

4. Expected Procedures and Steps for the Study

The following steps will be taken in order to start the Study;

(1) "Application Form For Japan's Development Study/Program" should be prepared by DENR and submitted to the Embassy of Japan through the National Economic and Development Authority (NEDA) by the end of November 2003.

(2) The Government of Japan will make a final decision to implement the Study.

(3) A preparatory study team will be dispatched to further discuss and decide the Implementing Arrangement of the Study.

Attendance List of Discussions

(DENR)

Dir. Julian D. Amador
Director, Environmental Management Bureau, DENR

Ms. Joyceline A. Goco
Head, Interagency Committee on Climate Change Secretariat

Chief, Institutional Coordination and Documentation Section, Environmental Education and Information Division, EMB-DENR

(JICA Project Formulation Study Team)

Mr. Hiroshi KURAKATA, Leader
Director, Energy and Mining Development Study Division, JICA

Mr. Tetsuya SHIMOKAWA
Section Chief, Global Environmental Affairs Office, METI

Mr. Ko GOTO
Program Officer, Energy and Mining Development Study Division, JICA

Ms. Michiko KONDO
Staff, Energy and Mining Development Study Division, JICA

Mr. Noboru YUMOTO
Consultant, PROACT International

Mr. Michinobu AOYAMA
Consultant, Nippon Koei Co., Ltd.

Attachment 1

Draft TOR of the Study

The study will develop the Clean Development Mechanism (CDM) projects promotion policy and CDM investment promotion measures. The study includes training workshops on CDM projects promotion.

1. Development of the CDM project promotion policy

The study will review existing climate change policies, sustainable development policies, greenhouse gas emission data which are necessary to develop CDM project design documents (herein after referred to as "CDM-PDD"), in the Philippines and current policies and trends of CDM projects in other Asean countries. The study will develop CDM project promotion policy which prioritize CDM projects and CDM investments promotion measures.

1-1 Collection and review of information relevant to CDM

1.1.1 Climate change policies

1.1.2 Sustainable development policies

1.1.3 Legal frameworks relevant to CDM projects such as Environmental Impact Assessment, etc.

1.1.4 Greenhouse gas emission data and other information and data which are useful to develop CDM-PDD

1.1.5 CDM policies and trends of CDM projects in other Asean countries

1-2 Development of the CDM project promotion policy

The CDM project promotion policy will include prioritization of CDM projects based on sectral criteria, technology, etc., and CDM investment promotion measures such as provision of information and data which are useful to develop CDM-PDD through the CDM web-based clearinghouse etc.

2. Promotion of CDM investments

The study will collect information and data, which assist CDM project participants to identify potential CDM projects and to design baseline and monitoring plan. In order to facilitate the formulation of small-scale CDM projects, which may contribute to rural sustainable developments, the study will develop streamlined standard baseline and monitoring methodologies for prioritized small-scale CDM projects through case studies. The case studies will provide opportunities to learn CDM project development procedures and methodologies to the CDM stakeholders. Further the study will develop necessary financing measures to enable local organizations to participate in CDM

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projects. The study will also provide information and data through the development of web-based clearinghouse.

2-1 Collection and analysis of information and data which are necessary for baseline design and monitoring plan

2-2 Development of streamlined standard baseline and monitoring methodologies for prioritized small-scale CDM projects and development of greenhouse gas emission factors specific to the Philippines through case studies

2-3 Financial development for local CDM project participants

2-4 Development of web-based clearinghouse to provide and to exchange information and data relevant to CDM projects in the Philippines to all concerned people and parties in the world

3. Training workshops on CDM

The study will provide series of training workshops on CDM project promotion to stakeholders such as government officials, CDM project participants, and financial organizations in the Philippines.

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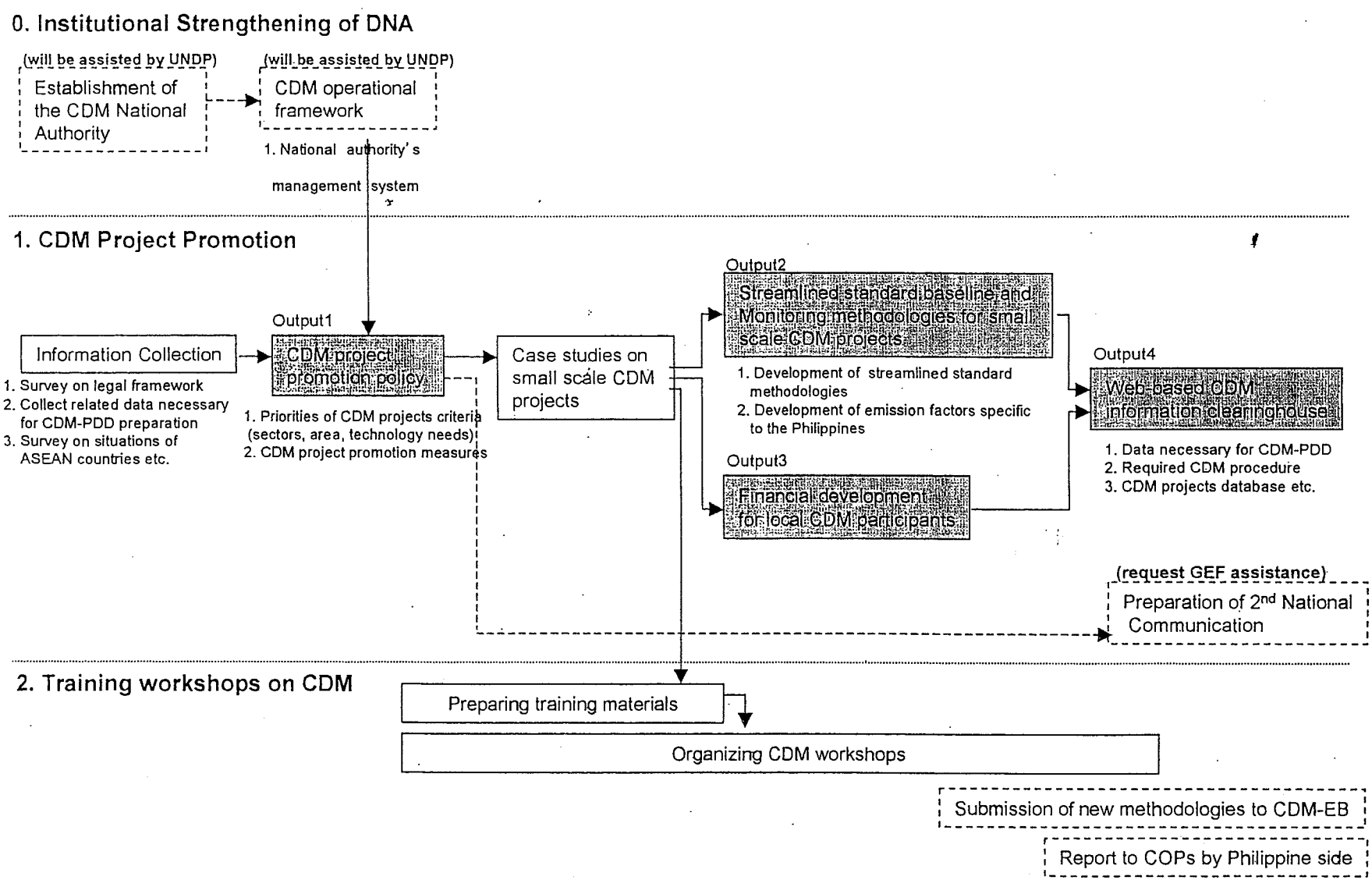
"The Study on Capacity Building to Promote Clean Development Mechanism (CDM) Projects in the Republic of the Philippines" Study Flow (Draft)



2.3 要請書(アプリケーションフォーム)案

draft

APPLICATION FORM FOR JAPAN'S DEVELOPMENT STUDY PROGRAM

Date of entry: month November year 2003

Applicant: the Government of The Republic of the Philippines

1. Project digest

(1) Project Title:The Study on Capacity Building to Promote Clean Development Mechanism Projects in the Republic of the Philippines

*Enter the project title in English (Spanish or French).

(2) Location (province/county name): Metro Manila

(city/town/village name): _____

from the metropolis : about _____ - _____ hours' ride/flight

(3) Implementing Agency

Name of the Agency: Department of Environment and Natural Resources

*Enter the name of the implementing agency including such details as the name of the bureau or department.

Number of Staff of the Agency: _____

(on a category basis)

Budget allocated to the Agency : _____

*Attach an organizational chart, and mark the department responsible for the study.

(4) Justification of the Project

*Provide detailed information of the project regarding the items below.

-Present conditions of the sector:

The government ratified the Kyoto Protocol under the United Nations Convention on Climate Change in Ocotober, 2003 and is preparing to designate the Department of Environment and Natural Resources as the national authority of CDM.

-Sectoral development policy of the national/local government:

The government has established the Inter-agency Committee on Climate Change. The government submitted the Philippines' Initial National Communication on Climate Change to the UNFCCC secretariat December 1999.

-Problems to be solved in the sector:

The government does not have budget and personnel resources enough to develop the CDM project promotion policy and CDM project promotion measures.

-Outline of the Project:

The study will develop CDM project promotion policy to attract CDM investors in the world. Based on the policy, the study will develop streamlined standard baseline and monitoring methodologies for prioritized small scale CDM projects through case studies, to reduce transaction costs. The study will develop financing measures for local CDM project participants and develop web-based clearinghouse to provide and exchange CDM related information to all concerned people and organizations on CDM in the Philippines in the world.

-Purpose (short-term objective) of the Project:

The study will develop CDM project promotion policy in order to attract CDM investors in the world. The study also encourages potential CDM participants to make CDM projects feasible in the Philippines by reducing transaction costs for small scale CDM projects and

assisting CDM project design by provision of necessary data and information through CDM web-based clearinghouse.

-Goal (long-term objective) of the Project:
The study helps the Philippines to achieve the goal of the UNFCCC and the Kyoto Protocol. The study contributes to the sustainable development in the Philippines and assists developed countries such as Japan to achieve the greenhouse gas emission reduction commitment under the Kyoto Protocol.

-Prospective beneficiaries:
(Population for which positive change are intended directly and indirectly by implementing the project, and gender disaggregated data, if available)
The all people of Philippines are beneficiaries by hosting CDM projects for sustainable developments. Also developed countries such as Japan will be beneficiaries by getting greenhouse gas emission reduction credits from CDM projects in the Philippines at reasonable price

-the Project's priority in the National Development Plan / Public Investment Program:

(5) Desirable or Scheduled time of the commencement of the Project:
month May year 2004

(6)Expected funding source and/or assistance (including external origin) for the Project:
JICA

*Describe the concrete policies for the realization of the project, and enter the prospects for realization and funding sources.

(7) Other relevant Projects, if any.
UNDP will provide an assistance to establish the designated national authority of CDM by funding from the Government of Netherlands.

2. Terms of Reference of the proposed Study

*Please fill in (1) and (2) below, paying particular attention to the following items.
-In the case that a study was conducted in the same field in the past, describe the grounds for requesting this study, the present status of the previous project, and the situation regarding the technology transfer.
-Whether there are existing studies regarding this requested study or not.
-Coordination with other economic and technical cooperation from Japan

(1) Necessity/Justification of the Study:
The government of the Philippines ratified the Kyoto Protocol under the UNFCCC October, 2003. In the current greenhouse gas emission reduction credit market in the world, there are competitions to attract CDM investors among developing countries. Therefore the Philippines needs to develop CDM project promotion policy and prepare CDM project promotion measures. Despite of the urgent needs for these government actions, the government does not have budget and personnel resources enough to execute. Therefore this study is urgently necessary.

(2) Necessity/Justification of the Japanese Technical Cooperation:
Japan is expected to be the main investors to CDM projects in Philippines. Japan is very advanced country in terms of mitigating global warming by developing and introducing energy efficient technologies and renewable energy technologies. Japan is alsoi very

active in the CDM rule making at the COP and CDM executive board.
Therefore the Government of Philippines requests Japan to provide a technical assistance for the capacity building on CDM.

(3) Objectives of the Study:

*Describe the objectives of the study in detail. Also, indicate who will benefit from the study in as much detail as possible, including gender disaggregated data and describe the beneficial effect in terms of quantity. Enter in a concise manner the goal expected to be achieved in the future by conducting the study.

*When the requested study is the only input scheme there is in the cooperation program, enter the same sentences given in the "Objective of the Cooperation Program" in the summary sheet. When more than one scheme is requested including this one, describe clearly the role of the requested study.

The study helps the Philippines to achieve the goal of the UNFCCC and the Kyoto Protocol. The study contributes to the sustainable development in the Philippines and assists developed countries such as Japan to achieve the greenhouse gas emission reduction commitment under the Kyoto Protocol.

The study will develop CDM project promotion policy to attract CDM investors in the world. The study also encourages potential CDM participants to make CDM projects feasible in the Philippines by reducing transaction costs for small scale CDM projects and assisting CDM project design by provision of necessary data and information through CDM web-based clearinghouse etc..

The all people of Philippines are beneficiaries by hosting CDM projects for sustainable developments. Also developed countries such as Japan will be beneficiaries by getting greenhouse gas emission reduction credits from CDM projects in the Philippines at reasonable price.

(4) Area to be covered by the Study:

*Enter the name of the target area for the study and attach a rough map to the documents submitted. The attached map should be at a scale that clearly shows the project site. Mark the site in red.

Whole country of the Philippines

(5) Scope of the Study:

*Enter in a concise manner using an itemized statement.

1. **CDM project promotion policy development**

The study will review the climate change policies, sustainable development policies, greenhouse gas emission data and other data and information which are useful to develop CDM-PDD in the Philippines, and CDM policies and trends of CDM projects in other Asean countries etc. The study will develop CDM project promotion policy which shows the priority of CDM project activities, and CDM project promotion measures etc..

2. **Promotion of CDM investments**

The study will develop streamlined standard baseline and monitoring methodologies for prioritized small scale CDM projects through case studies to reduce transaction cost. The study will develop financing measures for local CDM project participants and will develop web-based clearinghouse to provide and to exchange CDM related information to all concerned people and organizations in the world.

3. **Training workshops on CDM**

The study will provide a series of training workshops on CDM to all stakeholders in the Philippines.

(6) Study Schedule:
*Enter the time/period of the study.

From May, 2004 to March 2006

(7) Expected Major Outputs of the Study:
1) CDM project promotion policy (policy paper)
2) Streamlined standard baseline and monitoring methodologies for small scale CDM projects
3) Financial development for local CDM project participants
4) Web-based clearinghouse on CDM information
5) Programs and materials for training workshops on CDM

(8) Possibility to be implemented / Expected funding resources:

(9) Request of the Study to other donor agencies, if any:
*Please pay particular attention to the following items:
- -Whether you have requested the same study to other donors or not.
- -Whether any other donor has already started a similar study in the target area or not.
- -Presence/absence of cooperation results or plans by third-countries or international agencies for similar projects.
- -In the case that a study was conducted in the same field in the past, describe the grounds for requesting this study, the present status of the previous project, and the situation regarding the technology transfer.
- -Whether there are existing studies regarding this requested study or not. (Enter the time/period, content and concerned agencies of the existing studies.)

(10) Other relevant information
*Enter relevant information other than that described above, if any.
The government of the Philippines is requesting assistant to develop 2nd National Communication on Climate Change.

3. Facilities and information for the Study
(1) Assignment of counterpart personnel of the implementing agency for the Study: (number, academic background, etc.)

(2) Available data, information, documents, maps, etc. related to the Study:

(Please attach the list.)

(3) Information on the security conditions in the Study Area:

4. Global Issues (Environment, Gender, Poverty, etc.)

(1) Environmental components (such as pollution control, water supply, sewage, environmental management, forestry, biodiversity) of the Project, if any.

Climate change

(2) Anticipated environmental impacts (both natural and social) by the Project, if any.

Mitigation of climate change

(3) Women as main beneficiaries or not.

(4) Project components which require special considerations for women (such as gender difference, women specific role, women's participation), if any.

(5) Anticipated impacts on women caused by the Project, if any.

(6) Poverty alleviation components of the Project, if any.

(7) Any constraints against the low-income people caused by the Project.

5. Undertakings of the Government of (the recipient country)

In order to facilitate the smooth and efficient conduct of the Study, the Government of (the recipient country) shall take necessary measures:

(1) to secure the safety of the Study Team,

(2) to permit the members of the Study Team to enter, leave and sojourn in (the recipient country) in connection with their assignment therein, and exempt them from foreign registration requirements and consular fees,

(3) to exempt the Study Team from taxes, duties and any other charges on equipment, machinery and other materials brought into and out of (the recipient country) for the conduct of the Study,

(4) to exempt the Study Team from income tax and charges of any kind imposed on or in connection with the implementation of the Study,

(5) to provide necessary facilities to the Study Team for remittance as well as utilization of the funds introduced in (the recipient country) from Japan in connection with the implementation of the Study,

(6) to secure permission for entry into private properties or restricted areas for the conduct of the Study,

(7) to secure permission for the Study Team to take all data, documents and necessary materials related to the Study out of (the recipient country) to Japan, and,
(8) to provide medical services as needed. Its expenses will be chargeable to members of the Study Team.

6. The Government of (the recipient country) shall bear claims, if any arise against member(s) of the Japanese Study Team resulting from, occurring in the course of or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the member of the Study Team.

7. (The implementing Agency) shall act as counterpart agency to the Japanese Study Team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

8. (The implementing Agency) will, as the executing agency of the project, take responsibilities that may arise from the products of the Study.

*In the case that Detail Design Study is requested.

The Government of (the recipient country) assures that the matters referred to in this form will be ensured for the smooth conduct of the Development Study by the Japanese Study Team.

Signed:_____
Title: _____
On behalf of the Government of _____

Date: _____

2.4 主要面談者リスト

(1) 日本大使館
齊藤一等書記官

(2) JICA フィリピン事務所
中垣所長
杉山所員

(3) 天然資源環境省環境管理局(Environmental Management Bureau, Department of Environment and Natural Resources ／ DENR-EMB)
Mr. Rolando L. Metin, undersecretary
Mr. Julian D. Amador, Director, EMB
Ms. Joyceline A. Goco, Chief, EMB、大田専門家

(4) 天然資源環境相森林管理局(Forest Management Bureau, Department of Environment and Natural Resources ／ DENR-FMB)
Mr. Romeo Acosta, Director
Mr. Sofio Quintana
Mr. Arvie Tirso G. Caancan, Senior Forest Management Specialist
Mr. Shoshi TANAKA, JICA Forestry Expert

(5) 国家経済開発庁(National Economic and Development Authority ／ NEDA)
Ms. Vioula C. Conde, Utility Staff, Development Specialist
Ms. Joanne Tolentino, Senior Development Specialist, Public Investment Staff
Ms. Fay Maruh, SEDS, AS-NRP

(6) 日本貿易振興機構(Japan External Trade Organization ／ JETRO)
奥村所員

(7) 国際協力銀行(Japan Bank for International Cooperation ／ JBIC)
近藤駐在員

(8) 気象水文庁(Philippine Atmospheric, Geophysical and Astronomical Services Administration ／ PAGASA)
Dr. Flaviana Hilario, Supervising Weather Specialist
Ms. Edna Juanillo, Supervising Weather Specialist
Dr. Aida M. Jose, Chief, Climatology Branch
Ms. Lourdes V. Tibig, Supervising Weather Specialist
Mr. Nathaniel A. Cruz, Supervising Weather Specialist
Ms. Charmie A. Monteverde, Jr. Weather Specialist

(9) 公共事業道路省(Department of Public Works and Highways ／ DPWH)
Ms. Linda M. Templo, Director III, Planning Service
Ms. Becky Garsuta, Engineer
Ms. Charlene B. Blando, Engineer III, EIA Project Office
池田 裕二道路計画管理専門家

(10) 国連開発計画(United Nations Development Programme ／ UNDP)
Ms. Amelia D. Supetran, Portfolio Manager, Environment
Ms. Imee F. Manal, Programee Manager, Climate Change
Ms. Michiko Suga, Partnerships Advisor

(11) 科学技術省(Industrial Technology Development Institute, Department of Science and Technology ／ DOST-ITDI)
Dr. Alice B. Herrera, Fuels and Energy Division
Ms. Suzita S. Oredina, Environmental Division
Dr. Doris O. Tenorio, Environmental Division

(12) 運輸通信省(Department of Transportation and Communications ／ DOTC)
Ms. Dolores G. Pna, Supervising, Transportation Planning Service(Patdu Director の代理)
Mr. Gerazon R. Jayson
JICA 笹嶋専門家(総合交通政策アドバイザ)

(13) オランダ大使館
Mr. Jan Willem Cools, First Secretary, Forests & Environment
Mr. Ariel I. Jayme, Project Officer

(14) 貿易産業省投資委員会(Board of Investments, Department of Trade and Industry ／ DTI-BOI)
E.C. Hernandez 産業計画 Executive Director
F.A.Vistal 投資促進 Executive Director
E.F.Arcellana 産業政策 Director

(15) アジア開発銀行(Asian Development Bank／ ADB)
Mr. Ashok Sarkar, Energy Specialist, Finance and Information Division, Regional and Sustainable Development Department

(16) エネルギー省(Department of Energy ／ DOE)
Mr. C.C. Del Callar Undersecretary
Mr. L.C. Fernandez
M.S. Lagang
玉川 JICA 専門家

(17) Philippine Rural Reconstruction Movement ／ PRRM (NGO)

Ramon Faustino M. Sales, Jr. Assistant Director of Technical Services Office

(18) フィリピン開発銀行(Development Bank of the Philippines ／ DBP)

Mr. Rey Amaury A. Guarin, Assistant Vice President, Climate Change Program Manager at Program Management I-DBS

Ms. Grace D.L. Punsalan, Program Specialist, Climate Change Program at Program Management I-DBS

(19) 気候変動情報センター(Climate Change Information Center ／ CCIC)

Dr. Roberto C. Yap, Project Director, Climate Change Information Center, Manila Observatory, Ateneo de Manila University Campus

Ms. Atty. Angela Consuelo S. Ibay, Program Coordinator

Ms. Jean S. Laurente, Project Assistant

Mr. Ammiel M. De Leow, Institutional Division Officer.

2.5 予備調査に向けた留意事項

(1) カウンターパート体制の確認

カウンターパートの DENR には CDM の専門家は 2 名しかおらず、本格調査の実施にあたっては IACCC のメンバーである関係省庁、CCIC、NGO 等から調査内容ごとに適切なカウンターパートを選定する必要がある。カウンターパートの選定は DENR が行うことになっているが、今回の調査で得られた情報から判断すると、エネルギー省、CCIC、フィリピン開発銀行(DBP)の 3 組織は CDM に関して知識と強い関心を有しており、カウンターパートに加える必要があるものと思われる。

NGO も小規模 CDM プロジェクトについて強い関心を有しており、ケーススタディについては NGO にどのように参加してもらうか検討する必要がある。特にコミュニティベースの小規模 CDM プロジェクトでは NGO がプロジェクト実施者、モニタリング実施者等として CDM プロジェクトに主体的に参加する可能性が高く NGO の参加は必要不可欠である。また、フィリピンにおいて日本企業等が各種の CDM プロジェクトを円滑に実施していくためには地元 NGO の CDM に対する支持が必要であり、この観点からも NGO との協力関係の構築について配慮が必要である。

(2) DNA 設立及び DNA の Operational framework の進捗状況の確認

本格調査に先立ち、UNDP の支援により DNA 設立、その operational framework の作成が行われる予定になっている。Operational framework は CDM プロジェクトの承認手続き等を含む内容になる予定であるため、CDM プロジェクト促進に大きな影響を与えるものである。このため、本格調査の立ち上げを急ぎ、投資促進の観点から日本側の意見を operational framework に反映させていく機会が確保されるように工夫する必要がある。

また、operational framework が CDM プロジェクトの承認手続きについて具体的かつ明確な規定を作成しない場合には、本格調査の CDM プロジェクト促進政策において承認手続きを明確に規定する必要がある。

このように operational framework は本格調査の目的である CDM プロジェクト促進と密接に関連すると同時に、その進捗状況に応じて本格調査の業務内容、スケジュールを見直す必要が生じるものと

思われる。このためその作成状況の把握、日本側の意見反映を担保するため、事前調査においては本格調査立ち上げまでの間はDENRがJICAに対して進捗状況を適宜連絡すること、JICAの意見を反映する機会を設けることを合意する必要があるものと思われる。

(3) ケーススタディの対象プロジェクトの選定

ケーススタディの対象プロジェクトについては、フィリピンにおいて今後多数のCDMプロジェクトの実施が期待される分野を選定する必要がある。また、ケーススタディについては、当該分野ごとの専門家を調査団員に加える必要があるため、事前調査において対象プロジェクト分野を確定させる必要がある。さらに、ケーススタディを通じて開発されるベースライン・モニタリング方法論を、当該分野のプロジェクトのフィリピンにおける標準ベースライン・モニタリング方法論として利用可能とするためには、CDM-EBの新規方法論の審査を受ける必要がある。このため、ケーススタディの対象プロジェクトはCDMプロジェクトとして実際に実施する目処のある具体的なプロジェクトを選定することが望ましい。

なお、今回の調査で得られた情報から判断すると、再生可能エネルギープロジェクト(ピコハイドロ等)と廃棄物処分場またはバイオマスからのメタンガス回収プロジェクトは有力なケーススタディテーマと思われる。他のアジア諸国でも利用可能な完成度の高いケーススタディ(2件程度か)を実施し、方法論ではCDM-EBに認められるレベルのもの(JICA発方法論としてCDM-EBに登録する)を想定するためには、S/Wミッション時に案件の熟度、採算性、CDM適格性に問題のないようなCDMケーススタディ案件を事前にフィリピン側と合意しておくことが大切と考える。そのためには事前調査においてDENRからF/Sレベルの熟度を有する候補案件を複数上げてもらう必要がある。

(4) クリアリングハウス運営主体の選定

クリアリングハウスの開発及び調査期間中の運用はJICA調査団が行うが、調査終了後にはフィリピン側が運営する必要がる。このため、事前調査において調査終了後も適切に維持管理、情報のアップデートを行う経営資源と技術的能力を有する組織を特定することが必要である。当該組織に対しては、調査を通じてクリアリングハウスの運営、アップデート等の技術移転を行うことになる。

比国側にはアセアン諸国のCDM情報センターとしてCCICを位置付ける考えがあり、他の既存情報システムとの重複がないことを前提に、CICCをクリアリングハウスとして活用することについて事前調査において確認することが考えられる。

(5) 検討対象とする温室効果ガス排出係数の選定

フィリピン側はフィリピン固有の温室効果ガス排出係数の策定を希望しているが、係数の策定には文献調査のみでなく、実際の資源について炭素含有量、熱量の測定等の業務を必要とする場合が多いものと予想される。このため、本格調査の業務量を把握する観点からどのような排出係数についてフィリピン側が必要としているのか事前調査において明らかにする必要がある。

(6) ワークショップの実施方法

ワークショップについては、すでに多くのCDM関連ワークショップを開催しており、関係者のメーリングリストを有しているCCICとの提携が必要不可欠と思われる。また、ケーススタディについては、研修を兼ねて行うためにどのような進め方が適切かフィリピン側との意見交換が必要である。

(7) 事業実施を促進するための投資環境の整備

CDM事業の実施を促進するためには、制度整備・人材育成などソフト面の環境整備が大事である。

しかし、CDM を民間投資のスキーム（ODA については議論のあるところ）と考えるなら、優先セクター・候補案件に対する削減限界コストと事業の採算性への検討も大事と考える。比国に対する海外投資（民間）が近年むしろ減少傾向にある中、CDM への民間投資フローが発生したと考えた場合、比国にはCDM 投資により採算性がぎりぎりのレベルまで上がるセクター・候補案件はあるのか、あるとすれば何なのか、それに対するCDM 投資へのリスクヘッジは何があるのかをまず分析し、その上、フィリピンにとり必要な投資政策とは何なのかが検討すべきではないかと考える。

第 3 章　京都議定書・CDM を取り巻く最近の動向

1997 年 12 月の気候変動枠組条約（UNFCCC）第3回締約国会合（COP3）において署名された京都議定書では、我が国を含む附属書Ⅰ国（先進国）について、1990 年を基準年とし、第1約束期間（2008 年～2012 年）における温室効果ガス排出削減目標が法的義務として規定されている（我が国の場合、90 年比 6%の削減が目標）。この目標を達成するための一つの手段として、いわゆる京都メカニズムの枠組みが京都議定書の中に盛り込まれており、具体的には議定書第 6 条に基づく共同実施（JI: Joint Implementation）、議定書 12 条に基づくクリーン開発制度（CDM: Clean Development Mechanism）、議定書 17 条に基づく排出量取引の3つがある。このうち、CDM とは非附属書Ⅰ国（途上国）において附属書Ⅰ国が省エネプロジェクト等を実施し、当該プロジェクトから得られる温室効果ガスの追加的削減量を第三者機関が認証してクレジットを発行し、その全部又は一部を当事者間の合意によって、移転する仕組みである。

京都メカニズムは、温室効果ガス排出削減のための限界費用が低い国から高い国に移転することによって、費用対効果の高い排出削減に向けた地球規模の取組を可能にする制度である。とりわけ、既に相当程度の省エネ対策が推進され、温室効果ガスの限界削減費用が諸外国に比べて高い我が国にとって、京都メカニズム（特に CDM）の活用は目標達成に伴う我が国経済への影響を最小限にする上で不可欠と考えられている。

以下、京都議定書及び CDM を取り巻く最近の動向について UNFCCC 及び COP9 の動きから概観する。

3.1　UNFCCC

京都議定書については米国及び豪州が不参加を表明しているが、わが国をはじめ欧州諸国、カナダはすでに批准手続きを完了しており（合計で付属書Ⅰ国の排出量の 43.9%）、今後、ロシアの批准（付属書Ⅰ国の排出量の 17.1%）により議定書発効の条件である付属書Ⅰ国の排出量の 55%以上に達し発効することになる。

CDM については、2001 年 11 月の COP7 においてマラケシアコード Decision17/CO7 によりその実施規則が定められて以来、急速に準備が進められている。以下に各分野における進捗状況を示す。

(1)　プロジェクトデザインに関する事項

プロジェクトデザイン（ベースライン方法論及びモニタリング方法論）については、ベースライン＆モニタリング方法論パネルにおいて検討が行われている。2002 年 8 月末にプロジェクトデザインドキュメント（CDM-PDD）のガイドライン Ver.01 が作成された。引き続き同パネルは小規

模 CDM 用の簡素化された PDD ガイドライン Ver.01 及びインディカティブな簡素化されたベースライン方法論及びモニタリング方法論を作成し、これらのガイドライン等はパブリックコメント聴取手続きを経て、2003 年 1 月の第 7 回 CDM 理事会で承認された。また、同パネルは PDD ガイドライン（SSC-PDD）Ver.01 の用語集を作成し、第 7 回の CDM 理事会で承認された。3月に開催予定の CDM 理事会においては、CDM-PDD Ver.01 及び SSC-PDD Ver.01 の見直し版（Ver.02）の作成について検討を行う予定である。

CDM-PDD Ver.01 の構成:

- A: General description of project activity
- B: Baseline methodology
- C: Duration of the project activity/crediting period
- D: Monitoring methodology and Plan
- E: Calculation of GHG emissions by sources
- F: Environmental impact
- G: Stakeholders comments
- Annexes
  - Annex1: Information on participants in the project activity
  - Annex2: Information regarding public funding
  - Annex3: New baseline methodology
  - Annex4: New monitoring methodology
  - Annex5: Table: Baseline data

ベースライン方法論及びモニタリング方法論についてはマラケシアコードにおいて個別の CDM プロジェクトにおいて新たな方法論が提案された場合には、オペレーショナルエンティティ（OE)は CDM 理事会に報告して CDM 理事会が審査をする旨規定されている。CDM 理事会は新規の方法論を審査する専門家を募集しており、新規の方法論についてのこれらの専門家が実質的には審査を行い CDM 理事会に報告することになるものと考えられる。この点については第 7 回 CDM 理事会で OE の validation において新規方法論について CDM 理事会の審査を求める手続きが決定され、さらにその決定についての確認が3月 5 日に OE の信任パネルから示された。これによれば新規の方法論については、OE は記載内容が十分か否かを審査して、必要な書類が整っていれば OE は内容に関する審査は行わずに直ちに CDM 理事会に審査を求めることが確認された。また、新規方法論の審査を求めることが出来る OE は、すでに OE の信認に係る審査チームが選定され新規方法論の CDM 理事会に対する審査請求に係る書類の管理体制整備が確認された OE のみと規定された。

第1回の新規方法論の申請が締め切られ 15 件の申請があった。5 月 22,23 日に開催される方法論パネルで検討が行われ、6 月 7,8 日の CDM 理事会において議論された。なお、CDM

理事会により承認された方法論は、承認2件（ゴミ処理場で発生するメタンガスの回収、及びHFCの破壊）、条件付き承認5件、不承認8件、書式不備のため差し戻し1件となっている。

表 3-1 新規方法論申請リスト

方法論の名称	技術分野	提出OE	コメント
NM 0001 - "Vale do Rosario Bagasse Cogeneration (VRBC) Project" （ブラジル）	バイオマス熱電併給	TÜV	4 件
NM 0002 - "V&M do Brasil Fuel Switch Project"（ブラジル）	製鉄燃料転換	DNV	2件
NM 0003 - " Construction of new methanol production plant (called: M 5000) in the Republic of Trinidad and Tobago" （トリニダードトバコ）	アンモニア製造プラントから発生するCO2を利用したメタノール製造	TÜV	2 件
NM 0004 - " Salvador da Bahia Landfill Gas Project"（ブラジル）	廃棄物埋立処分場のメタンガス回収率向上及び焼却	DNV	2 件
NM 0005 - " NovaGerar landfill Gas to Energy Project"（ブラジル）	廃棄物埋立処分場のメタンガス回収・発電(発電についてはクレジットは請求せず)	DNV	0 件
NM 0006 - " Guatemala El Canada Hydoelectric Project" （グアテマラ）	水力発電	DNV	3 件
NM 0007 - " HFC Decomposition Project in Ulsan" (韓国)	HCFC22 の生産に際して副産物として生じる HFC23 の回収及び破壊	JQA	1 件
NM 0008 - "Peñas Blancas Hydroelectric Project" (コスタリカ)	水力発電	DNV	3 件
NM 0009 - AT Biopower Rice Husk Power Project in Thailand - Displacement of grid electricity （タイ）	バイオマス発電による系統電力の代替	DNV	2 件
NM 0010 - "Durban Landfill-gas-to-electricity project" （南アフリカ）	廃棄物処分場からのメタンガス回収強化及び発電	TÜV	1 件
NM 0011 - "26 MW Bagasse / Biomass based Cogeneration Power Project"（インド）	バイオマス発電	TÜV	7 件
NM 0012 - Wigton Wind Farm project	風力発電	SGS	2 件
NM 0013 - FELDA Lepar Hilir Palm Oil Mill	パームオイル工場嫌気性排水	中央	受付

Biogas Project in Malaysia （マレーシア）	処理装置から発生するメタンガス回収及び発電	青山	中
NM 0014 – AT Biopower Rice Husk Power Project in Thailand – Displacement of steam (タイ)	バイオマス発電による蒸気の代替	DNV	0 件
NM 0015 – AT Biopower Rice Husk Power Project in Thailand – Methane avoidance （タイ）	バイオマス発電によるメタンガス発生の抑制	DNV	1 件

注：TÜV は TÜV Süddeutschland Bau und Betrieb GmbH (TÜV Süddeutschland)
中央青山は ChuoAoyama PwC Sustainbility Research Institute Corporation. (formally, Chuo Sustainability Research Institute Co. Ltd. (CSRI))
JQA は Japan Quality Assurance Organisation (JQA)
DNV は Det Norsk Veritas Certification Ltd. (DNV Certification Ltd)

(2) 小規模 CDM に関する事項

下記の小規模 CDM については COP7 の Decision17 において、早急に立ち上げることが必要との判断から簡素化措置を講ずることが合意され、具体的な簡素化措置を COP8 で決めることが合意された。小規模 CDM の要件は以下のとおりである。

- 15MW 以下の再生可能エネルギープロジェクト
- 15GWh/年以下の省エネルギープロジェクト
- 15ktCO2/年以下の他のプロジェクト

これを受けて CDM 理事会は小規模 CDM パネル（通称 SSC Pane1 別添資料 5、SSC Panel TOR 参照）を設置した。小規模 CDM パネルは 2002 年 5 月から検討を開始し 2002 年 7 月に小規模 CDM に係る簡素化措置を CDM 理事会に報告した。その後、パブリックコメントの聴取手続きを経て、2002 年 10 月の第 6 回 CDM 理事会で検討され、COP8 において了承された。この報告に加えて既述の方法論パネルが作成した小規模 CDM 用の簡素化された PDD ガイドライン Ver.01 及びインディカティブな簡素化されたバースライン方法論及びモニタリング方法論が 1 月の CDM 理事会で承認され、一連の小規模 CDM に係る簡素化措置の内容は全て決定された。

なお、小規模 CDM の簡素化された措置の主要な内容は次のとおりである。

1) 手続きの簡素化

小規模 CDM の validation、verification 等の手続きは基本的には簡素化せずに通常の CDM と同じ手続きを要求される。唯一簡素化された点は、小規模 CDM に関しては CDM 理事会の承認なしに validation と verification を同一の OE に依頼できることとした点である。

2) ベースライン方法論

ベースライン方法論に関して、インディカティブリストに示された小規模 CDM については以下に示すバリアのうち 1 つ以上のバリアが存在することを証明すればプロジェクトは実施されないと見なすこととなった。

- 投資バリア:経済的に CDM プロジェクトケースよりもより魅力的なケースは、より多くの GHG 排出量をもたらすこと。(CDM プロジェクトケースは投資採算性が他のケースと比較して悪い。)
- 技術的バリア:CDM プロジェクトケースに比較して技術的に劣る技術が性能の不確実性や市場への浸透度の観点からリスクが小さく、これらの技術はより多くの GHG 排出量をもたらすこと。(CDM プロジェクトケースは技術的リスクが高い。)
- 普及している習慣によるバリア:普及している習慣や既存の規制、政策的要求がより GHG 排出量が多い技術の実施をもたらしていること。(CDM プロジェクトケースは習慣や規制により実施が阻害されていること。)
- その他:組織・体制面のバリア、情報入手・経営資源・組織の能力・資金調達力・技術の習得能力のバリア等のための、GHG 排出量が多いプロジェクトケース以外の活動が実施されること。

また、リーケージについては、小規模 CDM では原則として考慮する必要はないことになっているが、設備が他の場所から移設された場合(たとえば太陽光発電装置や風力発電装置が他の場所から移設されただけの場合には GHG 排出量の減少は生じない等)については考慮する必要がある。また、バイオマスプロジェクトについても、CDM のシンクプロジェクトの取り扱いが決まっていないためリーケージを考慮する必要がある。

3) インディカティブな簡素化されたバースライン方法論及びモニタリング方法論に記載されているプロジェクトタイプは以下のとおりである。

タイプⅠ:再生可能エネルギー

Ⅰ.A: Electricity Generation by the User

Ⅰ.B: Mechanical Energy for the User

Ⅰ.C: Thermal Energy for the User

Ⅰ.D: Electricity generation for a Grid

タイプⅡ:エネルギー効率改善(省エネルギー)

Ⅱ.A:Supply side energy efficiency improvement– transmission and distribution

Ⅱ.B:Supply side energy efficiency programs for specific technologies

Ⅱ.C:Demand side energy efficiency programs for specific technologies

Ⅱ.D:Energy efficiency and fuel switching measures for industrial facilities

Ⅱ.E:Energy efficiency and fuel switching measures for building

タイプⅢ:その他

Ⅲ.A：農業
Ⅲ.B：化石燃料の転換
Ⅲ.C：低 GHG 排出車による排出削減
Ⅲ.D：メタン回収

4) バンドリング及びデバンドリング

小規模 CDM では、小規模 CDM プロジェクトを複数束ねてプロジェクトデザイン、validation、verification 等の手続きを行うことを認めており、これをバンドリングと呼んでいる。このバンドリングの上限は、小規模プロジェクトの定義の範囲内に限定されている。一方、デバンドリングは小規模 CDM の定義を上回る規模の CDM プロジェクトを小さなプロジェクトに分割して小規模 CDM の規定を利用しようとするものである。これについては、次の 4 つのチェック項目が設けられ全ての項目に該当する場合はデバンドリングと認定され小規模 CDM の規定は適用されないこととなった。

- 同一のプロジェクト実施者
- 同一のプロジェクト分類及び技術
- 過去 2 年以内に登録されていること
- 最も接近しているプロジェクト境界が 1km 以内にある場合

小規模 CDM 用の PDD ガイドライン（SSC-PDD）は、方法論パネルが作成したが、その内容は次のとおりである。既述した PDD の内容と比較すると基本的な目次は同一であり、異なる点は Annex の内容が新規のベースライン方法論、モニタリング方法論、ベースラインデータの 3 項目が削除されたことである。これは、小規模 CDM については、インディカティブリストが作成されてベースライン及びモニタリング方法論が明記されているためである。

A: General description of project activity
B: Baseline methodology
C: Duration of the project activity/crediting period
D: Monitoring methodology and Plan
E: Calculation of GHG emissions by sources
F: Environmental impact
G: Stakeholders comments
Annexes
Annex1: Information on participants in the project activity
Annex2: Information regarding public funding

(3) オペレーショナルエンティティ（OE）の指定に関する事項

OE の指定については COP が行うことになっており、COP7 においては COP8 において最初の OE 指定を行うことになっていた。しかしながら COP8 までには OE 指定のための信認手続き

が間に合わなかったため、COP8 において暫定的に CDM 理事会が信認手続きを行った OE については暫定的にOE業務を行うことが認められた。OEの信認に関する事項は、CDM理事会のもとに設けられた信認パネルが検討を行っている。2002 年 9 月に信認パネルは OE の登録を京都議定書の付属書 A Sectors/sources に基づき下記のスコープごとに行うことを決めている。このスコープ作成を踏まえて、OE の申請受付は 2002 年 9 月から開始された。

信認パルは OE の審査業務を行う専門家を募集し、これらの専門家によるチーム（CDM-AT）により審査業務を実施している。また、信認の手順と基準として Procedural guidelines for accrediting operational entities by the executive board of the clean development mechanism を作成した。OE 申請者については第 7 回 CDM 理事会の決定に基づき名称と申請中のスコープを公表することとなり、2003 年 2 月 4 日から公表されている。これによれば現在申請中の OE は欧州が 4 法人、日本が 6 法人、韓国が 1 法人となっている。非付属書 I 国からの OE 申請は韓国企業が第 1 号である。非付属書 I 国の申請企業については OE 申請時点における申請料金（15,000 米国ドル）を 50%に割引き、信認が得られた時点で残りの 50%を支払うように特例措置が設けられている。OE 申請者は申請料金のほかにOEの事務所審査、審査現場の立会い審査等のたびに審査チームの旅行費用としてビジネスクラスの飛行機代及び 4 星クラスホテルの宿泊料を負担することになっている。

現在 OE 申請中の 11 法人の名称とスコープを以下に示す。

表 3-2 OE 申請中の法人リスト

法人名	所在地域	審査分野	パブリックコメント	方法論審査請求
TÜV Anlagentechnik GmbH	欧州	全分野	受付中	—
PricewaterhouseCoopers Certification B.V.	欧州	全分野	なし	OK
Korea Energy Management Corporation	韓国	1,4,5	1件	OK
BVQI Holdings Ltd.	欧州	全分野	なし	OK
SGS UK Ltd. (SGS = Société Générale de Surveillance)	欧州	全分野	なし	OK
Asahi & Co.	日本	全分野	なし	OK
Japan Consulting Institute (JCI)	日本	1,2,4,5,9,10,13	なし	OK
Tohmatsu Evaluation and Certification Organization (TECO)	日本	1,2,3,4,6,9,13	なし	OK
TÜV Süddeutschland Bau und Betrieb GmbH (TÜV Süddeutschland)	欧州	全分野	なし	OK
ChuoAoyama PwC Sustainbility Research	日本	1,2,3,7	なし	OK

Institute Corporation. (formally, Chuo Sustainability Research Institute Co. Ltd. (CSRI))				
Det Norsk Veritas Certification Ltd. (DNV Certification Ltd)	欧州	全分野	なし	OK
Japan Audit and Certification Organisation for Environment and Quality	日本	5 以外全分野	なし	OK
Japan Quality Assurance Organisation (JQA)	日本	1,4,5,8,9,11, 12,13	なし	OK

4)その他 CDM の実施に関する事項

CDM 理事会は第 6 回理事会において CDM プロジェクトの登録料を次のように定めている。

表 3-3 CDM プロジェクト登録費用

年間平均 CO^2 換算削減量	US$ ＊1
15,000 以下	5,000
15,000～50,000 以下	10,000
50,000～100,000 以下	15,000
100,000～200,000 以下	20,000
200,000 超	30,000

＊1:The registration fee paid will be deducted from the share of proceeds for administration due at issuance of CERs.

CDM 理事会は CDM 登録簿の作成準備を進めている。第8回 CDM 理事会において CDM プロジェクト登録に関する規定(別添資料 9 参照)を検討する予定となっている。

京都議定書批准国の CDM についてのナショナルオーソリティーの指定状況は次の表のとおりであり、ラテンアメリカ諸国の準備が進んでいる状況がうかがえる。

このように UNFCCC レベルでの GHG 排出削減プロジェクトに関する CDM のルール及び実施体制は概ね整備された状況にある。

表 3-4 ナショナルオーソリティーの指定状況

Country	Name of Organziation	Name of contact person
Argentina	Oficina argentina del Mecanismo para un Desarollo Limpio	
Bolivia	Programa Nacional de Cambios Climáticos – Oficina de Desarrollo Limpio	
Brazil	Comissão Interministerial de Mudança Global do Clima	Mr. Jose Domingos Gonzalez Miguez
Colombia	Ministerio del Medio Ambiente	
El Salvador	Ministerio del Medio Ambiente y Recursos Naturales	Mr. Mauricio Ayala
Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety	Mr. Franzjosef Schafhausen Mr. Thomas Forth
Morocco	Comité National MDP, Direction du Partenariat, de la Communication et de la Coopération	
The Netherlands	Ministry of Housing, Spatial Planning and the Environment	Mr. Pieter Van Geel
Nicaragua	Oficina Nacional de Desarrollo Limpio y Cambio Climático	
Peru	Consejo Nacional del Ambiente	Ms. Patricia Iturregui
Uruguay	Unidad de Cambio Climático (UCC)	

3.2 COP9

気候変動枠組条約第9回締約国会議(COP9)へ向けた非公式事前会合が 2003 年 10 月 6 日、COP9 議長に就任予定のハンガリーの主催によりローマで開催され、日本を含む 31 か国と EC が出席した。会合は 2003 年 12 月 1 日から 12 日までミラノで開催される予定の COP9 の閣僚級円卓会合の進め方について意見交換を行うことを目的としたものである。

閣僚級円卓会合で議長国ハンガリーの提案により、①気候変動、適応、緩和及び持続可能な開発、②技術、③評価の3つの議題を取り上げることが決まったほか、閣僚級円卓会合は交渉ではなく政治レベルでの自由な議論を促進する内容とすることが合意された。

また、意見交換の過程では、2013 年以降の温暖化対策の国際的制度のあり方が話題となり、中国が先進国と途上国の効果的参加が議論されるべきとの前向きの姿勢を示したほか、アルゼンチンも 2008 年から 2012 年までの京都議定書の第1約束期間終了後の制度のあり方について前向きな途上国を巻き込んだ形で開始すべきとの見方を表明した。京都議定書は「2005 年末までに議論を開始する」としているが、途上国の排出削減義務についての議論が出ることを警戒して、早期の議論開始に反対してきた背景がある。ただし今回の会合では産油国や一部の途上国が「先進国側がまず条約上の約束実施につき実績を示すべし」との従来の立場を繰り返す光景も依然として見られた。

COP9 では GEF の活動報告、各国の NC 報告、キャパシティビルディング・技術開発・技術移転に関する報告の以外に、植林・再植林活動等いわゆる吸収源 CDM の定義及び手続きの合意が最大の焦点と考えられている。特に再植林の基準年、非永続性、ベースライン、追加性、社会経済・環境影響の分析・評価等の論点に関しては各国から様々な提案が出ており、複数の選択肢を含む交渉用テキストが作成され、合意を目指すアプローチが予想されている。なお、吸収源 CDM については積極的に推進する立場の日本、カナダ、中南米諸国等と、慎重な EU 及び一部の途上国との対立がある中で、COP9 での合意に向けてなお多くの論点が残されている。

(1) COP9 に向けた植林・再植林に関する検討状況

植林等の吸収源 CDM の取扱いについては、2001 年 11 月の COP7 でのマラケシュ合意の中で、第1約束期間において新規植林及び再植林(afforestation and reforestation)を対象とすること、取得できるクレジットの上限を基準年排出量の 1%とすることが合意されたが、その定義や具体的な手続き(definition and modalities)については、更に SBSTA で検討し、2003 年 12 月の COP9 で採択のうえ、京都議定書の第1回締約国会合(COP/MOP1)で正式に決定することとされている。最近の動きと今後の予定は以下のとおり。

- 2003年1月　条約事務局がオプション・ペーパー公表
- 2月　ワークショップ(ブラジル)
- 3月　各国が吸収源 CDM の Annex 案を提出
- 4月　条約事務局が各国意見を踏まえ Annex のテキスト案作成
- 6月　SBSTA18(ドイツ)で協議
- 12月　COP9／SBSTA19で吸収源 CDM の Annex 案を採択予定

(1) 植林及び再植林に関する主要な論点(4 月時点のもの)

1) 定義

「森林」及び「新規植林」の定義について、国内吸収源と同様(注1)とすることがほぼ合意されている。一方、「再植林」の定義については、基準年(当該基準年の時点で森林で無かった

土地に植林することを再植林とする)を、途上国においては森林簿の情報が不足している等の理由で 1989 年末時点で森林であったか否かを判定することが困難であることから、基準年をより最近の年次(例えば 1999 年末)に変更すべきとするカナダ、日本、コロンビア等と、先進国の国内吸収源の定義と同様に 1989 年末とすべきとする途上国、EU を始めとする大多数の国との間で意見の相違がある。

(注1)マラケシュ合意における国内吸収源に係る定義は以下のとおり。

「森林」: ①最小面積0.05～1.0ha、②最小樹冠率10～30%、③成木の最小樹高2～5m をすべて上回るもの、「新規植林」:過去 50 年間森林でなかった土地を森林に転換する行為

2) 非永続性

非永続性の問題(CDM として植林・再植林された森林が、その後、山火事や伐採等により消失してしまった場合への対処の問題)は、吸収源 CDM 事業に特有の問題であり、既にマラケシュ合意でルールが決まっている排出削減型の CDM とは異なった扱いが必要となる。

非永続性への対処方法としては、①発行されるクレジット(CER)を有効期限付きのものとする方法(EU等が提案)、②将来の森林喪失に対して保険をかける方法(カナダが提案)の2つが有力な選択肢となっている。① のアプローチのみを認めるべきとする主張と、①、②の双方のアプローチを事業の実態にあわせて選択できるようにすべきとの主張があり、我が国は後者の立場。

3) その他(【 】内は我が国の主張)

① ベースライン

プロジェクトが無い場合の吸収量が基本。将来の社会経済的状況の変化やこれに伴う土地利用変化のシナリオ策定の必要性の有無について議論。【排出源 CDM と同様とすべきであり、将来の土地利用変化のシナリオ策定等の追加的な要件を課すべきでない】

② 追加性

ベースラインに対する炭素の追加的吸収を要件とするか、資金面、制度面、あるいは炭素吸収以外の環境面等の追加性を求めるかで議論がある。【排出源 CDM と同様の考え方で、ベースラインに対する炭素の追加的吸収とすべきであり、その他の追加的な要件を課すべきでない】

③ クレジット発生期間

排出源 CDM のクレジット発生期間よりも長いことが必要との意見が大勢であるが、具体的な年数には様々な意見がある。【① 20年、4回更新可(最大100年)、又は②50年、更新不可のいずれかを選択】

④ リーケージ

リーケージの計測対象範囲、リーケージが大きいと想定されるプロジェクトの取扱い等について議論。【排出源 CDM と同様に、プロジェクトに直接起因し、計測可能なもののみを対象とすべき。但し、排出量・吸収量の双方を考慮すべき。】

⑤ 社会経済的・環境的影響

排出源 CDM と同様にホスト国の判断事項とするか、新たにチェックリスト、ガイドライン等の国際的評価基準を作成するか。【環境影響に加え社会的・経済的影響も考慮することは可。但し、チェックリストや国際的基準は不要であり、ホスト国が判断すべき。】

(別記)

EU 提案(temporary CERs)

- シンク CDM プロジェクトで発生したクレジット(TCER)は、それが発行された約束期間における目標達成のためにのみ有効。従って、TCER は、発行された約束期間内に国の償却口座(retirement account)に移行され、次期約束期間への繰り越しは出来ない。
- TCER は発行後5年間で失効する。
- TCER が失効した後は、当該 TCER に相当する量の他のクレジット(AAU、CER、ERU 又は RMU)により補填されなければならない。
- また、TCER の失効に伴って、もとの森林が残っていれば、その炭素蓄積量に応じて、TCER を再発行することが出来る。

カナダの考え方(保険付CER)

- 保険アプローチとリスク管理アプローチを取る。
- 保険アプローチでは、伐採、火災等による森林の消失分の CER を、保険会社が京都クレジット(AAU、通常の CER 等)により補填する。
- リスク管理アプローチでは、プロジェクト参加者自身が組んだポートフォリオの中に、当該吸収源プロジェクト、他の吸収源プロジェクト、近隣の CDM プロジェクト等をコンポーネントとして配置し、当該吸収源 CDM プロジェクト起源の CER が消失した場合には、他のコンポーネント起源のクレジットで補填する。
- カナダは、TCER も認めつつ、選択肢の一つとして保険付 CER もあるとの立場。
- 主な手順

  -プロジェクト事業者は、OE に保険付 CER が有効であることを証明する文書を送付

  -OE は、保険付 CER を認証、CDM 理事会が保険付 CER を発行。

  -プロジェクト事業者は、森林の消失等があった時点で、OE に炭素の消失を連絡。OE は CDM 理事会に連絡。OE は、プロジェクト事業者の炭素消失量の計測報告

をもとに、炭素消失量を査定。
-炭素消失の連絡を受けたCDM 理事会は、当該CER の移転等を禁止。
-保険会社が当該 CER と同量のクレジットを補填。その後、CDM 理事会は当該CER を無効とする。

第 4 章　面談記録

4.1　日本大使館

2003 年 10 月 21 日（火）16 時～16 時 45 分
出席者：日本大使館　齊藤一等書記官
　　JICA 調査団　蔵方団長、下川団員、後藤団員、近藤団員、湯本団員、青山団員

調査団より対処方針資料に基づき本案件について説明を行い、次のようなコメントがあった。

フィリピン政府の京都議定書の批准はこの開発調査実施の必須条件となるのか、ODA の CDM プロジェクトへの利用についてはどのような状況か、パイロットプロジェクトはどのような内容を考えているか。CDM プロジェクトは発電セクターが中心であり、特にガス燃料転換の民間投資案件があるなど候補なのではないか。

これらに対し調査団より、京都議定書の批准は行われるべきと考えているが、CDM プロジェクトへの投資促進を主要な目的としている関係上、投資家への情報提供等は先行して実施しておく必要があるため、本開発調査開始の前提条件とまでは考えていないこと。ODA の利用については国際的な動向より考えると困難な状況であるが、まだ日本政府としては ODA を利用できるよう交渉を継続中であること。本開発調査内のパイロットプロジェクトについては、2 年間程度の調査期間内で実際の CDM プロジェクトをモニタリングまでを含めて完結させることは難しいことから、JICA や世銀の他案件（地方電化等）を実例に取るなどして実際のプロジェクトの形に近い形でケーススタディ（机上）を行うことを考えている旨を回答した。

4.2　JICA フィリピン事務所

2003 年 10 月 22 日（水）9 時 30 分～10 時
出席者：JICA フィリピン事務所　中垣所長、杉山所員
　　JICA 調査団　蔵方団長、下川団員、後藤団員、近藤団員、湯本団員、青山団員

調査団より対処方針資料に基づき説明ののち、事務所より以下のコメントがあった。

天然資源環境省（DENR）をはじめフィリピン政府機関全体の特徴として、法制度の整備は先行しているがその実行が不十分な点が多い。本案件も DENR が全体論を了解したとしても、調査の実施体制、方法等の段階で手詰まりになることがないよう注意すること。また局長クラスだけでなく次官クラスへの説明も行うべきであること。ASEAN 諸国での CDM キャパビルはどのように進める計画になっているのか。本案件が順調に進んだと仮定して、その後は何につながるのか。京都議定書の批准が遅れているのは何故か。本格調査の開始が想定される次年度の DENR の予算を確認しておく必要があるのではないか。他省庁との連携も良く考慮すること。

これらに対し調査団より、調査の実行段階で人材不足が露呈したエネルギー省電力キャパビル案件での経験もあり、DENR に対しても留意するようにしたいこと。ASEAN 諸国への CDM キャパビルについては、WSSD におけるタイプ2約束文書及び経済産業省の GAP スキームのもと、経済産業省

が NEDO、AOTS、JODC、JICA、JETRO 等の実施機関を活用しながら進めているところであり、フィリピンについては JICA を中心に準備を行っているところであること。本開発調査の次への繋がりについては、まずは民間投資が CDM プロジェクトへ流れてくることを期待する（JICA が直接 CDM プロジェクトを実施するものではない）こと、また JICA や世銀が実施している地方電化プロジェクトに関して CDM を適用できる可能性があること。フィリピン政府の京都議定書の批准が進まないのは、特に問題があって停滞しているわけではない（京都議定書は途上国に規制がかかるものではなく、投資への機会が増えるものと理解）と認識していることを伝えた。

4.3 国家経済開発庁（NEDA）

2003 年 10 月 22 日（水）11 時～11 時 45 分
出席者：Ms. Vioula C. Conde, Utility Staff, Development Specialist, Ms. Joanne Tolentino, Senior Development Specialist, Public Investment Staff, Ms. Fay Maruh, SEDS, AS-NRP
JICA 調査団　蔵方団長、下川団員、後藤団員、近藤団員、湯本団員、青山団員

調査団より訪問目的を説明ののち意見交換を実施した。なお、DENR-EMB との協議を受け、要請書が NEDA 宛てに提出されることとなるが、開発調査を開始するための前提条件となるため優先的に対応願いたい旨依頼した。意見交換の概要は以下のとおり。

- 京都議定書の批准については現在、上院にて審査中。DNA の指定は年末の予定。
- IACCC の運営は DENR が議長、DOST が共同議長を務めている。NEDA はメンバーで National/ Sectoral policy を担当している。
- ステアリングコミッティ（IACCC）には政策と技術の 2 つのワーキンググループがある。土地利用（吸収源分野）については IACCC にてワークショップがあった。
- CDM に関するキャパシティビルディングが必要である。IACCC/CCIC において project approval/ baseline study/ monitoring 等 CDM の技術的部分に関する一連のトレーニングがあるが、十分ではない。既存のキャパビルについては CCIC の Dr. Yap に尋ねるとよい。
- エネルギーセクターのうち、再生可能エネルギー分野が CDM の優先分野と考えている。
- UNDP/ World Bank/ ADB から支援を受けている。
- Sustainable Development の指標については Enhancing Philippines Challenge to 21（アジェンダ 21）にある goal elements を改定中である。
- NEDA はすべての ODA に責任を有しており、ODA の CDM プロジェクトへの流用（ダイバージョン）に関心を持っている。ODA investment と CDM の関係及び日本政府の stance はどうか。CDM には排出・環境・投資上の追加性要件がある一方、CER という将来価値が生じる。ODA ダイバージョンに必ずしも反対しない。これに対し調査団より、CDM プロジェクトに対する ODA ダイバージョンの共通認識は必ずしもできていないが、ODA による CDM キャパシティビルディングは認められているとの回答した。

（入手資料）
・Agenda21

4.4 天然資源環境省環境管理局(DENR-EMB)

2003 年 10 月 22 日(水)14 時～15 時
出席者:Ms. Joyceline A. Goco, Chief, EMB、大田 JICA 専門家(環境政策)
JICA 調査団 蔵方団長、下川団員、後藤団員、近藤団員、湯本団員、青山団員

予め用意しておいた質問票に沿って、以下の点につき確認した。

- 京都議定書の批准について、昨日(10 月 21 日)上院の第2ヒアリングを終了し、次週にも上院で承認される目処が立った。
- CDMプロジェクトの承認制度について、承認制度及び作業枠組を含めたDNA設立に関する提案しているところであり、正式には DAO(Department Administrative Order)(大領領命令(Presidential Administration Order)?)の発行という形で決定される。DNA の主な管轄組織としてDENRが事務局を務めることになるが、メンバーはその他関係機関も含めて構成される。個別の CDM プロジェクトの承認にあたっては、IACCC の場(関連省庁や NGO 等が参加)でレビューを行ったのち、DNA であるDENR が承認(押印)する形態が想定されている。
- DNA 設立にあたっては、UNDP(オランダ資金)の支援(フェーズ 1)を受けることになっているとのことであり、プロジェクトのプロポーザルが提供された。
- IACCC について、DENR の他、DOE、民間セクター、貿易促進・運輸・通信セクター、NGO 等様々な組織から構成されており、事務局、議長の他、エネルギー・森林の 2 つの技術委員会(technical committee)が存在する。
- 最近の活動について、CCIC を通して、UNEP の援助の下、能力開発プロジェクトとして、中央・地方政府の職員、DNB・DUB・SGS などのローカル・カウンターパート、開発銀行職員に対して、CDM の知識啓蒙から PDD や持続可能な開発など技術的事項まで様々な研修を提供している(研修の詳細はCCICのパンフレット参照のこと)。関係省庁のハイレベルの人材に対するブリーフィングも実施した。また、UNDP と協力して CDM 能力開発に係る調査も進めている。
- CDM の専門家はフィリピンにはあまりいないとしながらも、専門家のリストを提供するとの発言があった。OE(Operational Entity)に関してフィリピンにはローカルな OE はないが、国際的な監査法人のローカルパートナーがいる。
- GHGインベントリーはIACCCの事務局において協議及びデータ収集が行われているが、データ収集の状況はあまりスムーズではない。(どのようなデータを収集すべきであるかを取りまとめ、ディスクを配布してデータ入手に務めているとのこと。この作業のレファレンスマニュアルを作成している) UNDP-GEF の支援の下、GHG インベントリーのデータ収集のマニュアルを作成するなど、National Communication の開発が進められている。GHG 排出係数のうち、農業セクターのみローカルデータを整備したところである。レファレンスマニュアル及び収集したデータを後ほど提供するとのことであった。
- DENR-EMB にはCDMの専門官は2名であり、今後順次増員してきたい。DENR におけるCDMの責任者はメティン次官とのことである。
- CDM プロジェクトの可能性の高いセクターについて、エネルギー(特に再生可能エネルギー、省エネルギープロジェクト)やLULUCF(土地利用・林業)のプロジェクトが考えられる。LULUCFのプロジェクトについては COP9 の結果を待っているところである。なお、フィリピンにおけるCDM プロジェクトとしては世銀 PCF の間で、風力1件・コジェネレーション2件について実施の合意(Letter of no objection を発行)があり、Carbon Neutral Fund とピコ水力案件の協議を行って

いる。

- 最近のドナーの支援について、上記（UNEP、UNDP、オランダ）の支援の他、世銀によるピコ水力・風力発電など、カーボンニュートラルプログラムや CDM と再生可能エネルギー分野を併せたプロジェクトなどがある。また、ASEAN 国との協力として、ベトナムと能力開発プログラムや GHG 緩和のプロトタイプ・プログラムを実施している。
- JICA には、DENR 及び関係機関、地方政府における CDM に関する能力開発、専門家育成の支援を期待している。特に、アカウンティングや CDM のモニタリング・評価、PDD 等の技術的事項についてお願いしたい。また、エネルギーなどの小規模プロジェクトを活用したプロトタイプ・プロジェクトを通した CDM 実施プロセス及びベースライン手法等の技術移転を期待している。

4.5 日本貿易振興会（JETRO）マニラセンター

2003 年 10 月 22 日（水）16 時～16 時 45 分
出席者：奥村所員
JICA 調査団 蔵方団長、下川団員、青山団員

調査団より訪問の目的を説明し、意見交換を行った。

- 前回の JICA 調査団（2003 年 8 月）以降、目新しい動きはない。
- 2004 年 5 月頃大統領選の予定があり、大統領が変われば行政トップも変わる。それまでに本件 JICA 調査を先方と合意することはよい。
- DENR-EMB のアマドール局長は大臣に直接話せる人物で次官クラスでなくとも特に問題はない。
- 他のアジア諸国での CDM キャパビルの状況はどうなのかとの問いに対し、アジア諸国に対する JICA の CDM キャパビルの開発調査はフィリピンが初めてであると調査団より説明した。

4.6 国際協力銀行（JBIC）マニラ駐在員事務所

2003 年 10 月 22 日（水）16 時～16 時 45 分
出席者：近藤駐在員
JICA 調査団 後藤団員、近藤団員、湯本団員

JICA より対処方針資料に基づき概要を説明するとともに、意見交換を行った。

- JBIC マニラ事務所としても、現地にてドナー等の実施する CDM セミナーに参加し、情報収集を行っているところである。
- CDM キャパビルを行うのは重要だが、果たしてフィリピンにおいて排出権に関わる具体的な案件があるのか疑問である。フィリピンは資源が少ない上、インフラが未整備な為に民間投資のインセンティブが低い。（それに対して、調査団から小規模発電や地方電化に絡めて具体的案件も検討したい旨説明した。） CDM プロジェクトの基幹となる投資環境そのものの課題も重要だと考える。

- 日本企業のフィリピンに対する投資額は減少傾向にあるが、フィリピン政府の説明によるとこれまでインフラ型の投資であったものが、ソフト型(コールセンター等)に変化しているものであり、雇用創出の観点では変化はないとのことである。
- 日本企業との調整を行っているのか。(今回の調査団では日本企業と面談する予定はないが、日本において経済産業省フィリピンエネルギータスクフォース、DOEキャパシティ・ビルディングに関する開発調査等を通して日本企業の意見もヒアリングしており、今後は CDM についても意見聴取したいと説明した)
- JICA と METI にて 11 月 5, 6 日にマニラで開催する、投資促進セミナーへの招待状を JBIC へ送付することとした。また、CDM についての情報交換を適宜行うこととした。

4.7 気象水文庁(PAGASA)

2003 年 10 月 23 日(木)8 時～9 時

出席者:Dr. Flaviana Hilario, Supervising Weather Specialist, Ms. Edna Juanillo, Supervising Weather Specialist, Dr. Aida M. Jose, Chief, Climatology Branch, Ms. Lourdes V. Tibig, Supervising Weather Specialist, Mr. Nathaniel A. Cruz, Supervising Weather Specialist, Ms. Charmie A. Monteverde, Jr. Weather Specialist
JICA 調査団　蔵方団長、下川団員、後藤団員、近藤団員、湯本団員、青山団員

調査団より訪問目的を説明ののち、質問票に基づき意見交換を行った。

- PAGASA はフィリピンを代表して IPCC の活動に参加しており、COP の SBSTA(Subsidiary Body for Scientific and Technological Advice)にも参加している。また以前は UNFCCC のフォーカルポイントでもあった。現在は IACCC の副議長(PABASA が所属する DOST が副議長をしている。)をしている。このように PAGASA は地球温暖化の科学的な側面を担当している。
- 温暖化問題にかかる活動としては、米国の支援(country study)を受けて 1994 年の GHG インベントリー(第 1 回ナショナルコミュニケーション)を作成し、アップデート作業も行っている。現在、第 2 回ナショナルコミュニケーションの作成・提出を準備中である。(第 1 回ナショナルコミュニケーションは CCIC がとりまとめを担当した。第 2 回ナショナルコミュニケーションの作成責任機関は未定であるが、IACCC になるのではないか。)
- これまでに climate change information monitoring system, エルニーニョアセスメント、mitigation and adaptation assessment of agriculture 等を行うとともに、温暖化問題にかかるワークショップの開催、ポスターの作成等も行っている。各省が作成する温暖化対策に関する分野ごとの分析について技術支援を行っており、予算(ドナー援助)があれば分野ごとの分析の統合化及びより詳細な分析を行いたい。
- フィリピンにおいて最も懸念している温暖化問題は、エルニーニョ発生に対する影響である。エルニーニョは水資源、水力発電等に大きな影響を与える。温暖化がエルニーニョ発生に与える影響については調査研究報告を作成しているが、今後予算があれば簡単な冊子等も作成したい。
- PAGASA は 1990 年に風力・太陽エネルギーマッピングの第 1 回アセスメントを行った。風力発電等を開発しようとする企業等は PAGASA に風況データや日照データを求めてくる。(全国にある 60 箇所程度の気象台よりデータを入手している)

- フィリピンにおける再生可能エネルギーの中では、水力発電が最も有望なエネルギーと考えている。
- 予算が少ないため小規模ではあるが、GIS ベースの気候変動情報モニタリングシステム（降雨量、風況、日射、災害等）の開発を行っている。
- PAGASA は、JICA のナショナルインベントリー研修コース、気候変動研修コースに職員を参加させている。
- ASEAN 諸国との間で LULUCF の研究を行っている。

4.8 天然資源環境省環境管理局（DENR-EMB）

2003 年 10 月 23 日（木）9 時 45 分～11 時
出席者：Ms. Joyceline A. Goco, Chief, EMB, Mr. Julian D. Amador, Director, EMB（表敬のみ）
JICA 調査団　蔵方団長、下川団員、後藤団員、近藤団員、湯本団員、青山団員

EMB のアマドール局長に対し、本案件形成への協力を求めるとともに要請書（アプリケーションフォーム）の日本政府への早期提出を依頼し、了解された。

ゴコ氏との協議においては、昨日の協議を受け、調査団により作成した本格調査フロー案およびその ToR 案について説明し、協議を実施した。その結果、
- DNA の設立～運営支援までは UNDP 事業として行う。
- CDM プロジェクトへの投資促進は JICA が担当する。
- UNDP 事業が 2003 年 11 月～2004 年 7 月まで実施されることから、早ければ 2004 年春より始まる JICA 事業へ、UNDP 事業のアウトプットを反映させることが望ましい。

等について合意したため、M/M、本格調査フロー案、ToR 案を調査団にて修正した上、明日に再度協議を行うこととした。
M/M の署名者はメティン DENR 次官とする方向で調整を行うことに合意した。また、本格調査が始まる際には JICA 調査団に対する便宜供与（執務スペース提供等）が必要であることを了解された。

（入手資料）
- Tracking GHG, A Guide for Country Inventories
- CDM パンフレット
- CCIC 活動概要説明資料
- UNDP フェーズ 1 資料
- プロポーザル（カーボンアカウンティングキャパシティビルディング）
- Recommendations for Institutionalizing the GHG Inventory Process, Institutionalizing the Philippine GHG Inventory Process

4.9 公共事業道路省(DPWH)

2003 年 10 月 23 日(木)13 時 30 分～14 時 15 分
出席者:Ms. Linda M. Templo, Director III, Planning Service, Ms. Becky Garsuta, Engineer, Ms. Charlene B. Blando, Engineer III, EIA Project Office、池田 裕二道路計画管理専門家
JICA 調査団 蔵方団長、下川団員、後藤団員、近藤団員、湯本団員、青山団員

調査団より訪問の目的を説明ののち、質問票に基づき意見交換を実施した。

- DPWH は道路建設を主な事業としており、運輸交通部門は DOTC(運輸交通省)の所管となる。ただしマニラ地域レベルの運輸交通部門は MMDA の所管となっている。
- DPWH は IACCC のメンバーであるが、担当者が本日不在であるため、IACCC における DPWH の役割については説明できない。次週の月曜日までに E メールにて回答書を送付したい。

4.10 国連開発計画(UNDP)、DENR-EMB

2003 年 10 月 24 日(金)9 時～9 時 45 分
出席者:Ms. Amelia D. Supetran, Portfolio Manager, Environment, Ms. Imee F. Manal, Programee Manager, Climate Change, Ms. Michiko Suga, Partnerships Advisor
Ms. Joyceline A. Goco, Chief, DENR-EMB
JICA 調査団 蔵方団長、下川団員、後藤団員、近藤団員、湯本団員、青山団員

調査団より調査概要を説明ののち、協議を実施した。概要は以下のとおり。

- UNDP 事業(フェーズ 1)は、2003 年 11 月より 9 ヶ月の期間で実施すべく、今週オランダ大使館と契約を締結したところである。
- フェーズ 1 に含まれるものは、DNA の設立と、DNA の運用枠組みの 2 つである。いかに円滑な CDM プロジェクトの実施体制を構築するかがテーマである。フェーズ 1 には各種ガイドラインの作成も含んでおり、JICA のプロポーザルとは一部重複するかも知れない。ただし、JICA の作成しようとするガイドラインが投資促進の観点に特化しているのであれば問題ないだろう。
- JICA プロポーザルには小規模 CDM プロジェクトの促進のためにケーススタディを行うとなっているが、UNDP 等では小規模な事業に対して無償協力を実施しているので、題材として連携が図れるのではないか。
- 投資家は何を望んでいるのか、の問いに対し、本格調査の中で調査しながら検討すると回答した。アジア諸国の中でより魅力のあることを示す必要性について同意した。また METI のヘルプデスクに寄せられた日本企業からの問い合わせによると、CDM 承認にかかる手続きが不明瞭であることが問題と考えている企業が多いと回答した。(11 月 5、6 日の JICA、METI 共同開催のエネルギー分野投資促進セミナーにて、日本企業の投資に関する要望の発表があるため、この招待状を送付することとした)
- JICA プロポーザルにおいて、最初のアウトプットである「CDM プロジェクト投資促進ポリシー作成」までどれくらいの時間が必要か、の問いに対し、UNDP 事業(フェーズ 1)の仕上がり次第で変わるが半年は必要であると考えている旨回答した。なお、UNDP 事業(フェーズ 1)のアウトプ

ットが最終的に出るのを待つのではなく、進行状況について適宜情報交換を行いながら JICA 開発調査の準備を進めていくことについて、これは望ましい進め方であるとして合意された。

- フェーズ 2 については、オランダ大使館の予算にて CDM にかかる人材育成を主に行うことを検討していたが、今のところ実施については白紙の状態である。また、Danida（デンマーク援助庁）が興味があるとして DENR に接触してきている、とのことである。

4.11 天然資源環境省森林管理局（DENR-FMB）

2003 年 10 月 24 日（金）11 時～11 時 45 分
出席者：Mr. Romeo Acosta, Director, Mr. Sofio Quintana, Mr. Arvie Tirso G. Caancan, Senior Forest Management Specialist, Mr. Shoshi TANAKA, JICA Forestry Expert
JICA 調査団　蔵方団長、下川団員、後藤団員、湯本団員

調査団より訪問の目的を説明したのち、質問票に基づき意見交換を行った。

- DENR-FMB は CDM に関して DENR-EMB と協力して取り組んでいる。植林に関する具体的な CDM 案件はなく、CDM にかかる専門家は非常にわずかしかいない。このため、今後 CDM にかかる研修が必要である。フィリピンにおいて CDM は非常に新しいテーマであり、国レベルから地方レベルにいたるまでのオリエンテーションを行う必要がある。
- CDM の新規植林・再植林にかかるルール作成に関しては、フィリピンは 1989 年の土地利用のデータを有しているため、1989 年を基準年とする案を支持している。
- CDM に植林によるシンクを含めることについて、NGO の中に批判する声もある。このような批判はあまり強いものではないが。
- フィリピンでは多数の植林事業があるが、どれが CDM に該当するのか検討が必要である。植林事業には商業植林と自然保護のための植林事業があるが、伐採を行わない保護植林がシンクという意味では CDM プロジェクトに適しているのではないか。
- 植林の分野には、デンドロ（廃材か？）サーマル発電のようにエネルギー分野との境界領域の分野もある。
- CDM に関する研修については、CDM に特化した研修ではないが JICA の森林管理に関する研修に DENR-FMB から参加している。2 日前には、熱帯雨林と気候変動に関するワークショップがありこれにも参加した。ADB がフィリピンの植林による温暖化防止ポテンシャルの調査を実施した。（コンサルタント 8 人月の小規模な調査）温室効果ガスインベントリーに関する研修ワークショップにも DENR-FMB は参加している。
- 質問票に対する回答は各担当者からの回答を集めて後日送付するとのことであった。

4.12 科学技術省 産業技術開発研究所（DOST-ITDI）

2003 年 10 月 24 日（金）10 時 30 分～12 時
出席者：Dr. Alice B. Herrera, Fuels and Energy Division, Ms. Suzita S. Oredina, Environmental

Division, Dr. Doris O. Tenorio, Environmental Division
JICA 調査団　近藤団員、青山団員

調査団より訪問の目的について説明し、意見交換を行った。

- IACCC において、共同議長としてーディネーション業務を行うと共に、エネルギーや環境などの専門的知見からプロジェクトの評価を行っている。DOST の下部機関である PAGASA も IACCC のメンバーの一員である。また、DOST では産業別あるいは Solid（固形）別に基づいたエネルギー研究やクリーンエネルギーや排水などの環境に関する研究を行っている。DOET-ITDI は燃焼分野に強く排出係数の評価を実施している。GHG インベントリーについては、PAGASA がデータ収集し、DOST-ITDI はその評価・研究に関わっているのみである。
- CDM プロジェクトの可能性について、発電（特に再生可能エネルギー）や電力効率などのエネルギーセクターが挙げられた他、環境セクターとしてバイオガスなどの waste エネルギーが挙げられた。但し、DOST として優先する分野があるわけではない。
- CDM プロジェクト推進の障害として、手続き（プロジェクト評価）における資金不足がある。またキャパシティ不足も障害となっており、特にプロジェクトの評価やベースライン方法、フィリピンで適用すべき新技術などの能力開発が必要だと感じている。
- GHG 排出の関連機関としては PAGASA が紹介された。PAGASA から提供されるデータは IACCC で取りまとめられ、CCIC でデータ化及び出版されている。また CCIC ではデータ収集に関するセミナーが開催された。
- UNIDO の CDM ケーススタディについて、セメント/鉄鋼産業などのエネルギーセクターについての調査が行われ、その後 UNEP によって調査が継続されたとして、レポートを後日提供するとのことであった。
- 2003 年 10 月末に日本の ICETT(国際環境技術移転研究センター)のセミナーを受ける予定である。過去にも JICA（ICETT）の研修や世銀、UNIDO、COP のセミナーに参加した経験がある。
- CDM の優先分野については、エネルギー分野ではエネルギー効率の改善、再生可能エネルギー、廃棄物のメタン回収、産業分野ではセメント、製鉄、セラミック等がある。
- 産業分野の GHG 排出係数については ITDI が収集し、DOST の PAGASA が算出を担当する体制となっている。
- IACCC/CCIC では GHG インベントリーをアップデートするため、Tracking GHG なるブックレットを作成し、各省庁から GHG 関連データを吸い上げる体制の構築を図っている。
- ミンダナオで 10MW の風力発電プロジェクトがあるが、CDM プロジェクト化する予定はない。民間企業は CDM の良さを知らないのではないか。

（入手資料）

- Gerlap プロジェクト概要パンフレット（UNEP 支援）
- UNIDO 調査レポート

4.13 運輸通信省（DOTC）

2003 年 10 月 24 日（金）13 時 50 分～15 時
出席者：Ms. Dolores G. Pna, Supervising, Transportation Planning Service（Patdu Director の代理），

Mr. Gerazon R. Jayson, 笹嶋 JICA 専門家(総合交通政策アドバイザ)
JICA 調査団 近藤団員、青山団員

調査団より訪問目的を説明ののち、意見交換を行った。

- DOTC は IACCC の定例会に参加している。
- 交通セクターは大気汚染物質(NOx、SPM 等)の排出量の7割を占めている。自動車からの排出(GHG を含む)を IACCC に報告している。マニラ首都圏には 130 万台の自動車があり、中古エンジンの割合が多く、適切なメンテナンスが行われていない。さらにツーストロークのバイクも多い。
- DOTC では自動車の燃料転換(CNG、LNG、電気、CME:ココナツメチルエステル)を重要な政策課題として掲げている。自動車からのモーダルシフト(MRT/LRT)の長期計画を推進しているが、資金不足が課題となっている。
- CDMの障害としては事業資金の不足、承認手続きの煩雑さ、さらにCDMを準備するためのノウハウ、専門人材が少ない。
- 交通セクターの排出係数は持ち合せていないが、交通量のデータを IACCC に提供し、CCIC にて GHG を算出している。

(入手資料)
・質問票への回答

4.14 オランダ大使館(Royal Embassy of Netherlands)

2003 年 10 月 24 日(金)16 時 15 分～17 時 45 分
出席者:Mr. Jan Willem Cools, First Secretary, Forests & Environment, Mr. Ariel I. Jayme, Project Officer
JICA 調査団 蔵方団長、下川団員、後藤団員、湯本団員
(近藤団員、青山団員は途中まで参加)

調査団より訪問目的を説明ののち、意見交換を実施した。

- オランダ外務省は最近フィリピンを援助対象国リストから除外した。このため、オランダの ODA 資金による CDM にかかる UNDP を通じた技術協力はフェーズ 1 のみで終了し、フェーズ 2 について支援を継続する可能性はなくなった。このため日本が引き続き CDM キャパビルを支援することはフィリピンにとって良いことである。
- フィリピンからの当初の援助要請は非常に大規模なものであったが、フィリピン側の準備状況について見極めながら支援すべきと考えてフェーズを2つに分けた。いくら人材育成してもその人材が CDM 以外の分野で働くことになっては意味がない。今回行う支援は UNDP を通じて DNA 設立を支援するものである。この第 1 段階の支援(DNA 設立支援)については、本日 UNDP との契約が結ばれた。
- フィリピンの IACCC については本当にワークするかどうか強い懸念を有している。NGO も IACCC のメンバーに入っており、このようなマルチステークホールダー参加型の組織はうまくワークしないのではないか。

- JICA の支援はオランダ政府が UNDP を通じて行う DNA 設立支援を前提としているが、これがうまく行く保証はない。オペレーショナルフレームワークがどの程度のものが出来るのか見極めたほうが良い。JICA が UNDP の DNA 設立支援にも参加するといったことも考えられないか。
- ファイナンスについては、Development Bank が CDM ユニットを設立している。その責任者は、Assistant vice president の Mr. Reey Guaian である。
- ワークショップについては CCIC がマニラで各種ワークショップを実施しており、JICA がワークショップを行う際には CCIC とも良く連携したほうが良いと思う。ミンダナオやビサヤスでもワークショップ開催にニーズはある。
- NGO の中には CDM に批判的な声がある。実際、フィリピンから排出権を買い取るだけで自分の利益だけを考えているのではないかとの批判をオランダは受けたことがある。
- CDM に関して来週、英国の調査団がフィリピンに来るとの情報がある。
- ADB の CDM Facility については、オランダは世銀 PCF のように投資家とプロジェクト実施者の中間で各種アレンジメントをすることを期待して提案したが ADB は乗り気でなく、何のレスポンスもなかった。その後、2003 年 9 月にマニラで開催された IETA 等の CDM ワークショップ（4 月の予定を延期したもの）において突然に構想を打ち出した。これにはオランダはなんら関与していない。ADB は CDM プロジェクトの交渉を行うような体制が出来ていないのではないか。（能力に疑問がある。）
- オランダ環境省は排出権を世界中から買うことにしているが、オランダ外務省の ODA はこの活動とは一切かかわらないように厳格に線引きをして活動している。

4.15 貿易産業省投資委員会（DTI-BOI）

2003 年 10 月 24 日（金）17 時～18 時 10 分

出席者 E.C. Hernandez 産業計画 Executive Director、F.A.Vistal 投資促進 Executive Director、E.F.Arcellana 産業政策 Director
JICA 調査団 近藤団員、青山団員

調査団より訪問目的を説明ののち、意見交換を行った。

- 産業セクターに CDM 関連情報をフィードバックするため、IACCC のメンバーとしてマネジメント小委員会の活動に参加している。これまで IACCC/CCIC 主催の CDM プレゼンテーションを受けている。
- BOI は産業育成の政策／計画の策定を担当し、優先投資計画を毎年出している。CDM プロジェクト促進の優先分野として、DOE を支援して再生可能エネルギー分野における投資計画も作成している。
- フィリピン国は交通セクター（自動車）からの排出（NOx、SPM 並びに CO2）抑制が緊急課題で、天然ガス車の導入促進を図るため、輸入関税の大幅な削減策を打ち出している。
- BOI 登録／IACCC 承認のバガス発電案件を世銀に申請している。
- 京都議定書については 2003 年 10 月 22 日に上院を通過し間もなく批准するため、今後の CDM 推進の課題は様々なステークホルダーへの啓蒙活動、さらに案件準備のための手続き上の対応能力の強化、ガイドラインの整備が課題である。
- BOI では産業振興の主な政策手段として income tax（所得税）の優遇策（低減）があるが、政府

補助金等の財政手段は予算確保の面から難しい。
- IACCC の活動を通じて JICA、PCF やオランダ政府、UNDP/UNEP 等の支援による CDM 関連の能力強化プログラムに参加している。
- NEDO/JETRO に GAP の優先案件を提供している。
- フィリピン開発銀行では様々な環境改善事業に対して優遇金利を適用している。
- JICA 調査ではASEAN 諸国におけるCDMの取組を情報収集し、調和の取れたCDM 推進基準(策)を作って頂きたい。

(入手資料)
- 2003 年優先投資計画パンフレット
- 質問票への回答

4.16 アジア開発銀行(ADB)

2003 年 10 月 27 日(月)10 時～11 時 45 分
出席者:Mr. Ashok Sarkar、Energy Specialist, Finance and Information Division, Regional and Sustainable Development Department,
JICA 調査団 蔵方団長、後藤団員、近藤団員、湯本団員、青山団員

調査団より訪問目的を説明ののち、質問票に従い意見交換を実施した。
- ADB は本年 8 月に CDM Facility を設立した。この CDM Facility は、当初 3 年間は ADB が融資するプロジェクトで CDM に該当するプロジェクト(約 40 プロジェクトをリストアップ)を対象に、CER の売り手(途上国)と買い手(日本等先進国)の取引の促進を図る計画であり、将来は ADB の融資案件以外にも拡大していく構想である。この facility は世銀の PCF と異なり、自らCDM 投資を行うものではなく、売り手と買い手の仲介を行うものである。従って、買い手は自分の意思でCDMプロジェクトを選び、投資についてもPDDの作成段階から投資するか、CERが発生した時点で CER を買い取るかといった選択をすることが出来る。
- ADB はアジアの途上国に融資をしており、CER の売り手国とは非常に強い関係を有している。現在は、日本、カナダ、欧州の買い手国を訪問して、有望な買い手を捜しているところである。有望な買い手を20～25機関ほどコアグループとして特定し、年会費1万ドルで優先的にプロジェクト情報(プロジェクト・アイディア・ノート等)を提供することを考えている。
- 現在、operational guideline を作成中であり、年内にこれを完成させ、来年の第 1 四半期には買い手のコアグループを組織化したいと考えている。
- 組織の専属スタッフは少人数であるが、実際の業務では ADB の各部門が参加するため十分なスタッフを動員できる。具体的な業務は、ADB がプロジェクトを行う際に作成する Project Preparatory Technical Assistance (PPTA)の中に CDM のプロジェクトデザインに必要な内容を盛り込むことにより、CDM プロジェクトデザインを行う。PDD を OE にバリデーションしてもらい、CDM 理事会に登録する。このように通常の融資案件の業務のなかに CDM プロジェクトデザインの内容を盛り込むこと等により追加的な費用を抑制することが出来る。活動内容にはキャパシティビルディングは含まれていないので、JICA のキャパシティビルディングと連携していくことが出来る。

- この CDM Facility に特に関心を有している途上国は、インド、スリランカ、中国、ベトナム、インドネシア、フィリピンである。
- ADB の REACH プログラムは小規模な再生可能エネルギープロジェクトの CDM 化に関するプレフィージビリティスタディを行っている。REACH ではオランダがプレフィージビリティスタディ、デンマークが再生可能エネルギー、カナダが小規模国に関する支援を行っている。この REACH で特定されたプロジェクトも CDM Facility の対象事業となる。REACH では、各国ごとに 3 人の専門家(national technical experts)を選定しており、彼らが FS を実施している。フィリピン及びインドネシアの専門家リストを提供する。
- フィリピンは 9 月に ADB と IETA(International Emission Trading Association)が共催したマニラでの CDM ワークショップ(Southeast Asia Forum)において 20 件ほどのプロジェクトアイディアノートを提出していた。この情報は IETA のホームページに載っている。

(入手資料)
- CDM Facility 説明資料、パンフレット、コメント要望用資料
- PREGA プログラムの現地専門家リスト

4.17 エネルギー省(DOE)

2003 年 10 月 27 日(月)15 時 20 分～16 時
出席者:C.C. Del Callar Undersecretary、他 1 名、L.C. Fernandez、M.S. Lagang、他1名、玉川 JICA 専門家
JICA 調査団 蔵方団長、後藤団員、近藤団員、湯本団員、青山団員

調査団より本格調査の概要を説明ののち、意見交換を実施した。
- アテネオ大学の CCIC は Experts center for Asian countries の役割を果たせる組織で、アセアンにおける CDM センター役割を果たせる。
- L.C. Fernandez はアセアン 10 カ国の 2004 年～2009 年までのエネルギー戦略枠組みとなる Asian Energy Plan for Action のチェアマンをしており、CDM はエネルギー戦略の実現のための手段である。Action Plan はアセアン諸国の今後 5 年から 10 年間の戦略に影響を与えうる。CDM パートに関し、L.C. Fernandez は CCIC から支援を受けている。
- (京都議定書の批准を踏まえ)フィリピン国では DNA 設立自体は簡単なことで、課題は如何に具体的な CDM 事業を推進することである。アセアン諸国の再生可能エネルギーに影響を与えられるのは CCIC で、ただ、CCIC は事業実施のノウハウを知らず、ウェブサイトを通じた情報流通、NGO への情報提供のみである。
- 2004 年 6 月にアセアン 10+3(日本(METI)、韓国、中国)のエネルギー大臣会議が予定されている。今後 5 年間のアセアン諸国のエネルギー政策に大きな影響を与えうる会議である。会議ではアセアン 10 の会合、アセアン 10+3 の会合が予定され、本件 JICA 調査も UNDP 支援の DNA 設立を当てにせず、大臣会議に合わせればよい。
- DOE は事業実施という CDM の次のステージ、すなわち、資金手当と事業実施に向け進んでいる。
- DNA 指定＋データベース等の情報整備は IACCC/CCIC に任せればよい。

- 現状では比国のCDM事業はエネルギー案件がほとんどであるが、アセアン諸国のニーズは異なる可能性がある。CDM に関する情報整備は比国では簡単にできると考えるが、やるならアセアン10を対象とするのも一案である。
- 世銀PCFやオランダCERUPTの経験から比国に必要なのは、DNAの承認オペレーション、国際的に通用する共通の申請手続き(フォーム)の早期確立である。
- DOEでは5件のCDM事業を今すぐ実施したいところである。
- UNDP支援のDNA設立に9カ月もかかるのでは時間のかけすぎで効率が悪い。
- 日本フィリピンエネルギータスクフォースの活用も考えられる。

4.18 天然資源環境省(DENR)

2003年10月27日(月)17時30分～18時
出席者:Mr. Rolando L. Metin, undersecretary, Ms. Joyseline Goco, chief, EMB
JICA調査団 蔵方団長、後藤団員、近藤団員、湯本団員、青山団員

ゴコ氏と協議済みの協議録や本格調査のフロー案、ToR 案についてメティン次官に説明し、内容に了解が得られたため、協議録(M/M)への署名交換を実施した。

また、本格調査開始にかかる手続き(要請書をNEDAを通じて日本大使館に早急に提出すること。また提出された要請書を日本政府が採択のうえ、I/A の取り交わし、コンサルタントの選定を得て本格調査が始まること等)についても合わせて説明した。さらに、本格調査の実施にあたっては関係省庁等との調整が非常に重要であることから、その昨日をDENRが果たすことが必要である旨強調し、メティン次官の理解が得られた。

4.19 国家経済開発庁(NEDA)

2003年10月28日(火)10時～10時30分
出席者:Ms. Vioula C. Conde, Utility Staff, Development Specialist, Ms. Joanne Tolentino, Senior Development Specialist, Public Investment Staff
JICA調査団 蔵方団長、後藤団員、湯本団員、青山団員

調査団よりDENR署名済みのM/Mおよび協議済みアプリケーションフォーム原案について説明を行い、以下の意見交換を行った。

- CDM プロジェクトをどのように発掘し、またケーススタディにおいては既存の再生可能エネルギープロジェクト案件との関係はどうなるのかという問いに対し、本調査では個別プロジェクトの発掘ではなく、フィリピン政府として優先分野をどう定めるか等のポリシー作成に重点をおくものであるとし、ケーススタディにおいてはCDM-PDDを作成支援するなどしてCDMプロジェクト化することを考えている旨回答した。
- 既に CDM-PDD が存在するプロジェクトとの関係、およびファイナンスに関する支援はどうなるのかとの問いに対し、既存の5件の CDM プロジェクト候補案件は大きな規模であると理解して

おり、本調査においては主に小規模 CDM プロジェクトをいかに促進できるか検討したい、またその対象分野については本格調査の中で確認しながら進めていくことになること、ファイナンスについては、ローカル銀行(フィリピン開発銀行等)の役割が重要であると認識しており、ローカル銀行との協議も今週実施することを回答した。

- クリアリングハウスの支援にはハードウエアを含むのか、既存の CCIC との関係はどうなるのかとの問いに対し、ハードウエアについては今は何も決まっていないが、必要であれば供与を考えること、CCIC はワークショップ活動等が活発であり、本調査においても協調してワークショップ開発等を行うことを検討しており、今週面談予定であることを回答した。
- 本調査のスケジュールに関しての問いに対し、2003 年 11 月中に DENR より NEDA を通じて日本大使館へ正式要請が提出されることが必要であること、正式要請を受け日本政府が実施判断を行った後、予備(I/A 協議)調査団を 2004 年 1-2 月頃に派遣し実施内容が固まること、早ければ 2004 年 5-6 月頃に本格調査が開始されることを伝えた。
- 本調査を実施するうえで、DENR だけでなく、IACCC の他関係機関のメンバーにもハンズオントレーニングを実施して欲しい(調査期間終了後にノウハウを残すため)との要望に対し、了解している旨回答した。

4.20 日本大使館

2003 年 10 月 28 日(火)14 時～14 時 30 分
出席者: 日本大使館　齊藤一等書記官
JICA 調査団　蔵方団長、後藤団員、湯本団員、青山団員

調査団より現地報告書に基づき調査結果について報告を行い、有望な CDM プロジェクトリストの有無と、本格調査の開始時期についてコメントを受けた。これらに対し調査団より、今回は CDM プロジェクトリストの提供を受けなかったが、次回の I/A 協議の際にケーススタディの対象プロジェクトを検討することとなるが、その時点で CDM プロジェクトリストが必要になること、本格調査の開始時期については、最速で 2004 年 5-7 月頃になることを回答するとともに、要請書の受け取りや口上書の交換等に対する支援を依頼した。

4.21 JICA フィリピン事務所

2003 年 10 月 28 日(火)16 時～17 時
出席者: JICA フィリピン事務所　中垣所長、高田次長、杉山所員
JICA 調査団　蔵方団長、後藤団員

調査団より現地報告書に基づき調査結果について報告を行い、UNDP のフェーズ1を受けて JICA が調査を実施することで問題は生じないか、DNA 等の運用費用をどのように賄うのか、他国への展開はどうか、要望調査との関係はどうかについて質問があった。

これらに対し調査団より、UNDP のフェーズ 1 を受けることについては資金提供元であるオランダ

大使館と面談を実施し、予定されていたフェーズ2お実施しないことになったため、JICA調査との摩擦は生じないこと、DNA の運用費用等については留意して調査を行うこと、他国への展開についてはフィリピンを皮切りに検討していきたいと考えていること、要望調査については追加案件として内部調整を実施していることを説明した。

4.22 NGO (Philippine Rural Reconstruction Movement: PRRM)

2003 年 10 月 28 日(火)17 時～18 時
出席者:Ramon Faustino M. Sales, Jr. Assistant Director of Technical Services Office、
JICA調査団:湯本団員、青山団員

調査団より本件調査の概要、フローについて説明し、JICA 調査への協力について意見交換を行った。

- PRRM は IACCC の正式メンバーで、51 年の経歴を有する NGO である。現在のスタッフは 100 余名弱、貧困対策、保健・教育・環境分野を活動フィールドにしている。国内に 15 のブランチオフィスがあり、ケソン市にある 4F 建てビルに本部を構えている。
- 従来から農業・林業セクター、CBFM に多くの実績があり、1992 年から小規模水力、バイオマス、太陽光等の再生可能エネルギー、気候変動に取り組み始めた。IACCC/CCIC の CDMトレーニングに参加している。
- 小規模 CDM のメリット、小規模 CDM のバンドリングに関する認識があり、CDM スキームに関し相当程度の知識を保有していると推察する。
- これまで国連、FAO、WB、international NGO、ドイツ、スペイン、オランダ政府の仕事、あるいは DENR、農業省等政府機関から業務委託の経験があり、組織内に学者、エンジニア、専門家等多様な人材を抱えている。また、JBIC の農業セクター改革、災害復旧・救済事業などに参加している。
- FRRM は JICA 調査スコープにある小規模 CDM の視点を rural community の社会・経済・環境面のメリットから高く評価した。小規模 CDM を取り上げることは IACCC メンバーのすべての NGO が前向きに捉えてくれるとの見解を示した。
- ケーススタディには小規模CDMのバンドリング(小規模CDMの有効化をまとめて行う)を取り上げてほしい旨発言があった。ピコ水力など再生可能エネルギーの小規模 CDM 事業は高いトランザクションコストを回避するため、バンドリングが必要である。
- PCF のプロジェクトはスケールが大きすぎて、社会・環境への影響も大きい。比国には 40%の電化未了地域があり、poor community を対象とした貧困削減・持続性の視点が大事でこの意味、小規模 CDM を取り上げる JICA の調査は時宜を得ている。
- フィリピン国には廃棄物処理は地方自治体が責任を負い、廃棄物の 75%はマテリアルリサイクルができ、残り 25%はランドフィルになる。5 ヘクタール以下の小規模埋め立て処分場におけるメタン回収事業を小規模 CDM のバンドリング事業としてケーススタディに取り上げることはよいと考える。DENR は廃棄物の責任機関で本分野のポテンシャルリストをすでにリストアップ済みである。
- CDM スキームに関し、NGO はモニタリング、事業による地域社会への影響調査等に大きな役割を果たせる。NGO はまた地域社会の利害関係者へのコーディネートができる。

- NGO は国家レベルの開発計画、規制など政策の調整・統合に寄与できる。PRRM は income generation のために農民への知識普及に努めている。
- 植林に関し community based plantation は支持するが、大規模資本による大規模な植林事業に反対する。すべての NGO は長期的な視点に立脚した事業を支援であろう。
- デンドロサーマル事業は大規模植林→バイオマス確保→発電事業という構想になっているが、バイオマスの需要と供給のアンバランス(供給＜需要)、事業規模が地域社会で管理できるレベルを超えているため、森林破壊に繋がる恐れがある。

(入手資料)
- PRRM: The next 50 years 2002-2052
- Building rural capacities for sustainability
- Renewable energy to empower rural communities

4.23 フィリピン開発銀行(Development Bank of Philippine)

2003 年 10 月 29 日(水)10 時～12 時
出席者:Mr. Rey Amaury A. Guarin, Assistant Vice President, Climate Change Program Manager at Program Management I-DBS, Ms. Grace D.L. Punsalan, Program Specialist, Climate Change Program at Program Management I-DBS
JICA 調査団 湯本団員、青山団員

調査団より本件調査の概要、フローについて説明し、JICA 調査への協力について意見交換を行った。
- DBP は工業、コーポレート向け融資を担当する政府系金融機関で、職員数は約 1,500 名。IACCC のメンバーではないが、それは IACCC に金融機関が含まれていないためである。
- CDM は DBP 気候変動プログラムのコンポーネントの一つで、DBP はエネルギーセクターの CDM のみならず、植林・再植林の吸収源 CDM 事業への融資にも手掛ける予定である。
- DBP は海外政府系投融資への唯一の窓口で比国における CDM 金融ビジネスの focal point を目指している。現在、投資政策、CDM 候補案件等の情報を clearing house の機能を有するウェブより提供している。本件 JICA 調査に協力できることが多い。
- フィリピン国は CDM 分野における比較優位(他のアジア諸国に比べて)を確立するため、投資政策の整備、小規模 CDM のトランザクションコストを削減する必要がある。また、SD 指標、Emissions counting、Baseline study など CDM-PDD に必要なものを用意できる。
- DBP は CDM のため、Carbon Investment Banking Facility を作り、underline project finance と CER assets/ crediting の 2 種類の金融サービスを提供できる。
- DBP は Marginal profitable project を支援し、CERs の獲得と先進国へのセールスを考えている。PDD などのトランザクションコストは T/A 資金に含ませて支援し、代わりに CERs を一部保有する。
- DBP は 7 つの CDM プロジェクトがあり、この中に小規模 Biomass Cogeneration Projects のバンドリング案件(1MW)が含まれている。
- DBP は 2003 年 6 月より SME plus をスタートし、web system に各 Brach Office をリンクさせ、広域

をカバーするClearing houseを目指している。

- DBPはCDM事業のアセスを含めたサービスを提供できる。CDMは事業への投資価値を高め、他のドナー(JICAを含む)がPDD準備をT/Aで支援するならCERsを配分する。
- フィリピン国ではDENRがpolicy/approval、DBPがfinance/promotion、CCICがトレーニングの役割分担が考えられる。
- DBPは国内のCDM事業に融資するフィリピン(カーボン)ファンドの設立を構想している。海外ドナー・カーボンファンドからの投資を受入れ、プールして自国のCDMに投資するビジネスモデルである。これは案件実施の迅速化、事業リスク・カントリーリスク・通貨リスクのヘッジー、及び融資条件の平準化の利点がある。
- カーボン資産、リスクマネジメントに関して、本件JICA調査と協力できる。比較優位を高めるため、比国内の承認手続きの簡素化が望ましいと考える。

4.24 CCIC(Climate Change Information Center)

2003年10月30日(木)10時～12時

出席者: Dr. Roberto C. Yap, Project Director, Climate Change Information Center, Manila Observatory, Ateneo de Manila University Campus, Ms. Atty. Angela Consuelo S. Ibay, Program Coordinator, Ms. Jean S. Laurente, Project Assistant, Mr. Ammiel M. De Leow, Institutional Division Officer.
JICA調査団 湯本団員、青山団員

調査団より本件調査の概要、フローについて説明し、JICA調査への協力について意見交換を行った。

- CCICはアテネオ大学Manila Observatoryに設置された気候変動情報センターで10名の専任スタッフを擁するノンプロフィットの組織である。CCICは東アジア地域における気候変動の情報提供・技術協力・能力強化に関するハブ機能(アセアン情報センター)を目指しており、現在、気候変動・CDMを扱うKlima(タガログ語でClimate)と称するウェブサイトを運用している。
- これまで、UNEP-RISOの支援で比国のIACCCメンバーに対し継続的にCDM研修を実施している。2003年は6コース(各1日)のトレーニングを実施した。2004年からはsector、area、technology別に研修内容を充実して実施の予定である。また、NEDA、DOE、プライベートセクターに対しCDMのブリーフィングを行っている。
- 本件JICA調査についてはフィリピン国にとり、たいへん有益であるとのコメントがあった。CCICはJICA調査の4つのアウトプットに協力したい。中でも実施の実績があるClearing houseの開発・運用、Training workshopの実施に強い関心を示した。
- CCICより本件JICA調査におけるForestry sectorの扱い、アジア諸国での類似調査の状況について質問があった。これに対し調査団より、Forestry sectorはJICA調査におけるCDM promotion policy策定のフェーズでは含まれるが、Case studyの対象とするかどうかについては次回のI/A missionでフィリピン国DENRとの話し合いで決まるだろうとの見通しを説明した。また、CDMキャパビルに類するJICA調査はフィリピン国が初めのケースであると説明した。
- CCICでは来週、DENRに対し3日間のCDMワークショップを実施する予定である。JICA調査への具体的な協力内容についてDENR-EMBと相談したい。

- CCIC はフィリピン国の PCF 候補案件、小規模バイオマス案件の CDM 事業化に対し、技術アドバイスを与えている。
- GHG データの収集の仕組、データ収集用フォーマットシートについては GHG Inventory を担当する Dr. Jose Villarin が Inventory に関する研修で日本に滞在中のため、本人の帰国後にコンタクトさせる。第 2 回目の National Communication の整備は PAGASA とともに実施を開始したところである。なお、面談後、GHG データ収集の仕組及びフォーマットシートについて、DENR-EMB の Goco 女史に確認したところ、関連資料を電子メールで JICA（後藤）に送付するとの回答があった。
- フィリピン国における排出係数は IPCC のデフォルト値を採用しているが、ローカライズのニーズについては今後調査団に知らせる。

（入手資料）
- Climate Change Information Center (Philippines)
- Manila Observatory
- CD4CDM Capacity Development for the CDM
- CD4CDM – Philippines: Work Plan (2003-2005)
- Disturbing Climate

資料１　事前質問票

Oct 17. 2003
Japan International Cooperation Agency

Requests for Cooperation for the JICA Projects Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

1 Background information and the purpose of the Study

The International Community has been taking steady steps forward the emission reduction targets set by the Kyoto Protocol since the adaptation of the Marrakesh Accords at COP7. As one of the signatories of the Protocol, Japan has been initiating efforts to contribute to the climate change mitigation. In August 2002, the Japanese Government expressed its commitment to "Asia CDM Capacity Building Initiative" by engaging in 'Type2 Partnership Initiatives' with 7 Asian countries (including the Philippines) at the World Summit on Sustainable Development (WSSD) in Johannesburg. In doing so, Japan is now trying to form the best cooperation methods on CDM capacity building in Asian countries, in order to implement the CDM projects which will contribute to the emission reduction and to sustainable development of the host countries.

Within this context, Japan International Cooperation Agency (JICA) has been examining how best to take appropriate and effective approaches to CDM-related cooperation within its internal committee. And in this October, JICA, as one of the implementing agencies of the Initiatives, dispatches a Project Formation Study Team to your country, in order to establish cooperation frameworks with them for the promotion of the CDM for sustainable development, and to successfully start CDM projects. Initially, this Study in your country will be carried out to form its framework for CDM capacity building, and to have discussions to draw blue-print for JICA's cooperation projects, by visiting the authorities concerned and relevant organizations in your country.

2. Visiting organizations and schedule of the interview

The Study Team will visit official CDM contact point, governmental organizations concerning CDM implementation and other organisations.

The schedule of the mission is as follows:

The fourth or fifth week of October, 2003: Manila, the Philippines

3. Expected output of the interview survey

- Mutual understanding of the present situation, major issues and national policy for the promotion of CDM projects in your country, and
- Discussion concerning practical needs in your country concerning the CDM and JICA assistance programmes, especially on CDM capacity building.

4. Request for cooperation to the survey

The JICA Study Team would like to visit you and have an interview related with questionnaire as follows:

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JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to DENR -

Q1. Ratification of Kyoto Protocol

(1) Please describe the preparation work, barriers and possible time on ratification of Kyoto Protocol by the Government of the Philippines.

Q2. Establishment of Approval System for CDM Projects

(1) Please describe the latest situations on establishment of a National Authority for CDM and operational framework for implementing CDM projects in Philippines.
(2) Please describe the possible approval procedures and responsible organizations.
(3) What kind of roles of your organization is expected in CDM scheme?

Q3. Assistance from Netherlands Government

(1) Please describe the progress of the capacity building project for DENR implemented/sponsored by UNDP/Netherlands.

Q4. Readiness for JICA's Capacity Building Study

(1) Please describe your intention on C/P organization for the possible Study.
(2) Do you think the captioned JICA's Study is a top priority in Philippines and urgent for promotion of CDM projects?
(3) Please describe higher rank policy/programs in connection with the JICA Study, if any.

Q5. Activities of IACCC

(1) Please describe the organizational structure of IACCC and the roles of each member.
(2) Please describe the activities and achievements of IACCC in recent years.

Q6. Scope of JICA's Capacity Building Study

(1) What are your options about the Study's scope on supporting institutional and information building to promote CDM projects?

Q7. Availability of CDM experts/organizations in Philippines

(1) Are there any experts/organizations including consulting firms and NGOs, who can assist to prepare strategy for CDM in Philippines, to prepare Project Design Document for small scale CDM projects, to collect emission data of greenhouse gases, to promote public awareness and collect opinions of CDM stakeholders?
(2) If yes, please list the names, addresses and contact persons of such experts/organizations.

Q8. Systematic Flow for Preparation of GHG Inventory

(1) Please describe the flow for preparation of National Communication as well as Inventory of greenhouse gases in Philippines and responsibility of your organization.

(2) Please describe the scope of the project, which you had requested GEF to support for preparing NC and GHG inventory.

Q9. Organizations Responsible for GHG emissions

(1) Please list the organizations responsible for collecting/ maintaining GHG emissions data, and approaches for collecting such data preferably by sectors.
(2) What kind of GHG emissions data have your organization possessed.
(3) Please list the organizations responsible for defining/ establishing emission baseline for CDM projects, the typical methodologies and technical guidelines if any.

Q10. Barriers on CDM Scheme

(1) Please describe the major barriers on promotion of CDM projects in Philippines, including legal framework, institutional and appraisal/ approval procedures at national/ local levels, human resources and financial aspects.

Q11. Potential Sectors for CDM Projects

(1) Which sectors/ regions responsible by your organization have top priority for CDM projects?
(2) What kind of activities and results on CDM issues have your organization achieved in recent years?

Q12. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM capacity building in Philippines.

Q13. Participations on Japanese Training Program

(1) Please describe the records of your organization on participating the Japanese capacity building program organized by JICA, JBIC, METI, Jetro, NEDO, NGOs and private firms.

Q14. Activities with ASEAN countries

(1) Please describe the major activities/ cooperation ever before with ASEAN countries on CDM scheme and GHG emissions.

Thank you for your cooperation in advance.

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JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to DENR-FMB -

Q1. Potential Sectors for CDM Projects

(1) Which sectors/ regions responsible by your organization have top priority for CDM projects? Please refer to A/R and LULUF issues.

(2) What kind of activities and results on CDM issues have your organization achieved in recent years?

Q2. Possession of GHG Emission Data

(1) What kind of GHG emissions data have your organization possessed.

Q3. Barriers on CDM Scheme

(1) Please describe the major barriers on promotion of CDM projects in Philippines, including legal framework, institutional and appraisal/ approval procedures at national/ local levels, human resources and financial aspects.

Q4. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM capacity building in your organization.

Q5. Participations on Japanese Training Program

(1) Please describe the records of your organization on participating the Japanese capacity building program organized by JICA, JBIC, METI, Jetro, NEDO, NGOs and private firms.

Thank you for your cooperation in advance.

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JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to NEDA -

Q1. Ratification of Kyoto Protocol

(1) Please describe the preparation work, barriers and possible time on ratification of Kyoto Protocol by the Government of the Philippines.

Q2. Activities of IACCC

(1) Please describe the roles, activities and achievements of your organization at IACCC in recent years.

Q3. Readiness for JICA's Capacity Building Study

(1) Readiness for submission of the application form for the Study to the Japanese Government.

(2) Do you think the captioned JICA's Study is a top priority in Philippines and urgent for promotion of CDM projects?

(3) Please describe higher rank policy/programs in connection with the JICA Study, if any.

Q4. Potential Sectors for CDM Projects

(1) Which sectors/ regions have top priority for CDM projects in Philippines?

(2) What kind of activities and results on CDM issues have been achieved in recent years?

Q5. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM capacity building in Philippines.

Thank you for your cooperation in advance.

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JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to DOE -

Q1. Ratification of Kyoto Protocol

(1) Please describe the preparation work, barriers and possible time on ratification of Kyoto Protocol by the Government of the Philippines.

Q2. Activities of IACCC

(1) Please describe the roles, activities and achievements of your organization at IACCC in recent years.

Q3. Potential Sectors for CDM Projects

(1) Which sectors/ regions responsible by your organization have top priority for CDM projects? Please refer to energy sector.

(2) What kind of activities and results on CDM issues have achieved by your organization in recent years.

Q4. Barriers on CDM Scheme

(1) Please describe the major barriers on promotion of CDM projects in Philippines, including legal framework, institutional and appraisal/ approval procedures at national/ local levels, human resources and financial aspects.

Q5. Organizations Responsible for GHG emissions

(1) Please list the organizations responsible for collecting/ maintaining GHG emissions data, and approaches for collecting such data by your organization.

(2) What kind of GHG emissions data have your organization possessed.

(3) Please list the organizations responsible for defining/ establishing emission baseline for CDM projects, the typical methodologies and technical guidelines if any.

Q6. Information on ADB/PREGA Project

(1) Please describe the major findings/ results of PREGA project, and potential CDM projects in renewable energy and energy efficiency sectors.

Q7. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM capacity building in your organization.

Q8. Participations on Japanese Training Program

(1) Please describe the records of your organization on participating the Japanese capacity building program organized by JICA, JBIC, METI, Jetro, NEDO, NGOs and private firms.

Q9. Activities with ASEAN countries

(1) Please describe the major activities/ cooperation ever before with ASEAN countries on CDM scheme and GHG emissions.

Thank you for your cooperation in advance.

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JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to PAGASA -

Q1. Activities of IACCC

(1) Please describe the roles, activities and achievements of your organization at IACCC in recent years.

Q2. Potential Sectors for CDM Projects

(1) Which sectors/ regions responsible by your organization have top priority for CDM projects if any?

(2) What kind of activities and results on CDM issues have your organization achieved in recent years.

Q3. Organizations Responsible for GHG emissions

(1) Please list the organizations responsible for collecting/ maintaining GHG emissions data, and approaches for collecting such data by your organization.

(2) What kind of GHG emissions data have your organization possessed.

(3) Please list the organizations responsible for defining/ establishing emission baseline for CDM projects, the typical methodologies and technical guidelines if any.

Q4. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM capacity building in your organization.

Q5. Participations on Japanese Training Program

(1) Please describe the records of your organization on participating the Japanese capacity building program organized by JICA, JBIC, METI, Jetro, NEDO, NGOs and private firms.

Thank you for your cooperation in advance.

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JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to DTI-BOI -

Q1. Activities of IACCC

(1) Please describe the roles, activities and achievements of your organization at IACCC in recent years.

Q2. Potential Sectors for CDM Projects

(1) Which sectors/ regions responsible have top priority for CDM projects in Philippines?
(2) What kind of activities and results on CDM issues have your organization achieved in recent years.

Q3. Barriers on CDM Scheme

(1) Please describe the major barriers on promotion of CDM projects in Philippines, including legal framework, institutional and appraisal/ approval procedures at national/ local levels, human resources and financial aspects.
(2) Please describe the possible barriers regarding to foreign or private investment on CDM projects.
(3) Please describe the incentive measures for potential CDM projects such as taxation, subsidies, interesting rate and so on.

Q4. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM issues in Philippines.

Q5. Participations on Japanese Training Program

(1) Please describe the records of your organization on participating the Japanese capacity building program organized by JICA, JBIC, METI, Jetro, NEDO, NGOs and private firms.

Thank you for your cooperation in advance.

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JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to DOTC -

Q1. Activities of IACCC

(1) Please describe the roles, activities and achievements of your organization at IACCC in recent years.

Q2. Potential Sectors for CDM Projects

(1) Which sectors/ regions responsible by your organization have top priority for CDM projects? Please refer to transportation sector.

(2) What kind of activities and results on CDM issues have your organization achieved in recent years.

Q3. Barriers on CDM Scheme

(1) Please describe the major barriers on promotion of CDM projects in Philippines, including legal framework, institutional and appraisal/ approval procedures at national/ local levels, human resources and financial aspects.

Q4. Organizations Responsible for GHG emissions

(1) Please list the organizations responsible for collecting/ maintaining GHG emissions data, and approaches for collecting such data by your organization.

(2) What kind of GHG emissions data have your organization possessed.

(3) Please list the organizations responsible for defining/ establishing emission baseline for CDM projects, the typical methodologies and technical guidelines if any.

Q5. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM capacity building in your organization.

Q6. Participations on Japanese Training Program

(1) Please describe the records of your organization on participating the Japanese capacity building program organized by JICA, JBIC, METI, Jetro, NEDO, NGOs and private firms.

Thank you for your cooperation in advance.

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JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to DOST -

Q1. Activities of IACCC

(1) Please describe the roles, activities and achievements of your organization at IACCC in recent years.

Q2. Potential Sectors for CDM Projects

(1) Which sectors/ regions responsible have top priority for CDM projects in Philippines?

(2) What kind of activities and results on CDM issues have your organization achieved in recent years.

Q3. Barriers on CDM Scheme

(1) Please describe the major barriers on promotion of CDM projects in Philippines, including legal framework, institutional and appraisal/ approval procedures at national/ local levels, human resources and financial aspects.

Q4. Organizations Responsible for GHG emissions

(1) Please list the organizations responsible for collecting/ maintaining GHG emissions data, and approaches for collecting such data by your organization.

(2) What kind of GHG emissions data have your organization possessed.

(3) Please list the organizations responsible for defining/ establishing emission baseline for CDM projects, the typical methodologies and technical guidelines if any.

Q5. Information on UNIDO supported CDM Case Study

(1) Please describe the major findings/ results of CDM case study supported by UNIDO.

Q6. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM capacity building in your organization.

Q7. Participations on Japanese Training Program

(1) Please describe the records of your organization on participating Japanese capacity building program organized by JICA, JBIC, METI, Jetro, NEDO, NGOs and private firms.

Thank you for your cooperation in advance.

Oct 17, 2003

JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to DPWH -

Q1. Activities of IACCC

(1) Please describe the roles, activities and achievements of your organization at IACCC in recent years.

Q2. Most Feasible Sectors for CDM Projects

(1) Which sectors/ regions responsible by your organization have top priority for CDM projects? Please refer to infrastructure sector.

(2) What kind of activities and results on CDM issues have your organization achieved in recent years.

Q3. Barriers on CDM Scheme

(1) Please describe the major barriers on promotion of CDM projects in Philippines, including legal framework, institutional and appraisal/ approval procedures at national/ local levels, human resources and financial aspects.

Q4. Organizations Responsible for GHG emissions

(1) Please list the organizations responsible for collecting/ maintaining GHG emissions data, and approaches for collecting such data by your organization.

(2) What kind of GHG emissions data have your organization possessed.

(3) Please list the organizations responsible for defining/ establishing emission baseline for CDM projects, the typical methodologies and technical guidelines if any.

Q5. Trends of Foreign Assistance

(1) Please describe the latest situations/ tendencies of major foreign donors as well as international organizations on CDM capacity building in your organization.

Q6. Participations on Japanese Training Program

(1) Please describe the records of your organization on participating the Japanese capacity building program organized by JICA, JBIC, METI, Jetro, NEDO, NGOs and private firms.

Thank you for your cooperation in advance.

Oct 17. 2003
Japan International Cooperation Agency (JICA)

Requests for Cooperation for the JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

1 Background information and the purpose of the Study

As one of the signatories of the Kyoto Protocol, Japan has been initiating efforts to contribute to the climate change mitigation. In August 2002, the Japanese Government expressed its commitment to "Asia CDM Capacity Building Initiative" by engaging in 'Type2 Partnership Initiatives' with 7 Asian countries (including the Philippines) at the World Summit on Sustainable Development (WSSD) in Johannesburg. In doing so, Japan is now trying to form the best cooperation methods on CDM capacity building in Asian countries, in order to implement the CDM projects which will contribute to the emission reduction and to sustainable development of the host countries.

Japan International Cooperation Agency (JICA) has also been examining how best to take appropriate and effective approaches to CDM-related cooperation with the host countries within its internal committee. And in this October, JICA, as one of the implementing agencies of the Partnership Initiatives, dispatches a Project Formation Study Team to the Philippines, in order to establish collaborative frameworks for the promotion of the CDM for its sustainable development, and to successfully start CDM projects. Initially, this Study in the Philippines will be carried out to form its framework for CDM capacity building, and to have discussions to draw blue-print for JICA's cooperation projects for the capacity building, by visiting the authorities concerned and relevant organizations in the Philippines.

2. Visiting organizations and schedule of the interview

The Study Team will visit official CDM contact point, governmental organizations for the CDM implementation and other organisations.
The schedule of the mission is as follows:

The fourth or fifth week of October, 2003: Manila, the Philippines

3. Request for cooperation to the survey

The JICA Study Team would like to visit you and have an interview related with questionnaire as follows:

Oct 17, 2003

JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to UNDP-

As part of the Study to develop cooperation for the CDM capacity building, we would like to have information on the present situation in the Philippines concerning the CDM and your opinion on the method for cooperation with the related entities in CDM capacity building, so that this country can start exercising the CDM project successfully and exploit benefits from its implementation.

Therefore we would like to have an opportunity to meet and discuss the following topics with your agency. We would be very happy if you could spare your time for a few preparations for this interview.

Q1. Please describe the background, progress and supposed barriers on the project (financed/implemented by the Netherlands Government/UNDP) for establishment of DNA and capacity building of DENR.

Q2. Please describe the policy of your organization on promotion of CDM projects in Philippines, and contents of your future programs.

Thank you for your cooperation in advance.

Oct 17, 2003

JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to the Embassy of Netherlands -

As part of the Study to develop cooperation for the CDM capacity building, we would like to have information on the present situation in the Philippines concerning the CDM and your opinion on the method for cooperation with the related entities in CDM capacity building, so that this country can start exercising the CDM project successfully and exploit benefits from its implementation.

Therefore we would like to have an opportunity to meet and discuss the following topics with your agency. We would be very happy if you could spare your time for a few preparations for this interview.

Q1. Please describe the background, progress and supposed barriers on the project (financed/implemented by the Netherlands Government/UNDP) for establishment of DNA and capacity building of DENR.

Q2. Please describe the objectives and progress on Netherlands initiative for establishment of a CDM facility with Asian Development Bank in Philippines.

Q3. Please describe the activities and results of the Philippines on participation to the CERUPT tendering of your government if any.

Q4. Please describe the policy of your government on promotion of CDM projects in Philippines, and contents of your future programs.

Thank you for your cooperation in advance.

Oct 17, 2003

JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to Asian Development Bank-

As part of the Study to develop cooperation for the CDM capacity building, we would like to have information on the present situation in the Philippines concerning the CDM and your opinion on the method for cooperation with the related entities in CDM capacity building, so that this country can start exercising the CDM project successfully and exploit benefits from its implementation.

Therefore we would like to have an opportunity to meet and discuss the following topics with your agency. We would be very happy if you could spare your time for a few preparations for this interview.

Q1. Please describe the background, progress and supposed barriers on the REACH project.

Q2. Please describe the objectives and progress on the Netherlands initiative for establishment of a CDM facility with Asian Development Bank in Philippines.

Q3. Please describe the policy of your organization on promotion of CDM projects in Philippines, and contents of your future programs.

Thank you for your cooperation in advance.

Oct 17, 2003

JICA Project Formation Study on Supporting Institutional and Information Capacity Building to Promote CDM Projects in the Republic of the Philippines

- Questionnaire to World Bank-

As part of the Study to develop cooperation for the CDM capacity building, we would like to have information on the present situation in the Philippines concerning the CDM and your opinion on the method for cooperation with the related entities in CDM capacity building, so that this country can start exercising the CDM project successfully and exploit benefits from its implementation.

Therefore we would like to have an opportunity to meet and discuss the following topics with your agency. We would be very happy if you could spare your time for a few preparations for this interview.

Q1. Please provide the information on why the Philippines do not implement NSS, including issues on policy of the Philippines, problems associated with the donor countries and preparation work in Philippines.

Q2. Please describe the latest information/ attitudes of the Philippines to the World Bank initiatives of NSS and PCF.

Q3. Please describe the policy of your organization on promotion of CDM projects in Philippines, and contents of your future programs.

Thank you for your cooperation in advance.

資料２　調査団作成資料

-Draft-

<JICA-DENR (and IACCC,DOE)>

The Study Supporting Institutional and Information Capacity Building to Promote CDM Project in the Republic of the Philippines

Idea Paper of JICA's Development Study

August 19, 2003

Energy and Mining Development Study Division,
Mining and Industrial Development Study Dept.
Japan International Cooperation Agency

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contents

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1. Goal of the Study

1) JICA assist institutional and information capacity of GOP for smooth implementation of CDM project

-JICA's purpose is not doing CDM project ourselves but assist GOP personnel's capacity building.

2) Result of the above, the number of CDM project will be increased by private sector's investment

-GOP does not ratify KYOTO protocol yet but for preparing KP (ex; CDM procedure), some investors will have been interested in the Philippines.

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2. Outcome of the Study

In this Development Study, JICA assume 3 outcomes as bellows:

1) Assist DNA(Designated National Authority) Administration
-Draw up a CDM-NSS(National Strategy Study)
-Define approval procedure of CDM project
-Make standard for CDM project approval (Manuals, SD,PDD review; etc)
-Confirm approval procedure through a pilot project

2) Provide CDM Related Information and Text
-Set-up CDM Clearing-House, and institutional strengthen
-Provide CDM project information to private sector through Clearing-House
-Draw up texts for governmental person(high & middle-level policy-maker) and public
-Hold a enlightenment seminar

3) Assist Data Arrangement of Green-House-Gas
-Build data collection flow of GHG emission amount/ Arrange GHG Data
-Extract CDM potential project
-Submit National-Communication data to UNFCCC

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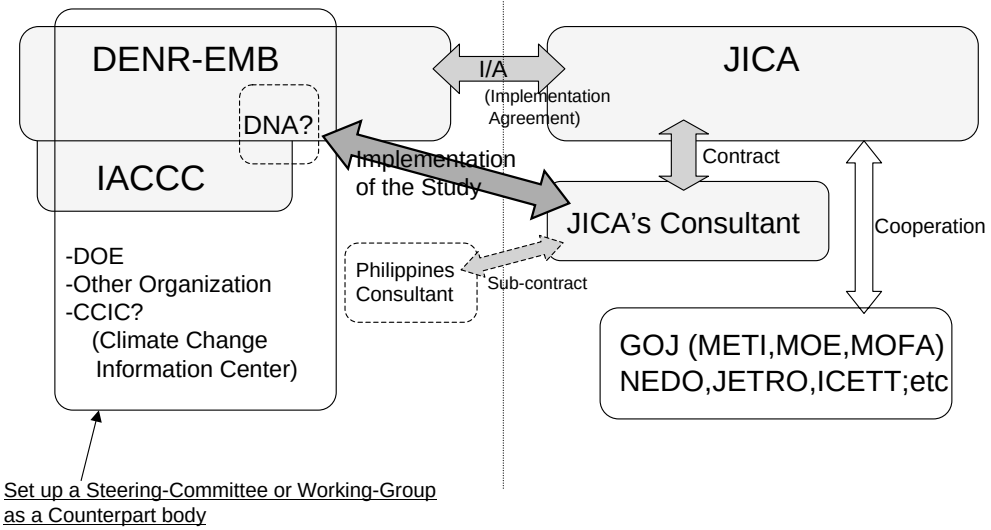
3. Study Structure

<The Philippines side> <Japan side>



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4. Input Resource of JICA

1) Term of the Project

-Start from May, 2004 (in 2 or 3 years)

2) Member of the JICA's Consultants (As a Study Team)

-CDM-NSS/ Calculate GHG A,B/ DNA Administration/
Information provide A,B/ Environmental Assessment
(Around 7 person, Total 50M/M)

*The Study Team work in the Philippines and Japan, as doing technical transfer to the Counterpart.

3) Equipment for the Study

-Planning procure some equipment for the pilot project.

*Input resource of Philippine side is appointed Counterpart personnel who working with JICA's consultants.

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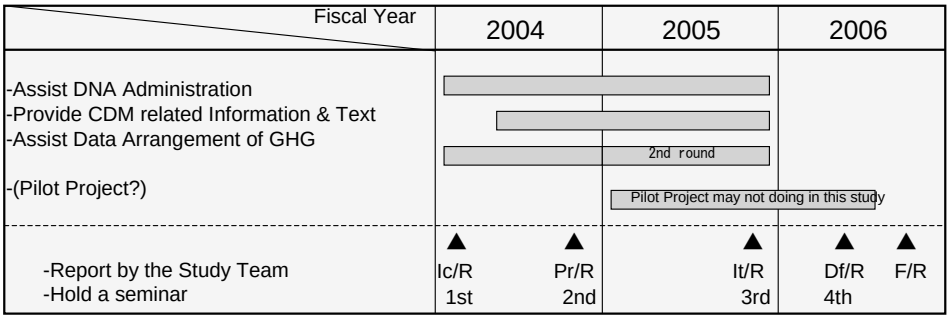
5. Future Schedule

1) Project Formation Study (Oct 22, 2003-Oct 28, 2003)
-Discussion detailed contents of the Study and Terms of Reference(T/R)
(Signing Minutes of Meeting (M/M) by DENR and JICA)

2) Preliminary Study (Around January, 2004)
-Final confirmation of contents of the Study
(Signing Implementation of Agreement (I/A) by DENR and JICA)
*Before dispatching the preliminary study team, the Philippines side need to request for assistance by submitting the Terms of Reference (T/R) to the GOJ through the diplomatic channel, and GOJ makes decision on implementation

3) Implementation of the Study (Start from May, 2004)



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6. Heed Things for Implementation of the Study

1) Submit Terms of Reference (T/R), GOJ's Decision
-Before dispatching JICA preliminary study team, GOP should submit T/R to GOJ. (through NEDA to Embassy of Japan.)
-After accepting T/R, GOJ decides to proceed with the Study through an inter-ministerial meeting.

2) Counterpart Body of the Philippines side
-DENR as a main counterpart, but IACCC and Department of Energy(DOE) should include counterpart body because of GHG data arrangement.
-So, who is the signer of M/M, I/A? (DENR, IACCC, DOE)

3) Donor Coordination
-JICA execute this Study in cooperation with UNEP,UNDP;etc activity.
(To be sure, JICA cooperate with METI, NEDO, JETRO, ICETT under the Green Aid Plan (GAP) umbrella.)

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(Ref.1) Current Situation of Other Donors

-**UNDP** is now executing CDM capacity development program with DENR, IACCC and CCIC. (Enabling Activity for the Maintenance and Enhancement of National Capacities to Prepare the National Communication on Climate Change.(Dec, 2001-Nov,2003)

-**ADB** is doing PREGA(REACH) project.

-**UNEP** propose CDM capacity development program list, as bellows;

UNEP proposal list

◆ 1. Information Campaign and Awareness Raising
◆ 2. Capacity Development for Senior National Policy-makers
◆ 3. Capacity Development for Mid-Level Policy-Makers
◇ 4. Establishment of CDM National Authority
◆ 5. Capacity Development for the CDM National Authority
6. Capacity Development for Project Developers
7. Capacity Development for Project Financiers
8. Capacity Development for NGOs, Local Communities, National Research Institutions and Academe
◆ 9. Investment Promotion for CDM Projects
◇ 10. Creating a Pipeline of CDM-eligible Projects

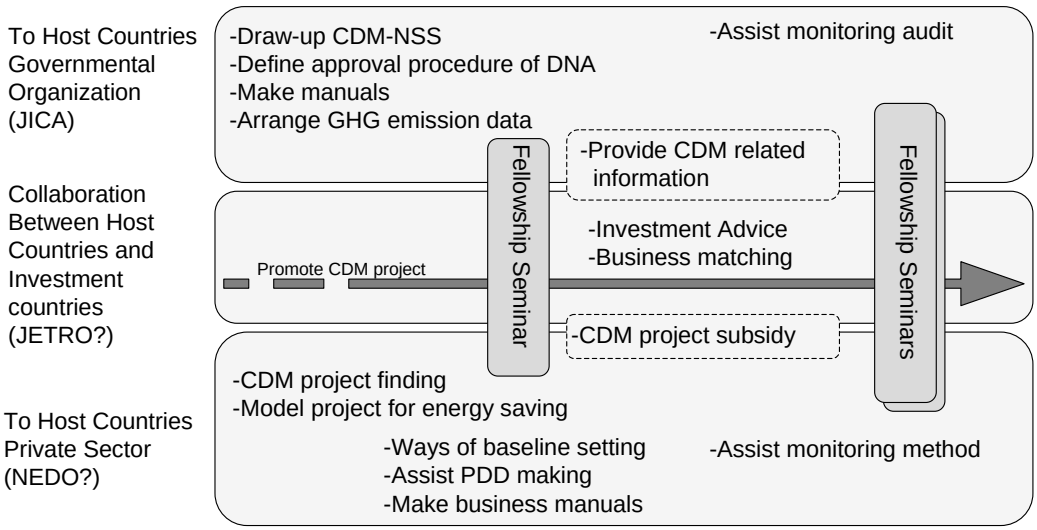
◆:JICA planning
◇:UNDP doing

(Ref.2) Idea of Donors Coordination

-We should cover all assistance items through donors coordination.

Items of CDM Capacity Building (Generalization)	Organization		Note
<To Governmental Organization>			
-Set-up DNA	UNDP	JICA	Follow UNDP
-Draw-up CDM-NSS		JICA	
-Define approval procedure of CDM project		JICA	
-Define evaluation method for SD		JICA	
-Evaluation method of Baseline setting & PDD		JICA	
-Audit monitoring method		JICA	
-Make laws & leg. for implementation CDM	UNDP		
-Financial Institution for CDM			JICA, JBIC?
-Arrange GHG emission data	UNDP	JICA	Follow UNDP
-Ways of GHG emission reduction	UNDP		
-Pick-up potential CDM project	UNDP	JICA	Follow UNDP
-Set-up & strengthen clearing-house		JICA	
-Confirmation of procedure by Model-project		JICA	
-Enlightenment for Governmental personnel		JICA	
<To Private Sector>			JICA does not support to Private sector directly.
-Methodology for baseline setting & PDD		NEDO?	
-Ways of monitoring		NEDO?	
-Confirmation of procedure by Model-project		NEDO?	
-Enlightenment for private sector		NEDO?	

(Ref.3) Image of Japan's Assistance Structure



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アジア諸国の実例（1／2）

対象国	フィリピン	インドネシア	マレーシア	タイ	ベトナム	中国	インド	パキスタン
KP批准	未批准	未批准	2002/9/4批准	2002/8/28批准	2002/9/25批准	2002/8/30承認	2002/8/26加入	未批准
NSS策定	未着手	2001年完了	ー（独自策定）	DFR策定中	DFR策定中	DFR策定中	キックオフ	ー
DNA設立/CDM法制化	検討中	検討中	整備済	法制化せず？	検討中	検討中	？	?
CDM案件例	?	CERUPT & PCF	?	日本政府 & PCF	?	CERUPT	CERUPT & PCF	?
日本政府承認済CDM/JI案件				タイ国マラにおけるゴム木廃材発電計画(2003/5承認CDM:年60ktCO2e)				
環境省F/S採択案件	[1] 廃棄物埋立処分地から発生するメタンガスを利用した木炭等製造とその有効利用調査(1999) [2] フィリピンにおけるNGO主導による住民参加型植林事業F/S(2003) [3] フィリピンにおける廃棄物埋立て処理場の回収埋立てガスによる発電事業の実施F/S(2003)	[1] 高生産型・環境保全型森林経営手法の確立の調査及びパイロット事業(2000) [2] インドネシアの植林評価方法に関する調査(2001) [3] 南スマトラ州の産業植林木等バイオマスを利用した炭化・発電事業のF/S(2001) [4] インドネシア共和国東カリマンタン州及び東ジャワ州における植林事業調査(2002) [5] インドネシア国ロンボク島における住民参加型CDM環境植林F/S(2003) [6] インドネシア共和国3州における植林及びバイオマスエネルギー利用プロジェクト調査(2003)	[1] 炭化を組み入れた持続的生産可能なCO2固定植林事業F/S(2000) [2] マレーシアにおける椰子殻発電事業からの炭素クレジット獲得プロセスの実際(2002) [3] マレーシアパームオイル廃液嫌気処理池より放出されるメタン排出の削減と対策技術の調査(2002) [4] マレーシア・パハン州チニ地区における近接パームオイル工場の統合に伴うメタン排出抑制とバイオマスの有効利用調査(2003)	[1] タイのバイオマス発電プロジェクトにおける炭素クレジット獲得プロセスの実際(2001) [2] ひまわりを資源作物とするバイオディーゼル油製造プロジェクトに関するタイでの調査(2003) [3] タイ国におけるバガスとライスハスク用いた熱電併給の事業化F/S(2003) [4] タイ国における廃棄物処理場（バンコク郊外）から発生するメタンガス有効利用発電施設の事業性の調査・検証(2003)	[1] ベトナムにおけるサトウキビからエタノール含有ガソリンの製造に関する調査(2000) [2] ベトナムにおける排出権獲得の為の民間資金を活用した環境植林CDM F/S(2002)	[1] 廃棄物最終処分場の準好気性メタンガスを利用した木炭等製造とその有効利用調査(1999) [2] 中国黄土高原における緑化の可能性調査(2000) [3] 中国における半導体工場より排出される代替フロンを対象としたCDM事業化調査(2003) [4] 大連経済技術開発区中央下水処理場汚泥消化メタンガスのコージェネレーション利用事業(2003)	[1] インドにおける廃糖蜜等からのエタノール燃料の製造に関する調査(2002)	
オランダ政府CERUPT案件		MNL Wayang Windu geothermal project (5.4MtCERs)				Inner Mongolia Wind power project (606ktCERs)	[1] Suzlon wind energy project (340ktCERs) [2] Vestas Tamil Nadu wind mill project (272ktCERs) [3] Enercon wind farm projects (475ktCERs) [4] Ind-Barath biomass project (300ktCERs) [5] Kalpa Taru biomass project (1.15MtCERs)	
世銀PCF案件		Sustainable cement production project ()		Mitr Pohl biomass waste cogen project (2.77MtCO2e)			Solid waste management Chennai (3.5MtCO2e)	
ADB省エネキャパビルPREGA対象国	○	○			○	○	○	○
UNEP-RISO CDMキャパビル対象国	○				○			
NEDO技術ニーズ調査/CDMセミナー	○	○	○	○	○	○	○	

アジア諸国の実例（2／2）

対象国	スリランカ	バングラデシュ	カンボジア	ラオス	ミャンマー	ネパール	ブータン	モンゴル
KP批准	2002/9/3加入	2001/10/22加入	2002/8/22加入	未批准	未批准	未批准	2002/8/26加入	1999/12/15加
NSS策定	策定中	ー	ー	ー	ー	ー	ー	ー
DNA設立/CDM法制化	?	積極的	?	?	?	?	?	?
CDM案件例	?	?	?	?	?	?	日本政府	?
日本政府承認済CDM/JI案件							E7ブータン小規模水力発電プロジェクト(2003/7承認CDM:年500tCO2e)	
環境省F/S採択案件			[1] カンボジア・モンドキリ原におけるゴムの木植林事業F/S(2003) [2] プノンペン市廃棄物埋立処分場(Stung Mean Chey)から排出するメタンガス等(LFG)の回収による温室効果削減及びエネルギー活用事業のF/S(2003)		ミャンマー・南シャン州CDM植林プロジェクトF/S(2000)			モンゴル森林再生計画支援事業調査(2000)
オランダ政府CERUPT案件								
世銀PCF案件								
ADB省エネキャパビルPREGA対象国	○	○	○			○		○
UNEP-RISO CDMキャパビル対象国			○					
NEDO技術ニーズ調査/CDMセミナー								

フィリピン政府機関のCDM取組とドナー支援策Matrix

	比国機関	所管分野	IACCC役割	CDM実績・施策	JICA	JBIC	METI/Jetro/NEDO	USAID	オランダ政府	ADB	世銀	GEF	UNIDO	UNDP	UNEP
Host Countries	比国・途上国全般への支援策						[1] GAP支援 [2] CDMニーズ調査 [3] CDMワークショップ[4] 道路、小水力、天然ガス基地、流動床のF/Sを実施	[1] NAPOCC策定支援 [2] Energy environment programを実施 [3] Inventory作成支援	[1] UNEP-RISOに資金提供 [2] ADBにCDMファシリティ設立を呼び掛け	[1] ADBはREACH計画を実施中。(オランダ資金PREGAは15カ国、カナダ資金は吸収源、デンマーク資金は再生・省エネの3部構成) [2] バンコクでCDMキャパビルワークショップ開催	[1] NSS (比国は未実施、前向きに変化) [2] PCF(前向きに変化)	[1] NC策定支援 [2] 再生エネ地方電化計画を実施(世銀担当)	アジア途上国の工業分野CDM活動を推進	包括パッケージのOperational Framework of CDM構想をオランダ政府に提案中	[1] UNEP-RISOは世界12カ国で大規模なCDMキャパビルを実施中 [2] UNEP/ROAPは6カ国でクリーナープロダクション推進とCDM連携
DENR-EMB	天然資源環境省（環境管理局）		共同議長/事務局	[1] DNA候補 [2] NC作成担当 [3] GHG inventory作成担当 [4] IPCC1996年GHG算定ガイドラインの比国版改定 [5] ECC承認機関	[1] 太田専門家(環境、田中専門家(林業) [2] 本件本格調査	過去10年にわたり円借款による森林セクター・植林事業の実施			UNDPのDNA設立・キャパビル支援への資金提供(2年で1.2億円)			NC策定支援をGEFに要請中		[1] 1998にUNDP支援CDMキャパビルのC/P [2] オランダ政府資金DNA設立・キャパビルを実施	UNEP-RISO実施のCDMキャパビルのサブタスクのDNA設立・キャパビル(オランダ資金/UNDP実施)のC/P
DOE	エネルギー省		メンバー	[1] DNA候補(オランダ・カナダの組織構成を参考) [2] エネルギーセクターのGHG算定(1996米国支援のワークショップを活用)	[1] PDP電力構造改革とDOEキャパビル開調実施中 [2] 玉川専門家(小水力開発) [3] 地方電化プロ技		エネルギーふタスクフォース現地セミナー	2001にUDAID支援のPCCMPのC/P		[1] ADB実施中PREGAのC/P [2] ADB実施済ALGASのC/P [3] 電力セクター再編に係るEPIMB/MEDPのTA発表					
NEDA	国家経済開発庁		メンバー												
PAGASA	気象水文庁（DOST傘下）		メンバー	1994GHGインベントリー担当（DOEは定期更											
DTI-BOI	貿易産業省（投資局）		メンバー		玉置専門家(投資促進)										
DOTC	運輸通信省		メンバー												
DOST	科学技術省		共同議長	R&D、バイオマス・クリーンエネルギーを推進									UNIDO実施のCDMケーススタディのC/P		
DPWH	公共事業道路省		メンバー												
PNOC-EDC	国家石油公社・電源開発公社		ー	小規模CDMを推進		北ルソン風力発電事業(円借款)のCDM適用ケーススタ									
DFA-UNIO			メンバー												
FRRM			メンバー												
ICEE			メンバー												
Earth Service Movement			メンバー												
Manila Observatory			メンバー												
Greenpeace			メンバー												
Climate Observatory-CCIC	アテネオ大学・気候変動情報センター		ー	CCICはクリアリングハウスの候補				USAID支援のSustainable climate initiativeを実施(GHGアカウント・人材育成等・知識ベース)				GHG Inventoryのサブコン			UNEP-RISOのCDMキャパビルを担当

資料３ 現地収集資料

(1)現地収集資料リスト

資料番号	資料名	資料入手先
1	Philippine Agenda 21	国家経済開発庁(NEDA)
2	Tracking GHG, A Guide for Country Inventories	天然資源環境省環境管理局(DENR-EMB)
3	CDMパンフレット	天然資源環境省環境管理局(DENR-EMB)
4	CCIC活動概要説明資料	天然資源環境省環境管理局(DENR-EMB)
5	UNDP支援(Establishment of the CDM National Authority, Operational Framework and Support Systems for the Philippines)フェーズ1資料	天然資源環境省環境管理局(DENR-EMB)
6	プロポーザル(Capacity Building on Carbon Accounting and Monitoring)	天然資源環境省環境管理局(DENR-EMB)
7	Recommendations for Institutionalizing the GHG Inventory Process	天然資源環境省環境管理局(DENR-EMB)
8	Climate Change Information Center (Philippines)	気候変動情報センター(CCIC)
9	Manila Observatory	気候変動情報センター(CCIC)
10	CD4CDM Capacity Development for the CDM	気候変動情報センター(CCIC)
11	CD4CDM – Philippines: Work Plan (2003-2005)	気候変動情報センター(CCIC)
12	Disturbing Climate	気候変動情報センター(CCIC)
13	PRRM: The next 50 years 2002-2052	NGO(Philippine Rural Reconstruction Movement: PRRM)
14	Building rural capacities for sustainability	NGO(Philippine Rural Reconstruction Movement: PRRM)
15	Renewable energy to empower rural communities	NGO(Philippine Rural Reconstruction Movement: PRRM)
16	CDM Facility説明資料、パンフレット、コメント要望用資料	アジア開発銀行(ADB)
17	PREGAプログラムの現地専門家リスト	アジア開発銀行(ADB)
18	DOTC 質問表への回答(DOTC Position Paper on CDM)	運輸通信省(DOTC)
19	Gerlapプロジェクト概要パンフレット(UNEP支援)	科学技術省 産業技術開発研究所(DOST-ITDI)
20	UNIDO調査レポート	科学技術省 産業技術開発研究所(DOST-ITDI)
21	2003年優先投資計画パンフレット	貿易産業省投資委員会(DTI-BOI)
22	BOI 質問票への回答	貿易産業省投資委員会(DTI-BOI)

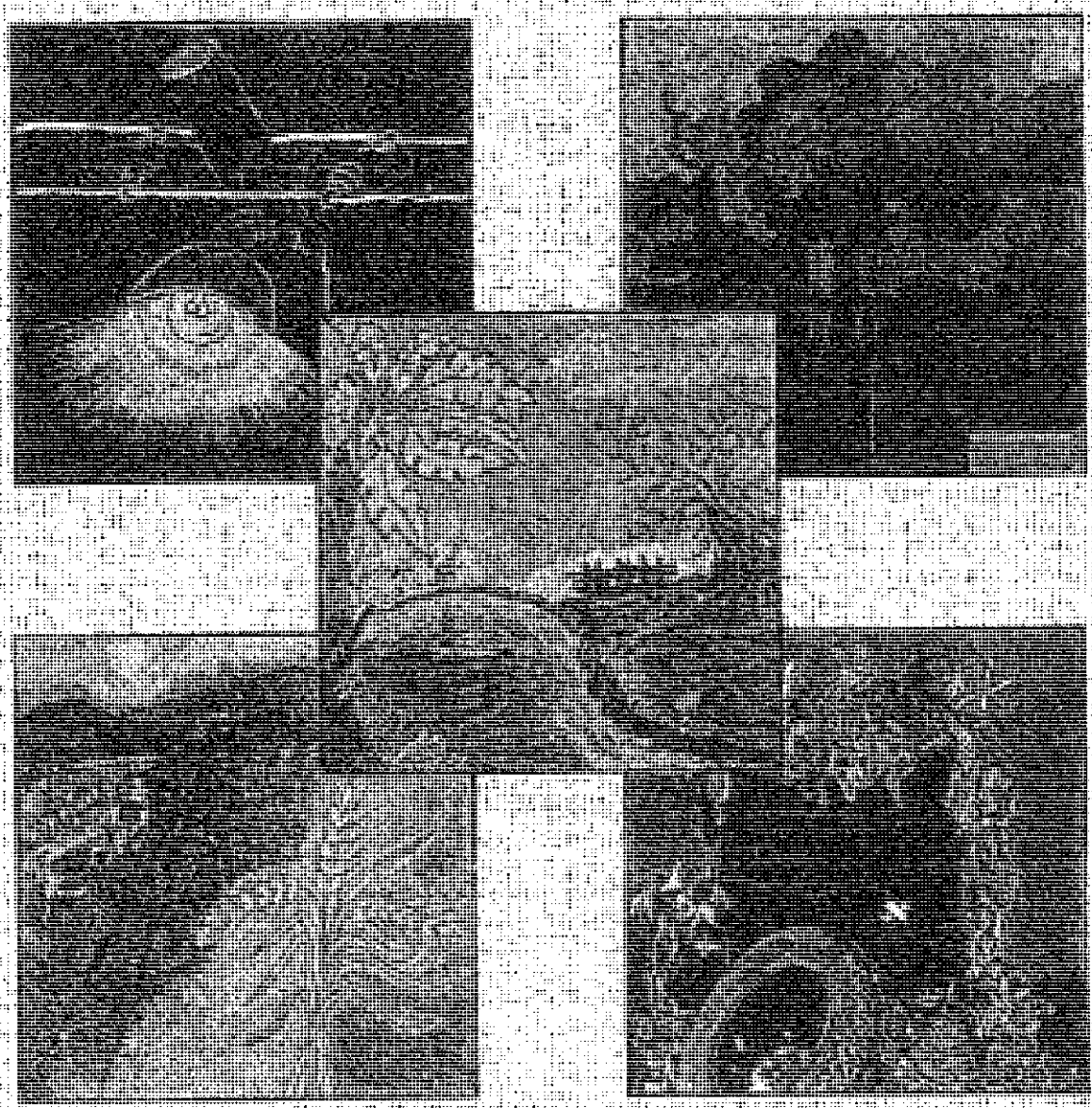
資料 3　現地収集資料

(2) Tracking Greenhouse Gases (抜粋: Executive Summary 及び Energy Sector)

DENR-EMB 提供

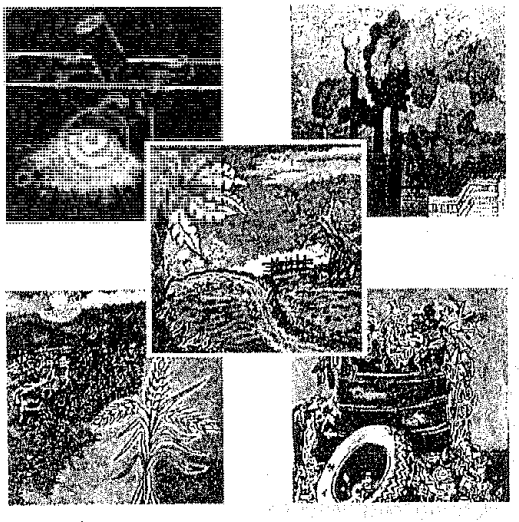
Tracking Greenhouse Gases

A Guide for Country Inventories



Tracking Greenhouse Gases

A Guide for Country Inventories



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NATIONAL STATISTICAL COORDINATION BOARD
PHILIPPINE IRON AND STEEL INSTITUTE
SAMAHAN SA PILIPINAS NG MGA INDUSTRIYANG KIMIKA

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Department of Environment
and Natural Resources

A GEF Project Implemented by the UNDP

Contents

THE 1994 PHILIPPINE GREENHOUSE GAS INVENTORY

Executive Summary

The presence of human-induced or anthropogenic greenhouse gases (GHGs) in our atmosphere can be attributed to activities and processes associated mainly with five important sectors: Energy, Industry, Agriculture, Waste, and Land Use Change and Forestry (LUCF). In 1994, the Philippines released a total equivalent amount of 102,957 kilotons (kt) of CO_2 into the atmosphere. This is due to the combination of GHGs emitted from various sources in the four sectors of Energy, Industry, Agriculture, and Waste, and the net uptake (sink) of GHGs from the LUCF sector. In the global context, this national amount is still minimal relative to the GHG emissions of other nations, especially those of developed country parties to the UNFCCC.

Discounting the contribution of the still controversial LUCF sector, national GHG emissions total about 103,085 kt of equivalent CO_2. Of the four non-LUCF sectors representing the country's sources of GHGs, the Energy sector is the most significant, accounting for about 49% of the national total. This is trailed closely by the Agriculture sector's contribution of about 32%. Industry and Waste follow with respective contributions of 10% and 9% of the total. Table ES-1 lists the GHG emission levels without the LUCF sector and Figure ES-1 shows the relative contributions of these four non-LUCF sectors to the national GHG emissions total. In contrast with these four sectors which act as GHG sources, activities and processes associated with the LUCF sector are able to sequester or remove about 127 kt of CO_2, an amount seemingly insignificant (0.1%) when compared with the national total (see Table ES-2 and Figure ES-2). However, as will be explained further below, the apparent insignificance of carbon sequestration from LUCF is actually the net sum of large and non-negligible sources and sinks in this sector.

Table ES-1. Non-LUCF emissions

Sector	CO_2 Emissions (Gg)
Energy	50,038
Industry	10,711
Agriculture	33,137
Waste	9,198
TOTAL	**103,085**

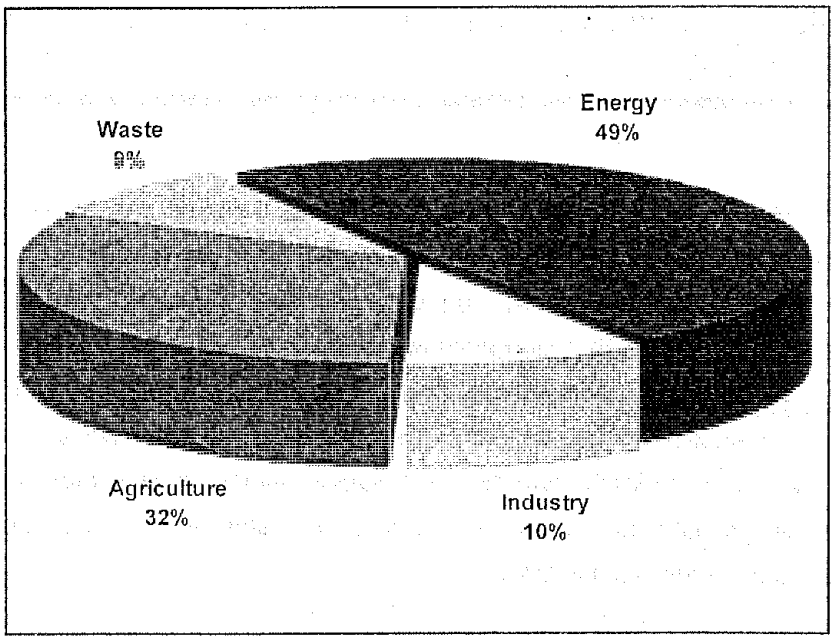

Figure ES-1. 1994 GHG emissions from the four non-LUCF sectors.

The GHGs of concern in the Philippines from these five sectors are mainly CO_2, methane (CH_4), nitrous oxide (N_2O), and hydrofluorocarbons (HFCs). To effectively compare the global warming impact of these non-CO_2 gases with that of CO_2, global warming potential (GWP) calculations are applied to each of these non-CO_2 GHGs. The GWP takes into account the varying efficacy of different GHGs in warming the planet relative to that of CO_2. For example, within a time horizon of 100 years, the current Intergovernmental Panel on Climate Change (IPCC) recommendation for the GWPs of CH_4 and N_2O are 21 and 310, respectively. The CO_2 equivalents are computed by multiplying the actual emissions of non-CO_2 GHGs (e.g. of CH_4 and N_2O) with their respective GWPs. Hence, for example, the potential global warming impact of 100 kt of CH_4 is equivalent to that of 2,100 kt of CO_2. The GHG emissions total cited above is in terms of equivalent CO_2 (to take into account the contribution of non-CO_2 GHGs).

Table ES-2. Total equivalent CO_2 emissions including LUCF sector

Sector	CO_2 Emissions (Gg)
GHG Emissions - LUCF	103,085
LUCF	-127
TOTAL	**102,957**

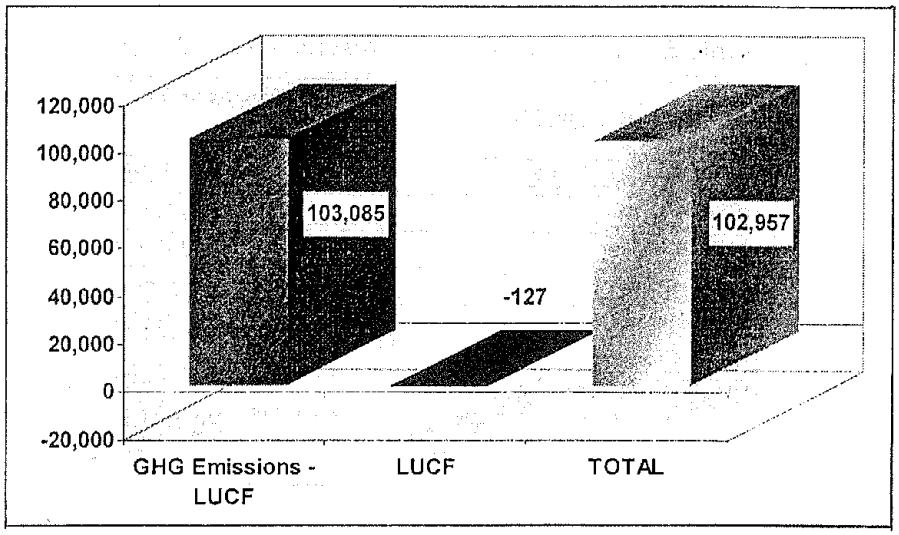

Figure ES-2. Net GHG emissions with the LUCF sector.

GHG emissions in the Energy sector (which is largely CO_2) comes mainly from fuel combustion. This sector alone emitted 50,038 kt of equivalent CO_2 in 1994. The subsector contributions to this total are tabulated in Table ES-3 and illustrated in Figure ES-3.

A significant portion (about 82%) of these emissions is from three major end users of fuel: the power generating industries, transportation, and the manufacturing industries. The main fuel types used in these subsectors are conventional fossil fuels such as oil and coal which are found to contribute substantially to GHG emissions. These conventional fuel types continue to dominate the current and projected energy mix of the country: 76% in 1994 and 67% by the year 2008. Non-conventional energy sources such as biomass, wind, and solar systems comprise only 10% and 21% of the energy mix for 1994 and 2008, respectively. Biomass contributes the greater share among these non-conventional energy systems. GHG emissions from these new and renewable energy systems are assumed to be insignificant.

In the Industry sector, 10,603 kt of CO_2 were released in 1994. A major fraction (86%) of the industrial CO_2 emissions comes from the cement and metal industries (see Table ES-4 and Figure ES-4).

Table ES-3. Equivalent CO_2 emissions from Energy

Subsector	CO_2 Emissions (Gg)
Energy Industries	15,508
Residential	4,359
Industries	9,497
Agriculture	1,189
Transport	15,888
Commercial	3,370
Fugitive Emissions	227
TOTAL	**50,038**

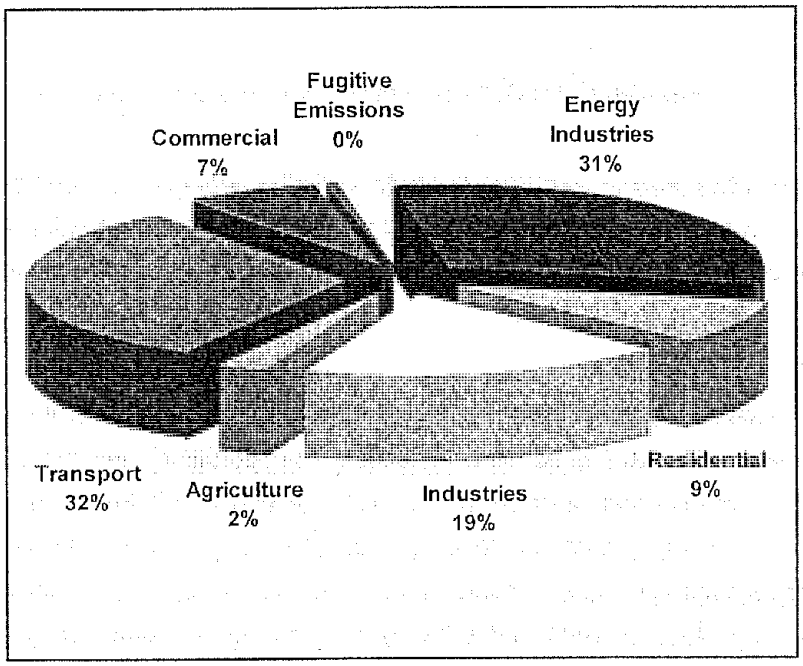

Figure ES-3: Subsector emissions from Energy.

These emissions arise directly from industrial processes associated with manufacturing cement and metals, and are not due to the power generation and consumption activities of these industries which are already accounted for in the Energy sector. In 1994, the Philippines produced around 239 million bags of cement and 2.669 million tons of steel corresponding to CO_2 emissions of 4,771 and 4,318 kt, respectively.

Table ES-4. Equivalent CO_2 emissions from Industrial Processes

Subsector	CO_2 Emissions (Gg)
Cement	4,771
Chemicals	99
Metals	4,334
Halocarbons	1,507
TOTAL	10,711

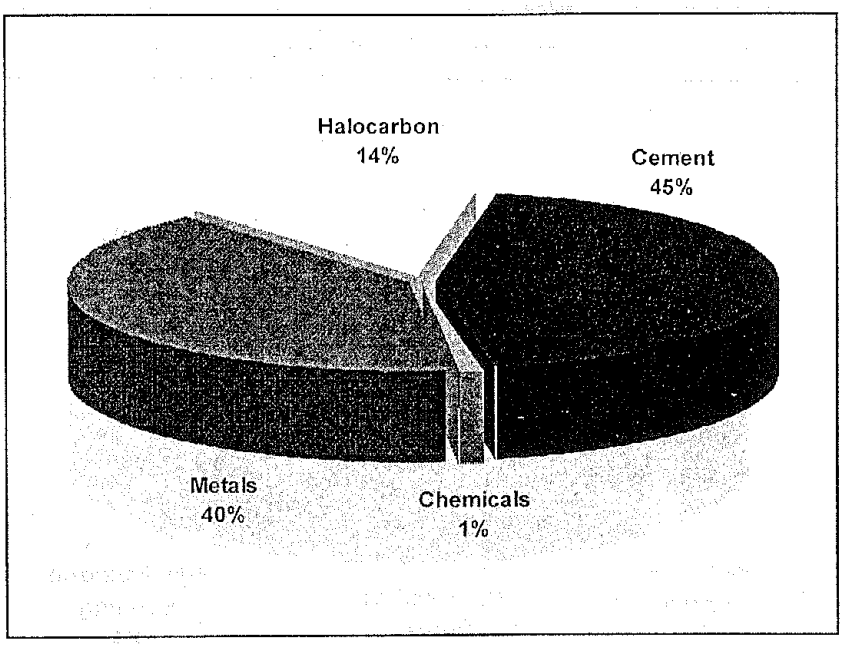

Figure ES-4. Subsector emissions from Industrial Processes.

In the other sectors of Agriculture and Waste, CH_4 and N_2O, rather than CO_2, are the significant GHGs emitted. Both Table ES-5 and Figure ES-5 show the equivalent CO_2 emissions attributed to Agriculture.

In this sector, non-CO_2 GHGs are emitted mostly from rice cultivation, domestic livestock, and agricultural soils. CH_4 emissions from rice paddies comprise about 40% of the Agriculture emissions and are due mostly to the anaerobic decomposition of organic matter in these aquaeous environments. Emissions from domestic livestock are derived mainly from enteric fermentation and manure management of animals such as buffalo, cattle, and swine. The total of 33,137 kt of equivalent CO_2 released from Agriculture (about 32% of the non-LUCF total of GHG emissions) indicates that next to Energy, this sector is an important source of GHGs in the atmosphere.

Table ES-5. Equivalent CO_2 emissions from Agriculture

Subsector	CO_2 Emissions (Gg)
Rice Cultivation	13,364
Domestic Livestock	10,497
Agricultural Residue Burning	583
Agricultural Soils	8,685
Grassland Burning	8
TOTAL	**33,137**

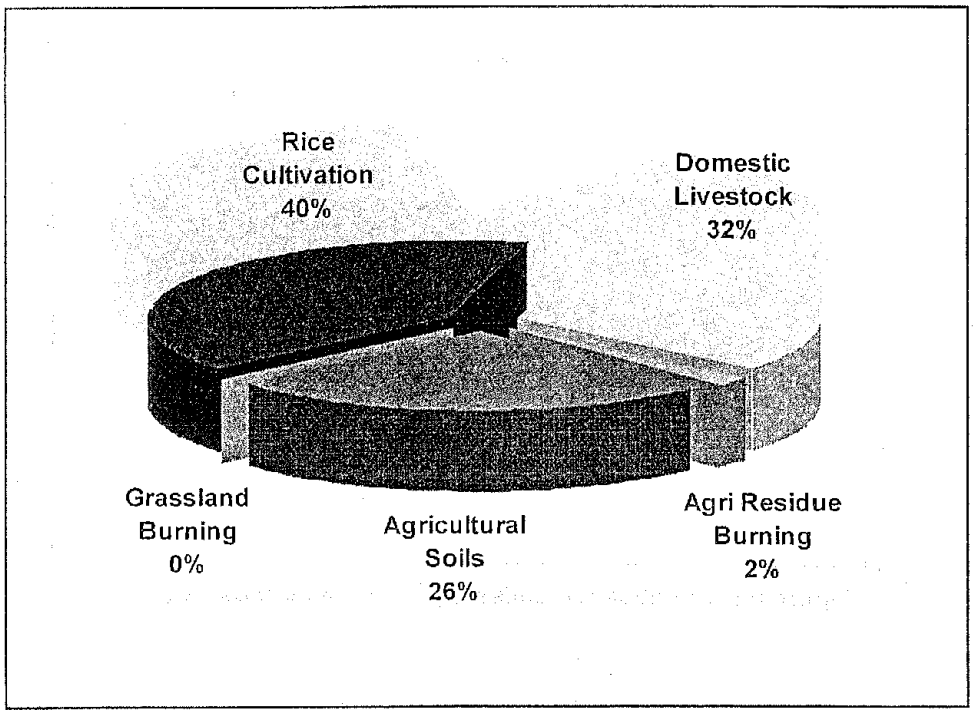

Figure ES-5. Subsector emissions from Agriculture.

GHG emissions from the Waste sector come from solid waste, domestic and industrial wastewater, and human sewage. About 60% of the CH_4 emissions in this sector is from solid waste as shown in Table ES-6 and Figure ES-6. In 1994, an estimated 4,200 kt of solid waste were brought to solid waste disposal sites. This amount does not consider the waste that was either uncollected or indiscriminately dumped in streams or urban waterways. The dumping of this amount of solid waste released about 203 kt of CH_4, equivalent to emitting around 4,253 kt of CO_2 into the atmosphere (using current GWP assumptions). Industrial wastewater, municipal wastewater, and human sewage share almost equally the other 40% of GHG emissions from this sector.

Table ES-6. Equivalent CO_2 emissions from Waste

Subsector	CO_2 Emissions (Gg)
Solid Waste	6,357
Domestic Wastewater	966
Industrial Wastewater	920
Human Sewage	954
TOTAL	**9,198**

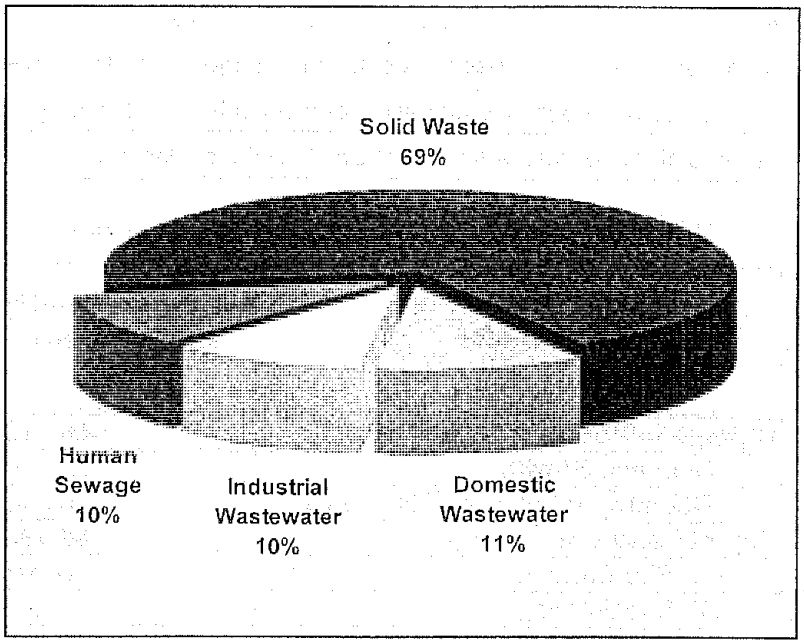

Figure ES-6. Subsector emissions from Waste.

The apparently insignificant total of 127 kt of CO_2 sequestered by the LUCF sector is due to the net impact of non-negligible changes in biomass growth and land use/forest conversion. As shown in Figure ES-7, LUCF sources and sinks individually rise to about 68% of the national total pf GHG emissions from the four non-LUCF sectors. Biomass growth alone from our forested lands and other land use categories is a major factor in bringing GHGs from the atmosphere back into the biosphere. This sink, however, is offset by biomass loss associated with forest harvest and deforestation. The land use area under consideration was about 16 Mha and the biomass growth of these land areas resulted in a cumulative uptake of 110,704 kt CO_2. However, carbon that is sequestered by the annual growth of these different vegetative types is offset by the yearly removal of biomass via harvest and deforestation. Roundwood/Fuelwood harvests in 1994 account for 42,381 kt of CO_2 emitted. Additionally, forest and land use conversion released a total of 68,197 kt CO_2. This includes emissions from activities

such as on site burning (for clearing purposes), off site burning (for domestic/industrial fuelwood), and biomass decay.

The net LUCF contribution is still not complete since biomass growth and loss are not the only determining components of this total. The still unknown impact of Philippine soil carbon and of biomass growth in abandoned lands together with uncertainties in local biomass densities and growth rates make it difficult to obtain a more complete value for the contribution of the LUCF sector to the national GHG emissions total. Despite the uncertainties, present calculations suggest that for the Philippines in 1994, the result of both carbon sequestration and release in LUCF suggests that this sector is still a net sink rather than a source of GHGs in the atmosphere.

Table ES-7. Equivalent CO_2 emissions from LUCF

Subsector	CO_2 Emissions(+) and Uptake(-) (Gg)
Change in Forest/Woody Biomass	**-68,323**
Biomass Growth	-110,704
Roundwood/Fuelwood Harvests	42,381
Forest/Land Use Change	**68,195**
On Site Burning	28,866
Off Site Burning	6,555
Decay	32,774
TOTAL	**-127**

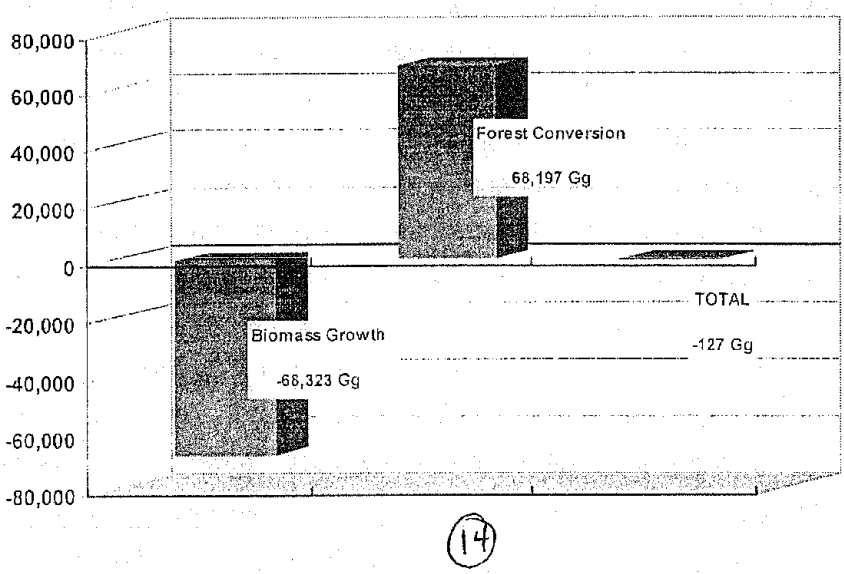

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Figure ES-7. Equivalent CO_2 sources and sinks in LUCF.

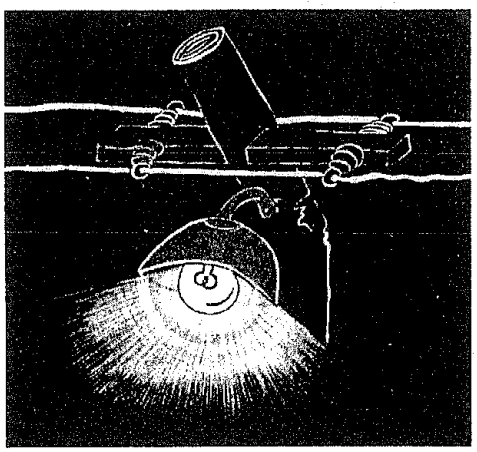
A summary of the inventory of sectoral sources and sinks; including the non-CO2 GHGs, is shown below in Table ES-8.

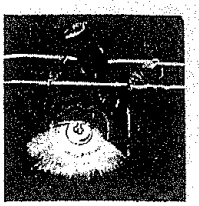
Table ES-8. 1994 GHG Inventory Summary

1994 PHILIPPINE GREENHOUSE GAS INVENTORY (Gg)							
SECTOR and SOURCE CATEGORIES	CO_2	CH_4	N_2O	NO_x	CO	NMVOC	SO_2
I. ENERGY							
A. Fuel Combustion Activities							433.36
1. Energy Industries	15,458	0.51	0.13	38.47	2.83	0.91	
2. Manufacturing Industries	8,980	8.08	1.12	60.93	986.71	13.81	
3. Transport	15,801	2.15	0.14	167.37	719.44	136.77	
4. Commercial/Institutional	3,368	0.06	0.00	0.63	0.13	0.03	
5. Residential	2,544	72.83	0.92	29.22	1,356.21	133.02	
6. Agriculture	1,185	0.11	0.01	1.08	0.22	0.05	
B. Fugitive Emissions from Fuels							
1. Coal Mining		10.32					
2. Oil		0.47		0.62	16.83	7.61	8.94
C. Biomass Emissions *	48,490						
TOTAL EMISSIONS FROM ENERGY	47,335	94.53	2.31	298	3,082	292	442
CO_2 EQUIVALENT	47,335	1,985	717				
TOTAL CO_2 EQUIVALENT	50,038						
II. INDUSTRY							
A. Cement	4,771						2.87
B. Chemicals	94	0.24		0.01	0.22	1.46	9.81
C. Asphalt				0.00	0.00	0.00	0.00
D. Food and Beverages						16.35	
E. Pulp and Paper				0.12	0.44	0.29	0.56
F. Metals	4,334			0.11	0.00	0.08	0.12
G. Halocarbons	1,507						
TOTAL EMISSIONS FROM INDUSTRY	10,707	0.24	0.00	0.23	0.66	18.18	13.35
CO_2 EQUIVALENT	10,707	5	0				
TOTAL CO_2 EQUIVALENT	10,711						
III. AGRICULTURE							
A. Domestic Livestock		333.47	11.27				
B. Rice Cultivation		636.40					
C. Grassland Burning		0.30	0.00	0.14	7.94		
D. Agricultural Residue Burning		20.34	0.50	18.14	427.23		
E. Agricultural Soils			28.02				
TOTAL EMISSIONS FROM AGRICULTURE		990.51	39.80	18	435		
CO_2 EQUIVALENT		20,801	12,337				
TOTAL CO_2 EQUIVALENT	33,137						
IV. WASTE							
A. Solid Wastes		302.73					
B. Domestic/Commercial Wastewater		46.02					
C. Industrial Wastewater		43.83					
D. Human Sewage			3.08				
TOTAL EMISSIONS FROM WASTE		392.58	3.08				
CO_2 EQUIVALENT		8,244	954				
TOTAL CO_2 EQUIVALENT	9,198						
V. LAND USE CHANGE AND FORESTRY							
A. Change in Forest/Woody Biomass	-68,323						
B. Forest/Land Use Change	65,549	114.41	0.79	28.43	1,001.11		
TOTAL EMISSIONS FROM LUCF	-2,774	114	1				
CO_2 EQUIVALENT	-2,774	2,403	244				
TOTAL CO_2 EQUIVALENT	-127						
TOTAL NAT'L GREENHOUSE GAS EMISSIONS	55,268	1,592	46	317	3,518	310	456
EQUIVALENT CO_2	55,268	33,436	14,252				
TOTAL NAT'L EQUIVALENT CO_2 EMISSIONS	102,957						

*CO_2 emissions from biomass are not included in the total (IPCC, 1996)

ENERGY





ENERGY REFERENCE MANUAL

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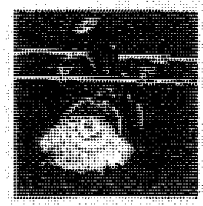


ENERGY SECTOR

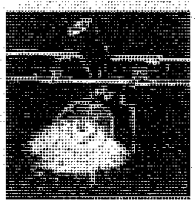
Reference Manual

1.1 INTRODUCTION

Fuel combustion and fuel production activities involving coal, oil, and natural gas are the two major sources of greenhouse gas (GHG) emissions from the Energy sector. Of the two, fuel combustion accounts for most (>90%) of the energy-related GHGs emitted into the atmosphere. Greenhouse gases released from fuel production activities such as coal mining, exploration, production, and processing of oil and gas products are minimal and are termed collectively as fugitive emissions.

Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are the GHGs released in the combustion of fuels. Also released in the process are the GHG precursors carbon monoxide (CO), nitrogen oxides (NO_x), and non-methane volatile organic compounds (NMVOCs). Of these six gases, the major gas emitted is CO_2 and the bulk of calculations in the Energy sector involves determining the amount of CO_2 released in fuel combustion activities. In the 1994 GHG inventory, fuel combustion accounts for 99.55% of the Philippines' energy-related GHG emissions.

In general, the heavy use of fuels can be attributed to activities associated with the energy industries (for power generation), transportation, and manufacturing industries. These three subsectors mainly utilize fossil-based fuels such as coal, fuel oil, diesel, and natural gas, which are found to contribute substantially to CO_2 emissions. According to the Department of Energy (DOE) data archives, these fuel types dominate about 60% of the country's energy mix in 1994 as shown in Figure 1-1. Furthermore, fossil based fuels to comprise 67% of the national energy mix by the year 2008 [DOE, 1999]. New and renewable energy (NRE) systems such as biomass fuel, wind, solar, hydroelectric, and geothermal energy systems account for about 40% of the energy mix in 1994 and a projected 33% for 2008. These NRE systems are assumed to have no net CO_2 emissions.



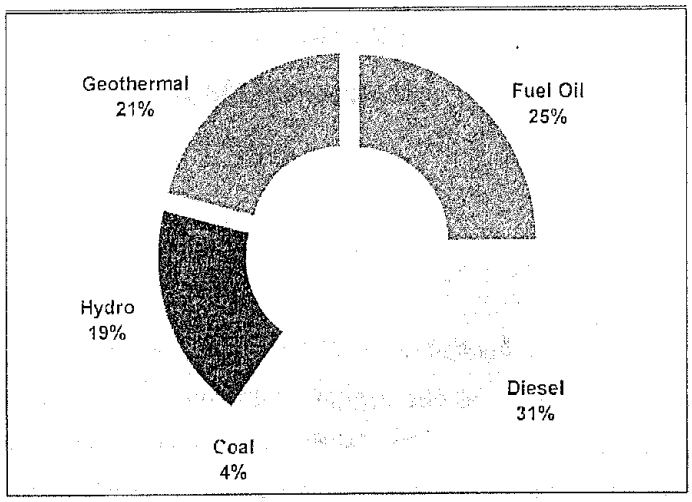


Fig. 1-1. Dominance of fossil fuel based energy in the 1994 Philippine energy mix. (Source: Department of Energy)

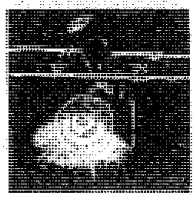
Fugitive GHG emissions from coal mining/handling and oil/gas production activities are mostly CH_4. These emissions, however, are insignificant compared to the GHGs released from fuel combustion. In the 1994 GHG inventory, 13% of the CH_4 emissions in the Energy sector are from fugitive emissions.

In this reference manual, GHG emissions from fossil fuel combustion are discussed in Sections 1.2 and 1.3. Fugitive emissions are explained in Section 1.4. Section 1.5 gives an overview of sulfur dioxide (SO_2) emissions from fuel combustion activities. The last section, Section 1.6, covers memo items such as CO_2 emissions not included in the national total but are still computed separately as recommended by the Revised 1996 IPCC Guidelines (henceforth, IPCC Guidelines) for completeness of the inventory. All the methods used in the computations are based on these IPCC Guidelines.

1.2 CO_2 Emissions From Fuel Combustion Activities

Fossil fuels are compounds that contain hydrocarbons, i.e. carbon and hydrogen atoms bonded together which, upon combustion, are broken down into their components, thus releasing energy in the process. The hydrogen and carbon molecules bond with oxygen to form H_2O and CO_2, respectively. This is illustrated schematically below:

$$\text{Hydrocarbon} + O_2 \xrightarrow[\text{Combustion}]{} H_2O,\ CO_2 + \text{Energy}$$



Estimating CO_2 emissions from fuel combustion can be done through either of two approaches, namely, the **top-down (or reference approach)**, and the **bottom-up (or sectoral approach)**. In the former, CO_2 emissions are accounted for by considering the overall supply of energy of the country in a particular year. In the bottom-up approach, CO_2 emissions are determined from the various subsectors that consume this supply of energy (hence, the sectoral approach). These two methods are discussed more extensively in the succeeding two subsections.

In both methods, the general formula used to compute for CO_2 emissions is:

$$\textit{Emissions (t } CO_2\textit{)} = \Sigma\,[\textit{Fuel Consumption (TJ)} \times \textit{Carbon Emission Factor (t C/TJ)} - \textit{Carbon Stored (t C)}] \times \textit{Fraction Oxidized} \times 44/12 \qquad \text{Eq 1-1}$$

where:

t CO_2 = tons (or 1000 kg) of CO_2

TJ = terajoules (10^{12} Joules)

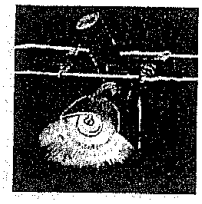
44/12 = ratio of the molecular weight of CO_2 (i.e., 44) to the atomic weight of C (i.e., 12) which is used to convert mass from C to CO_2

The summation (Σ) is carried over all types of fuel involved in energy combustion activities. These fuel types are listed below in Table 1-1.

Table 1-1. 1994 Philippine local fuel classification

Solid Fossils	*Primary Fuel*	Coal
Liquid Fossils	*Primary Fuel*	Crude Oil
	Secondary Fuels	Gasoline Kerosene Diesel Fuel Oil LPG Avturbo Naptha Asphalt Avgas Lube/Grease
Biomass Fuels	*Solid Biomass*	Wood/Woodwaste Bagasse Agriwaste (Crop Residue) Charcoal Animal Waste Industrial Waste/Black Liquor

Source: Department of Energy



Fuel consumption data for both the top-down and bottom-up approaches may be obtained from the DOE. For 1994, the DOE issued an Overall Energy Balance (OEB) sheet containing the fuel supply and consumption data of the different subsectors per to fuel type. This balance sheet also contains all the information needed for the top-down approach such as fuel production, import, export, stock change, and international bunker (to be explained further below). The 1994 OEB sheet is attached as Appendix 1A.

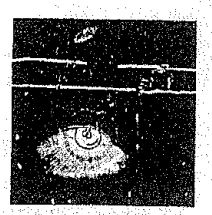
Note that in Eq 1-1, fuel consumption is expressed in terajoules (TJ), a unit of energy. In the OEB sheet, consumption data are expressed in ktoe or kilotons of oil equivalent, which is also an energy unit. (The conversion from ktoe to TJ is simply given by the relation: 1 ktoe = 41.868 TJ.) An energy unit such as TJ or ktoe provides consistency and uniformity when reporting energy utilization from various fuel types. Because raw fuel data can be expressed in different units, it is important to reduce all data into a common unit of energy. Liquid fuel can be expressed in barrels (bbl) and liters (li) and solid fuel in metric tons (MT). To convert these different fuel types to a common unit of energy, such as ktoe, the conversion factors are given in Appendix 1B. Other useful conversion factors (such as bbl to li) are also detailed here.

The **carbon emission factor**, as its name implies, indicates the carbon content of the fuel with respect to its energy content (t C/TJ). Shown in Table 1-2 are the default emission factors recommended by the IPCC Guidelines as well as the correspondence between the IPCC and local fuel types.

Table 1-2. Local and IPCC fuel types and emission factors

Local Fuel Type	IPCC Equivalent	Carbon Emission Factor (t C/TJ)
Coal	Sub Bituminous Coal	26.2
Crude Oil	Crude Oil	20.0
Premium Gasoline	Gasoline	18.9
Regular Gasoline	Gasoline	18.9
Unleaded Gasoline	Gasoline	18.9
Kerosene	Other Kerosene	19.6
Diesel	Gas/Diesel Oil	20.2
Fuel Oil	Residual Fuel Oil	21.1
LPG	LPG	17.2
Avturbo	Jet Kerosene	21.1
Naptha	Naptha	20.0
Asphalt	Bitumen	22.0
Avgas	Other Oil	20.0
Lube/Grease	Lubricants	20.0

Source: IPCC, 1997



IPCC [1996] recommends the above emission factors (EFs) as default values in the absence of local data. The IPCC, however, encourages the use of local factors if available.

Carbon stored refers to the non-combusted carbon in fuels. Hence, this should be subtracted from the overall energy CO_2 emissions. The top-down and bottom-up approaches have different methods of getting this value.

Top-Down Approach for Carbon Stored

Although included in the Energy sector, some fuel types such as asphalt and coal are used in non-energy activities. Road paving for example uses asphalt extensively. In this case, the carbon content of asphalt is not oxidized or combusted and is said to be stored. The release of this carbon into the atmosphere occurs gradually and is no longer covered in the fuel combustion process of energy activities. This amount of carbon must be deducted from the calculated emissions.

Information on fuel quantities involved in non-energy use can also be obtained from the DOE. This is likewise contained in the 1994 OEB sheet. Another source of information is the *Philippine Statistical Yearbook* which contains data on Philippine non-fuel petroleum consumption specifically for asphalt, naptha, and lubricants (lube/grease). For these fuel types, an auxiliary worksheet in the Energy Workbook is provided to compute for the amount of carbon stored.

Bottom-Up or Sectoral Approach for Carbon Stored

In the 1994 inventory, it is assumed that no carbon is stored for all fuels types except for lube/grease. For this fuel type, the IPCC default value of 0.5, i.e. 50% of the lube/grease ktoe is assumed to be stored. IPCC, however, also recommends values for estimating the fraction of carbon stored for the following fuel types: bitumen and feedstock materials such as naptha, gas/diesel oil, LPG, and ethane.

In fuel combustion, not all of the fuel's carbon content will be completely burned or oxidized. Table 1-3 lists the default IPCC values for the **fraction of carbon oxidized** per fuel type. The applicability of these values to local fuel types, however, remains to be determined.

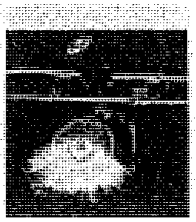


Table 1-3. Fraction of carbon oxidized in fuel combustion

Fuel Type	Fraction of Carbon Oxidized
Liquid Fossils	0.99
Solid Fossil or Coal	0.98
Biomass Fuels	0.88

Source: IPCC, 1997

1.2.1 TOP-DOWN OR REFERENCE APPROACH

The top-down approach calculates CO_2 emissions by looking at the primary level of energy supply and distribution. The basic data requirement is an overall inventory of the national fuel supply which includes information on fuel quantities for each of the fuel types listed in Table 1-1 that are utilized in the following activities:

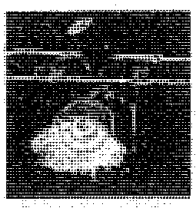
- production
- imports
- exports
- international bunkers, or the amount of fuel used for international aviation and marine transport
- stock change, or the variations in the quantity of fuel in stock.

Given these data, each fuel type's apparent consumption is computed thus:

$$Apparent\ Consumption = Production + Imports - Exports - International\ Bunkers - Stock\ Change \quad \text{Eq 1-2}$$

In Eq 1-2, fuels that are exported and fuels used for international bunkers (i.e., marine and aviation transport) are subtracted from the overall apparent consumption, hence are not included in the national GHG emissions inventory. CO_2 emissions from international bunkers are nonetheless computed as a separate memo item as recommended by IPCC [1996].

Stock change is the difference in fuel stocks between the previous year and the present inventory year. A negative stock change means a decrease in the fuel stock inventory which signifies an increase in the apparent consumption for the present



inventory year. A positive stock change, on the other hand, implies an increase in fuel stocks, hence, a decrease in the apparent consumption.

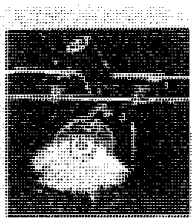
The apparent consumption given by Eq 1-2 is entered into Eq 1-1 to compute for CO_2 emissions using the top-down approach. Inventory results from this approach can be considered as an upperbound (or maximum) of the CO_2 emissions from fuel combustion activities. The approach provides an immediate, overall picture of the energy related emissions based on apparent fuel consumption based on the country's primary energy supply.

1.2.2. Bottom-Up or Sectoral Approach

The bottom-up approach is a more detailed method than the top-down approach. Computations are based on actual fuel consumption reported by six specific end-users of fuel: energy (or power generating) industries, transportation, manufacturing, residential, commercial, and agriculture.

The **energy industries** subsector consumes fuel through power plants that generate electricity. In 1994, power generation sources in the country can be categorized according to the following systems: Oil, Diesel, Coal, Gas Turbines, Hydropower, Geothermal, and NREs which refer to wind, solar, and biomass systems. By the year 2002, natural gas systems are scheduled to come on line. Of these eight power generating sources (including natural gas), five are dependent on fossil fuels: oil-based power plants, diesel and gas turbine plants, natural gas systems, and coal fired power plants. Hence, CO_2 emissions from this subsector may come mainly from the combustion of these four fuel types: fuel oil, diesel, coal, and natural gas (presumably by 2002).

The **transportation** subsector is made up of road, water, and air transport systems. Gasoline and diesel are the main fuel types used in road transport. In the Philippines, gasoline is further classified into premium, regular, and unleaded. The IPCC Guidelines, however, group these fuel types into one category which is gasoline. Other fuel types which are also used (in insignificant quantities) in road transportation are kerosene and fuel oil. Fuels for air transport are avturbo and avgas while for marine transport, diesel and fuel oil are the dominant fuel types.



Aside from the energy provided by power producers, **manufacturing industries** also buy raw fuel for other energy needs. The three dominant fuel types utilized in this subsector are coal, fuel oil, and diesel. About half of the total coal consumed in 1994 is from the cement industry. The biggest consumers of fuel oil are the food processing and cement industries.

The **residential** subsector is heavily dependent on LPG and kerosene for domestic activities such as cooking and lighting. Diesel and regular gasoline are used in relatively small quantities in this subsector.

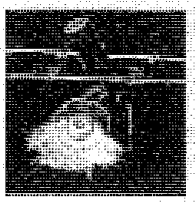
In the **commercial** subsector, diesel, fuel oil, and LPG are the fuel types commonly used. This subsector also uses regular gasoline and kerosene for its energy requirements.

In **agriculture**, diesel is the dominant fuel type used to run tractors and other heavy agricultural machinery. Other fuel types used in this subsector are regular gasoline, kerosene, and fuel oil.

The total fuel consumption of these subsectors by fuel type is entered into Eq 1-1 to determine CO_2 emissions per subsector.

The bottom-up approach provides a more detailed inventory of the CO_2 emissions from fuel combustion. It identifies the specific sectoral consumers of fuel and thus the major emitters of energy related greenhouse gases. Compared to the top-down approach, however, it is more data and computation intensive. Also, the estimated CO_2 emissions may be underestimated since this approach relies heavily on data reported by fuel end-users which may not always be complete. The completeness of data submitted, if at all, to the DOE has always been a perennial problem.

It is recommended that both top-down and bottom-up calculations be done. Ideally, there should not be much of a difference in the emission results using the two methods. In the 1994 inventory, there is a relatively small difference of 2,665 kt CO_2 between the computed emissions using the top-down (49,999.51 kt CO_2) and bottom-up (47,335.37 kt CO_2) approaches.



1.3 NON-CO_2 EMISSIONS FROM FUEL COMBUSTION ACTIVITIES

The combustion of fuels also releases non-CO_2 GHGs such as methane (CH_4), and nitrous oxide (N_2O) as well as the GHG precursors carbon monoxide (CO), nitrogen oxides (NO_x), and non-methane volatile organic compounds (NMVOCs). This section discusses the contribution of these gases to the total energy related GHG emissions.

In order to compare the warming effect of the non-CO_2 gases, CH_4 and N_2O, global warming potential (GWP) coefficients are applied. The GWP takes into account the varying effectiveness of the different GHGs in warming the planet with respect to CO_2. The current IPCC [1996] recommendation for the GWPs of CH_4 and N_2O are 21 and 310, respectively. The CO_2 equivalents are computed by multiplying the actual emissions (of CH_4 and N_2O) with the respective global warming potentials. Hence, for example, 100 Gg of CH_4 is equivalent to 2100 Gg of CO_2.

To compute for these non-CO_2 emissions, the following equation is used:

Non-CO_2 Emissions (kg gas)

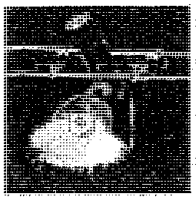
= *Fuel Consumption (TJ)* x *Emission Factor (kg gas/TJ)* Eq 1-3

In the next two sections (1.3.1 and 1.3.2), the two variables of the right hand side of this equation, namely fuel consumption data and the non-CO_2 emission factors, are explained further.

1.3.1 FUEL CONSUMPTION DATA FOR NON-CO_2 EMISSIONS

For fossil fuels such as coal and the oil derivatives, the data required are the same fuel consumption values contained in the OEB sheet. Non-CO_2 emissions, however, also include those emissions from the combustion of biomass fuels such as wood/woodwaste, charcoal, and other biomass/wastes (e.g., bagasse, agriwaste, animal wastes, industrial wastes, etc). The OEB sheet contains information on consumed biomass fuels only for the industry subsector. Unfortunately, the OEB does not contain data for the residential sector where this type of fuel is utilized the most.

Data on biomass fuel consumption in the residential subsector are obtained via interpolation. For the 1994 inventory, one basis is the data on biomass fuel consumption in the residential subsector found in the United Nations Development Programme/World



Bank Energy Sector Management Assistance Programme [UNDP-ESMAP, 1992] study on household energy consumption for 1989. The DOE started its own Household Energy Consumption Study (HECS) only in 1995. The ESMAP study made projections of household energy consumption patterns for the years 1995 and 2000 aside from the actual sampling that they carried out in 1989 based on a national annual population growth rate of 2.2%. The 1994 values are interpolated using the three sets of data points for 1989, 1995, and 2000.

To interpolate the values for biomass fuel consumption such as charcoal, for the year 1994, the available data points are first plotted. The values for charcoal are shown in Table 1-4.

Table 1-4. Charcoal consumption values for the year 1989 and projected values for the years 1995 and 2000

Year	Charcoal Consumption (kt)
1989	837
1995	966
2000	1,074

Source: UNDP-ESMAP, 1992

An exponential trend or regression line is drawn along these three points and the corresponding equation for the function is obtained. This is shown in Figure 1-3, where the broken lines represent the best fit line.

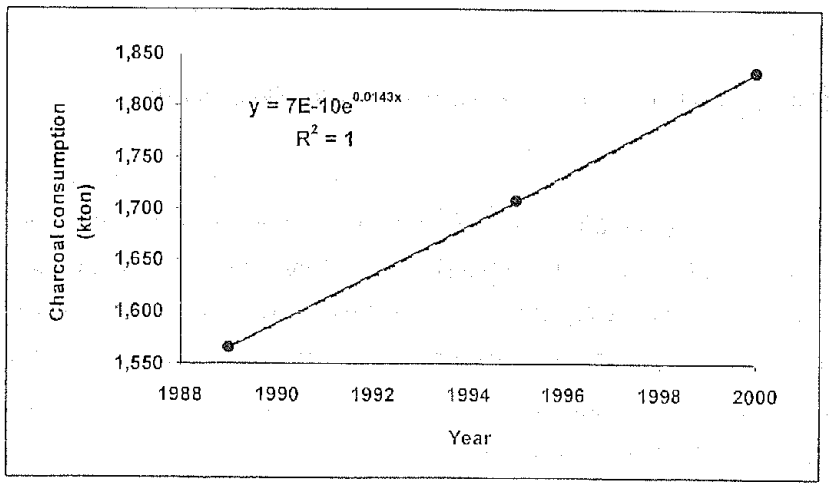
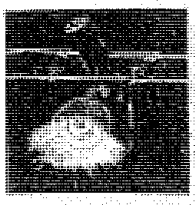


Figure 1-3. Charcoal consumption interpolation with the corresponding exponential fit equation.



The corresponding exponential function obtained is given by,

$$y = 7 \times 10^{-10} \exp(0.0143x)$$

where y is the unknown consumption variable for a particular year. For the year 1994 (x=1994), the charcoal consumption is found to be 1,693 kt (upon solving for y). The exponential trend line is chosen since it indicates the annual growth rate of the biomass fuel consumption. This annual growth rate is approximately equal to the coefficient of x which in the above equation is approximately 0.0143 or 1.43%. (Strictly speaking, the annual growth rate is equal to ($e^{0.0143}$ – 1) or 0.0144 or 1.44%.)

Table 1-5 shows the household consumption data for the three biomass fuels (charcoal, wood, and agriwaste) from the ESMAP study and the interpolated values for 1994. The corresponding trendline equations are also given.

Table 1-5. Consumption data for charcoal, wood and agriwaste including interpolated values with trendline equations

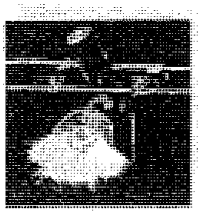
Year	Data Source	Charcoal (kt)	Wood (kt)	Agriwaste (kt)
1989	UNDP-ESMAP (actual)	1,564.93	18,316.90	2,570.45
1994	***Interpolated***	***1,681.44***	***19,270.44***	***2,702.00***
1995	UNDP-ESMAP (projection)	1,706.74	19,561.84	2,742.42
2000	UNDP-ESMAP (projection)	1,831.51	20,361.38	2,852.08
Interpolation Equations		$y=(7x10^{10}) \cdot \exp(0.0143x)$	$y=(8x10^{-05}) \cdot \exp(0.0097x)$	$y=(2x10^{-05}) \cdot \exp(0.0095x)$

1.3.2 Emission Factors for Non-CO_2 Emissions

Non-CO_2 emissions depend not only on the type of fuel used but also on the specific end user and the particular trace gas. In the agriculture subsector, it is also important to know whether fuel combustion activities are mobile or stationary. In the 1994 inventory, diesel is the major fuel type for agricultural transport equipment like tractors and thus falls under the mobile category.

Methane (CH_4)

Methane emissions come from the incomplete combustion of hydrocarbons in fuels. For mobile sources, the amount of CH_4 emitted is also a function of the methane content of the fuel, the amount of hydrocarbons unburnt in the engine, the engine type, and any



post-combustion controls [IPCC, 1997]. CH_4 emissions from fuel combustion are relatively small on a global scale and the uncertainty is high.

In the 1994 inventory, most of the CH_4 emissions come from the incomplete burning of biomass fuels such as wood/woodwaste, charcoal, and other biomass/waste. This in itself is 97% of the total CH_4 emissions from fuel combustion activities. Table 1-6 shows the default IPCC CH_4 EFs for each subsector and fuel type.

Table 1-6. CH_4 default emission factors (kg CH_4/TJ)

			Coal	Oil		Wood/ Wood Waste	Charcoal	Other Biomass and Wastes
Energy Industries			1	3		30	200	30
Manufacturing Industries			10	2		30	200	30
Transport	Aviation			0.5				
	Road			Gasoline	Diesel			
				20	5			
	Navigation		10	5				
Other	Commercial/Institutional		10	10		300	200	300
Sectors	Residential		300	10		300	200	300
	Agriculture/	Stationary	300	10		300	200	300
	Fishing	Mobile		5				

Source: IPCC, 1997

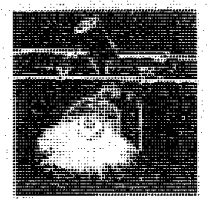
Nitrous Oxide (N_2O)

The combustion of fossil fuels also releases nitrous oxide, N_2O. As with CH_4, the contribution of fuel combustion to global N_2O emissions is minor and the uncertainty is high [IPCC, 1997]. Table 1-7 shows the default IPCC EFs for N_2O per subsector and fuel type.

Table 1-7. N_2O default emission factors (kg N_2O/TJ)

			Coal	Oil		Wood/ Wood Waste	Charcoal	Other Biomass and Wastes
Energy Industries			1.4	0.6		4	4	4
Manufacturing Industries			1.4	0.6		4	4	4
Transport	Aviation			2				
	Road			Gasoline	Diesel			
				0.6	0.6			
	Navigation		1.4	0.6				
Other	Commercial/Institutional		1.4	0.6		4	1	4
Sectors	Residential		1.4	0.6		4	1	4
	Agriculture/	Stationary	1.4	0.6		4	1	4
	Fishing	Mobile		0.6				

Source: IPCC, 1997



Nitrogen Oxides (NO_x)

Most of the emissions of NO_x from fuel combustion activities (about 48% in 1994) are from mobile sources. Even if it is not a GHG, NO_x plays a role in the formation of tropospheric ozone, O_3, as well as in the formation of acid rain. Table 1-8 shows the default IPCC emission factors for NO_x per subsector and fuel type.

Table 1-8. NO_x default emission factors (kg NO_x/TJ)

			Coal	Oil		Wood/ Wood Waste	Charcoal	Other Biomass and Wastes
Energy Industries			300	200		100	100	100
Manufacturing Industries			300	200		100	100	100
Transport	Aviation			300				
	Road			Gasoline	Diesel			
				600	800			
	Navigation		300	1500				
Other	Commercial/Institutional		100	100		100	100	100
Sectors	Residential		100	100		100	100	100
	Agriculture/	Stationary	100	100		100	100	100
	Fishing	Mobile		1200				

Source: IPCC, 1997

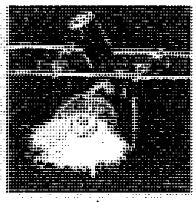
Carbon Monoxide (CO)

In general, the release of CO from the Energy sector comes from the incomplete combustion of fuel in motor vehicles. Note, however, the large EFs for biomass fuels in the commercial, residential, and agriculture subsectors shown in **Table 1-9** which lists the default IPCC values. This indicates that high CO emissions may also come from these fuel end users specially if biomass consumption is large. The residential sector, in particular, is a potential major CO emitter because of its intensive use of biomass (e.g. fuelwood and charcoal) for domestic cooking. In 1994, this sector accounts for 66% of the total CO emissions. Transportation contributes only about 23%.

Table 1-9. CO default emission factors (kg CO/TJ)

			Coal	Oil		Wood/ Wood Waste	Charcoal	Other Biomass and Wastes
Energy Industries			20	15		1000	1000	1000
Manufacturing Industries			150	10		2000	4000	4000
Transport	Aviation			100				
	Road			Gasoline	Diesel			
				8000	1000			
	Navigation		150	1000				
Other	Commercial/Institutional		2000	20		5000	7000	5000
Sectors	Residential		2000	20		5000	7000	5000
	Agriculture/	Stationary	2000	20		5000	7000	5000
	Fishing	Mobile		1000				

Source: IPCC, 1997



Non-methane Volatile Organic Compounds (NMVOCs)

Transportation and residential combustion of biomass fuels are the more important sources of NMVOCs. These two subsectors contribute 97% of the total NMVOC emissions from fuel combustion in 1994. Table 1-10 shows the default IPCC EFs for NMVOCs per subsector and per fuel type.

Table 1-10. NMVOC default emission factors (kg NMVOC/TJ)

			Coal	Oil		Wood/ Wood Waste	Charcoal	Other Biomass and Wastes
Energy Industries			5	5		50	100	50
Manufacturing Industries			20	5		50	100	50
Transport	Aviation			50				
	Road			Gasoline	Diesel			
				1500	200			
	Navigation		20	200				
Other	Commercial/Institutional		200	5		600	100	600
Sectors	Residential		200	5		600	100	600
	Agriculture/	Stationary	200	5		600	100	600
	Fishing	Mobile		200				

Source: IPCC, 1997

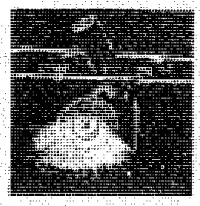
1.4 Fugitive Emissions

The release of GHGs into the atmosphere occurs not only during the combustion of fuels. The extraction of fuels and related activities such as fuel transport, processing, and storage, also result in GHG emissions of which CH_4 is the most notable. This section takes into account fugitive emissions from two main processes: a) coal mining and handling, and b) oil activities such as production, transport, refining and storage.

It is noted that there are other sources of fugitive CH_4 emissions and these are: venting/flaring in oil and gas production and activities involved in (natural) gas production/exploration. In the 1994 inventory, however, no information is available for these two processes. Data on venting and flaring are not regularly submitted by oil company contractors to the DOE and natural gas systems are expected to come on line only in 2002, as previously mentioned.

1.4.1 CH_4 Emissions from Coal Mining and Handling

Methane is inherently generated when coal is formed over millions of years. The extent of this coal formation determines how much CH_4 is generated. Once generated, the



amount of CH_4 in coal is controlled by the pressure and temperature of the coal seam [IPCC, 1997]. When coal is extracted or mined, the layers above the coal seam are removed, thus reducing the pressure and causing the release of CH_4 into the atmosphere.

The three main sources of CH_4 in these subsectors are underground mines, surface mines, and post-mining activities. It is important to distinguish underground mines from surface mines because depth affects the quantity of CH_4 stored in coal. Coal at greater depths will have higher concentrations of CH_4 since the pressure is greater. Hence, the emission factors are lower for surface mines and CH_4 emissions are generally also lower.

Coal processing, transport, and use are post-mining activities that also release CH_4. Desorption (or release) of CH_4 from the coal may occur while in transit or when the coal is crushed, broken and left to dry.

The emissions in all these processes are computed using the equation:

$$Emissions(Gg\ CH_4) = Emission\ Factor\ (m^3\ CH_4/ton) \times Tons\ of\ Coal\ produced \times Conversion\ Factor\ (Gg/10^6\ m^3) \quad \text{Eq 1-4}$$

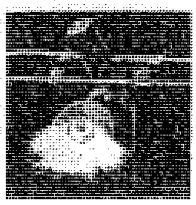
where the conversion factor converts the volume of CH_4 to a weight measure and is simply the density of methane at 20°C and 1 atm, 0.67 $Gg/10^6 m^3$. Table 1-11 shows the range of EFs for mining activities.

Table 1-11. Emission Factors for Mining Activities (Gg CH_4/ million ton of coal)

	Type of Mine/Activity	
	Underground	*Surface*
Mining	6.7-16.75	0.201-1.34
Post-mining	0.603-2.68	0-0.134

Source: IPCC, 1997

In the 1994 inventory, underground and surface mines produced 0.73 and 0.72 million tons of coal, respectively. Note that the amount of coal produced for mining and post-mining activities will be the same since the same quantity of coal is involved in both processes. Getting the average of the range of EFs listed in Table 1-11 and multiplying it by the corresponding production values, coal mining and handling activities in 1994 emitted a total of 10.32 Gg of CH_4.



1.4.2 FUGITIVE EMISSIONS FROM OIL ACTIVITIES

CH_4 is released when crude oil is produced, transported, and stored. In 1994, 10.69 PJ (peta or 10^{15} Joules) of oil were produced, 506.11 PJ loaded in tankers (or transported), and 497.75 PJ of oil refined and stored afterwards. These data were obtained from the DOE. To compute for CH_4 emissions, the following relation is applied

$$CH_4 \text{ Emissions from Oil Activities} = \sum A_i \times EF_i \qquad \text{Eq 1-5}$$

where A is the amount of oil in PJ involved in activity i, EF is the corresponding emission factor for activity i, and the summation is carried over each of the oil activities. Using the EFs listed in Table 1-12, oil activities in 1994 released 0.47 Gg of CH_4.

Table 1-12. Emission factors for oil production, transport, and storage activities

Category	Activity (PJ)	Emission Factor (kg CH_4/PJ)
Production	PJ of Oil Produced	2650
Transport	PJ of Oil Loaded in Tankers	745
Stored	PJ of Oil Refined	135

Source: IPCC, 1997

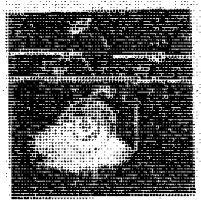
Note that there are no CH_4 emissions from oil refining. Gas emissions in this particular oil activity are sulfur dioxide (SO_2) and the GHG precursors CO, NOx, and NMVOC. To compute for these non-CO_2 emissions, the main information required is the crude oil throughput in kilotons from oil refining and catalytic cracking. These values, which can be obtained from the oil refining companies, are then multiplied to the emission factors given in Tables 1-13 and 1-14.

Table 1-13. Emission factors for GHG precursors and SO_2 from oil refining

Pollutant	Emission Factor (kg gas/t)
CO	0.09
NOx	0.06
NMVOC	0.62
SO_2	0.93

Source: IPCC, 1997

The GHG precursor, NMVOC, is also released through evaporation during oil storage. The emissions depend on the type and condition of the storage tanks. Table 1-



15 lists the emission factors from storage and handling for each type of storage tank. The emission factor is multiplied with the crude oil throughput from catalytic cracking to get the NMVOC emissions.

Table 1-14. Emission factors for GHG precursors and SO_2 from catalytic cracking

Pollutant	Emission Factor (kg gas/t)
CO	42.60
NOx	0.20
NMVOC	0.60
SO_2	1.50

Source: IPCC, 1997

Table 1-15. Emission factors for NMVOC emissions from oil storage and handling

Type of Handling Facility	Emission Factor (kg NMVOC/t)
Secondary Seals	0.20
Primary Seals	0.70
Fixed roof	4.90

If no information is available on the type of handling facility, the highest emission factor is used. Furthermore, countries with warm climate may have higher emissions. The 1994 inventory used the value for the fixed roof storage type which is also the highest emission factor listed in the Table 1-15.

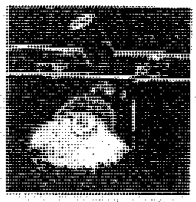
1.5 SO_2 Emissions from Fuel Combustion Activities

Even if sulfur dioxide (SO_2) is not a greenhouse gas, it has the potential to alter local or regional climate as an aerosol precursor.

SO_2 emissions are computed using the relation

$$SO_2 \ Emissions \ (kg) = \sum \left(EF_{ij} (kg \ SO_2 / TJ) \times A_{ij} (TJ) \right) \qquad \text{Eq 1-6}$$

where the summation is carried over all fuel types *i*, and sector activities *j*, *EF* is the emission factor, and *A* is activity data on energy consumption.



The emission factor depends on the fuel's sulfur content, sulfur retention in ash, abatement efficiency (if existing), and net calorific value. Given the above information, the emission factor is given by:

$$SO_2\ Emission\ Factor = 2\times\left(\frac{s}{100}\right)\times\left(\frac{1}{Q}\right)\times 10^6\times\left(\frac{100-r}{100}\right)\times\left(\frac{100-n}{100}\right) \quad \text{Eq 1-7}$$

where the factor 2 in the right hand side of the equation is the molecular weight ratio of SO_2 to S, s is the % sulfur content, r is the % retention of sulfur in ash, Q is the net calorific value (TJ/kt), the factor 10^6 is the (unit) conversion factor, and n is % efficiency of abatement technology and/or reduction efficiency.

Local data on the sulfur content of fuels exist for some fuel types, as provided by the DOE. For other fuel types, IPCC default values are used. Table 1-16 shows the sulfur content (%) of the different fuel types. Table 1-17 shows the net calorific values for the different fuel types.

Table 1-16. Sulfur content of the different fuel types

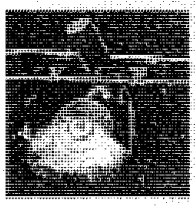
Fuel Type	% Sulfur Content in Fuel
Coal	3*
Fuel Oil	3
Diesel (road)	0.8*
Gasoline (road)	0.1*
Avturbo	0.05
Industrial Waste/Black Liquor	0.2
Fuelwood	0.2
Other Biomass	
Bagasse	0.02
Agriwaste	0.02
Animal Waste	0.02

Sources: *DOE; IPCC, 1997

Table 1-17. Net calorific values for the different fuel types

Fuel Type	Net Calorific Value (TJ/kt)
Coal	42.58
Fuel Oil	40.19
Diesel (road)	43.33
Gasoline (road)	44.80
Avturbo	44.59
Industrial Waste/Black Liquor	11.00
Fuelwood	15.00
Other Biomass	
Bagasse	8.00
Agriwaste	15.00
Animal Waste	11.00

Source: IPCC, 1997



1.6 MEMO ITEMS

1.6.1 CO_2 FROM BIOMASS FUEL

CO_2 emissions from the combustion of biomass fuels are covered as a memo item for completeness in the inventory process, as recommended by the IPCC [1996]. The computed CO_2 emissions, however, are not included in the inventory total since it is assumed that CO_2 released from the consumed biomass is absorbed in biomass regrowth [IPCC, 1997] and is thus taken up in the next growing cycle. Irretrievable net CO_2 emissions from biomass sources are accounted for in the Land Use Change/Forestry sector.

However, non-CO_2 emissions from biomass fuels such as wood/woodwaste, charcoal, and other biomass/wastes, are not memo items and are therefore included in the inventory.

1.6.2 CO_2 FROM INTERNATIONAL BUNKERS

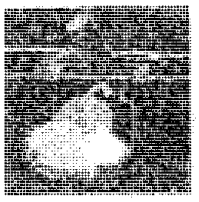
CO_2 emissions from fuel combustion in international marine and aviation are computed separately. As recommended by the IPCC Guidelines, these emissions are not to be included in the inventory total.

1.6.3 CO_2 FROM FUEL COMBUSTION IN INDUSTRY

The industry subsector can be categorized further into specific industries such as cement, sugar, paper processing, etc. This section is included if a more detailed inventory is desired to quantify the CO_2 emissions from the fuel consumption of each of these industries. Major industries that emit the most CO_2 as well as other GHGs can be readily identified if this detailed inventory is undertaken.

1.7 CONCLUSION

Fuel combustion activities and fugitive emissions are the two main sources of GHGs in the Energy sector. Majority of the emissions, however, come from the former. The combustion of conventional fossil fuel such as coal and oil, contributes substantially to GHG emissions, especially CO_2. Future emissions will have to account for natural gas based power, which is scheduled to come online in the country by 2002.



Fugitive emissions, on the other hand, are mostly composed of CH_4 coming from activities associated with coal mining/handling and oil production, transport, and refining. Although CH_4 has a high GWP, the net amount of CH_4 emitted is much smaller than the net CO_2 emissions coming from fuel combustion activities. A summary of the 1994 GHG emissions from the Energy sector is shown in **Figure 1-4**.

Sub Sector	CO_2 Emissions (Gg)
Energy Industries	15,508
Residential	4,359
Industries	9,497
Agriculture	1,189
Transport	15,888
Commercial	3,370
Fugitive Emissions	227
TOTAL	50,038

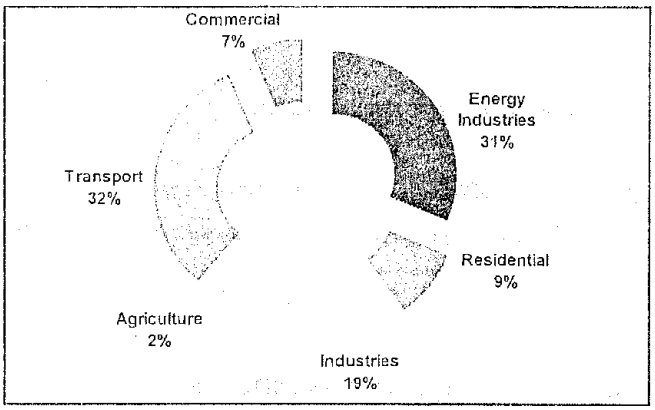
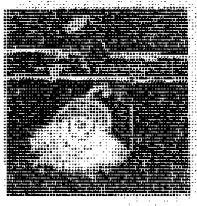


Figure 1-4. 1994 GHG emissions from Energy.

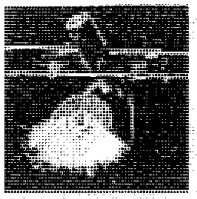


APPENDIX 1A

1994 OVERALL ENERGY BALANCE SHEET

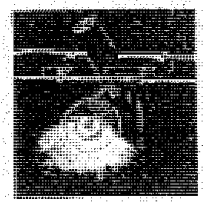
FUELS		PETROLEUM PRODUCTS					
	Coal	Crude	Premium	Regular	Kerosene	Diesel	Fuel Oil
Conversion Factors	0.00048	0.1344	0.1245	0.1223	0.127	0.1347	0.1444
Indigenous Production	695.60	256.38					
Imports (+)	534.35	11,884.58	378.80		83.48	1,976.35	1,069.05
Exports (-)		-176.50	0.00	-23.82			-47.65
Marine Bunkers (-)			0.00			-30.65	-62.00
Stock Change (+/-)	24.64	-149.16	11.45	6.60	5.92	142.54	53.40
PRIMARY ENERGY SUPPLY	1,254.59	11,815.30	390.25	-17.21	89.40	2,088.24	1,012.79
Refinery		-11,780.61	1,069.97	437.06	497.29	3,547.76	4,271.64
Power Generation						0.00	
Fuel Input (-)	-603.35					-1,476.69	-2,660.06
Electricity Gen.(GWh)	0.65					1,259.04	1,094.84
Gas Manufacture							
Transmission/Dist. Loss (-)							
Energy Sector Use & Loss (-)		-438.40					
NET DOMESTIC SUPPLY	651.89	-403.72	1,460.23	419.85	586.70	4,159.30	2,624.37
Statistical Difference	*-135.39*	*-403.72*	*31.19*	*-20.58*	*42.75*	*-37.50*	*386.13*
NET DOMESTIC CONSUMPTION	787.28	0.00	1,429.04	440.43	543.95	4,196.80	2,238.24
Industry	*639.66*				*29.00*	*439.39*	*1,560.84*
Manufacturing							
Beverages					0.00	0.00	0.00
Tobacco					0.00	3.34	13.41
Coco/Vegetable Oil					0.01	9.26	91.35
Sugar	2.87				0.01	35.92	86.58
Other Food Processing					1.25	59.21	254.02
Textile/Apparel					1.21	5.98	146.37
Wood Prod/Furniture					0.03	33.66	12.57
Paper Prod/ Printing					0.05	1.61	171.33
Chemicals Except Fertilizer	8.56				15.65	17.32	61.39
Fertilizer	5.72				0.00	1.48	17.44
Rubber/Rubber Prod					0.13	2.25	27.53
Glass/Glass Products					0.03	10.99	74.86
Cement	614.22				0.01	15.11	226.24
Lube Refining					0.15	83.00	82.69
Other Non-Metallic Minerals					5.23	4.98	18.35
Basic Metal	8.29				3.65	19.40	144.08
Machinery/ Equipment					0.00	0.00	0.00
Mining					0.00	55.65	119.06
Construction					1.38	80.17	13.57
Transport			1,429.04	338.87	2.93	2,997.01	283.82
Railway							
Road Transport			1,429.04	338.34	1.72	2,886.93	5.68
Water Transport				0.54	1.21	110.08	278.13
Air Transport							
Residential				6.08	469.90	15.38	
Commercial				18.46	39.52	437.44	390.02
Agriculture				77.01	2.59	307.58	3.56
Others, Non-Energy Use	147.62						

Department of Energy, 1999



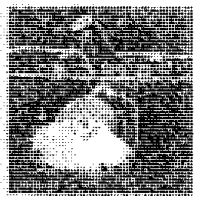
FUELS	PETROLEUM PRODUCTS					
	LPG	AVTurbo	Naphtha	Asphalt	AVGas	Others
Conversion Factors	0.0922	0.127	0.1238	0.1521	0.1224	0.1412
Indigenous Production						
Imports (+)	397.83	30.04			2.89	17.44
Exports (-)			-548.85			
Marine Bunkers (-)		-450.93				-0.17
Stock Change (+/-)	-7.70		8.52	3.22	0.98	16.72
PRIMARY ENERGY SUPPLY	390.14	-420.89	-540.33	3.22	3.87	33.99
Refinery	258.68	552.66	540.25	34.59	0.00	90.25
Power Generation						
Fuel Input (-)		-0.12	-1.75	0.00	0.00	-6.85
Electricity Gen.(GWh)						
Gas Manufacture						
Transmission/Dist. Loss (-)						
Energy Sector Use & Loss (-)						
NET DOMESTIC SUPPLY	648.81	131.65	-1.83	37.81	3.87	117.38
Statistical Difference	*-8.70*	*-50.57*	*-0.08*	*2.33*	*-2.51*	*-72.14*
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Industry	*6.96*		*0.00*			
Manufacturing						
Beverages	0.00				0.00	
Tobacco	0.08				0.00	
Coco/Vegetable Oil	0.00				0.01	
Sugar	0.00				0.00	
Other Food Processing	3.00				0.00	
Textile/Apparel	0.51				0.00	
Wood Prod/Furniture	0.00				0.00	
Paper Prod/ Printing	0.19				0.02	
Chemicals Except Fertilizer	0.01				0.00	
Fertilizer	0.00				0.00	
Rubber/Rubber Prod	0.00				0.00	
Glass/Glass Products	0.00				0.00	
Cement	0.00				0.00	
Lube Refining	0.00				0.00	
Other Non-Metallic Minerals	1.02				0.00	
Basic Metal	2.15				0.00	
Machinery/ Equipment	0.00				0.00	
Mining	0.00				0.01	
Construction	0.00				0.00	
Transport	0.00	182.22	0.00		6.38	
Railway						
Road Transport						
Water Transport						
Air Transport		182.22			6.38	
Residential	419.79					
Commercial	230.76	0.00				
Agriculture						
Others, Non-Energy Use				35.49		189.53

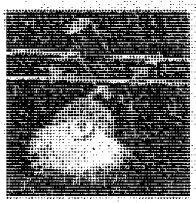
Department of Energy, 1999



FUELS	HYDRO	GEO	ELECTRICITY	BIOMASS FUELS			
	0.086	0.86		Bagasse	Fuelwood	Rice hull	Coconut
Conversion Factors	0.086	0.086	0.086	0.00023	0.00022	0.0003333	0.0004453
Indigenous Production	504.13	543.52		1,495	135	3,495	789
Imports (+)							
Exports (-)							
Marine Bunkers (-)							
Stock Change (+/-)							
PRIMARY ENERGY SUPPLY	504.13	543.52	0.00	1,495.00	134.92	3,495.43	789.21
Refinery							
Power Generation							
Fuel Input (-)							
Electricity Gen.(GWh)	504.13	543.52	2,619.47				
Gas Manufacture							
Transmission/Dist. Loss (-)			-407.12				
Energy Sector Use & Loss (-)			-97.35				
NET DOMESTIC SUPPLY	504.13	543.52	2,115.00	1,495.00	134.92	3,495.43	789.21
Statistical Difference			*0.00*	*0*	*0*	*0*	*0*
NET DOMESTIC CONSUMPTION			2,115.00				
Industry			918.82				
Manufacturing							
Beverages							
Tobacco							
Coco/Vegetable Oil							
Sugar							
Other Food Processing							
Textile/Apparel							
Wood Prod/Furniture							
Paper Prod/ Printing							
Chemicals Except Fertilizer							
Fertilizer							
Rubber/Rubber Prod							
Glass/Glass Products							
Cement							
Lube Refining							
Other Non-Metallic Minerals							
Basic Metal							
Machinery/ Equipment							
Mining							
Construction							
Transport	0.00	0.00	65.53				
Railway							
Road Transport							
Water Transport							
Air Transport							
Residential			626.25				
Commercial			504.39				
Agriculture							
Others, Non-Energy Use							

Department of Energy, 1999





APPENDIX 1B

OTHER ENERGY ACTIVITY DATA (1994)

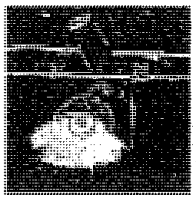
Biomass Fuel Consumption (KTOE)	
Industry	
Wood/Wood Waste	134.92
Charcoal	
Bagasse	1,495.00
Agriwaste	4,284.63
Other Solid Biomass	
Residential	
Wood/Wood Waste	4,228.99
Charcoal	962.68
Crop Residues (Agriwaste)	898.21

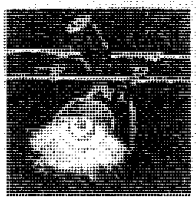
Ozone Precursors and SO_2 from Oil Refining	
Crude Oil Throughput (kt)	9,004.00

Ozone Precursors and SO_2 from Catalytic Cracking	
Crude Oil Throughput (kt)	376.00

CH_4 Emissions from Coal Mining and Handling		
Type of Mine	**Mining Activity**	**Amt. of Coal Produced (million t)**
Underground Mines	Mining	0.73
	Post-Mining	0.73
Surface Mines	Mining	0.72
	Post-Mining	0.72

CH_4 Emissions from Oil and Gas Activities	
Category	**Activity**
Oil	
Production	oil produced (PJ)
	10.69
Transport	oil loaded in tankers (PJ)
	506.11
Refining	oil refined (PJ)
	497.75
Storage	oil refined (PJ)
	497.75





APPENDIX 1C

CONVERSION FACTORS

Barrels (bbl) to ktoe conversion factors for liquid fuels

Liquid Fuel Types	Conversion Factors (ktoe/bbl)
Crude Oil	0.000134
Gasoline	
Premium	0.000125
Regular	0.000122
Unleaded	0.000125
Kerosene	0.000127
Diesel	0.000135
Fuel Oil	0.000144
LPG	0.000092
Avturbo	0.000127
Naptha	0.000124
Asphalt	0.000152
Avgas	0.000122
Lube/Grease	0.000146

Source: Department of Energy

MMBFOE to ktoe conversion factors for solid fuels

Solid Fuel Types	Conversion Factors (ktoe / MMBFOE)
Coal	162.38
Solid Biomass	144.4

Mass

1 ton = 1000 kg

1 Gigagram (Gg) = 10^6 kg

Volume

1 barrel (bbl) = 158.99 liters

1 gallon = 3.788 liters

Area

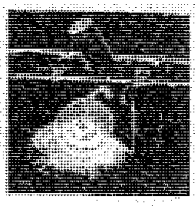
1 square meter = 10.7639 square feet

1 square kilometer = 100 hectares

1 hectare = 10,000 square meters

Scientific Notation

1 000 000 000 = 10^{12}	Tera
1 000 000 000 = 10^9	Giga
1 000 000 = 10^6	Mega
1 000 = 10^3	Kilo



ENERGY SECTOR

Workbook

1.1 INTRODUCTION

Greenhouse gas (GHG) emissions from the Energy sector come from the combustion of fuels and other activities related to the production of energy, such as coal mining, oil and gas explorations, production, and processing. Activity data for 1994 can be found in Appendix 1A (OEB sheet) and Appendix 1B of the Reference Manual.

The following table outlines the five main sections of this workbook and their corresponding worksheets:

Worksheet 1-1A	CO_2 from Fuel Combustion: Top-Down Approach
Worksheet 1-1B	CO_2 from Fuel Combustion: Bottom-Up Approach
Worksheet 1-2	Non-CO_2 Gases from Fuel Combustion (CH_4, N_2O, CO, NO_x, NMVOC)
Worksheet 1-3A	CH_4 Emissions from Coal Mining and Handling
Worksheet 1-3B	CH_4 Emissions from Oil/Gas Activities
Worksheet 1-3C	GHG Precursors and SO_2 from Oil Refining/Catalytic Cracking
Worksheet 1-4	SO_2 Emissions from Fuel Combustion
Worksheet 1-5A	CO_2 from Combustion of Biomass Fuels
Worksheet 1-5B	Emissions from International Bunkers
Worksheet 1-SA	CO_2 from Fuel Combustion Bottom- Up Approach: An Overview
Worksheet 1-SB	National Greenhouse Gas Inventory from the Energy Sector

For each section, an overview is first presented which includes the data requirements for each calculation and the possible sources of these data. Following this, the specific steps for completing the worksheets are then described.

1.2 CO_2 Emissions from Fuel Combustion

The two methods for calculating CO_2 emissions from the combustion of fossil fuels are the top-down and the bottom-up approach. See Sections 1.2.1 and 1.2.2 of the Reference Manual for a detailed discussion of these methods.

The basic formula for computing carbon emissions is given by the Revised 1996 IPCC Guidelines as:

$$Carbon\ Emissions = \sum (A_{ij} \times EF - C) \times B$$

where A is the fuel consumption in energy units (TJ), EF is the emission factor (t C/TJ), B is fraction of carbon oxidized, and C is carbon stored (TJ) or carbon that is not used in energy activities. The summation is carried over all energy subsectors and fuel types.

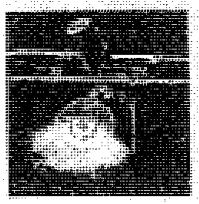
1.2.1 Top-Down or Reference Approach

The amount of CO_2 emitted in the top-down approach is calculated based on the overall national fuel inventory. This requires information on the different fuel types involved in the following activities:

- production
- importation
- exportation
- transport through international bunkers
- stock change

Data may be obtained from the Overall Energy Balance (OEB) sheet published by the Department of Energy (DOE). The 1994 OEB Sheet is reproduced in Appendix 1 of the Reference Manual.

The 1994 local fuel classification table is listed in Table 1-1 of the Reference Manual. Use **Worksheets 1-1A** for the step-by-step computations.



Step 1 Computing for the Apparent CO_2 Consumption
Worksheet 1-1A, Sheet 1 of 3

1 For each fuel type, enter the data (in ktoe) on fuel production, import, export, transport through international bunkers, and stock change into Columns A, B, C, D, and E, respectively.

2 Column F, gives the apparent consumption by using the formula:

$$F = A + B - C - D - E$$

Refer to Equation 1-2 of Section 1.2.1 of the Reference Manual for a clear definition of this equation.

Step 2 Expressing the Apparent CO_2 Consumption in TJ
Worksheet 1-1A, Sheet 2 of 3

3 Enter the conversion factor, 41.87 TJ/ktoe, in Column G.

4 In Column H compute the apparent consumption (in TJ), by multiplying Column G with Column F.

Step 3 Estimating Fuel Carbon Content

5 Input the carbon emission factors (in t C/TJ) for each fuel type in Column I. Refer to Table 1-2 of the Reference Manual for the default emission factors.

6 In Column J, get the carbon content (in t C) by multiplying Columns H and I.

7 In Column K, convert the results to units of Gg C by multiplying the values in Column J by 10^{-3}.

Step 4 Estimating Net Carbon Emissions
Worksheet 1-1A, Sheet 3 of 3

8 Input the amount of carbon stored for each fuel type in Column L. Refer to Section 1.2 of the Reference Manual for a discussion on stored carbon.

9 In Column M, subtract Column L from Column K to get the net carbon emissions.

Step 5 Estimating Actual Carbon Emissions

10 Set the fraction of carbon oxidized in Column N. Refer to the IPCC default values in Table 1-3 of the Reference Manual.

11 Multiply Columns M and N to get the actual carbon emissions in Gg of C in Column O.

Step 6 Estimating Actual CO_2 Emissions

12 Finally, in Column P, compute the actual CO_2 emissions (in Gg) by multiplying Column O by 44/12, which is the molecular weight ratio of CO_2 to C, converting carbon to CO_2 emissions.

1.2.2 Bottom-Up or Sectoral Approach

The preceding section calculates CO_2 emissions by considering the overall national inventory of fuel supply. Another approach is to look at the actual consumption of the specific subsectors. The subsectors are identified as the following: energy (or power generation) industries, transportation, manufacturing, residential, commercial, and agriculture. Fuel consumption data are contained in the OEB sheet.

The methodology is basically the same as in the reference approach but is more detailed in the sense that it is applied for each specified end user. Use **Worksheet 1-1B** for the step-by-step computations.

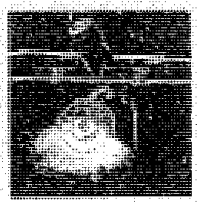
Step 1 Fuel Consumption in ktoe Units

1 For each subsector, enter the fuel consumption in ktoe for each type of fuel in the first column (Column A).

Step 2 Calculating for the Apparent Fuel Consumption (in TJ) for Each Fuel Type

2 In Column B, enter the appropriate conversion factor (41.87 TJ/ktoe) to convert into energy units (TJ).

3 Compute the apparent consumption (in TJ) in Column C by multiplying Column A with Column B.



Step 3 Estimating the Carbon Content for Each Fuel Type

4 Input the carbon emission factors (in t C/TJ) listed in Table 1-2 of the Reference Manual for each fuel type in Column D.

5 In Column E, get the carbon content (in t C) by multiplying Columns C and D.

6 Convert to units of Gg C by multiplying the values in Column E by 10^{-3}.

Step 4 Estimating Net Carbon Emissions

7 Input the fraction of carbon stored for each fuel type in Column G. Refer to Section 1.2 of the Reference Manual for a discussion on stored carbon.

8 Compute the amount of carbon stored (in Gg of C) in Column H by multiplying Columns F and G.

9 In Column I, subtract Column H from Column F to get the net carbon emissions.

Step 5 Estimating Actual Carbon Emissions

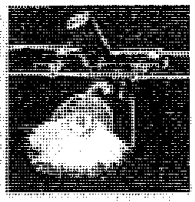
10 Enter the fraction of carbon oxidized in Column J. Refer to Table 1-3 of the Reference Manual for the default values.

11 Multiply Columns I and J in Column K to get the actual carbon emissions (in Gg of C).

Step 6 Estimating Actual CO_2 Emissions

12 Finally, in Column L, compute the actual CO_2 emissions (in Gg) by multiplying Column K by 44/12.

These steps (Steps 1 to 6) are followed for all the energy subsectors specified above.



1.3 Non-CO_2 from Fuel Combustion by Subsector

Greenhouse gases other then CO_2 are also emitted during fuel combustion. When coal, gasoline, diesel, wood/woodwaste, charcoal, and other biomass fuels are burned, the following non-CO_2 gases are emitted: methane (CH_4), nitrous oxide (N_2O), nitrogen oxides (NO_x), carbon monoxide (CO), and non-methane volatile organic compounds (NMVOCs). The complete list of biomass fuel categories can be found in Table 1-1 of the Reference Manual.

Coal, oil, and biomass fuel consumption are the basic data requirements and these can be found in the OEB sheet. Interpolation is done if data on years other than the inventory year are available. (Please refer to Section 1.3.1 of the Reference Manual for details regarding the interpolation process). In 1994, no data was available on residential biomass consumption. However, the UNDP-ESMAP study on household energy consumption contains data for 1989 and projected values for 1995 and 2000.

The worksheets for this section (**Worksheets 1-2**) provide the steps for computing non-CO_2 emissions from fuel combustion in each source category. The gases involved are CH_4, N_2O, NO_x, CO, and NMVOCs.

Supplementary Step: Converting from kton to TJ

This is an optional step, to be considered only if the raw data are in units of kton (kt)

Supplementary Worksheet 1-2: Converting from kton to TJ

1 In Column A, enter the biomass consumption data on wood/woodwaste, charcoal, and crop residue in kilotons (kt).

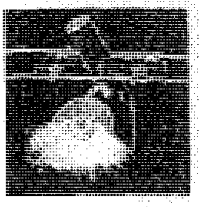
2 The conversion factors in ktoe/kt are already in Column B. In Column C, convert consumption units to ktoe by multiplying Columns A and B.

3 In Column D multiply Column C by 41.868 to convert to units of TJ.

Step 1 Estimating Fuel Consumption per Fuel Type

Worksheet 1-2, Sheet 1 of 3

4 For each subsector, enter the fuel consumption (in TJ) for each fuel type; coal in Column A1, oil in A2, wood/waste in A3, charcoal in A4, and other biomass/waste in A5.



Step 2 Emission Factors
Worksheet 1-2, Sheet 2 of 3

5 Input the emission factors (in kg/TJ) for each fuel type in the B Columns, i.e. B1 for coal, B2 for oil, and so on. Refer to Tables 1-6 to 1-10 of the Reference Manual for the different emission factors of the five non-CO_2 trace gases.

Step 3 Estimating Actual Emissions
Worksheet 1-2, Sheet 3 of 3

6 In the C Columns (C1, C2, C3, etc.), compute the emissions per fuel type by multiplying corresponding Columns of A and B, i.e. C1 = A1 x B1, C2 = A2 x B2, and so on.

7 Finally, in Column D, sum Columns C1 to C6 and multiply by 10^6 to get the net non-CO_2 trace gas emissions (in kg) for each energy subsector.

These steps are followed for all non-CO_2 gases. The only parameter that is varied is the emission factor which is dependent on the type of trace gas.

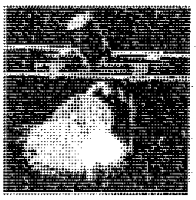
1.4 Fugitive Emissions

The processes of fuel extraction, transport, storage, and refining also lead to the release of GHGs, CH_4 in particular, and other non-CO_2 trace gases into the atmosphere. This section accounts for these fugitive emissions from three activities: coal mining/handling, oil/gas activities, and oil refining.

1.4.1 CH_4 Emissions from Coal Mining and Handling

Coal mining and other post-mining activities release CH_4 into the air. These emissions depend on the type of mining process, which can either be underground or surface mining. Refer to Section 1.4.1 of the Reference Manual for further discussions on CH_4 emissions from coal mining and handling.

The basic data requirements are coal production values for each type of mining process which can be obtained from the Coal and Mining Division of the DOE. Use **Worksheet 1-3A** for the step-by-step calculation.



Worksheet 1-3A, Sheet 1 of 1

1 For each type of mine and for mining activity, enter in Column A the amount of coal produced (in million tons). Note that the same coal production data are used for both mining and post-mining activities since the same amount of coal is involved in these two processes.

2 In Column B, enter the emission factors (in m^3 CH_4/t). Refer to Table 1-11 of the Reference Manual. In the 1994 inventory, the average of the minimum and maxium values listed was utilized.

3 Compute CH_4 emissions (in million m^3 of CH_4) in Column C by getting the product of Columns A and B.

Step 2 Converting CH_4 Emissions to Units of Gg

4 In Column D, input the factor $0.67/10^6 m^3$. (This will convert the units of Column C from million m^3 CH_4 to Gg of CH_4).

5 Get the net CH_4 emissions from coal mining in Gg of CH_4 in Column E by multiplying Columns D and C.

1.4.2 FUGITIVE EMISSIONS FROM OIL AND GAS ACTIVITIES

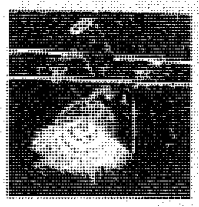
Oil activities (such as production, transport, refinery) and gas activities (such as production, processing, transmission, and distribution) are all potential sources of CH_4 emissions.

The basic data needed are the amount of oil produced, refined and transported and these are available from the Oil and Gas Division of the DOE. Gas exploration in the Philippines commenced only in 1994. Use **Worksheet 1-3B** for the step-by-step computations.

Step 1 Estimating CH_4 Emissions from Oil and Gas Related Activities

Worksheet 1-3B, Sheet 1 of 1

1 In Column A, enter the amount of oil in PJ (1 PJ = 10^{15} J) involved in production, transport, and refining.



2 The emission factors are already entered in Column B for each activity. (These factors are also listed in Table 1-12 of the Reference Manual.) Compute the CH_4 emissions (in kg of CH_4) in Column C by multiplying Columns A and B.

3 Finally, get the net emissions in Gg of CH_4 by dividing Column C by 10^6.

1.4.3 GHG PRECURSORS AND SO_2 FROM OIL REFINING

Converting crude oil into its derivatives (e.g. gasoline, diesel, LPG, kerosene, etc) in oil refineries releases CO, NO_x, NMVOCs, and SO_2 into the atmosphere. Storage and handling of oil products also emit NMVOCs.

To calculate these emissions, data on crude oil throughput and catalytic cracker throughput are needed. These data may be requested from oil refining companies.

Use **Worksheet 1-3C** for computing the emissions of GHG precursors CO, NO_x, NMVOC, and SO_2 from oil refining processes.

Step 1 Estimating Emissions from Oil Activities
Worksheet 1-3C, Sheet 1 of 3: GHG Precursors and SO_2 from Oil Refining

1 Enter the crude oil throughput (in kt) in Column A.

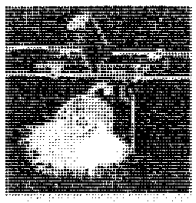
2 The trace gases CO, NO_x, NMVOC, and SO_2, are enumerated in Column B and the corresponding emission factors (in kg/t) are already entered in Column C. (The emission factors are also listed in Table 1-13 of the Reference Manual.) In Column D, compute the emissions (in t) by multiplying Columns A and C.

3 In Column E, get the net emissions (in Gg) by dividing Column D by 1000.

Step 2 Estimating Emissions from Catalytic Cracking
Worksheet 1-3C, Sheet 2 of 3: GHG Precursors and SO_2 from Catalytic Cracking

4 Input the catalytic cracker throughput (in kt) in Column A.

5 The trace gases CO, NO_x, NMVOC, and SO_2, are listed Column B and the corresponding emissions factors (in kg/t) are already set in Column C. (The



emission factors are also listed in Table 1-14 of the Reference Manual.) Compute emissions (in t) by multiplying Columns A and C.

6 In Column E, get the net emissions in Gg by dividing Column D by 1000.

Worksheet 1-3C, Sheet 3 of 3: NMVOC Emissions from Storage and Handling

7 In Column A, enter the crude oil throughput (in kt). The storage types, (secondary seals, primary seals, and fixed roof), are listed in Column B and the corresponding emissions factors (in kg/t) given in Column C. (The emission factors are also listed in Table 1-15 of the Reference Manual.)

8 Compute NMVOC emissions (in t) in Column D by multiplying Columns A and C.

9 Convert the net emissions to Gg by dividing Column D by 1000.

SO_2 Emissions from Fuel Combustion

Sulfur dioxide (SO_2) is not a GHG, but it has the potential to modify regional or local climate via the formation of sulfate aerosols. SO_2 emissions from fuel combustion in the different subsectors are computed in this section. (Refer to Section 1.5 of the Reference Manual for a detailed discussion on SO_2 emissions from fuel combustion activities.)

Fuel consumption data for fuel types that contain sulfur are found in the OEB sheet. The DOE has information on the percentage of sulfur content of certain fuel types. Default IPCC values are used for the other fuel types. Listed in Table 1-16 of the Reference Manual are the sulfur containing fuel types and the corresponding sulfur content. Use Worksheet 1-4 for the step-by-step calculations.

Worksheet 1-4, Sheet 1 of 1

1 Enter fuel consumption (in TJ) for each fuel type for each subsector in Column A.

2 In Column B, enter the % sulfur content of the fuel. Refer to Table 1-16 of the Reference Manual for the sulfur content of the different fuel types.

3 The default IPCC values for % sulfur retention in ash are already entered in Column C.

4 If applicable, enter the abatement efficiency (in %) in Column D. (No local information is available for the year 1994, hence, it is assumed that there are no local sulfur abatement activities.)

5 In Column E, enter the net calorific value (in TJ/kt). See Table 1-17 of the Reference Manual for the net calorific values of the different fuel types.

6 In Column F, compute the SO_2 emission factor (in kg/TJ) for each fuel type by using the following formula:

$$SO_2\ Emission\ Factor = 2\times\left(\frac{B}{100}\right)\times\left(\frac{1}{E}\right)\times 10^6\times\left(\frac{100-C}{100}\right)\times\left(\frac{100-D}{100}\right)$$

(Refer to Equation 1-7 of Section 1.5 of the Reference Manual for a detailed discussion of the above formula.)

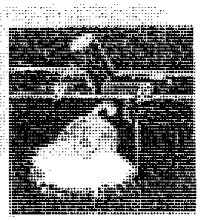
7 Finally, in Column G compute the SO_2 emissions (in t) by multiplying Columns A and F and dividing the product by 1000.

1.6 MEMO ITEMS

CO_2 emissions from biomass fuel combustion and international bunkers are recommended for inclusion as memo items by the IPCC Guidelines. The resulting CO_2 emissions are not included in the overall total of energy-related GHG emissions.

1.6.1 CO_2 FROM BIOMASS FUELS

The methodology of Section 1.2.2 (CO_2 from Fuel Combustion, Bottom-Up Approach) is applied in calculating CO_2 emissions from industrial and residential biomass fuel burning. The fuel categories this time are the various types of biomass fuels but the steps to be followed are just those of Section 1.2.2. Complete worksheet 1-5A, CO_2 from Residential and Industrial Biomass Fuels, for this memo item.



1.6.2 CO_2 FROM INTERNATIONAL BUNKERS

CO_2 emissions from marine and air transport are computed by looking at the fuel allocation for international bunkers in the top-down approach. Use **Worksheet 1-5B** for the following step-by-step calculation.

Worksheet 1-5B, Sheet 1 of 2

1 For each fuel type, input in Column A the fuel quantity transported internationally by marine and aviation vehicles (in ktoe). Note that these are the same data in Column D of **Worksheet 1-1A**.

2 Enter the appropriate conversion factor (41.87 TJ/ktoe) in Column B to convert to TJ.

3 In column C, compute the quantities delivered (in TJ) by multiplying Columns A and B.

4 Input the carbon emission factors (in t C/TJ) for each fuel type in Column D. (Refer to Table 1-2 of the Reference Manual.)

5 In column E, get the carbon content (in t of C) by multiplying Columns C and D.

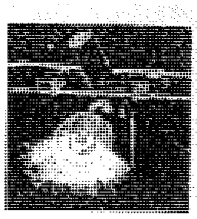
6 Convert units to Gg C by multiplying the values in Column E by 10^{-3}.

Worksheet 1-5B, Sheet 2 of 2

7 Enter the fraction of carbon stored for each fuel type in Column G.

8 Compute the amount of carbon stored (in Gg of C) by multiplying Column F with Column G in Column H.

9 In Column M, subtract Column H from Column F to get the net carbon emissions.



Step 5 Estimating the Actual Carbon Emissions of Each Fuel Type

10 Enter the fraction of carbon oxidized in Column J. The default IPCC values listed in Table 1-3 of the Reference Manual are used.

11 Multiply Columns I and J to get the actual carbon emissions (in Gg of C).

Step 6 Calculating for the Actual CO_2 Emissions from International Bunkers

12 Finally, in Column L, compute the actual CO_2 emissions (in Gg) by multiplying Column K by the molecular ratio 44/12.

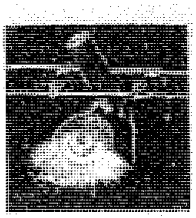
1.7 Conclusion

As summary of all the calculations, the following worksheets are completed to provide an overall picture of the energy-related GHG emissions.

a) Submodule: CO_2 from Fuel Combustion Bottom-Up Approach: An Overview, Worksheet 1-SA.

b) Submodule: National Greenhouse Gas Inventory from the Energy Sector, Worksheet 1-SB.

These two worksheets provide (a) a summary of the energy-related CO_2 emissions per fuel type and (b) an overview of the national total of the GHG and SO_2 emissions from the Energy sector.



ENERGY SECTOR

Worksheets

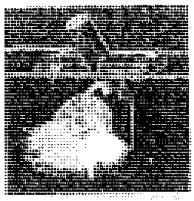
CO_2 FROM FUEL COMBUSTION: TOP-DOWN APPROACH

	Energy
	CO_2 from Energy Sources (Top-Down Approach)
	1-1A
	1 of 3

			STEP 1					
			A	B	C	D	E	F
Fuel Types			Production (ktoe)	Imports (ktoe)	Exports (ktoe)	International Bunkers (ktoe)	Stock Change (ktoe)	Apparent Consumption (ktoe)
								F=(A+B-C-D-E)
Liquid Fossil	Primary Fuels	Crude Oil	256.38	11,884.58	176.50		149.16	11,815.30
	Secondary Fuels	Gasoline (premium)		378.80	23.82		-18.06	373.04
		Kerosene		83.48			-5.92	89.40
		Diesel		1,976.35		30.65	-142.54	2,088.24
		Fuel Oil		1,069.05	47.65	62.00	-53.40	1,012.79
		LPG		397.83			7.70	390.14
		Avturbo		30.04		450.93		-420.89
		Naptha			548.85		-8.52	-540.33
		Asphalt					-3.22	3.22
		Avgas		2.89			-0.98	3.87
		Others		17.44		0.17	-16.72	33.99
		Liquid Fossil Totals	256.38	15,840.45	796.82	543.75	-92.50	14,848.76
Solid Fossil	Primary Fuels	Coal	696.00	534.00			-25.00	1,255.00
		Solid Fossil Totals	696.00	534.00	0.00	0.00	-25.00	1,255.00
		TOTAL	952.38	16,374.45	796.82	543.75	-117.50	16,103.76
Biomass Total								
		Solid Biomass						12,004.43

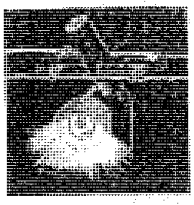
	Energy
	CO_2 from Energy Sources (Top-Down Approach)
	1-1A
	2 of 3

			STEP 2			STEP 3	
			G	H	I	J	K
Fuel Types			Conversion Factor (TJ/ktoe)	Apparent Consumption (TJ)	Carbon Emission Factor (t C/TJ)	Carbon Content (t C)	Carbon Content (Gg C)
				H=(FxG)		J=(HxI)	K=(Jx10^{-3})
Liquid Fossil	Primary Fuels	Crude Oil	41.87	494,682.98	20.00	9,893,659.66	9,893.66
	Secondary Fuels	Gasoline	41.87	15,618.37	18.90	295,187.12	295.19
		Kerosene	41.87	3,743.11	19.60	73,364.97	73.36
		Diesel	41.87	87,430.22	20.20	1,766,090.51	1,766.09
		Fuel Oil	41.87	42,403.49	21.10	894,713.64	894.71
		LPG	41.87	16,334.18	17.20	280,947.95	280.95
		Avturbo	41.87	-17,621.71	21.10	-371,818.11	-371.82
		Naptha	41.87	-22,622.55	20.00	-452,451.08	-452.45
		Asphalt	41.87	135.00	22.00	2,970.09	2.97
		Avgas	41.87	161.86	18.90	3,059.19	3.06
		Others	41.87	1,422.98	20.00	28,459.58	28.46
		Liquid Fossil Totals		621,687.94		12,414,183.53	12,414.18
Solid Fossil	Primary Fuels	Coal	41.87	52,544.34	26.20	1,376,661.71	1,376.66
		Solid Fossil Totals		52,544.34		1,376,661.71	1,376.66
		TOTAL		674,232.28			
Biomass Total							
		Solid Biomass	41.87	502,601.48	29.90	15,027,784.31	15,027.78



Module	Energy
Submodule	CO_2 from Energy Sources (Top-Down Approach)
Worksheet	1-1A
Sheet	3 of 3

			L	M	N	O	P
Fuel Types			Carbon Stored (Gg C)	Net Carbon Emissions (Gg C)	Fraction of Carbon Oxidized	Actual Carbon Emissions (Gg C)	Actual CO_2 Emissions (Gg CO_2)
				M=(K-L)		O=(MxN)	P=(Ox[44/12])
Liquid Fossil	Primary Fuels	Crude Oil		9,893.66	0.99	9,794.72	35,913.98
	Secondary Fuels	Gasoline		295.19	0.99	292.24	1,071.53
		Kerosene		73.36	0.99	72.63	266.31
		Diesel		1,766.09	0.99	1,748.43	6,410.91
		Fuel Oil		894.71	0.99	885.77	3,247.81
		LPG		280.95	0.99	278.14	1,019.84
		Avturbo		-371.82	0.99	-368.10	-1,349.70
		Naptha		-452.45	0.99	-447.93	-1,642.40
		Asphalt	2.97	0.00	0.99	0.00	0.00
		Avgas		3.06	0.99	3.03	11.10
		Others		28.46	0.99	28.17	103.31
		Liquid Fossil Totals	2.97	12,411.21		12,287.10	45,052.71
Solid Fossil	Primary Fuels	Coal		1,376.66	0.98	1,349.13	4,946.80
		Solid Fossil Totals		1,376.66		1,349.13	4,946.80
						TOTAL	49,999.51
Biomass Total							
		Solid Biomass		15,027.78	0.88	13,224.45	48,489.65



CO_2 EMISSIONS FROM FUEL COMBUSTION: BOTTOM-UP APPROACH

Sector:	Energy
Source Category:	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)
Method:	1-1B Step by Step Calculations
Sheet:	1 of 10 (Energy Industries)

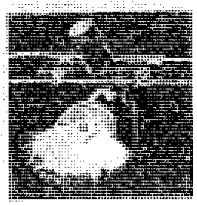
Fuel Type and Subsector	STEP 1	STEP 2		STEP 3		
	A	B	C	D	E	F
	Consumption (ktoe)	Conversion Factor (TJ/ktoe)	Consumption (TJ)	Carbon Emission Factor (t C/TJ)	Carbon Content (t C)	Carbon Content (Gg C)
			C=(AxB)		E=(CxD)	F=(Ex10^{-3})
Energy Industries						
Coal	603.35	41.67	25,260.99	26.20	661,838.05	661.84
Diesel	1,476.69	41.87	61,826.19	20.20	1,248,889.06	1,248.89
Fuel Oil	2,660.06	41.87	111,371.22	21.10	2,349,932.66	2,349.93
Avturbo	0.12	41.87	4.87	21.10	102.80	0.10
Naptha	1.75	41.87	73.11	20.00	1,462.20	1.46
Asphalt	0.00	41.87	0.00	22.00	0.00	0.00
Avgas	0.00	41.67	0.00	18.90	0.00	0.00
Others	6.85	41.67	286.86	20.00	5,737.23	5.74
TOTAL CONSUMPTION			198,823.24			

Sector:	Energy
Source Category:	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)
Method:	1-1B Step by Step Calculations
Sheet:	2 of 10 (Energy Industries)

Fuel Type and Subsector	STEP 2			STEP 3		STEP 4
	G	H	I	J	K	L
	Fraction of Carbon Stored	Carbon Stored (Gg C)	Net Carbon Emissions (Gg C)	Fraction of Carbon Oxidised	Actual Carbon Emissions	Actual CO_2 Emissions
		H=(FxG)	I=(F-H)		K=(IxJ)	L=(Kx[44/12])
Energy Industries						
Coal	0.00	0.00	661.84	0.98	648.60	2,378.20
Diesel	0.00	0.00	1,248.89	0.99	1,236.40	4,533.47
Fuel Oil	0.00	0.00	2,349.93	0.99	2,326.43	8,530.26
Avturbo	0.00	0.00	0.10	0.99	0.10	0.37
Naptha	0.00	0.00	1.46	0.99	1.45	5.31
Asphalt	0.00	0.00	0.00	0.99	0.00	0.00
Avgas	0.00	0.00	0.00	0.99	0.00	0.00
Others	0.50	2.87	2.87	0.99	2.84	10.41
TOTAL CO_2 EMISSIONS						15,458.02

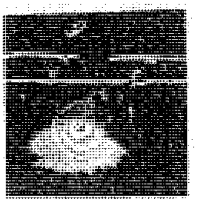
Sector:	Energy
Source Category:	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)
Method:	1-1B Step by Step Calculations
Sheet:	3 of 10 (Manufacturing Industries)

FUEL TYPE AND SUBSECTOR	STEP 1	STEP 2		STEP 3		
	A	B	C	D	E	F
	Consumption (ktoe)	Conversion Factor (TJ/ktoe)	Consumption (TJ)	Carbon Emission Factor (t C/TJ)	Carbon Content (t C)	Carbon Content (Gg C)
			C=(AxB)		E=(CxD)	F=(Ex10^{-3})
Manufacturing Industries						
Coal	639.66	41.87	26,781.20	26.20	701,667.56	701.67
Kerosene	29.00	41.87	1,214.10	19.60	23,796.29	23.80
Diesel	439.39	41.87	18,396.52	20.20	371,609.72	371.61
Fuel Oil	1,560.84	41.87	65,349.13	21.10	1,378,866.61	1,378.87
LPG	6.96	41.87	291.29	17.20	5,010.17	5.01
Naptha	0.00	41.87	0.00	20.00	0.00	0.00
TOTAL CONSUMPTION			112,032.24			
Memo Items:						
Wood/Wood Waste	134.92	41.87	5,648.91	29.90	168,902.31	168.90
Charcoal		41.87	0.00	29.90	0.00	0.00
Bagasse	1,495.00	41.87	62,592.66	29.90	1,871,520.53	1,871.52
Agriwaste	4,284.63	41.87	179,389.09	29.90	5,363,733.84	5,363.73
Other Solid Biomass		41.87	0.00	29.90	0.00	0.00
		Total Biomass	247,630.66			



	Energy					
	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)					
	1-1B Step by Step Calculations					
	4 of 10 (Manufacturing Industries)					
	Step 1			Step 2		Step 3
FUEL TYPE AND SUBSECTOR	G Fraction of Carbon Stored	H Carbon Stored (Gg C)	I Net Carbon Emissions (Gg C)	J Fraction of Carbon Oxidised	K Actual Carbon Emissions	L Actual CO_2 Emissions
		H=(FxG)	I=(F-H)		K=(IxJ)	L=(Kx[44/12])
Manufacturing Industries						
Coal	0.00	0.00	701.67	0.98	687.63	2,521.33
Kerosene	0.00	0.00	23.80	0.99	23.56	86.38
Diesel	0.00	0.00	371.61	0.99	367.89	1,348.94
Fuel Oil	0.00	0.00	1,378.87	0.99	1,365.08	5,005.29
LPG	0.00	0.00	5.01	0.99	4.96	18.19
Naptha	0.00	0.00	0.00	0.99	0.00	0.00
					TOTAL CO_2 EMISSIONS	8,980.12
Memo Items:						
Wood/Wood Waste	0.00	0.00	168.90	0.99	167.21	613.12
Charcoal	0.00	0.00	0.00	0.99	0.00	0.00
Bagasse	0.00	0.00	1,871.52	0.99	1,852.81	6,793.62
Agriwaste	0.00	0.00	5,363.73	0.99	5,310.10	19,470.35
Other Solid Biomass	0.00	0.00	0.00	0.99	0.00	0.00
					Total Biomass	26,877.09

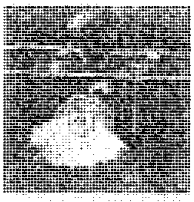
	Energy					
	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)					
	1-1B Step by Step Calculations					
	5 of 10 (Transport)					
	Step 1		Step 2		Step 3	
FUEL TYPE AND SUBSECTOR	A Consumption (ktoe)	B Conversion Factor (TJ/ktoe)	C Consumption (TJ)	D Carbon Emission Factor (t C/TJ)	E Carbon Content (t C)	F Carbon Content (Gg C)
			C=(AxB)		E=(CxD)	F=(Ex10^{-3})
Road Transport						
Gasoline	1,767.37	41.87	73,996.36	18.90	1,398,531.14	1,398.53
Kerosene	1.72	41.87	71.98	19.60	1,410.90	1.41
Diesel	2,886.90	41.87	120,870.18	20.20	2,441,577.60	2,441.58
Fuel Oil	5.66	41.87	236.02	21.10	5,022.20	5.02
		Subtotal	195,176.54			
Domestic Marine						
Gasoline	0.54	41.87	22.42	18.90	423.77	0.42
Kerosene	1.21	41.87	50.64	19.60	996.49	1.00
Diesel	110.08	41.87	4,608.79	20.20	93,097.53	93.10
Fuel Oil	278.13	41.87	11,644.78	21.10	245,704.38	245.70
		Subtotal	16,326.83			
Domestic Aviation						
Avturbo	182.22	41.87	7,629.29	21.10	160,978.11	160.98
Avgas	6.36	41.87	267.12	18.90	5,048.55	5.05
		Subtotal	7,896.41			
		TOTAL CONSUMPTION	219,399.78			



Module	Energy					
Submodule	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)					
Worksheet	1-1B Step by Step Calculations					
Sheet	6 of 10 (Transport)					
	STEP 4			STEP 5		STEP 6
FUEL TYPE AND SUBSECTOR	G Fraction of Carbon Stored	H Carbon Stored (Gg C)	I Net Carbon Emissions (Gg C)	J Fraction of Carbon Oxidised	K Actual Carbon Emissions	L Actual CO_2 Emissions
		H=(FxG)	I=(F-H)		K=(IxJ)	L=(Kx[44/12])
Road Transport						
Gasoline	0.00	0.00	1,398.53	0.99	1,384.55	5,076.67
Kerosene	0.00	0.00	1.41	0.99	1.40	5.12
Diesel	0.00	0.00	2,441.58	0.99	2,417.16	8,862.93
Fuel Oil	0.00	0.00	5.02	0.99	4.97	18.23
					Subtotal	13,962.95
Domestic Marine						
Gasoline	0.00	0.00	0.42	0.99	0.42	1.54
Kerosene	0.00	0.00	1.00	0.99	0.99	3.62
Diesel	0.00	0.00	93.10	0.99	92.17	337.94
Fuel Oil	0.00	0.00	245.70	0.99	243.25	891.91
					Subtotal	1,235.01
Domestic Aviation						
Avturbo	0.00	0.00	160.98	0.99	159.37	584.35
Avgas	0.00	0.00	5.05	0.99	5.00	18.33
					Subtotal	602.68
					TOTAL CO_2 EMISSIONS	15,800.63

Module	Energy					
Submodule	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)					
Worksheet	1-1B Step by Step Calculations					
Sheet	7 of 10 (Commercial)					
	STEP 1	STEP 2		STEP 3		
FUEL TYPE AND SUBSECTOR	A Consumption (ktoe)	B Conversion Factor (TJ/ktoe)	C Consumption (TJ)	D Carbon Emission Factor (t C/TJ)	E Carbon Content (t C)	F Carbon Content (Gg C)
			C=(AxB)		E=(CxD)	F=(Ex10^{-3})
Commercial						
Gasoline	18.46	41.87	773.03	18.90	14,610.28	14.61
Kerosene	39.52	41.87	1,654.82	19.60	32,434.39	32.43
Diesel	437.44	41.87	18,314.56	20.20	369,954.12	369.95
Fuel Oil	390.02	41.87	16,329.45	21.10	344,551.48	344.55
LPG	230.76	41.87	9,661.65	17.20	166,180.37	166.18
Avturbo	0.00	41.87	0.00	21.10	0.00	0.00
		TOTAL CONSUMPTION	46,733.51			

Module	Energy					
Submodule	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)					
Worksheet	1-1B Step by Step Calculations					
Sheet	8 of 10 (Commercial)					
	STEP 4			STEP 5		STEP 6
FUEL TYPE AND SUBSECTOR	G Fraction of Carbon Stored	H Carbon Stored (Gg C)	I Net Carbon Emissions (Gg C)	J Fraction of Carbon Oxidised	K Actual Carbon Emissions	L Actual CO_2 Emissions
		H=(FxG)	I=(F-H)		K=(IxJ)	L=(Kx[44/12])
Commercial						
Gasoline	0.00	0.00	14.61	0.99	14.46	53.04
Kerosene	0.00	0.00	32.43	0.99	32.11	117.74
Diesel	0.00	0.00	369.95	0.99	366.25	1,342.93
Fuel Oil	0.00	0.00	344.55	0.99	341.11	1,250.72
LPG	0.00	0.00	166.18	0.99	164.52	603.23
Avturbo	0.00	0.00	0.00	0.99	0.00	0.00
					TOTAL CO_2 EMISSIONS	3,367.66



	Energy					
	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)					
	1-1B Step by Step Calculations					
	9 of 10 (Residential, Agriculture)					
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FUEL TYPE AND SUBSECTOR	A Consumption (ktoe)	B Conversion Factor (TJ/ktoe)	C Consumption (TJ)	D Carbon Emission Factor (t C/TJ)	E Carbon Content (t C)	F Carbon Content (Gg C)
			C=(AxB)		E=(CxD)	$F=(Ex10^{-3})$
Residential						
Gasoline	6.08	41.87	254.54	18.90	4,810.90	4.81
Kerosene	469.90	41.87	19,673.68	19.60	385,604.05	385.60
Diesel	15.38	41.87	643.80	20.20	13,004.81	13.00
LPG	419.79	41.87	17,575.59	17.20	302,300.23	302.30
TOTAL CONSUMPTION			37,893.07			
Agriculture						
Gasoline	77.01	41.87	3,224.36	18.90	60,940.40	60.94
Kerosene	2.59	41.87	108.64	19.60	2,129.39	2.13
Diesel	307.58	41.87	12,877.62	20.20	260,127.39	260.13
Fuel Oil	3.56	41.87	149.16	21.10	3,147.30	3.15
TOTAL CONSUMPTION			16,359.78			

	Energy					
	CO_2 from Fuel Combustion by Source Categories (Bottom-Up Approach)					
	1-1B Step by Step Calculations					
	10 of 10 (Residential, Agriculture)					
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FUEL TYPE AND SUBSECTOR	G Fraction of Carbon Stored	H Carbon Stored (Gg C)	I Net Carbon Emissions (Gg C)	J Fraction of Carbon Oxidised	K Actual Carbon Emissions	L Actual CO_2 Emissions
		H=(FxG)	I=(F-H)		K=(IxJ)	L=(Kx[44/12])
Residential						
Gasoline	0.00	0.00	4.81	0.99	4.76	17.46
Kerosene	0.00	0.00	385.60	0.99	381.75	1,399.74
Diesel	0.00	0.00	13.00	0.99	12.87	47.21
LPG	0.00	0.00	302.30	0.99	299.28	1,097.35
TOTAL CO_2 EMISSIONS						2,544.30
Agriculture						
Gasoline	0.00	0.00	60.94	0.99	60.33	221.21
Kerosene	0.00	0.00	2.13	0.99	2.11	7.73
Diesel	0.00	0.00	260.13	0.99	257.53	944.26
Fuel Oil	0.00	0.00	3.15	0.99	3.12	11.42
TOTAL CO_2 EMISSIONS						1,184.63

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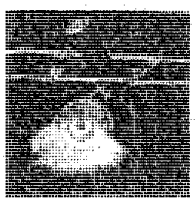
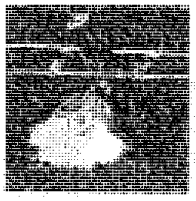


NON-CO_2 EMISSSIONS FROM FUEL COMBUSTION ACTIVITIES

Module	Energy							
Submodule	Non-CO_2 from Fuel Combustion by Source Categories							
Worksheet	1-2							
Sheet	1 of 3 for CH_4							
			A					
Activity			Fuel Consumption (TJ)					
			A1	A2		A3	A4	A5
			Coal	Oil		Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			20,531.55	161,554.51				
Manufacturing Industries			42,014.89	117,827.14		5,648.91		241,981.75
Transport	Domestic Aviation			4,772.63				
	Domestic Marine			16,701.13				
	Road			Gasoline	Diesel			
				72,573.69	121,672.71			
Other Sectors	Commercial/Institutional			6,302.60				
	Residential			37,249.28		177,059.26	40,305.46	37,606.10
	Agriculture/	Stationary		10,814.51				
	Forestry/Fishing	Mobile						
All Others								
		TOTAL	62,546.44	549,468.38		182,708.17	40,305.46	279,587.85

Module	Energy							
Submodule	Non-CO_2 from Fuel Combustion by Source Categories							
Worksheet	1-2							
Sheet	2 of 3 for CH_4							
			B					
Activity			Emission Factors (kg/TJ)					
			B1	B2		B3	B4	B5
			Coal	Oil		Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			1.00	3.00		30.00	200.00	30.00
Manufacturing Industries			10.00	2.00		30.00	200.00	30.00
Transport	Domestic Aviation			0.50				
	Domestic Marine		10.00	5.00				
	Road			Gasoline	Diesel			
				20.00	5.00			
Other Sectors	Commercial/Institutional		10.00	10.00		300.00	200.00	300.00
	Residential		300.00	10.00		300.00	200.00	300.00
	Agriculture/	Stationary	300.00	10.00		300.00	200.00	300.00
	Forestry/Fishing	Mobile		5.00				
All Others								

Module	Energy								
Submodule	Non-CO_2 from Fuel Combustion by Source Categories								
Worksheet	1-2								
Sheet	3 of 3 for CH_4								
			C						D
Activity			Emissions by Fuel (kg) C=AxB						Total Emissions
			C1	C2		C3	C4	C5	D=sum(C[1-6]) / 10^6
			Coal	Oil		Wood/Woodwaste	Charcoal	Other Biomass	
Energy Industries			20,531.55	484,663.52		0.00	0.00	0.00	0.51
Manufacturing Industries			420,148.90	235,654.28		169,467.20	0.00	7,259,452.55	8.08
Transport	Domestic Aviation			2,386.31					0.00
	Domestic Marine		0.00	83,505.65					0.08
	Road			Gasoline	Diesel				0.00
				1,451,473.79	606,363.53				2.06
Other Sectors	Commercial/Institutional		0.00	63,028.05		0.00	0.00	0.00	0.06
	Residential		0.00	372,492.77		53,117,778.88	8,061,091.98	11,281,830.25	72.83
	Agriculture/	Stationary	0.00	108,145.06		0.00	0.00	0.00	0.11
	Forestry/Fishing	Mobile							0.00
All Others									
								TOTAL	83.74



Sheet:	Energy
Source:	Non-CO_2 from Fuel Combustion by Source Categories
Method:	1-2
Gas:	1 of 3 for N_2O

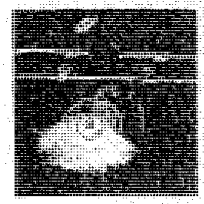
Activity			A Fuel Consumption (TJ)				
			A1	A2	A3	A4	A5
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			20,531.55	161,554.51			
Manufacturing Industries			42,014.89	117,827.14	5,648.91		241,981.75
Transport	Domestic Aviation			4,772.63			
	Domestic Marine			16,701.13			
	Road			Gasoline: 72,573.69	Diesel: 121,672.71		
Other Sectors	Commercial/Institutional			6,302.80			
	Residential			37,249.28	177,059.26	40,305.46	37,606.10
	Agriculture/	Stationary		10,814.51			
	Forestry/Fishing	Mobile					
All Others							
		TOTAL	62,546.44	549,468.38	182,708.17	40,305.46	279,587.85

Sheet:	Energy
Source:	Non-CO_2 from Fuel Combustion by Source Categories
Method:	1-2
Gas:	2 of 3 for N_2O

Activity			B Emission Factors (kg/TJ)				
			B1	B2	B3	B4	B5
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			1.40	0.60	4.00	4.00	4.00
Manufacturing Industries			1.40	0.60	4.00	4.00	4.00
Transport	Domestic Aviation			2.00			
	Domestic Marine		1.40	0.60			
	Road			Gasoline: 0.60	Diesel: 0.60		
Other Sectors	Commercial/Institutional		1.40	0.60	4.00	1.00	4.00
	Residential		1.40	0.60	4.00	1.00	4.00
	Agriculture/	Stationary	1.40	0.60	4.00	1.00	4.00
	Forestry/Fishing	Mobile					
All Others							

Sheet:	Energy
Source:	Non-CO_2 from Fuel Combustion by Source Categories
Method:	1-2
Gas:	3 of 3 for N_2O

Activity			C Emissions by Fuel (kg) C=AxB					D Total Emissions
			C1	C2	C3	C4	C5	D=sum(C[1-6]) / 10^6
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass	
Energy Industries			28,744.17	96,932.70	0.00	0.00	0.00	0.13
Manufacturing Industries			58,820.85	70,696.28	22,595.63	0.00	967,927.01	1.12
Transport	Domestic Aviation			9,545.26				0.01
	Domestic Marine		0.00	10,020.68				0.01
	Road			Gasoline: 43,544.21	Diesel: 73,003.62			0.00
								0.12
Other Sectors	Commercial/Institutional		0.00	3,781.68	0.00	0.00	0.00	0.00
	Residential		0.00	22,349.57	708,237.05	40,305.46	150,424.40	0.92
	Agriculture/	Stationary	0.00	6,488.70	0.00	0.00	0.00	0.01
	Forestry/Fishing	Mobile						0.00
All Others								
							TOTAL	2.31



Module	Energy
Submodule	Non-CO_2 from Fuel Combustion by Source Categories
Worksheet	1-2
Sheet	1 of 3 for CO

Activity			A Fuel Consumption (TJ)				
			A1	A2	A3	A4	A5
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			20,531.55	161,554.51			
Manufacturing Industries			42,014.89	117,827.14	5,648.91		241,981.75
Transport	Domestic Aviation			4,772.63			
	Domestic Marine			16,701.13			
	Road			Gasoline: 72,573.69	Diesel: 121,672.71		
Other Sectors	Commercial/Institutional			6,302.80			
	Residential			37,249.28	177,059.26	40,305.46	37,606.10
	Agriculture/	Stationary		10,814.51			
	Forestry/Fishing	Mobile					
All Others							
		TOTAL	62,546.44	549,468.38	182,708.17	40,305.46	279,587.85

Module	Energy
Submodule	Non-CO_2 from Fuel Combustion by Source Categories
Worksheet	1-2
Sheet	2 of 3 for CO

Activity			B Emission Factors (kg/TJ)				
			B1	B2	B3	B4	B5
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			20.00	15.00	1,000.00	1,000.00	1,000.00
Manufacturing Industries			150.00	10.00	2,000.00	4,000.00	4,000.00
Transport	Domestic Aviation			100.00			
	Domestic Marine		150.00	1,000.00			
	Road			Gasoline: 8,000.00	Diesel: 1,000.00		
Other Sectors	Commercial/Institutional		2,000.00	20.00	5,000.00	7,000.00	5,000.00
	Residential		2,000.00	20.00	5,000.00	7,000.00	5,000.00
	Agriculture/	Stationary	2,000.00	20.00	5,000.00	7,000.00	5,000.00
	Forestry/Fishing	Mobile		1,000.00			
All Others							

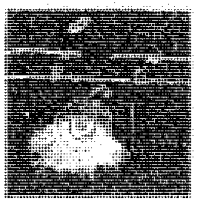
Module	Energy
Submodule	Non-CO_2 from Fuel Combustion by Source Categories
Worksheet	1-2
Sheet	3 of 3 for CO

Activity			C Emissions by Fuel (kg) C=AxB					D Total Emissions
			C1	C2	C3	C4	C5	D=sum(C[1-6]) / 10^6
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass	
Energy Industries			410,630.96	2,423,317.60	0.00	0.00	0.00	2.83
Manufacturing Industries			6,302,233.45	1,178,271.38	11,297,813.52	0.00	967,927,006.18	986.71
Transport	Domestic Aviation			477,262.77				0.48
	Domestic Marine		0.00	16,701,129.42				16.70
	Road			Gasoline: 580,589,514.85	Diesel: 121,672,706.21			0.00
								702.26
Other Sectors	Commercial/Institutional		0.00	126,056.09	0.00	0.00	0.00	0.13
	Residential		0.00	744,985.55	885,296,314.75	282,138,219.33	188,030,504.09	1,356.21
	Agriculture/	Stationary	0.00	216,290.12	0.00	0.00	0.00	0.22
	Forestry/Fishing	Mobile						0.00
All Others								
							TOTAL	3,055.53

[illegible]	Energy							
[illegible]	[illegible] from Fuel Combustion by Source Categories							
[illegible]	[illegible]							
[illegible]	1 of 3 for NOx							
Activity			A Fuel Consumption (TJ)					
			A1	A2		A3	A4	A5
			Coal	Oil		Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			20,531.55	161,554.51				
manufacturing industries			42,014.89	117,827.14		5,648.91		241,981.75
Transport	Domestic Aviation			4,772.63				
	Domestic Marine			16,701.13				
	Road			Gasoline	Diesel			
				72,573.69	121,672.71			
Other Sectors	Commercial/Institutional			6,302.80				
	Residential			37,249.28		177,059.26	40,305.46	37,606.10
	Agriculture/	Stationary		10,814.51				
	Forestry/Fishing	Mobile						
All Others								
		TOTAL	62,546.44	549,468.38		182,708.17	40,305.46	279,587.35

[illegible]	Energy							
[illegible]	Non CO_2 from Fuel Combustion by Source Categories							
[illegible]	1-2							
[illegible]	2 of 3 for NOx							
Activity			B Emission Factors (kg/TJ)					
			B1	B2		B3	B4	B5
			Coal	Oil		Wood/Woodwaste	Charcoal	Other Biomass
Energy industries			300.00	200.00		100.00	100.00	100.00
manufacturing industries			300.00	200.00		100.00	100.00	100.00
Transport	Domestic Aviation			300.00				
	Domestic Marine		300.00	1,500.00				
	Road			Gasoline	Diesel			
				600.00	800.00			
Other Sectors	Commercial/Institutional		100.00	100.00		100.00	100.00	100.00
	Residential		100.00	100.00		100.00	100.00	100.00
	Agriculture/	Stationary	100.00	100.00		100.00	100.00	100.00
	Forestry/Fishing	Mobile		1,200.00				
All Others								

[illegible]	Energy								
[illegible]	Non-CO_2 from Fuel Combustion by Source Categories								
[illegible]	1-2								
[illegible]	3 of 3 for NOx								
Activity			C Emissions by Fuel (kg) C=AxB						D Total Emissions
			C1	C2		C3	C4	C5	D=sum(C[1-6]) / 10^6
			Coal	Oil		Wood/Woodwaste	Charcoal	Other Biomass	
Energy industries			6,159,464.41	32,310,901.28		0.00	0.00	0.00	38.47
manufacturing industries			12,604,466.91	23,565,427.51		564,890.68	0.00	24,198,175.15	60.93
Transport	Domestic Aviation			1,431,768.32					1.43
	Domestic Marine		0.00	25,051,694.12					25.05
	Road			Gasoline	Diesel				0.00
				43,544,213.61	97,338,164.97				140.88
Other Sectors	Commercial/Institutional		0.00	630,280.46		0.00	0.00	0.00	0.63
	Residential		0.00	3,724,927.73		17,705,926.29	4,030,545.99	3,760,610.08	29.22
	Agriculture/	Stationary	0.00	1,081,450.62		0.00	0.00	0.00	1.08
	Forestry/Fishing	Mobile							0.00
All Others									
								TOTAL	297.70



Module	Energy
Submodule	Non-CO_2 from Fuel Combustion by Source Categories
Worksheet	1-2
Sheet	1 of 3 for NMVOC

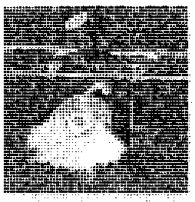
Activity			STEP A A Fuel Consumption (TJ)				
			A1	A2	A3	A4	A5
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			20,531.55	161,554.51			
Manufacturing Industries			42,014.89	117,827.14	5,648.91		241,981.75
Transport	Domestic Aviation			4,772.63			
	Domestic Marine			16,701.13			
	Road			Gasoline	Diesel		
				72,573.69	121,672.71		
Other	Commercial/Institutional			6,302.80			
Sectors	Residential			37,249.28	177,059.26	40,305.46	37,606.10
	Agriculture/	Stationary		10,814.51			
	Forestry/Fishing	Mobile					
All Others							
		TOTAL	62,546.44	549,468.38	182,708.17	40,305.46	279,587.85

Module	Energy
Submodule	Non-CO_2 from Fuel Combustion by Source Categories
Worksheet	1-2
Sheet	2 of 3 for NOx

Activity			STEP A B Emission Factors (kg/TJ)				
			B1	B2	B3	B4	B5
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass
Energy Industries			5.00	5.00	50.00	100.00	50.00
Manufacturing Industries			20.00	5.00	50.00	100.00	50.00
Transport	Domestic Aviation			50.00			
	Domestic Marine		20.00	200.00			
	Road			Gasoline	Diesel		
				1,500.00	200.00		
Other	Commercial/Institutional		200.00	5.00	600.00	100.00	600.00
Sectors	Residential		200.00	5.00	600.00	100.00	600.00
	Agriculture/	Stationary	200.00	5.00	600.00	100.00	600.00
	Forestry/Fishing	Mobile		200.00			
All Others							

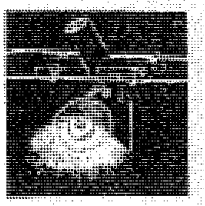
Module	Energy
Submodule	Non-CO_2 from Fuel Combustion by Source Categories
Worksheet	1-2
Sheet	3 of 3 for NOx

Activity			STEP A C Emissions by Fuel (kg) C=AxB					D Total Emissions
			C1	C2	C3	C4	C5	D=sum(C[1-6]) / 10^6
			Coal	Oil	Wood/Woodwaste	Charcoal	Other Biomass	
Energy Industries			102,657.74	807,772.53	0.00	0.00	0.00	0.91
Manufacturing Industries			840,297.79	589,135.69	282,445.34	0.00	12,099,087.58	13.81
Transport	Domestic Aviation			238,631.39				0.24
	Domestic Marine		0.00	3,340,225.88				3.34
	Road			Gasoline	Diesel			0.00
				108,860,534.04	24,334,541.24			133.20
Other	Commercial/Institutional		0.00	31,514.02	0.00	0.00	0.00	0.03
Sectors	Residential		0.00	186,246.39	106,235,557.77	4,030,545.99	22,563,660.49	133.02
	Agriculture/	Stationary	0.00	54,072.53	0.00	0.00	0.00	0.05
	Forestry/Fishing	Mobile						0.00
All Others								
							TOTAL	284.60



	Energy					
	CH_4 Emissions from Coal Mining and Handling					
	1-3A					
	1 of 1					
Type of Mine	Mining Activity	A Amt. of Coal Produced (million t)	B Emission Factor (m^3CH_4 / t)	C Methane Emissions (million m^3)	D Conversion Factors (0.67 Gg $CH_4/10^6m^3$)	E Methane Emissions (Gg CH_4)
				C=AxB		E=CxD
Underground Mines	Mining	0.73	17.50	12.72	0.67	8.52
	Post-Mining	0.73	2.45	1.78	0.67	1.19
Surface Mines	Mining	0.72	1.15	0.83	0.67	0.56
	Post-Mining	0.72	0.10	0.07	0.67	0.05
					TOTAL	10.32

	CH_4 Emissions from Oil and Gas Activities			
	1-3B			
	1 of 1			
Category	A Activity	B Emission Factor	C CH_4 Emissions (kg CH_4)	D Emissions CH_4 (Gg CH_4)
			C=AxB	D=(C/10^6)
Oil				
Exploration	#of wells drilled	(kg CH_4 / well drilled)		
Production	PJ oil produced	(kg CH_4 / PJ)		
	10.69	2650	28,328.50	0.03
Transport	PJ oil loaded in tankers	(kg CH_4 / PJ)		
	506.11	745	377,051.95	0.38
Refining	PJ oil refined	kg CH_4 / PJ refined		
	497.75		0.00	0.00
Storage	PJ oil refined	kg CH_4 / PJ refined		
	497.75	135	67,196.25	0.07
			TOTAL CH_4 FROM OIL	0.47
Gas				
Production / Processing	PJ gas produced	(kg CH_4 / PJ)		
		46000		
Transmission and	PJ gas consumed	(kg CH_4 / PJ)		
Distribution				
Other leakage				
			TOTAL CH_4 FROM GAS	
Venting and Flaring from Oil/Gas Production	PJ oil and gas produced	(kg CH_4 / PJ)		
			TOTAL CH4 FROM OIL AND GAS	



Module	Energy
Submodule	GHG Precursors and SO_2 from Oil Refining
Worksheet	1-3C
Sheet	1 of 3

A	B	C	D	E
Crude Oil Throughput (kt)	Pollutant	Emission Factor (kg/t)	Emissions (t)	Emissions (Gg)
			D=AxC	E=D/1000
9,004.00	CO	0.09	810.36	0.81
	NOx	0.06	540.24	0.54
	NMVOC	0.62	5,582.48	5.58
	SO_2	0.93	8,373.72	8.37

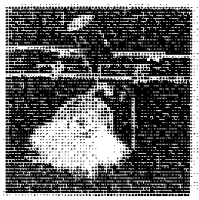
Module	Energy
Submodule	GHG Precursors and SO_2 from Catalytic Cracking
Worksheet	1-3C
Sheet	2 of 3

A	B	C	D	E
Catalytic Cracker Throughput (kt)	Pollutant	Emission Factor (kg/t)	Emissions (t)	Emissions (Gg)
			D=AxC	E=D/1000
376.00	CO	42.60	16,017.60	16.02
	NOx	0.20	75.20	0.08
	NMVOC	0.60	225.60	0.23
	SO_2	1.50	564.00	0.56

Module	Energy
Submodule	GHG Precursors and SO_2 from Oil Refining
Worksheet	1-3C NMVOC Emissions from Storage and Handling
Sheet	3of 3

A	B	C	D	E
Crude Oil Throughput (kt)	Pollutant	Emission Factor (kg/t)	Emissions (t)	NMVOC Emissions (Gg)
			D=AxC	E=D/1000
9,004.00	Secondary Seals	0.20	1,800.80	
	Primary Seals	0.70	6,302.80	
	Fixed roof	4.90	44,119.60	44.12

*where nothing is known the highest factor should be used.
*emissions from this source may be higher in countries with a warm climate.

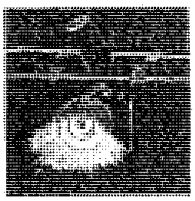


SO_2 Emissions from Fuel Combustion

	Energy						
	SO_2 Emissions from Fuel Combustion by Source Categories						
	1-4						
	1 of 1						
	Sheet 4	Sheet 5				Sheet 6	
	A	B	C	D	E	F	G
Fuel Type	Fuel Consumption (TJ)	Sulphur Content of Fuel (%)	Sulphur retention in ash (%)	Abatement Efficiency (%)	Net Calorific Value (TJ/kt)	SO_2 Emission Factor (kg/TJ)	SO_2 Emissions (t)
						F=2 x (B/100) x (1/E) x10^{6}x ((100-C)/100) x ((100-D)/100)	G=(AxF)/1000
Coal*	52,042.20	3	5	0	42.58	1,338.66	69,666.64
Fuel Oil	205,081.76	3	0	0	40.19	1,492.91	306,168.34
Diesel (road)*	120,870.18	0.8	0	0	43.33	369.26	44,632.42
Gasoline (road)*	73,996.36	0.1	0	0	44.8	44.64	3,303.41
Avturbo	7,634.17	0.05	0	0	44.59	22.43	171.21
Fuelwood	5,648.91	0.2	0	0	15	266.67	1,506.38
Other Biomass							
Bagasse	62,592.66	0.02	0	0	8	50.00	3,129.63
Agriwaste	179,389.09	0.02	0	0	15	26.67	4,783.71
TOTAL	707,255.32						433,361.73

Memo Item: CO_2 from Biomass Fuels

	Energy					
	Memo Item 1: CO_2 from Biomass Fuel Combustion					
	1-5A CO_2 from Residential and Industrial Biomass Fuels					
	2 of 2					
	Sheet 4			Sheet 5		Sheet 6
	G	H	I	J	K	L
Fuel Type and Sector	Fraction of Carbon Stored	Carbon Stored (Gg C)	Net Carbon Emissions (Gg C)	Fraction of Cabon Oxidized	Actual Carbon Emissions (Gg C)	Actual CO_2 Emissions (Gg CO2)
		H=(FxG)	I=(F-H)		K=(IxJ)	L=(Kx[44/12])
Industry*						
Wood/Wood Waste	0.00	0.00	168.90	0.88	148.63	544.99
Charcoal	0.00	0.00	0.00	0.88	0.00	0.00
Bagasse	0.00	0.00	1,871.52	0.88	1,646.94	6,038.77
Agriwaste	0.00	0.00	5,363.73	0.88	4,720.09	17,306.98
Other Solid Biomass	0.00	0.00	0.00	0.88	0.00	0.00
					Total Industry Biomass	23,890.75
Residential**						
Wood/Wood Waste	0.00	0.00	5,294.07	0.88	4,658.78	17,082.21
Charcoal	0.00	0.00	1,205.13	0.88	1,060.52	3,888.56
Crop Residues (Agriwaste)	0.00	0.00	1,124.42	0.88	989.49	3,628.14
					Total Residential Biomass	24,598.91
					TOTAL	48,489.65



	Energy
	Memo Item 1: CO_2 from Biomass Fuel Combustion
	1-5A CO_2 from Residential and Industrial Biomass Fuels
	1 of 2

	STEP 1	STEP 2		STEP 3		
	A	B	C	D	E	F
Fuel Type and Sector	Consumption (ktoe)	Conversion Factor (TJ/ktoe)	Consumption (TJ)	Carbon Emission Factor (t C/TJ)	Carbon Content (t C)	Carbon Content (Gg C)
			C=(AxB)		E=(CxD)	F=(Ex10^{-3})
Industry*						
Wood/Wood Waste	134.92	41.87	5,648.91	29.90	168,902.31	168.90
Charcoal		41.87	0.00	29.90	0.00	0.00
Bagasse	1,495.00	41.87	62,592.66	29.90	1,871,520.53	1,871.52
Agriwaste	4,284.63	41.87	179,389.09	29.90	5,363,733.84	5,363.73
Other Solid Biomass		41.87	0.00	29.90	0.00	0.00
		Total Industry Biomass	247,630.66			
Residential**						
Wood/Wood Waste	4,228.99	41.87	177,059.26	29.90	5,294,071.96	5,294.07
Charcoal	962.68	41.87	40,305.46	29.90	1,205,133.25	1,205.13
Crop Residues (Agriwaste)	898.21	41.87	37,606.10	29.90	1,124,422.41	1,124.42
		Total Residential Biomass	254,970.82			

*DOE OEB Sheet
**UNDP-ESMAP

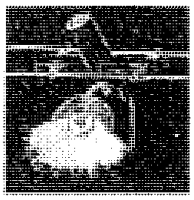
MEMO ITEM: CO_2 FROM INTERNATIONAL BUNKERS

	Energy
	Memo Items
	1-5B Emissions from International Bunkers (Marine and Air Transport)
	1 of 2

		STEP 1	STEP 2		STEP 3		
		A	B	C	D	E	F
Fuel Types		Qauntities delivered (ktoe)	Conversion Factor (TJ/ktoe)	Quantities delivered (TJ)	Carbon Emission Factor (t C/TJ)	Carbon Content (t C)	Carbon Content (Gg C)
				C=(AxB)		E=(CxD)	F=(Ex10^{-3})
Solid Fossil	Coal						
Liquid Fossil	Diesel	30.65	41.87	1,283.35	20.20	25,923.68	25.92
	Fuel Oil	62.00	41.87	2,596.02	21.10	54,776.09	54.78
	Avturbo	450.93	41.87	18,879.44	21.10	398,356.18	398.36
	Others	0.17	41.87	7.00	20.00	139.99	0.14
	TOTAL			**22,765.81**			

	Energy
	Memo Items
	1-5B Emissions from International Bunkers (Marine and Air Transport)
	2 of 2

		STEP 4			STEP 5	STEP 6	
		G	H	I	J	K	L
Fuel Types		Fraction of Carbon Stored	Carbon Stored (Gg C)	Net Carbon Emissions (Gg C)	Fraction of Carbon Oxidised	Actual Carbon Emissions (Gg C)	Actual CO_2 Emissions (Gg CO_2)
			H=(FxG)	I=(F-H)		K=(IxJ)	L=(Kx44/12)
Solid Fossil	Coal	0.00	0.00	25.92	0.99	25.66	94.10
Liquid Fossil	Diesel	0.00	0.00	54.78	0.99	54.23	198.84
	Fuel Oil	0.00	0.00	398.36	0.99	394.37	1,446.03
	Avturbo	0.00	0.00	0.14	0.99	0.14	0.51
	Lube / Grease	0.00	0.00	0.00	0.99	0.00	0.00
						TOTAL	1,739.48



SUMMARY OF EMISSIONS FROM ENERGY

GHG Emissions: CO_2, CH_4, N_2O

Source	CO_2	CH_4	CO_2 Equivalent	N_2O	CO_2 Equivalent	TOTAL EMISSIONS Gg CO_2
Energy Industries	15,458.02	0.51	10.61	0.13	38.96	15,507.59
Residential	2,544.30	72.83	1,529.50	0.92	285.61	4,359.41
Manufacturing Industries	8,980.12	8.08	169.78	1.12	347.21	9,497.11
Agriculture	1,184.63	0.11	2.27	0.01	2.01	1,188.91
Transport	15,800.63	2.15	45.06	0.14	42.20	15,887.89
Commercial	3,367.66	0.06	1.32	0.00	1.17	3,370.16
Fugitive Emissions		10.79	226.68			226.68
TOTAL	47,335.37	83.74	1,758.54	2.31	717.16	50,037.75

GHG Precursors: NO_x, CO, NMVOC

Source	NO_x	CO	NMVOC
Energy Industries	38.47	2.83	0.91
Residential	29.22	1,356.21	133.02
Manufacturing Industries	60.93	986.71	13.81
Agriculture	1.08	0.22	0.05
Transport	167.37	719.44	136.77
Commercial	0.63	0.13	0.03
Fugitive Emissions	0.62	16.83	49.93
TOTAL	297.70	3,065.53	284.60

資料 3　現地収集資料

(3) Recommendations for Institutionalizing the GHG Inventory Processes

DENR-EMB 提供

Institutionalizing the Philippine Greenhouse Gas (GHG) Inventory Process

V. Recommendations for institutionalizing the GHG inventory process

Keeping in mind the lessons learned from institutionalization in other contexts and the experience of agencies involved in the inventory process, the Philippines could formulate strategies for systematizing and regularizing the compilation of the national GHG emissions inventory. Such strategies are best employed when they actually build on existing structures and procedures. Annex II contains recommendations for a possible framework to guide information management practices per inventory sector.

In order to institutionalize the inventory process, four central strategies can be employed: (a) informing strategically positioned people about the concerns of climate change and training people in the inventory process, (b) strengthening the IACCC as an institution, (c) establishing within the IACCC a technical working group on the GHG inventory, and (d) developing an information system to prepare the inventory.

A. Awareness building and technical training

As seen in the cases of Colombia's inventory process and the institutionalization of PCSD and solid waste management, building awareness about the issue is the first step in any type of multi-stakeholder activity. As discussed above in Part III (Constraints on Institutionalization), the complex nature of climate change prevents many people from understanding it, leading to indifference toward or ignorance about the inventory process.

To encourage cooperation with the inventory process, a basic understanding of climate change issues must be achieved at both the technical and managerial levels of the agencies involved in the process. Having high profile advocates of climate change issues, specifically at the levels of decision-making, will help draw institutional support for the inventory. Within government, executive and legislative decision-makers should be briefed regularly on the ever-evolving issues of climate change. These briefings should be designed in such a way as to facilitate the formulation of mandates needed to act on various climate change concerns, one of which is the inventory process. Technical staff should as well be informed since it is they who shall be involved in inventory compilation. A much wider audience for raising climate change awareness is most possible and imperative in the private sector and civil society.

At the same time that awareness is being built, technical capacity should also be developed among those who are involved in the inventory process and those who are in a position to train others within their organizations. Such a multiplier strategy of training trainors ensures that the skills and resources needed in the inventory process are not lodged solely in one government office or consultancy firm. It also ensures that the inventory process is not easily thwarted by the periodic changes in administration. Continuity in training ought to be assured since guidelines for inventory compilation (such as the Revised Guidelines and Good Practice Guidance of the Intergovernmental Panel on Climate Change) are continuously evolving with the development of GHG emissions research.

B. Institutional strengthening of the IACCC

To realize the goal of implementing a system for the national GHG inventory, the IACCC needs to assert its existing authority and broaden its political boundaries. The attention demanded of the IACCC by the inventory process may be comparable to its other current commitments. Specific details of the inventory system will be laid out later in this section.[14] Before these steps can be fully pursued, however, the IACCC must establish three prerequisite conditions:

A full-time secretariat Since the ultimate goal of institutionalizing the GHG inventory is to produce an annual account of GHG emissions, the responsibilities of the Secretariat as the coordinating body for this exercise will be ongoing. As soon as one inventory is completed, the assembly of data for the next one should begin. Members of the Secretariat are already restricted in the time that they can dedicate to the IACCC's existing activities because of their duties in the DENR's Environmental Education and Information Division. Adding more responsibilities to their daily workload will only exacerbate the situation and threaten the sustainability of the inventory process. Allowing the members of the IACCC Secretariat to focus on their functions as administrators o climate change activities would enable them to provide the administrative support tha this endeavor will require and to advance the goals of the IACCC.

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appropriate information or even to attend meetings. To ensure the continuity of the inventory process, the IACCC needs the authority to demand compliance.

Mandate

One way to secure all three of these prerequisites for an institutionalized inventory system is by strengthening the IACCC's mandate. The IACCC's current mandate permits it to establish the working groups that will serve as the instruments of the inventory process. Once established, however, the working group would be incapable of even devising mechanisms for the inventory system without the administrative support of a secretariat and accompanying funds. If it overcame the odds and outlined a set of procedures, it would need enduring authority to complete its tasks. Since the current mandate does not provide for any of those elements, IACCC must use other means to secure them.

Initially, the IACCC may seek support for a full-time secretariat and additional funding from the DENR secretary. Part of the rationale behind awareness-raising activities among leaders in government is to build support for such a move. Due to the instability of programs designed at the behest of a standing secretary and the restriction of his authority to activities within DENR, however, this can only be seen as an interim solution. Securing a more permanent arrangement is critical.

A revised administrative order was drafted in 1998 with provisions to strengthen the IACCC, but it was never approved. The structure and content of this document ought to be revisited and reviewed in order to determine how its terms might provide a stable environment for the inventory process. After revision, it will be necessary to lobby the President and other appropriate leaders to ensure its enactment. Targeting Presidential advisors during the awareness-building campaigns might make securing the passage of such a mandate substantially easier.

Finally, a set of implementing rules and regulations (IRR) should be drafted for the revised directive. Without these, the real powers of the Committee are unclear.

Pursuing short-term measures has proven to be a successful strategy in winning long-term viability and should be pursued. The National Statistical Coordination Board (NSCB) "piloted the Philippine Economic-Environmental and Natural Resources Accounting Project (PEENRA) in 1995 to 1997 only as a subprogramme of the Integrated Environmental Management for Sustainable Development (IEMSD) of the DENR with funding support from the United Nations Development Programme (UNDP)".[16] Different technical working groups were then created for the compilation of Fishery, Land/Soil and Water Resources asset accounts. In the phase II of the project, the NSCB aims to institutionalize the project by creating a PEENRA Unit in NSCB. The PEENRA, however, has remained a foreign-assisted project up to year 2001 due to the existing government policy of "no creation of new units". After determined advocacy work of

[16] http://www.nscb.gov.ph/projects/peenra.htm

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NSCB to the Department of Budget and Management, PEENRA has been considered as a locally funded project in the year 2002, a stepping-stone towards the regularization of the PEENRA Unit at the NSCB.[17] After establishing the importance of the GHG inventory process—if even on a limited basis—it should be easier to rally support among appropriate leaders to provide adequate funding and personnel.

In reality, strengthening the mandate of the IACCC at the level of a republic act or an executive order is probably a medium-term goal because of the substantial level of support that it demands. As the case of solid waste management demonstrates, however, a focused mandate is a vital component of a successful inventory process.

C. Technical Working Group on GHG Inventory

As the IACCC generates support for a stronger mandate, it can begin the process of institutionalization by creating a technical working group designated to complete the inventory on a regular basis. With accountability resting on the shoulders of this body, completion of the inventory in an efficient and timely basis is more certain than in its absence. Forming the technical working group (TWG) and outlining the mechanisms of the inventory process can commence at a basic level even before the establishment of a full-time secretariat or an institutional fund because the IACCC's current mandate grants it the power to establish TWGs. Although the full institutionalization of the TWG will depend upon the procurement of additional resources, laying the groundwork for the inventory process can begin immediately.

1. Structure

Each of the five sectors identified in the greenhouse gas emissions inventory—energy, industry, agriculture, waste and land use change and forestry—will maintain its own sectoral working group (SWG) responsible for conducting and reporting emissions for the respective sector. It is strongly recommended that membership within each sector include organizations that possess data relevant to the inventory as well as a research institution that can serve as a resource for emissions research or as a partner in the QA/QC process. A lead agency can be designated to serve as the coordinator of each sectoral inventory based on its ties with the other actors in the sector and its own statistical and informational resources.

An overall central steering committee composed of organizations with experience in conducting inventories and representatives from the lead agencies of each of the five SWGs will be called the GHG Technical Working Group (GHG-TWG). The GHG-TWG itself shall oversee all technical aspects of the inventory process, focus on cross-cutting issues, act as the final mediator in any dispute among members of the SWGs, and will be responsible for synthesizing the sectoral inventory results from the SWGs into the final

[17] based on emailed comments of NSCB (Mr. Edgar Lopez-Dee) on draft of this document

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national inventory. Actual membership in the SWGs can be based on institutional mandate and capacity. One possible configuration is shown in Figure 1.

By providing administrative support for the technical functions of the members, the IACCC Secretariat will act as the driving force behind the completion of the periodic inventory. One or more members of the IACCC Secretariat should be designated to perform secretariat functions to the TWG and the SWGs. In addition to organizing meetings and trainings as needed, the secretariat will maintain an updated contact list of representatives from each participating organization to ensure the continuity of the inventory. When all worksheets have been completed and the final inventory compiled, the secretariat will be responsible for coordinating the presentation of these documents to the entire IACCC for final approval before submitting them to the UNFCCC.

2. Tasks

Some of the more immediate tasks for the GHG-TWG are described below. Annex II details the GHG-TWG's specific functions and a suggested scheme of information flow that is to guide inventory compilation from emission source to the GHG-TWG.

Creating and strengthening partnerships Just as Brazil pursued unconventional partners, the IACCC can seek out actors who have not traditionally played a significant role in climate change activities yet can lend technical expertise to the inventory process. Academics whose research has potential application in the determination of local emissions factors and activity data, or other partners with access to data needed for the inventory could be tapped in order to complete the inventory's final output.

The GHG-TWG could serve as the venue to formalize these new ties and to solidify pre-existing relationships, allowing contributing organizations to discuss difficulties or conflicts that arise. With improved communication among stakeholders, agencies with statistics relevant to the inventory can learn about each other's data collection and management practices. Through this sharing, questions about the reliability of some information can be clarified, leading to a better understanding of the inventory's accuracy. Additionally, information management techniques may be streamlined over time as government agencies become more aware of overlapping data collection requirements, thus improving relations with the private sector.

Technical capacity building One component of the process of forging partnerships among groups involved in climate change can involve strengthening the member agencies themselves. Unfortunately, the IACCC alone cannot develop all of the data collection systems or infrastructure necessary for the inventory process to run smoothly; it must work within the environment established by its partners. The GHG-TWG's success in pursuing technical capacity building activities for its partners, however, will be a major factor in determining the performance of the inventory process.

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Developing a reporting framework Once the membership of the GHG-TWG and the SWGs are established, its members must devise a reporting framework. Since the IPCC has already laid out the methodology and content of the inventory reports, the GHG-TWG would only need to clarify the administrative aspects of their preparation and then supervise the technical aspects of their completion. In order to establish a continuous system for completing the inventory, the GHG-TWG would need to specify four components of the reporting process:

- a timetable for agencies to submit data,
- the flow of information from the source agencies to the central team, [18]
- the level of data analysis to be conducted at each reporting level, and
- a strategy for ensuring compliance with the established requirements.

This last component is probably the most crucial factor in determining the success of the inventory process. Even after securing the legal authority to require compliance, the GHG-TWG must continue to strategize on the efficient flow of information that an inventory system demands. Catalysts might include both negative and positive inducements, ranging from sanctions for non-compliance to incentives for on-time and accurate reporting.

Ensuring quality assessment and quality control Although the development of a comprehensive quality assessment and control procedure will take a long time, it is important to introduce elements of such a system early. According to the IPCC Good Practice Guidance, maintaining a program of QA/QC helps "to improve transparency, consistency, comparability, completeness, and confidence in national inventories."[19] Especially since few systems currently exist to verify the statistics provided by government agencies and private sector firms, the development of a QA/QC system can help evaluate data reliability, which will be important for baseline and trendline purposes.

The levels at which QA/QC procedures will be applied need to be considered as well. Such levels may be the stage of activity data collection, worksheets completion, or overall inventory compilation, etc.. The identity of potential evaluators or reviewers, institutional support, and sources of funding ought to be factored in when institutionalizing QA/QC in the inventory process. The availability of financial and technical resources will affect the scope of the QA/QC process.

D. GHG information management system

Considering the sheer volume of data required to complete the inventory, a process without an organized data management system is doomed to fail. In the system currently employed to source the data and complete the inventory worksheets, too many people are

[18] Please see Annex II for one possible structure for the flow of data from source agency to central compiling team.

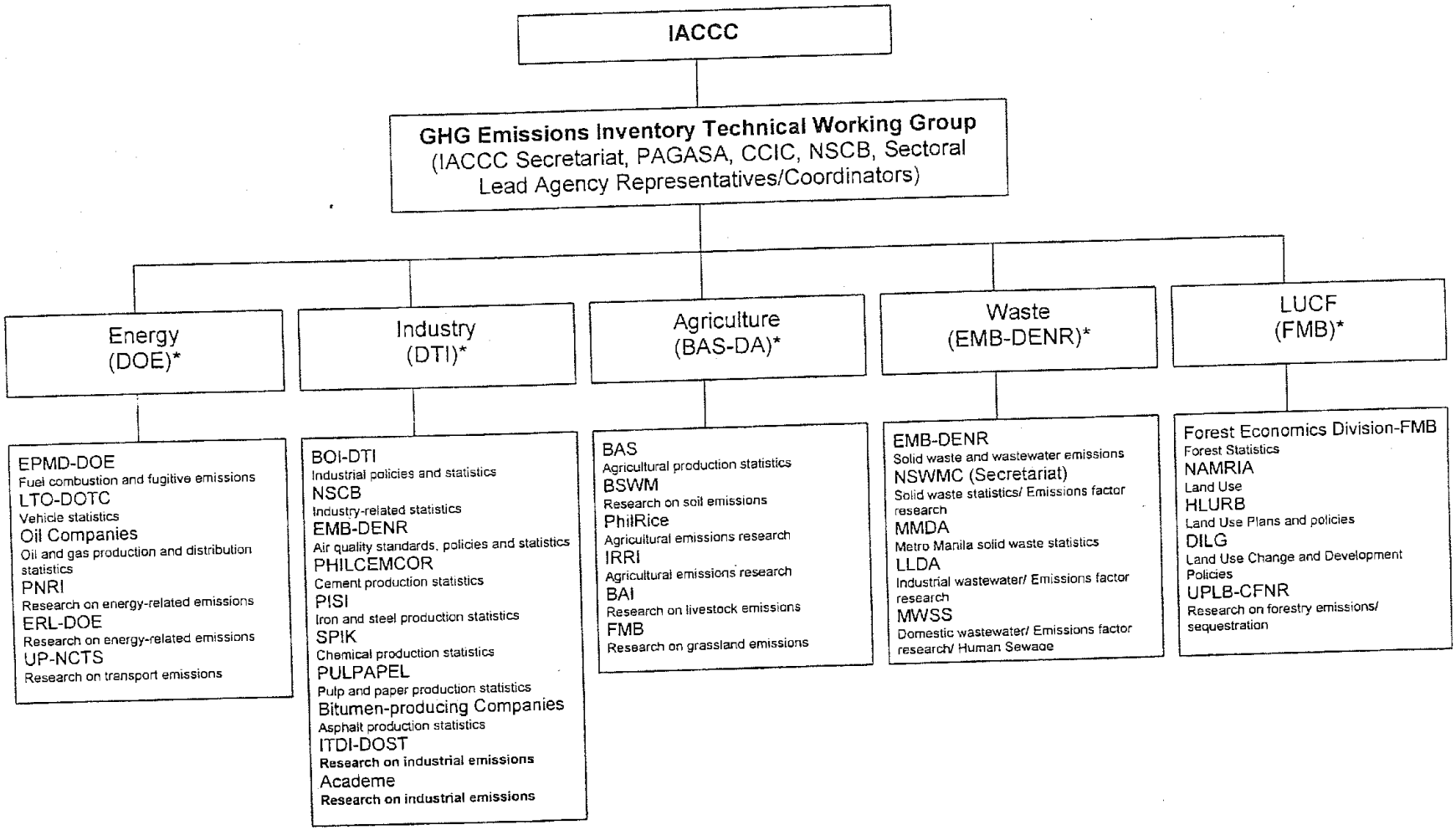
[19] Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories.* May 2000, p. 8.4.

needed to sift through files and convert measurements from one reporting format to another. In order to maintain a continuous reporting schedule, more efficient methods must be developed for compiling the statistics necessary to complete the reports.

To facilitate data submission by the reporting agencies and to minimize paperwork among agencies, a computer/internet-based system for reporting GHG emissions should be established. Such a system would simply build on the manual information management systems established by the GHG-TWG, allowing agencies to input their data from a remote location via the internet and incorporate a procedure for QA/QC. Implementing this type of database would eliminate the need for so many 'middle men' in the inventory process, as the Australian Greenhouse Office has discovered, saving time and money. It would also minimize the time required to compute the emissions from the activity data by enabling a user to input the activity data directly into the database, with the conversion factors already programmed into the system.

Freed from the need to evaluate worksheets for human error and to discuss minute details of translating data into actual emissions, members of the GHG-TWG and SWGs would have more time to focus on cross-cutting issues, local emissions research, managing uncertainties, and designing a more complete QA/QC process. A web-based version of this system may take time to develop because some government agencies lack access to the internet, but the adoption of a computerized database for the inventory is essential to ensure efficient management of the data received and to allow for improved archival of data. If adopted, however, it could serve as a prototype which other Parties to the UNFCCC could use to develop their own inventory systems.

Figure 1. Proposed GHG Emissions Inventory Working Group



*Lead Agency

資料 3　現地収集資料

(4) Clean Development Mechanism

DENR-EMB 提供

Clean Development Mechanism

For more information, please contact:

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UNEP

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Introduction to the CDM
summarizes the national values and benefits of participation in the CDM, including an outline of the process by which the CDM projects can be identified, developed, financed, implemented and the resulting CDM project emission reduction monitored, reported, verified and certified.

This introduction is connected to a larger UNEP project on "Capacity Building for the CDM" implemented by the UNEP Collaborating Centre on Energy and Environment, Risoe National Laboratory, Denmark. The overall objective of the project is to develop the institutional capability and human capacity for implementation of the CDM in developing countries.

The project is funded by the
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The Clean Development Mechanism
(CDM)

UNEP Collaborating Centre on Energy and Environment
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RISØ Risoe National Laboratory
Roskilde
Denmark

Clean Development Mechanism

Page

UNEP

The Clean Development Mechanism (CDM)

Introduction

The Clean Development Mechanism (CDM), a cooperative mechanism established under the Kyoto Protocol, has the potential to assist developing countries in achieving sustainable development by promoting environmentally friendly investment from industrialized country governments and businesses*. This document provides an overview of the CDM's background, structure, and project cycle, and examines the potential value and benefits for participating developing countries. The document also suggests steps for developing a national CDM strategy and provides examples of CDM projects. While the basic rules have been established, the CDM is a work in progress by participating governments. This document presents the latest available information and will be updated in the future to reflect important changes.

Background

The 1997 Kyoto Protocol, a milestone in global efforts to protect the environment and achieve sustainable development, marked the first time that governments accepted legally-binding constraints on their greenhouse gas emissions. The Protocol also broke new ground with

* The Kyoto Protocol does not exclude the possibility of unilateral CDM projects, where investors are developing country entities.

its innovative "cooperative mechanisms" aimed at cutting the cost of curbing these emissions. As it does not matter to the climate where emission reductions are achieved, sound economics argues for achieving them where they are least-costly. The Protocol therefore includes three market-based mechanisms aimed at achieving cost-effective reductions — International Emissions Trading (IET), Joint Implementation (JI), and the CDM.

The CDM, contained in Article 12 of the Kyoto Protocol, allows governments or private entities in industrialized countries to implement emission reduction projects in developing countries and receive credit in the form of "certified emission reductions," or CERs, which they may count against their national reduction targets. The CDM strives to promote sustainable development in developing countries, while allowing developed countries to contribute to the goal of reducing atmospheric concentrations of greenhouse gases.

> Kyoto Protocol Article 12.2 "The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3."

The UNFCCC & the Kyoto Protocol

Increasing scientific evidence of human interference with the global climate system, along with growing public concern about the environment, pushed climate change onto the political agenda in the mid-1980s. In 1988, the United Nations Environment Programme

(UNEP) and the World Meteorological Organization (WMO) established the Intergovernmental Panel on Climate Change (IPCC) to provide policymakers with authoritative scientific information. The IPCC, consisting of hundreds of leading scientists and experts on global warming, was tasked with assessing the state of scientific knowledge concerning climate change, evaluating its potential environmental and socioeconomic impacts, and formulating realistic policy advice.

Two years later in 1990, the IPCC published a report concluding that the growing accumulation of human-made greenhouse gases in the atmosphere would "enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface" by the next century, unless measures were adopted to limit emissions. The report confirmed that climate change was a threat and called for an international treaty to address the problem. Later that same year, the Second World Climate Conference echoed the same call. The United Nations General Assembly responded by formally launching negotiations on a framework convention on climate change and establishing an "Intergovernmental Negotiating Committee" to develop the treaty. Negotiations to formulate an international treaty on global climate protection began in 1991 and resulted in the completion, by May 1992, of the United Nations Framework Convention on Climate Change (UNFCCC).

The United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC was opened for signature at the UN Conference on Environment and Development (the Earth Summit) in Rio de Janeiro, Brazil, in June 1992, and entered into force in March 1994. The Convention sets an "ultimate objective" of stabilizing atmospheric concentrations of greenhouse gases at safe levels. Such levels, which the Convention does not quantify, should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic

development to proceed in a sustainable manner. To achieve this objective, all countries have a general commitment to address climate change, adapt to its effects, and report their actions to implement the Convention. As of December 2001, the Convention currently has received 186 instruments of ratification.

The Convention divides countries into two groups: Annex I Parties, the industrialized countries who have historically contributed the most to climate change, and non-Annex I Parties, which includes primarily the developing countries. The principles of equity and "common but differentiated responsibilities" contained in the Convention require Annex I Parties to take the lead in returning their greenhouse gas emissions to 1990 levels by the year 2000. They must also submit regular reports, known as national communications, detailing their climate change policies and programs, as well as annual inventories of their GHG emissions.

The Kyoto Protocol

The Kyoto Protocol was adopted in December 1997. The Protocol creates legally binding obligations for 38 industrialized countries, including 11 countries in Central and Eastern Europe, to return their emissions of GHGs to an average of approximately 5.2 percent below their 1990 levels as an average over the period 2008-2012.

The targets cover the six main greenhouse gases: carbon dioxide, methane, nitrous oxide; hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride. The Protocol also allows these countries the option of deciding which of the six gases will form a part of their national emissions reduction strategy. Some activities in the land-use change and forestry sector, such as deforestation and reforestation, that emit or absorb carbon dioxide from the atmosphere, are also covered.

Negotiations continued after Kyoto to develop the Protocol's operational details. While the Protocol identified a number of modalities to help Parties reach their targets, it does not elaborate on the specifics. After more than four years of debate, governments finally in 2001 agreed to a comprehensive rulebook—the Marrakech Accords—on how to implement the Kyoto Protocol. The Accords also intend to provide governments with sufficient clarity to consider ratification.

The Clean Development Mechanism (CDM) and the Cooperative Mechanisms

The Protocol establishes three cooperative mechanisms designed to help industrialized countries (Annex I Parties) reduce the costs of meeting their emissions targets by achieving emission reductions at lower costs in other countries than they could domestically.

- *International Emission Trading* permits countries to transfer parts of their 'allowed emissions' ("assigned amount units").

- *Joint Implementation* (JI) allows countries to claim credit for emission reductions that arise from investment in other industrialized countries, which result in a transfer of equivalent "emission reduction units" between the countries.

- *The Clean Development Mechanism*(CDM) allows emission-reduction projects that assist in creating sustainable development in developing countries to generate "certified emission reductions" for use by the investor.

The mechanisms give countries and private sector companies the opportunity to reduce emissions anywhere in the world—wherever the cost is lowest—and they can then count these reductions towards their own targets.

Through emission reduction projects, the mechanisms could stimulate international investment and provide the essential resources for cleaner economic growth in all parts of the world. The CDM, in particular, aims to assist developing countries in achieving sustainable development by promoting environmentally friendly investment from industrialized country governments and businesses.

The funding channelled through the CDM should assist developing countries in reaching some of their economic, social, environmental, and sustainable development objectives, such as cleaner air and water, improved land use, accompanied by social benefits such as rural development, employment, and poverty alleviation and in many cases, reduced dependence on imported fossil fuels. In addition to catalyzing green investment priorities in developing countries, the CDM offers an opportunity to make progress simultaneously on climate, development, and local environmental issues. For developing countries that might otherwise be preoccupied with immediate economic and social needs, the prospect of such benefits should provide a strong incentive to participate in the CDM.

Overview of the CDM

Participation

The CDM allows an Annex I Party to implement a project that reduces greenhouse gas emissions or, subject to constraints, removes greenhouse gases by carbon sequestration, or "sinks," in the territory of a non-Annex I Party. The resulting certified emission reductions, known as CERs, can then be used by the Annex I Party to help meet its emission reduction target. CDM projects must be approved by all Parties involved, lead to sustainable development in the host countries, and result in real, measurable and long-term benefits in terms of climate change mitigation. The reductions must also be additional to any that would have occurred without the project.

In order to participate in the CDM, there are certain eligibility criteria that countries must meet. All Parties must meet three basic requirements: voluntary participation in the CDM, the establishment of a National CDM Authority, and ratification of the Kyoto Protocol. In addition, industrialized countries must meet several further stipulations: establishment of the assigned amount under Article 3 of the Protocol, a national system for the estimation of greenhouse gases, a national registry, an annual inventory, and an accounting system for the sale and purchase of emission reductions.

Eligible Projects

The CDM will include projects in the following sectors:

- End-use energy efficiency improvements
- Supply-side energy efficiency improvement
- Renewable energy

- Fuel switching
- Agriculture (reduction of CH_4 and $N2_O$ emissions)
- Industrial processes (CO_2 from Cement etc., HFCs, PFCs, SF_6)
- Sinks projects (only afforestation and reforestation)

Annex I Parties must refrain from using CERs generated through nuclear energy to meet their targets. In addition, for the first commitment period (2008-2012), the only sink projects allowed are those involving afforestation or reforestation, and Annex I Parties can only add CERs generated from sink projects to their assigned amounts up to 1% of their baseline emissions for each year of the commitment period. Further guidelines for carbon sink projects will be developed to ensure they are environmentally sound.

In order to make small projects competitive with larger ones, the Marrakech Accords establish a fast track for small-scale projects with simpler eligibility rules—renewables up to 15 MW, energy efficiency with a reduction of consumption either on the supply or the demand side of up to 15 gigawatthours/yr, and other projects that both reduce emissions and emit less than 15 kilotons of CO_2 equivalent annually. The Executive Board has been tasked with defining modalities and procedures for the fast track, and will submit them to the Eighth Conference of the Parties (COP 8), to be held in New Delhi in October 2002.

Financing

Public funding for CDM projects must not result in the diversion of funds for official development assistance. In addition, the CERs generated by CDM projects will be subject to a levy–known as the "share of the proceeds"– of 2%, which will be paid into a newly-created adaptation fund to help particularly vulnerable developing countries adapt to the adverse effects of climate change.

Another levy on CERs will contribute to the CDM's administrative costs. To promote the equitable distribution of projects among developing countries, CDM projects in least developed countries are exempt from the levy for adaptation and administrative costs.

The Executive Board

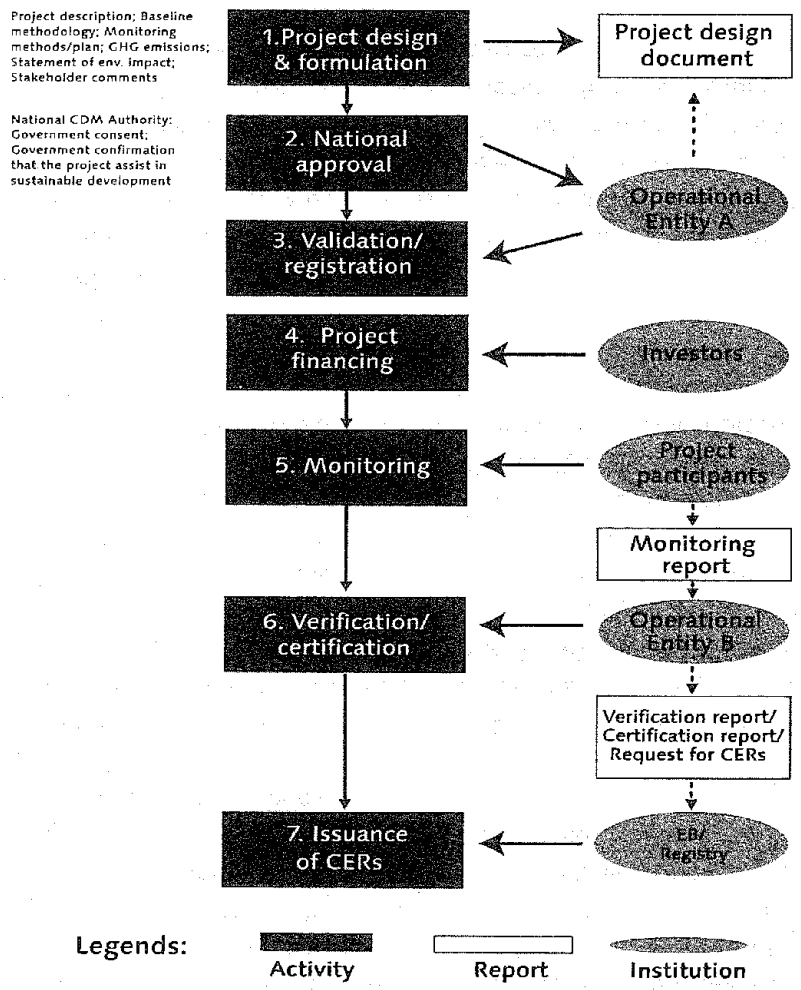
The CDM is supervised by an Executive Board, which itself operates under the authority of the Parties. The Executive Board is composed of 10 members, including one representative from each of the five official UN regions (Africa, Asia, Latin America and the Caribbean, Central and Eastern Europe, and OECD), one from the small island developing states, and two each from Annex I and non-Annex I Parties. The Executive Board held its opening meeting at the Marrakech talks in November 2001, marking the launch of the CDM.

The Executive Board will accredit independent organizations–known as operational entities –that will validate proposed CDM projects, verify the resulting emission reductions, and certify those emission reductions as CERs. Another key task is the maintenance of a CDM registry, which will issue new CERs, manage an account for CERs levied for adaptation and administrative expenses, and maintain a CER account for each non-Annex I Party hosting a CDM project.

Project Identification and Formulation

The first step in the CDM project cycle is the identification and formulation of potential CDM projects. A CDM project must be real, measurable and additional. To establish additionality, the project emissions must be compared to the emissions of a reasonable reference case, identified as the baseline. The baseline is established by the project participants according to approved methodologies on a project-specific basis. These baseline methodologies are being developed based on the three approaches in the Marrakech Accord:

Project cycle for the CDM



The CDM project cycle as shown on the figure has seven basic stages: project design and formulation, national approval, validation and registration, project finance, monitoring, verification/certification and issuance of CERs. The first four are performed prior to the implementation of the project, while the latter three are performed during the lifetime of the project.

- existing actual or historical emissions;
- emissions from a technology that represents an economically attractive investment; or,
- the average emissions of similar project activities under taken in the previous five years under similar circumstances and whose performance is among the top 20% of their category.

CDM projects must also have a monitoring plan to collect accurate emissions data. The monitoring plan, which constitutes the basis of future verification, should provide confidence that the emission reductions and other project objectives are being achieved and should be able to monitor the risks inherent to baseline and project emissions. The monitoring plan can be established either by the project developer, or by a specialized agent. The baseline and monitoring plan must be devised according to an approved methodology. If the project participants prefer a new methodology, it must be authorized and registered by the Executive Board. The project participants must choose whether the crediting period shall be 10 years or 7 years with a possibility to be renewed two times (a maximum of 21 years).

National Approval

All countries wishing to participate in the CDM must designate a National CDM Authority to evaluate and approve the projects, and serve as a point of contact. Although the international process has given general guidelines on baselines and additionality, each developing country has the responsibility to determine the national criteria for project approval. Together with the investor, the host country must prepare a project design document with the following structure:

- General description of the project;
- Description of the baseline methodology;
- Timeline and crediting period;
- Monitoring methodology and plan;

- Calculation of GHG emissions by sources
- Statement of environmental impacts;
- Stakeholder comments.

The National CDM Authority issues the necessary statements: that the government participates voluntary in the project and confirms that the project activity assists the host country in achieving sustainable development.

Validation and Registration

A designated operational entity will then review the project design document and, after public comment, decide whether or not it should be validated. These operational entities will typically be private companies such as auditing and accounting firms, consulting companies and law firms capable of conducting credible, independent assessments of emission reductions. If validated, the operational entity will forward it to the Executive Board for formal registration.

Monitoring, Verification and Certification

The carbon component of a mitigation project cannot acquire value in the international carbon market unless submitted to a verification process designed specifically to measure and audit the carbon component. Therefore, once the project is operational, participants prepare a monitoring report, including an estimate of CERs generated, and submit it for verification by an operational entity.

Verification is the independent ex-post determination by an operational entity of the monitored reductions in emissions. The operational entity must make sure that the CERs have resulted according to the guidelines and conditions agreed upon in the initial validation of the project. Following a detailed review, an operational entity will produce a verification report and then certify the amount of CERs generated by the CDM project.

Certification is the written assurance that a project achieved the reductions as verified. The certification report also constitutes a request for issuance of CERs. Unless a project participant or three Executive Board members request a review within 15 days, the Executive Board will instruct the CDM registry to issue the CERs.

National Value and Benefits

The basic principle of the CDM is simple: developed countries can invest in low-cost abatement opportunities in developing countries and receive credit for the resulting emissions reductions, thus reducing the cutbacks needed within their borders. While the CDM lowers the cost of compliance with the Protocol for developed countries, developing countries will benefit as well, not just from the increased investment flows, but also from the requirement that these investments advance sustainable development goals. The CDM encourages developing countries to participate by promising that development priorities and initiatives will be addressed as part of the package. This recognizes that only through long-term development will all countries be able to play a role in protecting the climate.

From the developing country perspective, the CDM can:

- Attract capital for projects that assist in the shift to a more prosperous but less carbon-intensive economy;
- Encourage and permit the active participation of both private and public sectors;
- Provide a tool of technology transfer, if investment is channelled into projects that replace old and inefficient fossil fuel technology, or create new industries in environmentally sustainable technologies; and,
- Help define investment priorities in projects that meet sustainable development goals.

Specifically, the CDM can contribute to a developing country's sustainable development objectives through:

- Transfer of technology and financial resources;
- Sustainable ways of energy production;
- Increasing energy efficiency & conservation;
- Poverty alleviation through income and employment generation; and
- Local environmental side benefits

The drive for economic growth presents both threats and opportunities for sustainable development. While environmental quality is an essential element of the development process, in practice, there is considerable tension between economic and environmental objectives. Increased access to energy and provision of basic economic services, if developed along conventional paths, could cause long-lasting environmental degradation---both locally and globally. But by charting a different course and providing the technological and financial assistance to follow it, many potential problems could be avoided.

In comparing potential CDM projects with what might otherwise take place, it is clear that the majority will entail not only carbon reduction benefits, but also produce a range of environmental and social benefits within developing countries. Sustainable development benefits could include reductions in air and water pollution through reduced fossil fuel use, especially coal, but also extend to improved water availability, reduced soil erosion and protected biodiversity. For social benefits, many projects would create employment opportunities in target regions or income groups and promote local energy self-sufficiency. Therefore carbon abatement and sustainable development goals can be simultaneously pursued.

Many options under the CDM could create significant co-benefits in developing countries, addressing local and regional environmental

problems and advancing social goals. For developing countries that might otherwise give priority to immediate economic and environmental needs, the prospect of significant ancillary benefits should provide a strong inducement to participate in the CDM.

Developing a National CDM Strategy

Evaluation of National Interests and Priorities

The CDM presents an opportunity to channel resources towards the projects that are most likely to further national sustainable development. Criteria for CDM projects should therefore be based on a country's sustainable development objectives, which may be identified by the goals and policies already established for social and economic development in related areas, such as energy, land-use change and transportation. At the national level, sustainable development programs or environmental plans may already be in place in related areas, such as policies on forests, renewable energy and clean technologies.

Building Support for CDM — A Participatory Approach

One of the most challenging aspects of building a national CDM strategy is enlisting the active support from all sectors of society (civil, NGOs, private and public sector) and different sectors of the economy (industry, energy, agriculture, forestry). A successful CDM strategy will require official governmental support, both in terms of ratification of the UNFCCC and the Kyoto Protocol, but also in designating a National Authority to approve CDM projects. However, governments will also play a key role in cooperating with the private sector to market the CDM proposals to prospective investors.

The private sector can help ensure an emphasis on efficiency and the development of clear and simple rules. Including the participation of

the private sector in the institutional building process encourages a less bureaucratic and more results-oriented approach in the procedure. The private sector is essential for driving the CDM, as investors seek cost-efficient means of mitigating their emissions.

Non-governmental organizations (NGOs) should also be incorporated in the development and implementation of the strategy, since they bring an environmental and social focus to the institutional agenda. NGOs can be repositories of valuable scientific expertise and technical know-how in developing and evaluating projects.

The integration of these sectors is seldom easy. Some governments may enjoy a good working relationship with NGOs and the private sector, allowing them to distribute responsibilities and work together. Other governments, however, may have a more distant relationship among the different sectors, making it more difficult to reach a common goal. In any case, the approach should match national circumstances.

National Institutional Structure to Implement CDM Projects

The National CDM Authority is the host country entity or body that evaluates potential CDM projects and provides written approval confirming that the project activity is voluntary, complies with national and international criteria, and assists in achieving sustainable development of the host country.

The National CDM Authority needs to have open communication with the government agencies of the sectors relevant to the CDM. The technical review of projects can often involve the ministries or bureaus of the relevant sector (energy, natural resources, environment, etc.). The approval of CDM projects could also involve foreign affairs ministries, since they often serve as the UNFCCC focal point.

Evaluation and Approval

A sound evaluation process will increase the probability of having projects successfully validated and certified as CDM projects, and reduce the perceived and real risks of national and foreign investors in developing and implementing carbon mitigation projects. It can also create incentives for specific project types or for priority sectors. The evaluation process also provides the main filter for ensuring that projects pursue CDM objectives consistent with relevant national policies, strategies and priorities.

International criteria: As a starting point in the evaluation process, a CDM project must first satisfy the internationally agreed criteria. Article 12 of the Kyoto Protocol stipulates three principal eligibility criteria for CDM projects:

- Projects must assist Non-Annex I Parties "in achieving sustainable development and contributing to the ultimate objective of the Convention".
- Projects must result in "real, measurable and long-term benefits related to the mitigation of climate change".
- Projects must result in "reductions in emissions that are additional to any that would occur in the absence of the certified project activity".

The Marrakech Accords stipulate more criteria that must be met by potential CDM projects. These international criteria focus mainly on technical aspects of the carbon mitigation activities of the project and are meant to ensure that the expected benefits related to the mitigation of climate change are real, measurable and additional.

National Criteria: The host country has the prerogative to decide whether a project assists in achieving sustainable development, and therefore should develop national criteria and requirements to ensure a coherent, justifiable and transparent assessment. Key elements could include:

compliance with existing political and legal frameworks; compatibility with local priorities; comments by local stakeholders directly and indirectly involved with the project; local availability of qualified human resources and adequate institutional resources; and the potential for local institutional enhancement and national capacity building.

In deciding which of these criteria are to be adopted, the host country should consider the direct relationship between requirements and transaction costs. The more requirements imposed on project developers, the higher the preparation costs. In a carbon market where the CDM already has many prerequisites, host countries should balance information requirements necessary for quality control with rising preparation costs.

Another key element for attracting CDM investments is the host country's application of quick and transparent procedures for screening, evaluating and approving projects. To achieve this goal, the National CDM Authority should implement a standardized system to screen, evaluate, and approve CDM projects. Host countries will need to establish guidelines for presenting projects. For validation and verification, CDM projects must be drafted in the format of a Project Design Document (PDD). The guidelines for the presentation of projects need to be consistent and transparent, so that project developers are not subjected to changing formats.

Project Supply, Identification and Formulation

To promote CDM investment, host countries can hold training sessions for project developers, during which they are shown how to identify potential projects, understand the context of the UNFCCC and the carbon market, and familiarize themselves with the PDD. Training sessions may also be necessary to understand the more complex aspects of CDM projects, such as generating proper documentation for the

establishment of baselines (including assumptions and methodologies used), as well as calculating project emissions, reductions and leakage; that is, the indirect effect of emission reduction projects that lead to a rise in emissions elsewhere. Participants in the training courses should include project developers, private companies, government agencies, bankers, NGOs and other stakeholders. Host countries can facilitate international investment by developing a portfolio of diverse high quality CDM projects that address the needs and interests of a wide spectrum of investors.

Conclusion

The full extent of potential benefits available to developing countries under the CDM is difficult to forecast, but its enormous potential to promote sustainable development and increase foreign investment flows is clear. With thoughtful planning and the development of a national CDM strategy, it can also assist in addressing local and regional environmental problems and in advancing social goals. The CDM allows developing countries to participate in the global effort to combat climate change at a time when other development priorities may limit the funding available for GHG emission reduction activities. The CDM's objective of advancing the development goals of developing countries recognizes that only through long-term sustainable development will all countries be able to play a role in climate protection.

CDM Projects Examples

For the following section, the acronym AIJ before the name of the host country signifies that the example is taken from the Actions Implemented Jointly (AIJ) pilot phase, a forerunner of the CDM developed under the UNFCCC.

End-Use Energy Efficiency

Energy Efficiency Measures in Industrial Boilers (Viet Nam)

This project, from the Asian Least-cost Greenhouse Gas Abatement Strategy (ALGAS), will improve boiler efficiencies in the industrial sector. The targeted improvements will have low investment costs and include the following measures: measuring devices, control devices, and insulating materials. The project will disseminate new technologies to industry and propose relevant measures for upgrades.

The project's primary goal is the reduction of energy consumption by industrial boilers per unit of product and, therefore, to reduce CO_2 emissions in the industrial sector. In Viet Nam the industrial sector is the highest CO_2 emitter, responsible for 40% of overall emissions.

The baseline for the project is the continued use of inefficient boilers in Viet Nam with an average efficiency of 45 percent. The proposed improvements will raise the average efficiency of industrial boilers to 60 percent. The project will lead to an estimated reduction of emissions of 150 kt CO_2 per year. It will also reduce the emissions of local airborne pollutants. This is important in Viet Nam since the industrial sector emits the highest share of the SO_2 emissions and is the second highest NO_x emitting sector.

Supply-Side Energy Efficiency

Combined Heat and Power (CHP) Project in Shangqiu Thermal Power Plant in Henan Province (AIJ-China)

For many developing countries, CHP could provide the basis for potential CDM projects. The aim of this project is to replace 24 small low-efficiency, coal-fired industrial boilers, which supply industrial process heat, with new coal-fired circulating fluidised bed combustion boilers (CFBC), coupled with co-generating units with 24 MW capacity. The plant will supply power to the Shangqiu Aluminium (Al) Refinery Plant and the project will enable it to meet its load demand for the newly increased refinery capacity of 15000 tons Al/year without suffering from reoccurring blackouts and shortages.

The project will save 965 TJ of coal per year, resulting in an emission reduction of 88 kt CO_2 per year. Local and regional pollution will be reduced, as SO_2 emissions will be reduced effectively by the desulphurisation rate of 85% in the CFBC boiler. Particles and dust will be reduced by 95%, and NOx emissions will also decrease.

Waste

Bio-Gen Biomass Power Generation Project, Phase I (AIJ-Honduras)

Power and heat production can be generated from agricultural wastes, such as peanut shells, rice husks, coconut husks, orange processing waste, palm oil production waste, logging residues, wood waste from sawmills etc. In many cases, a CDM project of this type will both reduce GHG emissions and reduce a local pollution problem.

One example is the 15 MW biomass waste-to-energy project in Guaimaca, Honduras. The plant will utilize wood wastes generated from forest products processing in the region. The waste, including sawmill and logging residues, are currently burned under uncontrolled conditions or disposed of in rivers or low-lying areas. The project will reduce the CO_2 emissions by 119 kt CO_2 emitted from the use of fuel oil in the baseline. The power produced by the plant will be sold to the national utility and will displace electricity and associated emissions that would have been produced by fossil-fuel facilities.

The plant will be able to operate as a base load plant operating 7500 hours per year. Therefore, since electricity demand is expected to increase at a high rate in Honduras, the capacity from this project will reduce the amount of fossil-fueled capacity otherwise expected. The new capacity from the project could also help reduce the present number of selective power cuts, which prevent local sawmills from operating efficiently. The project may also act as a catalyst for projects at other mills or within other industries, allowing more local facilities to become self-sufficient in their power supply.

Wind

Alizés Rural Electrification (AIJ-Mauritania)

This project seeks to install small 1 kW wind turbines in 150 rural villages that lack access to electricity. The wind turbines will supply power to battery-charging stations, which families will use as their source of electricity. The electricity from the wind turbine will replace kerosene, candles and batteries for most families. Those already using batteries will save long transport times to bring their batteries to the central grid and no CO_2 will be emitted when their batteries are charged. The total annual emission reduction from the 7500 families in the 150 villages is calculated to be 0.88 kt CO_2.

In Mauritania, only the main urban centers are electrified. The number of urban poor is rapidly increasing due to rural migration. This trend is likely to continue in the absence of basic rural amenities. To improve the quality of life in the rural area and stem the flood of migrants to

urban slums, high quality energy and electricity must be brought online as the foundation for social and economic development.

Mauritania is one of the windiest countries in West Africa, and the project builds on the successful experience of Programme Alizés, a cooperative initiative of the French NGO GRET (Technological Research and Exchange Group) and the Mauritanian Department of Energy. Programme Alizés transferred wind mechanical water-pumping technology to villages in Mauritania and Senegal. The new electricity-generating wind CDM project will build private sector capacity, establish credit lines and facilitate collaborative arrangements with foreign suppliers of equipment and services. A first phase of installing about 40 small wind turbines was completed with GEF financing.

Solar

Residential Solar Water Heating (South Africa)

South Africa is a dry country with one of the best solar regimes available, with solar energy radiation at approximately 2190 kWh/m²/year. The proposed solar water-heating (SWH) project is in a municipally-owned Hostels to Homes Development Project in Lwandle, a low-income area in Cape Town. The community chose SWHs with back up (either electricity or gas) as their preferred technology for water heating upgrades several years ago; but limited funds and no direct incentives have meant that the project has not been implemented. The project has been developed by the Energy & Development Research Center at the University of Cape Town.

This example illustrates that the GHG emission reduction potential of solar water heating projects is heavily dependent on the baseline. The residents at Lwandle are currently using kerosene stoves for water heating. However, given the push for electrification and the desire to upgrade the hostels, residents will probably have access to standard

electric storage geyser heaters in the near future. If the 341 households in the project were supplied with SWHs with electricity backup, the emission would be reduced with 4.7 $ktCO_2$/year, when the baseline is electric heaters. However, if the baseline is assumed to be kerosene water heating, the emission will increase by 0.7 $ktCO_2$/year. Since electricity is generated from coal, the GHG emission from the electrical backup is higher than the GHG emission from the kerosene heaters. In the latter case, the project will only reduce local air pollution from kerosene combustion.

The project is expected to create jobs and local economic growth through small-scale entrepreneurs undertaking installation and maintenance of the SWHs, the sale of hot water coupons and spin-offs, such as hot water use in activities like hairdressing and laundry.

Hydro

Chacabuquito 26 MW Run of River Hydropower Project (Chile)

Approximately 100 km north of Santiago, Chile, a hydropower plant will be built and connected to the central grid in Chile, where it will replace coal thermal power generation. The project, which is being developed under the World Bank's Prototype Carbon Fund (PCF), seeks Certified Emission Reductions (CERs) for three 7-year "renewal" periods, depending on baseline development. The total emission reduction in all the 21 years will be 2.8 million tons of CO_2. The total estimated costs are $37 Millions and will produce 175 GWh gross (160 GWh) net power annually.

The project will contribute to the sustainable development in Chile through:

- use of local renewable energy resources (small hydro to displace coal thermal power);

- increased commercial activity through clean and renewable source of power; and,
- generation of employment in the region where the project will be located.

The Environmental Impact Statement for the project showed no significant ecological or social impact on the watershed. The project has been endorsed by the National Environment Commission, which chairs the National Advisory Committee on Global Climate Change.

Biomass

Sustainable Fuelwood and Charcoal Production for the Pig Iron Industry in Minas Gerais, the Plantar Project (Brazil)

In this Prototype Carbon Fund (PCF) project, fossil fuel will be replaced by sustainable biomass. The significant mineral wealth, fuel wood and hydroelectric potential enabled the State of Minas Gerais to emerge as the Brazilian iron and steel center in the 1960s and 1970s. These industries were initially reliant on supply of charcoal from native forests. The pig iron production sector is now comprised of two sets of players: the large integrated pig iron mills using coke and the small independent companies with 25% of the total production.

This project is concerned with these charcoal-using producers, which have small blast furnaces with unit size of about 90,000 tons a year. Many of them are closing down because they cannot use charcoal from native forests (due to legal restrictions) and they do not have the resources to switch to charcoal from managed plantations. Some are moving to other regions with fewer restrictions on the use of native forest for charcoal production. Of the 67 firms in Minas in 1992, only 37 remain today. Therefore, the project would have significant positive impact on the rural economy of the State of Minas Gerais.

The project seeks to establish, between 2002 and 2009, 23100 ha of high yielding eucalyptus plantations to supply the wood for the charcoal production. The charcoal will be produced on the leading edge of carbonization technology currently deployed in Brazil. This technology will reduce the methane emissions by 70% from the charcoal production process and will capture the potential commercial value of pyrolytic oils and tars. This reduction in local pollution will improve the charcoal workers health. In the period up to 2010, when the eucalyptus plantation is mature, about 5 million tons CO_2 is sequestered. When the production of charcoal forms, the plantation starts. After which, the annual emission reduction due to lower coal consumption is about 0.4 million tons CO_2.

資料 3　現地収集資料

(5) Establishment of the Clean Development Mechanism (CDM) National Authority,

Operational Framework and Support Systems for the Philippines

UNDP 提供

Phase 1 + 2

United Nations Development Programme

Department of Environment and Natural Resources –
Environmental Management Bureau (DENR-EMB)

and

The Philippine Inter-Agency Committee on Climate Change (IACCC)

Establishment of the Clean Development Mechanism (CDM) National Authority, Operational Framework and Support Systems for the Philippines

Manila, PHILIPPINES

March 31, 2003
(Final Draft)

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CURRENCY RATIOS

As of March 31, 2003

1 US Dollar = Philippine PESO (PhP) 54.07
1 US Dollar = 0.92653 Euro
1 Euro (EUR) = 2.20371 Dutch Guilder (NLG)
1 Euro (EUR) = 1.07950 US Dollar (USD)

ABBREVIATIONS

ALGAS	Asia Least Cost Greenhouse Gas Abatement Strategy
CAA	Clean Air Act
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
DENR	Department of Environment and Natural Resources
DENR – EMB	Department of Environment and Natural Resources – Environment Management Bureau
DOE	Designated Organization Entity
DFA	Department of Foreign Affairs
ELI	Efficient Lighting Initiative
FATL	Fuels and Appliance Testing Laboratory
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GNP	Gross National Product
GOP	Government of the Philippines
HLURB	Housing and Land Use Regulatory Board
IACCC	Inter-Agency Committee on Climate Change
IAQIF	Integrated Air Quality Improvement Framework
LUCF	Land Use, Change, and Forestry
MMBFOE	Million Barrels of Fuel Oil Equivalent
MTPDP	Medium-Term Philippine Development Plan
NA	National Authority
NAPCC	National Action Plan on Climate Change
NAQCP	National Air Quality Control Plan
NCCC	National Commission on Climate Change
NSWMC	National Solid Waste Management Commission
PAG-ASA	Philippine Atmospheric Geophysical and Astronomical Services Administration
PDD	Project Design Document
PELMATP	Philippine Efficient Lighting Market Transformation Project
PEP	Philippine Energy Plan
PSSD	Philippine Strategy for Sustainable Development
RESCO	Rural Energy Service Company
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework on Climate Change Convention
VROM	"Ministry of Housing, Spatial Planning, and Environment"

PROJECT KEY SHEET

Project Name:	Establishment of the Clean Development Mechanism (CDM) National Authority, Operational Framework and Support Systems for the Philippines
Project Location:	Nationwide
Proposed Executing Agency:	Environmental Management Bureau - Department of Environment & Natural Resources- (DENR-EMB) in behalf of the Inter-Agency Committee on Climate Change
Location and Address Details of Head Office:	DENR Compound Visayas Avenue, Diliman, Quezon City 1116 Philippines
Contact Person:	Ms. Joyceline A. Goco Head, IACCC Secretariat
Long Term Objective:	To facilitate the country's shift to sustainable development, through accelerated socio-economic growth, fueled by investments through mechanisms like the Clean Development Mechanism (CDM) and the global reduction of greenhouse gases.
Immediate Objective:	To put in place the CDM system of the Philippines through the designation of the National Authority (NA) and establishing its operational framework and support systems.
Project Beneficiaries:	The ultimate beneficiary is the global community and the country's general public with GHG avoided or abated worldwide and the achievement of the Philippines sustainable development goals. The direct beneficiaries are the industries and the private sector which shall be the recipients of improved technologies and additional project financing, as well as the national government agencies that will be involved in the CDM process.
Starting Date of the Project:	April 2003
Completion Date of the Project:	March 2005
Budget Financing:	The Netherlands Government: **US$ 1.0 M** Philippine Government: **PhP 2.38 M** (in-kind contribution) UNDP: **US$ 31,656** (in-kind contribution)

v

1. INTRODUCTION

1.1 BACKGROUND

The Philippines, as a country Party to the UN Framework Convention on Climate Change (UNFCCC) and signatory to its Kyoto Protocol, has embarked on several undertakings over the past years to enable it to comply with its commitments under this Convention. In March 31, 2000, the Philippines completed and submitted to the UNFCCC Secretariat its Initial National Communication on Climate Change (INCCC), detailing what it has done so far to comply with its commitments under the Convention.

The Philippines' Initial NCCC included the results of the 1994 Philippine Greenhouse Gas (GHG) Inventory, which is its main commitment. The inventory indicated that the country released a total equivalent amount of 100,738 ktons of CO_2 into the atmosphere for that period. Likewise, the country's future GHG emissions by the contributing sectors, namely energy, industry, agriculture and wastes were calculated and projected to increase to 195,091 ktons by 2008, a 94% rise from the 1994 level. This figure provides local GHG mitigation and reduction opportunities even if the Philippines, a non-Annex 1 country Party, is not required to do so under the UNFCCC.

Under the Kyoto Protocol, Annex 1 (developed) country Parties are required to reduce their emissions in accordance with their quantified emission reduction objectives or QELROS. Non-annex I (developing) country Parties, on the other hand, do not have quantified emission reduction targets under the Convention and the Protocol. The Philippines as a non-Annex I country, does not have any commitment to reduce GHG emissions within a specific timeframe but is committed to put in place, "win-win" options that will effectively reduce its greenhouse gas emissions, at the same time meeting its sustainable development objectives.

The Kyoto Protocol established legally binding obligations for Annex I countries to reduce their overall GHG emissions by about 5% of their 1990 levels by 2008-2012. It provides for three (3) mechanisms to assist developed country Parties meet their respective GHG emission reduction commitments and obligations overseas. One of the three mechanisms is called the "*Clean Development Mechanism*" (CDM). As enunciated in Article 12 of the Protocol, the CDM is the only mechanism that involves the participation of non-Annex 1 country Parties in the GHG reduction process of the Annex I country Parties. In order to participate, non-Annex 1 countries are required by the Conference of the Parties-meeting of the Parties (CoP-moP), the highest decision making body of the Protocol, through the CDM Executive Board, to establish their National Authorities (NAs) before they can participate in the CDM. The National Authority is the host country entity that provides written approval confirming that the proposed CDM project is voluntary, complies with national and international criteria, and assists in the sustainable development of the host country. It shall be the focal point for all CDM-related business transactions among local and foreign investors.

Since the Philippines is intending to participate in the CDM process, it has to establish/designate its NA and define/ establish the operational framework under which it will operate. This NA and its operational framework establishment is not that easy as it will require significant capacity building. In particular, the NA's capacity to determine whether projects will be eligible for the CDM and meet the country's sustainable development criteria in the process needs to be built up. This would require developing its competency on GHG mitigation analysis, including establishment of baselines and selection of optimum technologies. Moreover, the other stakeholders too, particularly the private sector and other proponents who will eventually design and implement the projects, need to be capacitated.

As early as 1999, when the details of the CDM were still being debated, the United Nations Development Programme (UNDP) provided technical assistance to selected countries, including the Philippines, to undertake a study on the capacity building needs of developing countries that would eventually participate in the CDM process. As the CDM rules were not yet finalized then, the study had to be done under a lot of assumptions. The results were actually meant to input into the then on-going debate about the parameters and scope of the CDM. The study was able to define the existing policy and legal framework existing at the time in the participating countries, as well as, identify representative projects which might be considered eligible for CDM. However, with the full articulation of the CDM rules in the Marrakech Meeting of the Conference of the Parties of the UNFCCC, these parameters are now quite clear and preparations for which need to be completed.

1.2 RATIONALE FOR DONOR INVOLVEMENT

As indicated by the results of the 1999 UNDP CDM study and in view of the CDM rules that have been formulated by the CDM Executive Board, the Philippines needs to institute certain interventions at the policy, institutional and individual levels to enable the mechanism's successful implementation. For example, it has to emplace the proper legal context and institutional arrangements to encourage a competitive CDM market in the Philippines, at the same time ensuring that the investments contribute optimally to the achievement of the country's sustainable development objectives. It would also require the generation of the appropriate technical competencies and capacities, particularly in the area of GHG inventory and baseline setting, mitigation analysis and technology option selection, at the individual stakeholder level, in both the implementing national agencies and the private sector and NGO proponents. All of these have to be integrated together in an operational framework which defines the policy and institutional regime governing the CDM's implementation in the country.

While the national network of agencies working on climate change, the Inter-Agency Committee on Climate Change (IACCC), has the basic capacity to undertake coordination function(s), (which is a major activity in generating the endorsement for the CDM proposal to the Executive Board), it cannot do this optimally because of lack of resources (both financial and manpower). This network of agencies, which is being contemplated to constitute the NA, is envisioned to face grave difficulty in the discharge of other corollary functions such as the maintenance of the national GHG inventory and other related information so critical to the verification and validation activities under the CDM process. All of these capacity building requirements are meant to be addressed in a very short time frame (within a year) as the CDM is expected to be operational once the Kyoto Protocol enters into force (expected anytime soon). Unfortunately, the country cannot rely on its own resources alone to prepare for the implementation of this mechanism as it has significant resources and capacity constraints which could be primarily addressed through substantial technical and financial assistance from developed countries like the Netherlands and multilateral agencies like the UNDP.

The Netherlands Government is regarded as an active partner of the Government of the Republic of the Philippines (GoP) with considerable climate change experience. It is also one of the first developed country Parties to assign public funds for implementing the mechanisms of the Kyoto Protocol, including the CDM. It has specifically set up a CDM office under the International Environmental Affairs Directorate under the Ministry of Housing, Spatial Planning and the Environment (VROM), which is tasked to arrange CDM projects with non-Annex I country Parties. It has also formulated its CDM Implementation Plan, which sets out strategies, procedures and the underlying principles for the Netherlands to implement the CDM. The GoP, therefore, recognizes that the Netherlands Government can contribute invaluable related experience, expertise and resources to the Philippines' efforts to set up its own CDM systems and procedures.

The UNDP, on the other hand, as an implementing agency of the Global Environment Facility (GEF), is another preferred partner of the Philippines as it has been instrumental in assisting the country undertake sustainable energy projects and enabling activities under the UN Framework Convention on Climate Change and its Kyoto Protocol, as well as, the other multilateral environmental agreements.

In light of the above, the GoP, with further technical assistance from the UNDP, prepared a project proposal on the development of an operational framework for the implementation of the CDM. The first draft of this proposal was consulted with the Royal Netherlands Embassy (RNE) in Manila, which indicated interest to support the furtherance of the proposal based on certain pre-requisites, particularly the designation of the NA. For the elaboration of the issues tackled by the proposal, the RNE provided preparatory financial assistance, particularly for consultations and further development of the proposal based on the results of the multi-stakeholder consultations.

2. NATIONAL AND LOCAL CONTEXT

The Philippines was among the first countries to subscribe to the sustainable development paradigm and sign the Global Agenda 21 and related multilateral environmental agreements like the UN Framework Convention on Climate Change and the Convention on Biodiversity (CBD) at the Earth Summit in Rio de Janeiro in 1992. Even prior to this, it already crafted its Philippine Strategy for Sustainable Development (PSSD) in 1989, which was

subsequently elaborated into a Philippine Agenda 21 (PA 21) after the UN Conference on Environment and Development (UNCED). The country's decision to tread the path to sustainable development was catalyzed not only by the global developments like the Earth Summit but by its own internal experience which generated consensus on the issue among the country's major stakeholders. It has undergone significant social, political and economic transformation for the past 50 years but continues to face developmental challenges even at the onset of the 21st century. Foremost of these is the country's significant, pervasive and persistent poverty situation which seems to demand more radical and innovative solutions. This is compounded by, or as another school of thought would have it, caused by the continuing degradation of the country's environment and natural resources base, on which a significant portion of the population, particularly rural communities, depend for livelihood and sustenance.

Among the causes of this degradation which is not internally generated and has elicited a lot of concern is climate change. Climate change is expected to further exacerbate the poverty situation in the country because its major ecosystems- forests, coastal and marine areas, fresh water resources and agricultural areas are vulnerable to extreme climatic events and the phenomenon's other impacts like sea level rise. The country is also ill-equipped to deal with other effects like impact on health because of the surge in climate related diseases. As majority of the country's poor population live in rural areas, particularly among the coastal communities, the effects of these impacts are expected to be devastating. These are among the reasons why the country aligned itself with more than 150 countries under the UNFCCC process.

However, the Philippines also takes cognizance of the other aspect of the Convention which promises to provide a significant boost to the country's economy, thereby addressing the poverty situation. This is primarily in the energy sector, which fuels the country's economic growth. As the UNFCCC and its Kyoto Protocol provides for the transfer of technology from developed nations to developing countries including additional financial resources to shift from conventional fossil fuel to renewable energy use, it looks with optimism at the mechanisms within the convention process providing for these transfers. Among these is the CDM which is expected to provide a sizeable amount of investments, primarily in the energy sector.

The Philippines' Medium Term Development Plan (MTPDP) for 2001 –2004 stresses macroeconomic stability and sustained growth of income and employment across sectors, socio-economic groupings and regions. It envisions overcoming poverty "with a comprehensive set of social and economic policies and programmes with an equity orientation, underpinned by good governance and adherence to the rule of law." The proposed CDM project is expected to contribute to the enhancement of the policy environment and emplacement of transparent procedures conducive to investments and consequently, socio-economic growth which dissipates equitably to the countrysides through CDM projects which also involve the communities.

2.1 Brief Description of the National/Sectoral/Sub-sectoral Context

The Philippines was among the first countries to embrace the sustainable development paradigm, adopting the Philippine Strategy for Sustainable Development (PSSD) in 1989. This was followed by the Philippine Agenda 21 (PA 21) in 1996 serving as the country's blueprint for sustainable development. The PA 21 was considered as the highest development policy document in the country encompassing all other national and sectoral development plans. It aims to achieve environment and development goals by:

1) Promoting sustainable development through trade liberalization;
2) Making trade and environment mutually supportive; and
3) Encouraging macroeconomic policies conducive to environment and development.

The vision and guiding principles set forth in the PA 21 were directed to be integrated into the Medium-Term Philippine Development Plan (MTPDP). The current MTPDP (2001 – 2004) envisions **"a sustainable development anchored on growth with social equity."** This vision is to be measured by poverty reduction and improvement in income distribution. The pursuit of the MTPDP vision entails political stability and a strong and more competitive private sector. The government sees itself as assuming the role of increasingly making competitive markets work to ultimately alleviate poverty. The use of land and natural resources is intended to proceed in a manner that yields the greatest economic benefit to both present and future

generations. The MTPDP focuses on achieving economic growth with social equity by: significantly reducing the number of poor families; enabling the regions outside the National Capital Region to contribute more to development; and creating a more internationally competitive business sector supported by an efficient public sector at the national and local levels.

Aside from the PSSD, the Government of the Philippines also adheres to the Social Reform Agenda, the results of the Conference on Human Ecological Security, the Anti-Poverty Summit, and the Manila International Conference for the Operationalization of Economics of Sustainable Development. Adherence to the above reflects the Philippines' international commitments.

On climate change, the country was one of the earliest to respond to the challenges of this global phenomenon. It established the Inter-Agency Committee on Climate Change (IACCC) by virtue of Administrative Order No. 220 signed by President Corazon C. Aquino in December 1991. The IACCC is composed of 15 government agencies and NGO representatives. It is co-chaired by the Department of Environment and Natural Resources (DENR) and Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA). It is mandated to coordinate various climate change related activities in the country, propose climate change policies and measures and prepare the Philippine positions to the UNFCCC negotiations. The Committee regularly meets to discuss current trends and issues on climate change. There are plans to further expand the membership and functions of the IACCC. Furthermore, it has undertaken various activities and projects (elaborated on in Section 2.3) showing the government's commitment and contributions toward the achievement of the goals and objectives of the Climate Change Convention.

On the Kyoto Protocol, although the Philippines, as a non-Annex 1 country party, has no obligation to reduce its GHG emissions, it has expressed willingness to do its share in mitigating national emissions. This is reflected in the various projects and activities previously and currently being undertaken, which are mostly supported by the Global Environment Facility (GEF) through the UNDP and bilateral support, geared towards GHG mitigation in the context of the country's sustainable development agenda.

The CDM is one of the mechanisms under the Kyoto Protocol that Annex 1 country Parties can adopt to comply with their emission reduction commitments to the Convention in partnership with non-Annex 1 country Parties. The CDM is likewise meant to support the national sustainable development agenda of the non-Annex 1 country Parties and contribute to the ultimate global GHG emission reduction objective of the Convention. Although the Protocol has yet to enter into force, the Philippines would like to position itself this early to be a qualified and active player in the CDM process.

To be able to qualify and play an active role in the CDM market, the Philippines needs to put in place a competitive CDM operational framework at this point in time to be in step with other developing countries with whom it will have to compete for CDM projects. Considering, however, the array of more pressing national socio-economic and political problems competing for its meager financial resources, the equally serious environmental concerns are relegated to the back seat. The Philippines has not been a participant in any Joint Implementation activity (which is similar in nature to CDM) making it inexperienced in crafting CDM fundable projects. While it is recognized that the National Authority and its accompanying administrative machinery is a necessary pre-requisite for participation in the CDM market, the government and other stakeholders have yet to unify their efforts towards this direction.

The Government of the Netherlands is in a position to provide the needed financial assistance to formulate and establish and capacitate the Philippine CDM National Authority and, at the same time, facilitate access to sources of proven environmentally sound and friendly technologies. The Government of the Netherlands, through the UNDP, is the preferred partner of the Government of the Philippines in this particular activity.

2.2 Relevant Prior and On-Going Assistance to the Sector

Relevant Completed Projects:

Asia-Least Cost Greenhouse Gas Abatement Strategy (ALGAS) Project
The Asia Least-cost Greenhouse Gas Abatement Strategy (ALGAS) project was carried out during 1995-1998. It was implemented under a regional technical assistance executed by the Asian Development Bank (ADB) and funded by the Global Environment Facility (GEF) through the United Nations Development Programme (UNDP). The project involved the participation of 12 Asian countries, which included the Philippines.

The development objective of ALGAS was to limit the growth of GHG emissions from Asia, and to build a substantial pool of expertise in the region for addressing issues on global climate change. Expertise were developed in areas such as the estimation and measurement of GHGs, identification of technologies and initiatives for reducing GHGs, and economic and social analyses for identifying cost-effective mitigation options. The ALGAS Project embodied a strong emphasis on regional cooperation. It has sought to enhance regional capabilities in a number of critical environmental and natural resource disciplines, which will ultimately allow the nations of the region to more effectively meet their commitments to the Framework Convention on Climate Change. The principal objectives of this project were to: (a) develop and improve the regional and national capacity to undertake, prepare, and present baseline and historical inventories of GHG emissions and sinks to meet the standards and requirements of the FCCC; (b) improve the reliability of GHG emission and sink inventories for the region; (c) develop national and regional capacities to identify, formulate, and analyze GHG abatement initiatives; and (d) develop and implement national and regional least-cost GHG abatement strategies.

Enabling the Philippines To Prepare A National Communication Program in Response to its Commitments to the UNFCCC
The project, conducted in 1997, was aimed at helping the Government of the Philippines build the capacity of various government agencies to prepare the country's initial communication to the United Nations Framework Convention on Climate Change. This was made possible with the financial assistance from the GEF through the UNDP. The main output of the project was the publication of the country's National Communication on Climate Change and its submission to the UNFCCC Secretariat. The project enabled the preparation of the 1994 greenhouse gas (GHG) inventory (baseline for non-Annex I Country Parties) using the guidelines prescribed under Article 12 of the Climate Change Convention and the decisions set by the Conference of the Parties. A series of training courses were conducted on GHG inventory to institutionalize the process among various agencies. Consultation seminars were also conducted involving other key players such as the private sector and industry, policy-makers, academe, non-government organizations and people's organizations. A database of climate change researches and other relevant activities was established at the Inter-Agency Committee on Climate Change (IACCC) Secretariat to consolidate all information gathered and facilitate efficient accessing of data.

During the multi-stakeholders consultation workshops conducted by the project, one of the recommendations was to establish or strengthen the appropriate mechanisms, structures and entities needed to implement the integrated abatement strategy. The need to draw up the policy and institutional framework relevant to mitigation of greenhouse gas emissions in the country was also stressed in these workshops. Training of critical sectors and groups was also recommended, particularly in the fields of renewable energy and energy efficiency.

Relevant On-going Activities:

Enabling Activity for the Maintenance and Enhancement of National Capacities to Prepare the National Communication on Climate Change
The Enabling Activity for the Maintenance and Enhancement of National Capacities to Prepare the National Communication on Climate Change, is a bridging project of the GoP, through the IACCC, between the "Enabling Activity to prepare its Initial National Communication on Climate Change" and the second enabling activity for the GoP to prepare its Second National Communication to the UNFCCC. This bridging project involves three major areas. First, it is meant to build the capacity to institutionalize the national communication preparation process with emphasis on the gaps and constraints identified in the initial enabling activity. Secondly, it is supposed to undertake capacity building for participation in systematic observation networks and identify capacity and technological needs in this area. Finally, the project is expected to strengthen/improve national activities for public

awareness and education and access to information, including information from international centers and networks.

Capacity Building to Remove Barriers in the Promotion of Renewable Energy in the Philippines
This project, which is just starting up, is the result of the findings and recommendations of a preparatory phase which: (1) identified the key barriers; (2) proposed activities to remove those barriers; and (3) prepared a full project brief and document seeking to remove those barriers at a national level. The PDF-B project further identified linkages and cooperation among donors to remove barriers to promoting renewable energy for the ensuing UNDP-GEF full project. The principal objective of the full project prepared from the PDF-B assistance is to reduce GHG emissions by identifying and removing the major barriers to the development and utilization of renewable energy to replace fossil fuel use in the Philippines. The proposed full project would achieve these objectives by:

1) capacity building of government agencies to formulate renewable energy policies;
2) information dissemination and public awareness raising;
3) institutional strengthening to increase coordination between organizations;
4) development of market strategy for utilization of renewable energy;
5) support program for renewable energy delivery mechanisms;
6) innovative financing schemes; and
7) development of standards, specification, testing, and certification for the renewable energy industry in the Philippines.

Funding for the project comes from the GEF, through the UNDP, with the Department of Energy as the Executing Agency. Local participating agencies and institutions provide counterpart funding.

Palawan Alternative Rural Energy and Livelihood Support Project
This project which is aimed at reducing the long-term growth of greenhouse gas (GHG) emissions through removing barriers to commercial utilization of renewable energy power systems to substitute for use of diesel generators in Palawan, is winding up. This project is intended to demonstrate the viability of the RESCO (Rural Energy Service Company) delivery mechanism of renewable energy systems, and economic activities of productive use of renewable energy services for rural communities. By the end of the project it is expected that there will be: 1) Increased capacity and recognition of renewable energy and RESCO at the local government level; 2) A range of financial incentives established; 3) A revised Provincial Energy Master Plan; 4) Increased public awareness of renewable energy systems and RESCO; 5) Increased information and services provided to potential investors in renewable energy; 6) A commercial and sustainable RESCO delivery mechanism set up to provide renewable energy services in Palawan; 7) A risk-sharing mechanism established to buy down the risks for the RESCO.

The Center for Renewable Resources and Energy Efficiency (CRREE), a non-government organization, serves as the executing agency with the Palawan Provincial Government as the cooperating agency. The financial support comes from the GEF and UNDP.

Philippines Efficient Lighting Market Transformation Project (PELMATP)
The undertaking is a project preparation activity (PDF-B), for a full project meant to overcome the technical and market barriers outside the main focus of the IFC's Efficient Lighting Initiative (ELI) Program and any other international lighting initiatives. The results of the preparatory phase were: 1) preliminary characterization of the Philippine markets for energy efficient lighting; 2) characterization of the stage of development in the legal, regulatory and fiscal frameworks setup by the GOP to promote end-use efficiency (including that of lighting); 3) identification of technical and market obstacles; and 4) proposed activities to help overcome those identified obstacles.

The Department of Energy, through its Fuels and Appliance Testing Laboratory (FATL) Division, is the executing agency with funding support from the GEF through the UNDP. This preparatory phase, which is being implemented by Geosphere Inc., is expected to be completed during the first half of 2003.

3. PRESENT SITUATION AND PROBLEM ANALYSIS

The Philippines is among the countries subscribing to the notion of sustainable development, a key pillar of which is a vibrant and resilient environment. Under the country's various plans, therefore, protecting and enhancing the environment, as well as, promoting the sustainable use of its natural resources has been underscored. According to the Philippine Agenda 21, the essence of sustainable development is the harmonious integration of a sound and viable economy, responsible governance, social cohesion and ecological integrity. It postulates that the extent of a country's economic productivity is determined by its environment's carrying capacity and the ability of its natural resources base to provide the basic materials. Economic profitability, therefore, could be increased by enhancing the environmental carrying capacity.

The Medium Term Philippine Development Plan (MTPDP) likewise echoes this concern by stressing that environmental sustainability is a key thrust. The objective is to arrest continuing degradation of the country's environment and natural resources, which is both a cause and effect of poverty in rural areas. The National Anti-Poverty Action Agenda (NAAA) also emphasizes the importance of attending to the ecological dimension because it is critical to the sustainable development of the country's productive resources, and consequently, the alleviation of poverty.

Despite these policy enunciations, however, poverty and unemployment remain the country's gravest economic problems. It is postulated that for these to be fully addressed at the end of the decade, the economy must grow on a sustained basis and across all sectors, while generating the greatest employment. There is a need, therefore, to harness and develop the full potentials of sectors contributing the most and the fastest to the growth of the Philippine economy. Business and industry sectors are seen as the primary engines of economic growth.

Historically, rapid growth and development proceeded unsustainably, most notably at the expense of the environment and natural resources sector. The growing consensus is that the sector has reached a critical stage. The Philippines has a total land area of 30 million hectares. However, as of 1996, only approximately 5.493 million hectares of forestlands remained with actual forest cover. Similarly, mangrove resources have been extensively exploited. The original estimate of 400,000-500,000 hectares of mangrove forests has been reduced to a total of 115,100 hectares in 1996. Further, the Philippines is already suffering from water shortages and air pollution and the situation is expected to worsen in the ensuing years. Moreover, many flora and fauna species face extinction in the uplands, wetlands, and coastal areas and overall, the major sub-sectors of the ENR sector are incurring significant damage.

Clearly, the sustained damage to an already critical environment has disastrous effects on natural resources and, accordingly, sustainable development and poverty alleviation within the Philippines. Although all of humanity suffers similarly due to depleted and damaged resources, people who rely on these resources for their livelihood, as in the case of the Philippines, are the most affected. These communities are usually the most poor and marginalized groups. The coastal and marine ecosystem of the Philippines is considered an important source of livelihood for about 70% of the country's municipalities. Accordingly, the MTPDP identifies that continuing degradation of the country's environment and natural resources, is both a cause and effect of poverty in rural areas. However, while the Philippines recognizes that resource use cannot continue unmanaged and be a major factor in the entrenchment of poverty of the nation, particularly of marginalized groups, such sustainable use requires substantial capacity on the part of the stakeholders. In turn, for this capacity to be built requires a significant amount of technical and financial resources which could realized through foreign assistance.

As discussed in the previous section, this critical condition of the country's environment and natural resources which have implications on the country's sustained socio-economic growth, stands to be further exacerbated by global environmental problems like climate change which has been brought about by the massive anthropogenic emissions of greenhouse gases from fossil fuel use. While the Philippines considers its GHG contributions to the atmosphere as insignificant, it is committed to do its part in abating/mitigating these emissions.

In 1994, the Philippines released a total equivalent amount of 100,738 ktons of CO_2 into the atmosphere. This is due to the combined effect of greenhouse gas (GHG) emissions from four sectors, namely, energy, industry, agriculture and wastes, and the net uptake (sink) of GHGs from the land-use change and forestry (LUCF) sector. In the global context, this national amount is minimal relative to the GHG emissions of other countries, especially those of developed country parties to the UNFCCC.

However, as climate change is a significant factor affecting the country, the Philippines recognizes that GHG emissions need to be mitigated and addressed. Many people live in coastal areas and are at risk from the impacts of climate change; extreme climatic events, sea level rise and degradation of marine ecosystems. The predicted negative effects of climate change on agriculture, forestry and water resources may also further entrench poverty and burden a struggling economy. Being an archipelago, with prevailing tropical climate, the Philippines is also highly vulnerable to the impact of climate change. Of the vulnerability assessments conducted in preparation for the Philippines' Initial National Communication on Climate Change, the simulation results showed that certain agricultural crops are projected to have a decrease in yield, and that key reservoirs and coastal ecosystems will be seriously affected. Changes in rainfall pattern may also increase the rate of conversion of forests to agricultural lands due to human migration from areas degraded by drought and erosion to more productive forestlands. Local biodiversity also may decrease and the effect of possible disease incidence needs to be studied further.

Thus, the Philippines, by signing of the UNFCCC, commits to contribute to the global effort to mitigate climate change through the reduction of GHG emissions. To begin implementation of the ultimate objective of the FCCC, which is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system," (Article 2, UNFCCC), the Philippines has begun initial activities to establish an inventory of GHG emissions and sinks, to develop measures to reduce emissions and facilitate adaptation to climate change, apply climate friendly technology, undertake sustainable management of GHG sinks, plans and programs for adaptation and protection of vulnerable areas, to incorporate climate change considerations in its national policies, research and systematic observation, and to develop an initial national communication which details the Philippines' implementation of the Convention.

Projects have also been undertaken to gain experience in climate change mitigation. The UNDP/GEF project, Asia Least-Cost GHG Abatement Strategy (ALGAS) highlighted the important role the energy sector can play in reducing future GHG emissions in the Philippines and identified renewable energy technologies (RETs) as a priority area in the country's GHG abatement strategy. Furthermore, the Philippines Agenda 21 also identified the need to develop and utilize RETs as the country's priority strategy and the National Action Plan on Climate Change proposed the gradual shift from the current fossil fuel-dominated energy mix towards NRE. However, as the "Capacity Development Initiative (CDI) Country Capacity Development Needs And Priorities- A Synthesis" report (UNDP-GEF, October 2000) outlines, six priority areas have been identified for country capacity development in climate change. These are: a) awareness/understanding, b) abatement, c) vulnerability and adaptation, d) the Clean Development Mechanism, e) Convention negotiations, and f) technology transfer.

The Philippines faces several constraints in these 6 areas. Identified constraints to the Philippines' capacity to assess its vulnerability to climate change and its adaptation options are the absence or weakness of an overall policy framework to direct what is, by necessity, an integrated multi-sectoral, multi-disciplinary approach to V&A. Such an integrated approach requires the clear definition of mandates and functions of those agencies (both government and civil society) tasked to undertake V&A. Another constraint is the inadequacy of critical human resources and analytical skills needed to undertake vulnerability assessments and adaptation planning. The shortage and inaccessibility of data from climate measurement/monitoring systems, together with the lack of institutions specializing in V&A are other impediments to effective action in this area.

A comprehensive awareness and understanding of the issue itself which seems to underpin many of the concerns and capacity constraints is needed for all sectors involved. Moreover, the capacity constraints associated with this priority area cut across all levels, (systemic, institutional, and individual), and focus largely on the lack of a managed system of information that can be attributed to a lack of human, financial, and information resources. Poverty also contributes to ambiguities in understanding climate change. These

constraints inhibit consensus building and the clear definition of mandates and programs in the national and local arena.

For the abatement of greenhouse gas emissions, in order for the Philippines to: a) reduce a growing dependence on fossil fuels; b) meet ambitious targets for reliable, economic supplies of grid electricity; and, c) realize widespread electrification and poverty relief in remote communities, new and renewable energy (NRE) sources of energy will have to be tapped over the next ten years. These are abundant throughout the country but relatively under-utilized.

Innovative financing and market delivery mechanisms will play a central role in providing the capital and access to the market required to meet expansion targets. Efforts in various facets of NRE development have been extensively pursued by the public sector. With meager resources, however, the government alone cannot sustain the development of the industry.

Recent years, however, have witnessed the growth in private sector participation in NRE development. There have been significant studies and projects, which have been undertaken on this area. However, despite these previous studies and projects, there exist both substantive and procedural barriers in the country's policies and laws, which inhibit private sector participation and public-private sector partnership necessary for sustainable NRE development. A general assessment however, leads to the conclusion that effective private sector involvement and partnership with Government and other sectors of civil society can take place on a broad and commercialized scale only if these barriers are adequately addressed.

Moreover, the lack of market strategies, economic incentives that can promote alternative energy systems or energy efficiency, and the lack of institutional coordination and commitment may also constrain the Philippines' efforts to undertake abatement measures.

The fourth area for which capacity development is needed is the clean development mechanism (CDM). The Philippines' participation in this mechanism is currently constrained, firstly by the absence of a National Authority for CDM, an operational framework for CDM to operate under and also by a lack of understanding of and information on CDM in general, of an institutional and legal framework, of technical infrastructure, of enforcement capacity, and of human resources needed to operationalize the mechanism. These capacity constraints and others mentioned under this section, create gaps in project negotiation and development skills, project baselining, monitoring, verification, auditing, and certification, setting up sustainable development indices, and cost-benefit assessments, etc.In this context, barriers to effective technology transfer for CDM may also be a constraint with the lack of a clear country policy and entity responsible for this area, the unavailability of local R&D infrastructure and professional expertise, the absence or incompleteness of the Philippines' assessment of its technological needs, the lack of information on local practices or traditional technologies, of motives and incentives for innovation.

Specific capacity development interventions needed to address the lack of overall national climate policy framework revolve mainly around clearly defining the mandates of various agencies engaged in climate change and thereafter, CDM; strengthening climate change focal points and establishing a national authority to coordinate climate change activities including CDM, instituting mechanisms of accountability to the public, and raising the level of public awareness on the issue. Moreover, there is the need to strengthen "relevant and key academic and research institutions and non-governmental organizations" (Annex, Decision 10/CP5) in their capacity to respond to the Philippines' issues and concerns on climate change. A fully integrated approach to V&A has been espoused, taking into account the socio-cultural and economic context that is inextricably linked to the vulnerability of the Philippines.

In terms of the absence of a legal or regulatory framework, the Philippines is close to ratification of the Kyoto Protocol and methods are explored within the project proposal to expedite the designation of the National Authority.

Some of the required economic measures related to CDM are being addressed through projects outlined below. Market mechanisms skewed towards fossil fuel utilization (because of their ready availability and familiarity) are identified to be a major constraint. Capacity needs in this area focus on market development, the

promotion, development, multiplication, and utilization of alternative energy systems beyond the pilot stage and in areas where feasible. However, in general, information, human, financial, and technical resources are needed to capably analyze the impact of subsidies and incentives, market mechanisms, and to enhance the public appreciation and use of these abatement systems. These needs are likewise stressed in areas where traditional fossil fueled systems are being renovated for greater efficiency.

An enabling environment for investment in CDM and renewable energy systems depends on the availability of technically accurate energy resource assessments, endogenous capacity in the workforce to gain access to and absorb this alternative technology, and an "enlightened" population that can discern the value (for climate protection) of these alternative systems. There is need, also to internalize (on a systemic level) the external costs of global climate degradation through extensive training on the relatively new economics and science of this global issue. In this regard, capacity is likewise being sought to familiarize the various sectors in the country with the various policy instruments such as command-and-control and market based mechanisms being forwarded today in the climate arena. Capacity to discern the applicability of either or a mix of both in the unique social, economic, and political context of the Philippines is needed.

Policy statements in this area of energy that directly touch on climate change require more advocacy with the pending NRE Bill. Although, GHG mitigating systems under the outlined projects below also establish policies for the use of other viable sources of energy, lessening the dependence on fossil fuel.

The clean development mechanism, which provides for the participation of developing country parties in the climate protection effort through funding of their initiatives in sustainable development, will help to address some of these many constraints, partial solutions and needs. Although as mentioned above, capacity needs here include the establishment of institutional linkages, project development and implementation, development of sustainable development indicators, project negotiation skills, and other such aspects that are required for meaningful participation in this Kyoto Protocol mechanism.

The value of civil society or NGO participation in climate-related activities will also be evident, although capacity needs to focus on developing those relevant and key institutions by renewed infusion of financial and material resources and the expansion of a human resource pool of experts. Any lack of coordination within and among the different sectors of society (e.g. government, NGOs, civil society, private sector) will indicate that serious capacity needs exist in the area of management and leadership. Enabling the clear definition of institutional roles and functions through the establishment of an operational framework for CDM, is an important capacity need.

In addition to all of this, the need for enhancing management and administrative capacities is also evident. It also follows that developing management capacity entails training people in institutions to plan effectively and to evaluate policies and measures according to well-defined performance indicators.

Capacity is still needed to increase the level of participation of all stakeholders. The effectivity of any such participatory approach to decision making will also necessarily depend on the level of conscientization of all the participants in the policy formulation and implementation process. Capacity interventions are, therefore, needed to increase the participation and level of understanding of all the stakeholders in this issue.

Informed decision making is critical for management of CDM and it depends on the organized and managed flow of information. Such technology is currently lacking and therefore a constraint. Capacity is, thus, needed to enable agencies to set up managed systems of climate related information, to supervise and retain capacity that has been built up through information or training, and to institutionalize public access to publicly owned information.

Capacity is likewise needed to develop a large pool or "critical mass" of resource people in both government and civil society who are conversant with the multi-faceted issue of global climate change. Most of the capacity development constraints and needs at the individual level touch on the issues of human resource availability, awareness raising, information sharing, and skills training. The constraints that have been identified are the lack of human resources, the generally low level of public awareness, the lack of information dissemination, and the absence of requisite skills to address climate change.

A notable capacity gap at the individual level touches on the acquisition of skills in vulnerability assessment and adaptation planning, abatement analysis, project development and management, international negotiation, fund raising, and administrative skills such as strategic planning. Because the availability of such skills is also constrained by financial matters, capacity is, therefore, likewise sought to address this lack of funding while ensuring, as above, that the training received diffuses effectively.

Figures 1 and 2 reflect an analysis of the problem in Problem Tree Format.

FIGURE 1 – Problem Tree Analysis

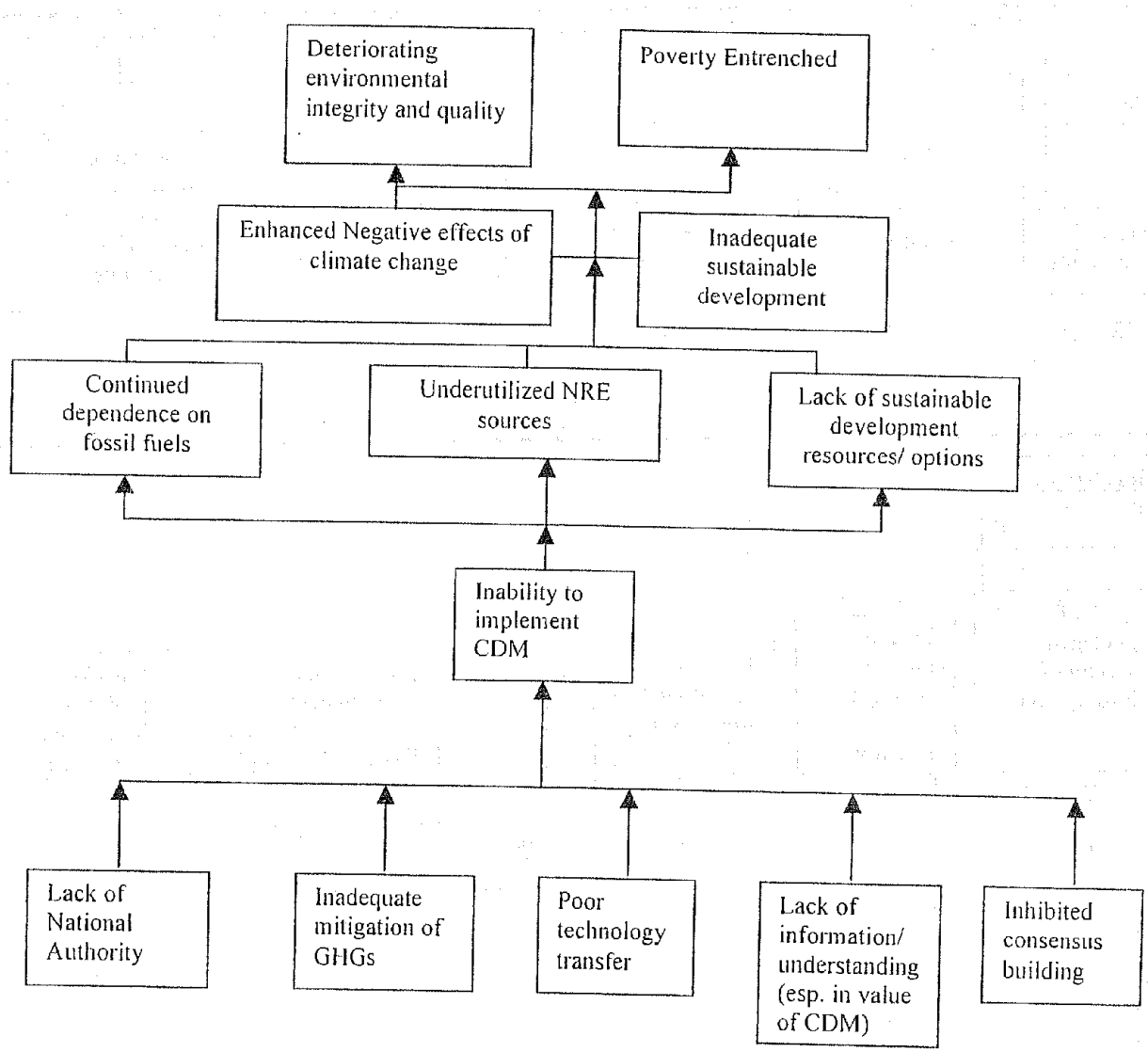
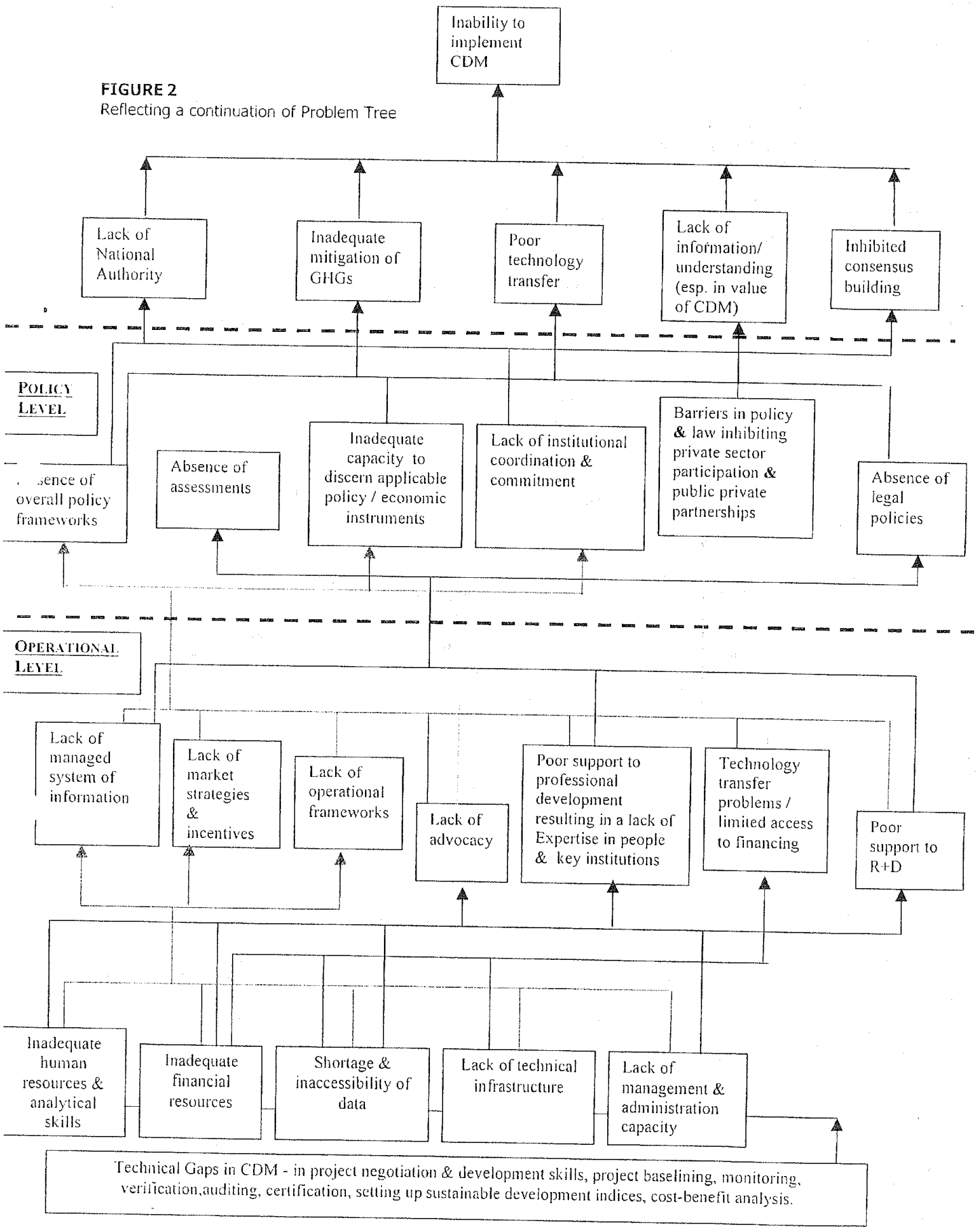


FIGURE 2
Reflecting a continuation of Problem Tree



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4. THE PROJECT

4.1 SCOPE OF THE PROJECT

The Project, "Establishment of the Clean Development Mechanism (CDM) National Authority, Operational Framework and Support Systems for the Philippines", seeks to create/establish the Philippine National Authority for CDM, establish the framework within which it shall operate, and assess, develop and implement a capacity building program for the key stakeholders to facilitate its (NA) effective operation.It will also undertake an information,education and communications (IEC) campaign to raise awareness on and promote advocacy for the mechanism.

- **Project Components**

The Project shall cover four (4) specific areas, namely:

I. Establishment of the CDM National Authority
II. Development of the Operational Framework of the National Authority and the National Registry
III. Assessment of the capacity building requirements, development and implementation of capacity building program for key stakeholders in the operation of the National Authority
IV. Advocacy and IEC on CDM

I. Establishment of the CDM National Authority

The Kyoto Protocol requires non-Annex 1 country parties to designate a National Authority which shall endorse to the Executive Board, proposed CDM projects that support national sustainable goals. The legal document creating the National Authority will identify it as the entity responsible for overseeing the process of CDM implementation in the country, including the formal endorsements of CDM proposals to the CDM Executive Board. The output of this scope of work is a legal document defining what the National Authority is, identifying the institution designated as the National Authority, defining its functions and scope of authority. The most expedient path will be chosen. The possible legal options are discussed in greater detail in Section 4.6, "Project Approach and Strategies".

Parallel to the creation of the National Authority is the overarching need to push the ratification of the Kyoto Protocol. Presently, the "Instrument of Ratification" has been endorsed by the Department of Foreign Affairs to the Office of the President and is now with the Senate. This activity will follow through the process until the ratification is completed.

II. Development of the Operational Framework of the NA including the National Registry

The project shall set up an Operational Framework, which will include definition of the legal and administrative requirements and the prescribed systems and procedures for securing the NA endorsement, among others. This component will likewise work for the institutionalization of a system for estimating anthropogenic emissions by sources and removal by sinks of greenhouse gases on an annual basis. This database shall be called the " National CDM Registry" which will provide the core information (GHG emissions) for the Philippines' Annual National Communication to the Conference of Parties. The system shall provide for the maintenance and update of the Registry database which will also include the preferred mitigation options. These options shall be promoted to interested investors for CDM purposes.

Securing the Certified Emissions Reduction (CER) certificate, which is equivalent to the amount of GHG emissions mitigated, requires a validation and monitoring scheme regulated by the Executive Board of the CDM. The validation scheme will require a Project Design Document (PDD) that provides objective evidence that there is indeed a valid GHG emission reduction resulting from the use of the clean technology, which would not happen without the benefit of CDM.

III. **Assessment, Development and Implementation of the Capacity Building Requirements of the NA and other Stakeholders to Implement the CDM Operational Framework**

The project shall undertake an assessment of the capacity building requirements of the NA staff and other key stakeholders. A capacity building program shall be developed and guidelines for its implementation shall be prepared. In this regard, proper coordination shall be made with the other entities undertaking CDM-related activities such as the Climate Change Information Center (CCIC). The implementation of specific programs may be subcontracted to qualified groups such as the CCIC. The NA shall define the goals and targets of the national " Capacity Building Program " which shall be the basis of all capacity building initiatives in the country.

IV. **Advocacy and IEC on CDM**

Corollary to item 3 above, another function that needs to be discharged is the conduct of promotional activities for the various stakeholders of CDM in the country. The objective of this is to enhance awareness on CDM and increase support for its implementation. IEC materials development and advocacy activities shall be undertaken in this component.

4.2 PROJECT JUSTIFICATION

Participation in the Clean Development Mechanism requires a developing country to have in place an operational National Authority, which shall be the official entity to orchestrate the country's participation in CDM, following the criteria established in the Kyoto Protocol. Without the National Authority's approval and endorsement, no CDM project will happen in that country. Based on the outcome of COP7, the Marrakech Accord generated optimism that the Kyoto Protocol will enter into force anytime now. In view of this possibility, the country Parties including the Philippines, which have or are contemplating to ratify the Protocol, need to take immediate action to prepare for the required systems and procedures to allow them to participate in the CDM.

Viewing the CDM as an opportunity to achieve its investment targets for priority sectors like energy, this project is considered by the GoP as a high priority project because it will help put in place, the policy, technical and human infrastructure needed to make the mechanism operational in the Philippines.

4.3 LONG TERM OBJECTIVES

The projects over-all long term objective is the country's achievement of sustainable development goals through sustained economic growth anchored on a healthy and vibrant environment and the reduction of GHG, globally, resulting in the climate change mitigation. Its medium term objective is the alleviation of poverty by enhancing the capacity of certain sectors like energy, agriculture and forestry to increase their contribution to the country's economy through a mechanism like the CDM.

4.4 IMMEDIATE OBJECTIVES

The immediate objectives leading to the overall objective are the following:

1) Immediate Objective One: To secure the official designation of a national government entity (e.g. the IACCC) as the National Authority for CDM.

2) Immediate Objective Two: To formulate the CDM Operational Framework and the design and setting up of the National Registry for GHG Emissions.

3) Immediate Objective Three: To undertake the needed capacity building for the NA and the other stakeholders to enable them to play their roles appropriately in a CDM regime.

4) Immediate Objective Four: To strategically disseminate information on the CDM and the country's CDM Framework to attain broad stakeholders participation in and support for the process.

4.5 PROJECT BENEFICIARIES

The ultimate beneficiary is the global community and the country's general public with greenhouse gases avoided or abated worldwide and the Philippines' sustainable development goal achieved through specific development projects.

The establishment of the CDM process starting with the designation of the National Authority will usher the entry of an emerging global industry spearheaded by the private sector that makes possible the transformation of an environmental concern (GhG mitigation) into investment opportunities in support of the country's sustainable development aspirations. The direct benefit to the national economy may be initially insignificant due to the limited size of business transactions that may result. However, it may be expected that in due time, for as long as the bureaucratic hurdles in the operation of the CDM process are minimized, potential investors will recognize the advantages and benefits of transacting CDM business in the Philippines, resulting to more investments coming in, in the future.

The first line beneficiaries will be the national government agencies who will be involved in implementing the CDM process in the Philippines, as well as, the industries/ private sector and other CDM project proponents who will be the recipients of additional capacity building, new technologies and project funding. The second line beneficiaries shall be the consuming public who are the intended users of the resulting products and services generated by the CDM process. The more competitively priced products and services will make them more affordable and accessible to a greater number of target users.

4.6 PROJECT STRATEGY AND APPROACH

The project will utilize a variety of strategies and approaches to achieve its objectives. Among these are the generation of the necessary policy and legal issuances to institutionalize the operationalization of the CDM in the Philippines. Another is the establishment/ designation of the required mechanisms (e.g. NA) and support systems (e.g. National GHG Registry) and the capacitation of the relevant stakeholders (e.g. concerned NGAs, private sector and other proponents like NGOs).

The National Authority is the focal point for all CDM-related transactions. By the nature of its operation, the NA shall interface with various stakeholders from the different agencies and sectors including among others those from the energy, agriculture, forestry, and industry sectors. The multi-sectoral coverage of the functions of the NA is an important characteristic that must be given priority consideration in its identification. To facilitate immediate establishment of a workable CDM process within the country, the project will work for the immediate designation of a national government entity or network of entities, which will respond to the above concern of multisectoralism, drawing in broad multi-stakeholder support through continuous and extensive consultations.

Based on the initial assessment of competencies of member agencies and institutions of the IACCC versus the requirements of the National Authority given in **Table 1 (Annex 1)** and elaborated in **Table 2 (Annex 2)** and the consultations conducted for purposes of elaborating this proposal, as well as, those conducted on CDM implementation in the country in general, the preponderance is to have the Inter-Agency Committee on Climate Change (IACCC) be officially designated as the National Authority for the Clean Development Mechanism in the immediate or short term, unless a more preferred single agency is identified and eventually designated as such. The major reasons behind this strategy are the following:

1. The CDM process is due to be operational globally anytime soon, simply awaiting the formal entry into force of the Kyoto Protocol. This, therefore, requires the availability of an appropriate government institution, entity or mechanism able to immediately discharge the basic coordination function required under the CDM. The IACCC, while multi-agency and multi-sectoral, has experience doing this, albeit ministerial function of endorsement is delegated to the Chair, the Secretary of the Department of Environment and Natural Resources (DENR).

2. The IACCC, by its composition, is multi-sectoral. It includes the energy and environment agencies among others, which are two of the key players in CDM projects. In Latin American countries, the Department of Environment, in particular, has proven to be a major contender as NA.

3. Due to its multi-sectoral membership, the varied expertise needed in the operation of the NA are mostly available within the IACCC; additional capacity building in specific areas are required but not to the extent needed by a new institution/group if designated as NA.

4. As a result of its existence for about eleven (11) years, the commitment of its member agencies and institutions to its mandate has been established. Interface among them has matured making operational flow fluid. It has established a working system for endorsement and referral of projects, as in the case of projects funded by the Global Environment Facility(GEF).

5. Since the IACCC was created through an Administrative Order, it can tap government resources by virtue of the President's authority.

There are three (3) possible legal paths that can be considered in officially designating the IACCC as the NA. These are:

1. Option 1 - A legal opinion from the Office of the President stating that the present mandate of the IACCC as stipulated in AO No. 220 which created it, covers the functions of the National Authority for CDM;
2. Option 2 – An amendment to AO No. 220 extending the mandate of the IACCC to include the functions of the National Authority for CDM.
3. Option 3 – An official designation of the IACCC by the President as NA.

Considering the urgency of the need to have the National Authority in place, either Option 1 or 3 would be the most expedient and practical path to consider. This would be the basis of the Department of Foreign Affairs to officially inform the CDM Executive Board that the official CDM National Authority in the Philippines is the IACCC.

5. PROJECT IMPLEMENTATION

The following are the activities that shall be carried out in establishing the National Authority for Clean Development Mechanism (CDM) and making it operational in the Philippines. Under each activity is a description of what shall be done.

A1 ESTABLISHMENT OF THE NATIONAL AUTHORITY

Immediate Objective A1: To secure the official designation of the appropriate governmental entity (i.e. the IACCC) as the National Authority for CDM in the Philippines.

Output A1. A Legal Issuance Designating the National Authority for the CDM process in the Philippines.

Notwithstanding the route to be selected based on the further consultations to be undertaken under the project, the projected output under this objective is a Legal Document (e.g. Legal Opinion from the Office of the President stating that the present mandate of the IACCC as stipulated in AO No. 220 extends to cover the functions of the National Authority; or, as necessary, an amendment to the AO No. 220 explicitly stating that the mandate of the IACCC shall be extended to cover the functions and responsibilities of the National Authority or simply a memorandum order from the President designating the NA).

Activity A1.1 Through further consultations with the stakeholders, primarily the IACCC, and legal advice of experts, the preferred legal option for the NA designation will be selected.

As had been mentioned in Section 4.6, there are three possible options in securing the official designation of the most appropriate government entity (i.e. the IACCC) as the CDM National Authority. One is a legal opinion from the Office of the President on the extent of coverage of the existing mandate of the contemplated entity (IACCC). The second is a revision of the Administrative Order to specifically cover the discharge of the additional functions as NA. The third involves the mere issuance of the President of a Memorandum Order to the designated NA for this additional task.

The project will then work through the formal mechanisms and concerned institutions to have the needed legal document issued during the initial phase of the project.

The appropriate and necessary organizational structure to implement the issuance will then be drawn up and institutionalization of the same effected.

A2 DEVELOPMENT OF THE NATIONAL CDM OPERATIONAL FRAMEWORK AND THE NATIONAL CDM REGISTRY

Immediate Objective A2: To enable the optimum and efficient functioning of the NA through the provision of a clear National CDM Operational Framework and a National Registry for GHG Emissions.

Output A2.1. National Authority's Management System

Activity A2.1.1. Review past studies and available literature on the existing policies, legal and administrative requirements governing the entry of new projects/investments, identifying gaps and constraints and providing recommendations to address these, to facilitate entry and implementation of CDM projects.

Activity A2.1.2. Craft new/supplementary policies and legal issuances to address the identified gaps and constraints for the optimum functioning of the CDM process in the Philippines.

Activity A2.1.3. Adopt national sustainable development criteria and indicators for use in the CDM assessment process.

Activity A2.1.4. Develop Systems and Procedures, with clear accountabilities and timeframes within the NA system, to implement CDM efficiently and optimally. A business "process map" may be drawn up to determine the optimal operating system for the NA. **Annex 3** depicts the CDM Project Cycle which could be the starting basis for the NA business map.

Activity A2.1.5. Develop protocols and supplementary tools to implement the systems and procedures.

Activity A2.1.6. Develop the documentary requirements of the NA to enable it to assess the CDM proposal and issue the necessary endorsement to the CDM Executive Board.

Activity A2.1.7. Pilot test the designed management system.

Activity A2.1.8. Prepare and issue the necessary legal and administrative issuances to operationalize the management system.

Output A2.2. National CDM Registry

Activity A2.2.1 Update the country's national and sectoral inventory of greenhouse gases.

Activity A2.2.2 Conduct a national and sectoral analysis of GHG mitigation options.

Activity A2.2.3. Transform mitigation options into project concepts and menu of options from which possible CDM investors can choose from. These options should be matched and harmonized with national and sectoral sustainable development priorities and thrusts.

Activity 2.2.4. Design the National Registry System including data gathering, banking and dissemination protocols, institutional implementation arrangements and soft and hardware requirements, among others.

Activity 2.2.5. Validate the design and emplace the National Registry System.

A3 CAPACITY BUILDING TO OPERATIONALIZE THE "CDM OPERATIONAL FRAMEWORK"

Immediate Objective A.3 To capacitate the various CDM stakeholders, particularly the NA through a comprehensive capacity building programme.

Output A3.1. Capacitated CDM Stakeholders, particularly the concerned offices within the National Authority.

Activity 3.1.1 Assess the existing/required manpower complement of concerned offices within the NA to enable it to function efficiently and effectively.

Activity 3.1.2. Work out augmentation of manpower complement of the NA, including additional budget for operations.

Activity 3.1.3 Assess capacities/competencies of the various stakeholders, particularly the NA, to implement CDM, primarily through a training needs assessment.

Activity 3.1.4 Based on the identified competency gap/lack, draw up a comprehensive training and capacity building programme for the stakeholders.

Activity 3.1.5. Conduct trainors training on the various aspects of CDM implementation.

Activity 3.1.6. Develop training materials on CDM.

Activity 3.1.7. Conduct echo seminars and training on CDM.

A4 ADVOCACY AND IEC ON THE CDM

Immediate Objective 4.1 To enhance awareness on and increase support for the implementation of CDM in the country.

Output 4.1. Most appropriate mechanism/entities to discharge promotional functions on CDM.

Activity 4.1.1 Assess existing capacity, mandate(s) and structure of existing entities (e.g. IACCC member agencies, CCIC, other private sector entities like the Chambers, private sector NGOs) to undertake promotional activities for CDM purposes.

Activity 4.1.2. Select the most appropriate entity or mechanism (may be a network of entities) to conduct promotional activities for CDM.

Activity 4.1.3. Work out formal collaboration, linkages and mechanics for systematic access to updated information (if promotional entity is different from the NA) and free flow to the private sector and other proponents.

Output 4.2 A general public and stakeholders (particularly the private sector) with a heightened awareness on the benefits, pitfalls and opportunities of the CDM process.

Activity 4.2.1. Formulate IEC plan on the strategic dissemination of CDM information.

Activity 4.2.2. Prepare proto-type, test and mass produce IEC materials on CDM for widespread and strategic dissemination.

Activity 4.2.3. Conduct other IEC/advocacy activities like seminar-workshops, focused group discussions,etc...

The Project Implementation Work Plan showing the timetable for the implementation of the above activities is given in ***Annex 4.***

6. PROJECT ORGANIZATION AND MANAGEMENT

The Department of Environment and Natural Resources (DENR), through the Environmental Management Bureau that serves as Secretariat to the IACCC, will be the executing agency and shall be responsible for the overall management of the project on a day-to-day basis. The IACCC Secretariat shall designate a Project Manager, two (2) regular technical staff and one (1) administrative staff of EMB to assist in the project implementation on a part time basis. These personnel shall serve as the government counterpart staff to the project. The IACCC Secretariat will ensure proper coordination and liaison between the Project and the UNDP, the Netherlands government and other national government departments and agencies and non-governmental institutions with which cooperation is needed for the efficient and successful operation and implementation of the project. Likewise, UNDP shall provide overall management and technical advice to the project.

To ensure continuity of the project implementation and provision of full-time staff, the project will hire one (1) Project Coordinator who shall be tasked to coordinate the activities of the project staff and consultants, two (2) technical assistants, one (1) finance officer and one (1) administrative staff. The staff to be hired shall form part of a Project Management Office (PMO) directly under the guidance of the Project Manager-IACCC Secretariat (EMB). Various sub-contracts are likewise lined-up. These would require the services of consulting firms/consultants to undertake specific tasks. The services of expatriate consultants may be required since there is limited local experience in this new field, at present. The Terms of Reference (TOR) of each of the project staff and sub-contract is given as ***Annex 5.***

An organizational chart showing the overall project organization and management is presented as ***Annex 6.***

7. BUDGET

The total contribution being requested from the Netherlands Government, through the UNDP is US$ 1.0 M. The government contribution, on the other hand, which is in-kind from the IACCC members and the DENR-EMB, is about PhP 2.38 M. Details of the Dutch contribution per UNDP Component Budget Line is presented in ***Annex 7*** including the breakdown of GoP counterpart.

8. RISKS AND CONDITIONS

A potential problem analysis identified the following vulnerable areas of the project:

- Delay in the Ratification of the Kyoto Protocol
- Delay in the Creation of the National Authority resulting from the current administration's priority for 2004 election-related preparatory activities.

Preventive measures are identified to address the vulnerable areas that are controllable.

One of the major concerns of the project is the possible delay in the official designation of the IACCC as the NA, which may push the project duration within the vicinity of the 2004 election period. However, all components can proceed even while the NA designation is being worked out, except completion of the capacity building which would obviously involve primarily the NA.

A vulnerable area beyond the control of the project is the ratification of the Kyoto Protocol. The IACCC is closely monitoring the ratification process and would provide a very significant lobbying force, especially when awareness on CDM opportunities needs to be brought to the attention of the decision makers in the Legislative and Executive Bodies of government.

9. MONITORING, EVALUATION AND REPORTING

The EMB, acting as the IACCC Secretariat, will be the agency responsible for the implementation monitoring and evaluation of all the activities throughout the duration of the Technical Assistance. It shall also be responsible for reporting the results of the monitoring and evaluation to the UNDP. The UNDP, on the other hand will provide a copy of these reports to the Netherlands Government through its Embassy in Manila.

A detailed annual and quarterly work and financial plan shall be prepared by the EMB, indicating the activities targeted to be implemented for the said period and will serve as the basis for evaluating the progress of the project activities. The work and financial plan shall be reviewed and revised whenever necessary in consultation with the UNDP.

9.1 Reporting

In accordance with the UNDP procedures, the designated Project Coordinator shall prepare an updated Annual Progress Report (APR) every six (6) months and will serve as an input to the Tripartite Project Review (TPR) to be held every end of the year of implementation. The semi-annual progress report will be based on the approved work plan and the quarterly progress and financial reports prepared separately and submitted to the UNDP. The TPR will be participated by representatives from the UNDP, DENR, members of the IACCC, private sector and the Netherlands Government. Supplementary meetings may be convened as the need arises.

The project Terminal Report will also be prepared by the IACCC Secretariat. It will be reviewed during the final TPR and final evaluation meeting. A draft terminal report shall be prepared in advance to allow for the review and technical clearance from the UNDP and the Project Steering Committee, at least three (3) months in advance prior to the terminal meeting of the TPR of the project. The terms of reference of review and evaluation shall be submitted by the UNDP to the Netherlands Government, through its Embassy, for review and approval.

9.2 Impact Monitoring and Evaluation

A measure of effectiveness of the project is the number of Project Design Documents (a documentation requirement by the CDM) that are being prepared for submission to the National Authority. Another measure of effectiveness is the number of inquiries from potential investors in CDM projects or buyers of CER certificates.

10. ACTIONS TO BE TAKEN PRIOR TO THE START OF THE PROJECT

There are certain prerequisites that have to be undertaken prior to the start of the project. They are:

- Identification of seconded personnel, office and office facilities and other operational support needed by the National Authority.
- Identification of Consultancy Firm(s) for activities to be subcontracted.

The IACCC will be responsible for undertaking the above prerequisites.

ANNEX 1

Table 1. Existing IACCC Competency vs. Competency Requirements of the National Authority

National Authority Functions	Competency Requirements	IACCC Member Agency/ Institution	IACCC Member Agency Competency	Competency Gap
1. Evaluation and Approval of CDM Proposals				
1.1. Review of Key International Criteria				
a. Eligibility of Project Type ▪ Consistency with UNFCCC Decisions	▪ Understanding of criteria defined in Bonn, Marrakech, & those forthcoming from the Executive Board	Department of Environmental and Natural Resources	▪ Participates as part of Philippine delegation in COP meetings and is fully aware of related decisions and developments	None
b. Additionality ▪ Review of quantitative baseline assessment ▪ Review of qualitative description & justification of baseline scenario	▪ Expertise in the technical review of emissions in the baseline and alternative scenarios	Department of Environmental and Natural Resources Department of Energy Department of Science and Technology	▪ Reviews Environmental Impact Assessment Applications ▪ Establishes Environmental Standards ▪ Prepares the Philippine Energy Plan with projections on future energy supply mix ▪ Does technology assessment of energy projects	May require capacity enhancement in actual preparation and analysis of baseline and alternative scenarios
c. Measurability ▪ Review of quantification of impacts of project intervention on carbon stock and flows (difference between baseline & alternative scenarios)	▪ Environmental Impact Assessment Expertise	Department of Environmental and Natural Resources	▪ Monitors projects with approved ECC, EIS ▪ Has mature database on pollution load to environment	None

National Authority Functions	Competency Requirements	IACCC Member Agency/ Institution	IACCC Member Agency Competency	Competency Gap
		Department of Energy	▪ Prepares EIS of energy projects ▪ Performs technical performance evaluation of renewable energy and energy efficiency projects	None
▪ Review of projections on carbon stocks and flows & accounting principles for quantification of emissions reductions and carbon offsets generated & accumulated over the project life ▪ Review of accounting provisions for dealing with permanence and reversibility of project interventions	▪ Financial review of baseline and alternative scenario assumptions	Department of Energy	▪ Has technical knowledge of renewable energy and energy efficiency technologies ▪ Has database of macro energy consumption of various sectors	May need capacity enhancement on the whole range of NRE options
		National Economic and Development Authority	▪ Conducts macro-economic and project specific studies ▪ Has database for sectoral assumptions used in macro-economic planning and sensitivity	
d. Externalities ▪ Review of provision for the management of leakage	▪ Expertise in assessment of consumer behavior in rural electrification projects	Department of Energy	▪ Actively involved in implementation of rural electrification project analysis	May need capacity enhancement on actual project assessment
National Authority Functions	Competency Requirements	IACCC Member Agency/ Institution	IACCC Member Agency Competency	Competency Gap

▪ Review of provision for the management of risks related to carbon stocks and flows	▪ Financial expertise for assessing the financial viability of proposed CDM Projects		▪ Does financial evaluation of projects on case-to-case basis	May need capacity enhancement on financial evaluation in context of climate change
e. Securing Carbon Benefits ▪ Review of Monitoring Plan ▪ Review of provisions in the Monitoring Plan for preparing & facilitating periodic verification & final certification of emissions reductions	▪ Technical expertise in meteorology/ instrumentation	Department of Environment and Natural Resources Department of Energy	▪ Monitors projects with approved ECC, EIS ▪ Conducts energy audits	None
1.2. Review of CDM proposals based on National Criteria	▪ Knowledge of relevant development priorities ▪ Legal and regulatory expertise	Department of Environment and Natural Resources Department of Energy Department of Trade and Industry National Economic and Development Authority	▪ Enforces environmental laws and regulations ▪ Assists in formulation and enforcement of energy related laws and regulations ▪ Provides incentives to investments ▪ Regulates business/ project enterprises ▪ Identifies National development priorities	None

National Authority Functions	Competency Requirements	IACCC Member Agency/ Institution	IACCC Member Agency Competency	Competency Gap
2. Tracking and Reporting				
2.1. Development & submission of annual report on national CDM activities to the UNFCCC Secretariat	▪ Information and data tracking system for CDM activities (i.e. registering & tracking the holding and transfer of CERs)	Department of Environment and Natural Resources	▪ As co-chair of the IACCC, it is capable of undertaking this task with the support of the committee members	None
3. Optional functions				
3.1. Capacity Building for CDM Project Development[1]				
3.2. Marketing CDM Projects	▪ The marketing of CDM projects by the NA shall mainly be through the web-based listing of projects that have been included in the National Registry. However, some of the members of the IACCC by virtue of their mandates are in the best position to promote the opportunities for CDM investment in the Philippines to the local and international market. Specifically, these agencies are the DFA and the DTI. The ability to help promote CDM investments in the Philippines is a natural consequence of their mandate and daily operations	Department of Trade and Industry Department of Foreign Affairs	▪ Has links with local and international business community looking for opportunities for investment in the Philippines ▪ Has international link with the network of embassies ▪ Commercial attaches/consuls are linked to business/ commercial networks of each country	Needs capacity building in the context of CDM marketing

[1] The National Authority shall coordinate the national capacity building program for CDM. It may implement capacity building programs or engage the services of qualified external groups like the Climate Change Information Center (CCIC).

ANNEX 2

Table 2
COMPETENCY REQUIREMENTS OF THE NATIONAL AUTHORITY

1.0 Educational Background of Staff

Graduates of Engineering, Economics, Physics, Chemistry or Forestry are preferred for Project Design Document Evaluators.

2.0 Knowledge and experience in assessing CDM Technologies

The knowledge and experience identified in the following fields are needed to understand the technical merits of potential proposals that will be submitted to the National Authority. The PDD evaluator must have sufficient training or experience in the fields below to give a credible assessment of the PDD based on the National and International Criteria:

- Renewable energy technologies particularly those that are commercially ready. Examples are solar water heaters, photovoltaics, micro/minihydro, wind turbines, biomass technologies such as biogas, and alternative fuels or fuel substitutes such as cocodiesel and alcodiesel.

- Energy conservation and Energy Efficiency technologies such as, waste heat recovery, combustion efficiency add-ons, high efficiency burners, co-generation technology packages, demand side efficiency programs such as use of capacitor banks, variable flow control of airconditioning units, use of efficient lighting luminaries, use of suitable lighting reflectors and others.

- Forest Management, Agriculture and related fields of endeavor

3.0 Knowledge of Government Plans and Programs

The role of the National Authority in CDM Project Cycle shown in **Annex 3** is to determine if the CDM Project falls within the National Criteria. The National Criteria will require that the CDM Proposal be aligned to the government's Plans and Programs for sustainable development. It is therefore a MUST that the PDD Evaluator should be familiar with the Plans and Programs of the Government and should know who in the appropriate agency must be consulted for more details of specific plans/programs that are relevant to the PDD being reviewed.

4.0 Competency in reviewing the baseline of the PDD

One of the possible functions of the National Authority* is to promote CDM projects to investors and buyers of Certified Emissions Reductions (CERs) credits. After checking if the proposed project is within the National Criteria, the next task is to review the technical aspects of the PDD particularly the baseline and project assumptions. While it is the task of the Designated Operating Entity to validate related assumptions used, the National Authority reviewer must also be technically knowledgeable to determine the acceptability of the assumptions used in order to establish its credibility to the proponents. It must be emphasized, however, that the National Authority must aim to quickly pass on the PDD review to the DOE who shall do the detailed technical validation.

Key to discern the good projects from the bad is the ability to determine the acceptability of the assumptions used in establishing the PDD's Baseline. The review must look into hidden risks inherent in the assumptions and the range of uncertainties of the figures used in the parameters of the baseline. This competency can be acquired through training and guidance from an experienced practitioner. What can be imparted in training would be the standard methodologies used which are basically combustion equations, typical values of power plant efficiencies and heating values of different fuels. This may also include knowledge of Conventional Combustion Technologies such as boilers, furnaces, dryers, kilns, internal combustion engines and others.

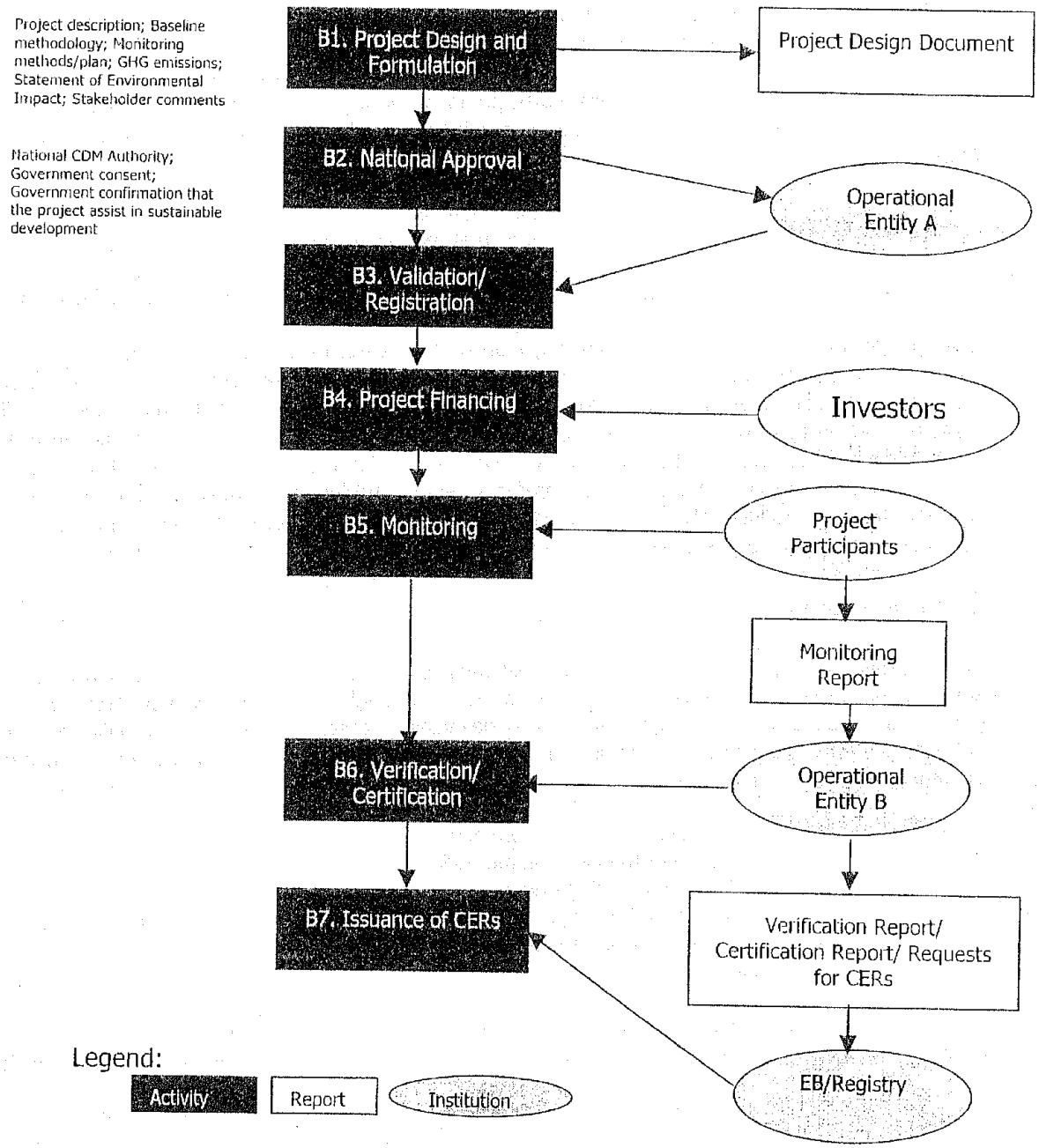
There are however, certain aspects of the competency requirement that cannot be acquired through training, such as defining the system boundary of the baseline, identifying leakages, and identifying key data sources that would clarify the boundary of the baseline and reduce the uncertainties of assumptions used in the baseline. These can only be acquired through actual practice and experience in developing the baseline from one project to another. These project characteristics are most of the time unique to the project by virtue of the technology, the local environment, the location, the local culture and practices, and the seasonality of certain baseline parameters, etc.

5.0 Competency in Project Feasibility Studies

The National Authority must have the capability to discern the feasibility of the proposed CDM Project considering the assumption that the project will remain viable throughout the crediting period during which the CERs will be sold. This capability will be based on competencies needed in making project feasibility studies. This will include among others financial/economic computations, sensitivity analysis, risk analysis, project management and management systems audit and other methodologies related to project design and feasibility analysis.

*Could be an entity outside the NA

ANNEX 3
CDM Project Cycle



The CDM project cycle shown on above has seven basic stages namely: project design and formulation, national approval, validation and registration, project finance, monitoring, verification/certification and issuance of CERs. The first four are performed prior to project implementation while the latter three are performed during the lifetime of the project.

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B1 Project Identification and Formulation

The first step in the CDM project cycle is the identification and formulation of potential CDM projects. A CDM project must be real, measurable and additional. To establish additionality, the project emissions must be compared to the emissions of reasonable reference case, identified as the baseline. The baseline is established by the project participants according to approved methodologies on a project-specific basis. The baseline methodologies are being developed based on the three approaches in the Marrakech Accord:

- Existing actual or historical emissions;
- Emissions from a technology that represents an economically attractive investment; or,
- The average emissions of similar projects undertaken in the previous years under similar circumstances and whose performance is among the top 20% of their category.

CDM projects must also have a monitoring plan to collect accurate emission data. The monitoring plan, which constitutes the basis of future verification, should provide confidence that the emission reductions and other project objectives are being achieved and should be able to monitor the risks inherent to baseline and project emissions. The monitoring plan can be established either by the project developer, or by a specialized agent. The baseline and monitoring plan must be devised according to an approved methodology. If the project participants prefer a new methodology, it must be authorized and registered by the Executive Board. The project participants must choose whether the crediting period shall be 10 years or 7 years with a possibility to be renewed two times (a maximum of 21 years).

B2 National Approval

All countries wishing to participate in the CDM must designate a National CDM Authority to evaluate and approve the projects, and serve as point of contact. Although the international process has given general guidelines on baselines and additionality, each developing country has the responsibility to determine the national criteria for approval. Together with the investor, the host country must prepare a project design document with the following structure:

- General description of the project;
- Description of the baseline methodology;
- Timeline and crediting period;
- Monitoring methodology and plan; Calculation of GHG emissions by sources;
- Statement of environmental impacts;
- Stakeholder comments

The National Authority issues the necessary statements: that the government participates voluntarily in the project and confirms that the project activity assists the host country in achieving sustainable development.

Figure A3-1 below shows the process of reviewing the PDD to determine if it is within the national criteria.

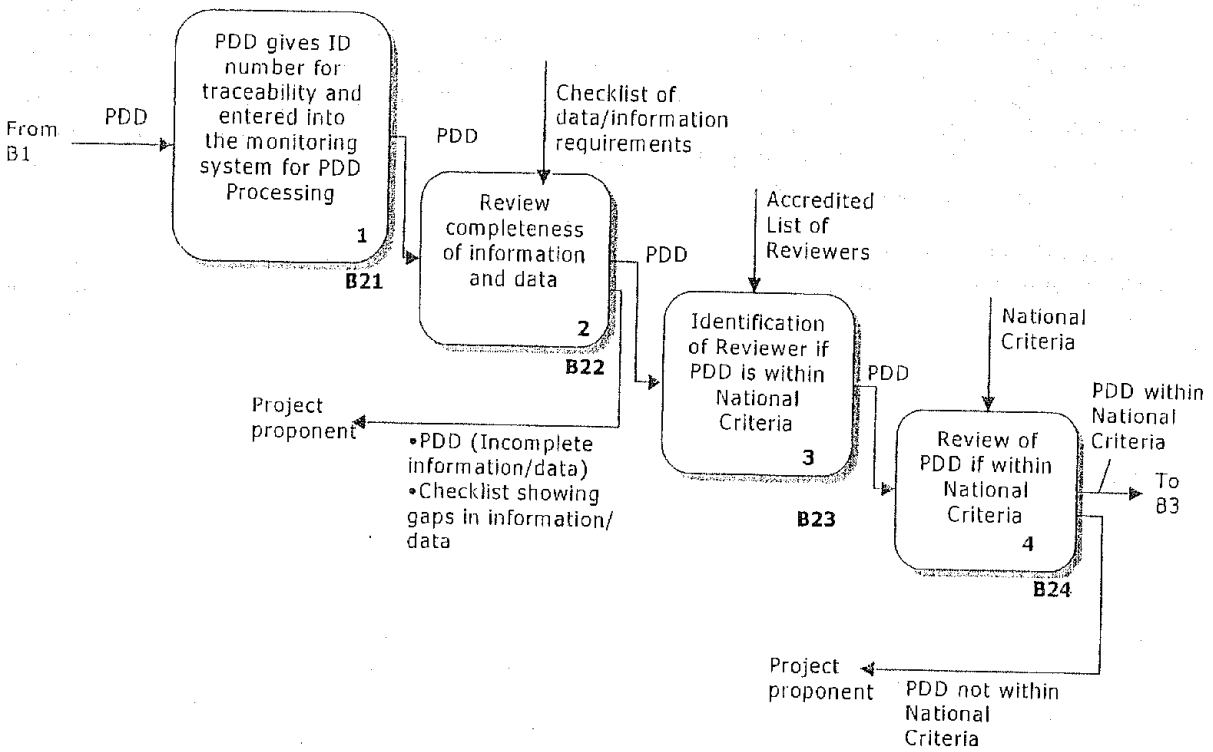

Figure A3-1. National Approval Process

Upon receipt of the Project Design Document the National Authority shall review the completeness of the data and information and the project's alignment with the national criteria. Any gaps in the information or data requirement will be identified and brought to the attention of the project proponent. A "Checlkist of information and data requirements for PDD Applications" will aid the review. The accomplished checklist will be used to document the gaps in information and data needed to process further the PDD Application. The checklist, which will be given a unique identification number, will identify the person who made the review. This identification number will be used for tracking the status of the application. This system will facilitate providing responses to queries from project proponents on the status of their applications. The National Authority shall establish a monitoring system that will track the duration and status of processing of applications as a way to review the efficiency of application processing and a means to prevent unnecessary or unintended delays in processing.

For those applications that are complete in information and data requirements, the National Authority shall identify the "Reviewer" who will be responsible for determining if the application is within the National Criteria. The Reviewer shall be chosen only from an "Accredited List of Reviewers for the CDM National Criteria". Accredited Reviewers must undergo orientation and training on Clean Development Mechanism and the National Criteria for CDM. The National Authority shall define other Qualification Requirements relevant to establish a competent and independent review process. This may include educational attainment, job experiences in selected fields relevant to CDM technologies, background review of the candidate and others. The National Authority shall assure that the review process will be independent and impartial. This can be done by giving code numbers to the Reviewers so that the reviewer's name is not declared while still being able to trace the identity of the reviewer in the records and in the Application Monitoring System. A "Maximum Period for Review" shall be defined by the National Authority so as to control the processing time of applications. Reviewers who fail to meet the deadline shall be rated "unsatisfactory". This status shall be recorded in the "Accredited List of Reviewers for the CDM National Criteria". Reviewers with "unsatisfactory" ratings shall only be used when no other reviewer is available. Reviewers thrice rated "unsatisfactory" shall be delisted from the accredited list and shall be registered in the "List of Delisted Reviewers".

All applications submitted to the National Authority and their corresponding records of review (from the review of information and data requirements to the review against the National Criteria shall be open to the public. This can be done by through a website where the records can be accessed or through a physical archive where interested parties can visit and look through the file folders. Only the pending applications will be shown in the website. Those Applications that have been terminated or completed can be accessed upon request whether electronically or by mail. The "Application Monitoring Scheme" shall be in electronic form and shall be part of the website of the National Authority.

Those PDD Applications satisfying the National Criteria shall be registered in the "Register of Project Design Documents that Meet the National Criteria". This list shall also be a part of the website of the National Authority.

ANNEX 4

PROJECT IMPLEMENTATION WORK PLAN								
ACTIVITIES	**Year 1**				**Year 2**			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
A1 Creation of the National Authority Consultations with stakeholders Selection of Preferred Option for NA (Legal) And Issuance of Legal Document								
A2 Formulation of the National CDM Operational Framework and the National Registry of GHG Emissions A21 National Authority's Management System A22 National Registry of GhG Emissions								
A3 Capacity Building to Operationalize the "CDM Operational Framework" A31 Capacitated CDM Stakeholders, particularly the NA Development of Training Program for the NA and representative IACCC members Implementation of Training Program Attaining Broad Stakeholder Participation Assessment of Political Environment & Capacity Building requirements of Key Stakeholders Review the Legal Framework Development of Capability Building Program Key Stakeholders Establishment and Operation of the "National CDM Operational Framework"								
A4 Advocacy and IEC on the CDM A41 Most Appropriate mechanism for promo activities A42 Heightened awareness								

United Nations Development Programme

Department of Environment and Natural Resources –
Environmental Management Bureau (DENR-EMB)

and

The Philippine Inter-Agency Committee on Climate Change (IACCC)

Phase 1
Establishment of the Clean Development Mechanism (CDM) National Authority, Operational Framework and Support Systems for the Philippines

Manila, PHILIPPINES

August13, 2003
(Final Draft)

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CURRENCY RATIOS

As of March 31, 2003

1 US Dollar = Philippine PESO (PhP) 54.07
1 US Dollar = 0.92653 Euro
1 Euro (EUR) = 2.20371 Dutch Guilder (NLG)
1 Euro (EUR) = 1.07950 US Dollar (USD)

ABBREVIATIONS

ALGAS	Asia Least Cost Greenhouse Gas Abatement Strategy
CAA	Clean Air Act
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
DENR	Department of Environment and Natural Resources
DENR – EMB	Department of Environment and Natural Resources – Environment Management Bureau
DOE	Designated Organization Entity
DFA	Department of Foreign Affairs
ELI	Efficient Lighting Initiative
FATL	Fuels and Appliance Testing Laboratory
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GNP	Gross National Product
GOP	Government of the Philippines
HLURB	Housing and Land Use Regulatory Board
IACCC	Inter-Agency Committee on Climate Change
IAQIF	Integrated Air Quality Improvement Framework
LUCF	Land Use, Change, and Forestry
MMBFOE	Million Barrels of Fuel Oil Equivalent
MTPDP	Medium-Term Philippine Development Plan
NA	National Authority
NAPCC	National Action Plan on Climate Change
NAQCP	National Air Quality Control Plan
NCCC	National Commission on Climate Change
NSWMC	National Solid Waste Management Commission
PAG-ASA	Philippine Atmospheric Geophysical and Astronomical Services Administration
PDD	Project Design Document
PELMATP	Philippine Efficient Lighting Market Transformation Project
PEP	Philippine Energy Plan
PSSD	Philippine Strategy for Sustainable Development
RESCO	Rural Energy Service Company
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework on Climate Change Convention
VROM	"Ministry of Housing, Spatial Planning, and Environment"

PROJECT KEY SHEET

Project Name:	Establishment of the Clean Development Mechanism (CDM) National Authority, Operational Framework and Support Systems for the Philippines
Project Location:	Nationwide
Proposed Executing Agency:	Environmental Management Bureau - Department of Environment & Natural Resources- (DENR-EMB) in behalf of the Inter-Agency Committee on Climate Change
Location and Address Details of Head Office:	DENR Compound Visayas Avenue, Diliman, Quezon City 1116 Philippines
Contact Person:	Ms. Joyceline A. Goco Head, IACCC Secretariat
Long Term Objective:	To facilitate the country's shift to sustainable development, through accelerated socio-economic growth, fueled by investments through mechanisms like the Clean Development Mechanism (CDM) and the global reduction of greenhouse gases.
Immediate Objective:	To put in place the CDM system of the Philippines through the designation of the National Authority (NA) and establishing its operational framework and support systems.
Project Beneficiaries:	The ultimate beneficiary is the global community and the country's general public with GHG avoided or abated worldwide and the achievement of the Philippines sustainable development goals. The direct beneficiaries are the industries and the private sector which shall be the recipients of improved technologies and additional project financing, as well as the national government agencies that will be involved in the CDM process.
Starting Date of the Project:	April 2003
Completion Date of the Project:	March 2005
Budget Financing:	The Netherlands Government: **US$ 178,500** Philippine Government: **PhP 1.367 M** (in-kind contribution) UNDP: **US$ 23,742** (in-kind contribution)

1. INTRODUCTION

1.1 BACKGROUND

The Philippines, as a country Party to the UN Framework Convention on Climate Change (UNFCCC) and signatory to its Kyoto Protocol, has embarked on several undertakings over the past years to enable it to comply with its commitments under this Convention. In March 31, 2000, the Philippines completed and submitted to the UNFCCC Secretariat its Initial National Communication on Climate Change (INCCC), detailing what it has done so far to comply with its commitments under the Convention.

The Philippines' Initial NCCC included the results of the 1994 Philippine Greenhouse Gas (GHG) Inventory, which is its main commitment. The inventory indicated that the country released a total equivalent amount of 100,738 ktons of CO_2 into the atmosphere for that period. Likewise, the country's future GHG emissions by the contributing sectors, namely energy, industry, agriculture and wastes were calculated and projected to increase to 195,091 ktons by 2008, a 94% rise from the 1994 level. This figure provides local GHG mitigation and reduction opportunities even if the Philippines, a non-Annex 1 country Party, is not required to do so under the UNFCCC.

Under the Kyoto Protocol, Annex 1 (developed) country Parties are required to reduce their emissions in accordance with their quantified emission reduction objectives or QELROS. Non-annex I (developing) country Parties, on the other hand, do not have quantified emission reduction targets under the Convention and the Protocol. The Philippines as a non-Annex I country, does not have any commitment to reduce GHG emissions within a specific timeframe but is committed to put in place, "win-win" options that will effectively reduce its greenhouse gas emissions, at the same time meeting its sustainable development objectives.

The Kyoto Protocol established legally binding obligations for Annex I countries to reduce their overall GHG emissions by about 5% of their 1990 levels by 2008-2012. It provides for three (3) mechanisms to assist developed country Parties meet their respective GHG emission reduction commitments and obligations overseas. One of the three mechanisms is called the "*Clean Development Mechanism*" (CDM). As enunciated in Article 12 of the Protocol, the CDM is the only mechanism that involves the participation of non-Annex 1 country Parties in the GHG reduction process of the Annex I country Parties. In order to participate, non-Annex 1 countries are required by the Conference of the Parties-meeting of the Parties (CoP-moP), the highest decision making body of the Protocol, through the CDM Executive Board, to establish their National Authorities (NAs) before they can participate in the CDM. The National Authority is the host country entity that provides written approval confirming that the proposed CDM project is voluntary, complies with national and international criteria, and assists in the sustainable development of the host country. It shall be the focal point for all CDM-related business transactions among local and foreign investors.

Since the Philippines is intending to participate in the CDM process, it has to establish/designate its NA and define/ establish the operational framework under which it will operate. This NA and its operational framework establishment is not that easy as it will require significant capacity building. In particular, the NA's capacity to determine whether projects will be eligible for the CDM and meet the country's sustainable development criteria in the process needs to be built up. This would require developing its competency on GHG mitigation analysis, including establishment of baselines and selection of optimum technologies. Moreover, the other stakeholders too, particularly the private sector and other proponents who will eventually design and implement the projects, need to be capacitated.

As early as 1999, when the details of the CDM were still being debated, the United Nations Development Programme (UNDP) provided technical assistance to selected countries, including the Philippines, to undertake a study on the capacity building needs of developing countries that would eventually participate in the CDM process. As the CDM rules were not yet finalized then, the study had to be done under a lot of assumptions. The results were actually meant to input into the then on-going debate about the parameters and scope of the CDM. The study was able to define the existing policy and legal framework existing at the time in the participating countries, as well as, identify representative projects which might be considered eligible for CDM. However, with the full articulation of the CDM rules in the Marrakech Meeting of the Conference of the Parties of the UNFCCC, these parameters are now quite clear and preparations for which need to be completed.

1.2 RATIONALE FOR DONOR INVOLVEMENT

As indicated by the results of the 1999 UNDP CDM study and in view of the CDM rules that have been formulated by the CDM Executive Board, the Philippines needs to institute certain interventions at the policy, institutional and individual levels to enable the mechanism's successful implementation. For example, it has to emplace the proper legal context and institutional arrangements to encourage a competitive CDM market in the Philippines, at the same time ensuring that the investments contribute optimally to the achievement of the country's sustainable development objectives. It would also require the generation of the appropriate technical competencies and capacities, particularly in the area of GHG inventory and baseline setting, mitigation analysis and technology option selection, at the individual stakeholder level, in both the implementing national agencies and the private sector and NGO proponents. All of these have to be integrated together in an operational framework which defines the policy and institutional regime governing the CDM's implementation in the country.

While the national network of agencies working on climate change, the Inter-Agency Committee on Climate Change (IACCC), has the basic capacity to undertake coordination function(s), (which is a major activity in generating the endorsement for the CDM proposal to the Executive Board), it cannot do this optimally because of lack of resources (both financial and manpower). This network of agencies, which is being contemplated to constitute the NA, is envisioned to face grave difficulty in the discharge of other corollary functions such as the maintenance of the national GHG inventory and other related information so critical to the verification and validation activities under the CDM process. All of these capacity building requirements are meant to be addressed in a very short time frame (within a year) as the CDM is expected to be operational once the Kyoto Protocol enters into force (expected anytime soon). Unfortunately, the country cannot rely on its own resources alone to prepare for the implementation of this mechanism as it has significant resources and capacity constraints which could be primarily addressed through substantial technical and financial assistance from developed countries like the Netherlands and multilateral agencies like the UNDP.

The Netherlands Government is regarded as an active partner of the Government of the Republic of the Philippines (GoP) with considerable climate change experience. It is also one of the first developed country Parties to assign public funds for implementing the mechanisms of the Kyoto Protocol, including the CDM. It has specifically set up a CDM office under the International Environmental Affairs Directorate under the Ministry of Housing, Spatial Planning and the Environment (VROM), which is tasked to arrange CDM projects with non-Annex I country Parties. It has also formulated its CDM Implementation Plan, which sets out strategies, procedures and the underlying principles for the Netherlands to implement the CDM. The GoP, therefore, recognizes that the Netherlands Government can contribute invaluable related experience, expertise and resources to the Philippines' efforts to set up its own CDM systems and procedures.

The UNDP, on the other hand, as an implementing agency of the Global Environment Facility (GEF), is another preferred partner of the Philippines as it has been instrumental in assisting the country undertake sustainable energy projects and enabling activities under the UN Framework Convention on Climate Change and its Kyoto Protocol, as well as, the other multilateral environmental agreements.

In light of the above, the GoP, with further technical assistance from the UNDP, prepared a project proposal on the development of an operational framework for the implementation of the CDM. The first draft of this proposal was consulted with the Royal Netherlands Embassy (RNE) in Manila, which indicated interest to support the furtherance of the proposal based on certain pre-requisites, particularly the designation of the NA. For the elaboration of the issues tackled by the proposal, the RNE provided preparatory financial assistance, particularly for consultations and further development of the proposal based on the results of the multi-stakeholder consultations.

2. NATIONAL AND LOCAL CONTEXT

The Philippines was among the first countries to subscribe to the sustainable development paradigm and sign the Global Agenda 21 and related multilateral environmental agreements like the UN Framework Convention on Climate Change and the Convention on Biodiversity (CBD) at the Earth Summit in Rio de Janeiro in 1992. Even prior to this, it already crafted its Philippine Strategy for Sustainable Development (PSSD) in 1989, which was

subsequently elaborated into a Philippine Agenda 21 (PA 21) after the UN Conference on Environment and Development (UNCED). The country's decision to tread the path to sustainable development was catalyzed not only by the global developments like the Earth Summit but by its own internal experience which generated consensus on the issue among the country's major stakeholders. It has undergone significant social, political and economic transformation for the past 50 years but continues to face developmental challenges even at the onset of the 21st century. Foremost of these is the country's significant, pervasive and persistent poverty situation which seems to demand more radical and innovative solutions. This is compounded by, or as another school of thought would have it, caused by the continuing degradation of the country's environment and natural resources base, on which a significant portion of the population, particularly rural communities, depend for livelihood and sustenance.

Among the causes of this degradation which is not internally generated and has elicited a lot of concern is climate change. Climate change is expected to further exacerbate the poverty situation in the country because its major ecosystems- forests, coastal and marine areas, fresh water resources and agricultural areas are vulnerable to extreme climatic events and the phenomenon's other impacts like sea level rise. The country is also ill-equipped to deal with other effects like impact on health because of the surge in climate related diseases. As majority of the country's poor population live in rural areas, particularly among the coastal communities, the effects of these impacts are expected to be devastating. These are among the reasons why the country aligned itself with more than 150 countries under the UNFCCC process.

However, the Philippines also takes cognizance of the other aspect of the Convention which promises to provide a significant boost to the country's economy, thereby addressing the poverty situation. This is primarily in the energy sector, which fuels the country's economic growth. As the UNFCCC and its Kyoto Protocol provides for the transfer of technology from developed nations to developing countries including additional financial resources to shift from conventional fossil fuel to renewable energy use, it looks with optimism at the mechanisms within the convention process providing for these transfers. Among these is the CDM which is expected to provide a sizeable amount of investments, primarily in the energy sector.

The Philippines' Medium Term Development Plan (MTPDP) for 2001 –2004 stresses macroeconomic stability and sustained growth of income and employment across sectors, socio-economic groupings and regions. It envisions overcoming poverty "with a comprehensive set of social and economic policies and programmes with an equity orientation, underpinned by good governance and adherence to the rule of law." The proposed CDM project is expected to contribute to the enhancement of the policy environment and emplacement of transparent procedures conducive to investments and consequently, socio-economic growth which dissipates equitably to the countrysides through CDM projects which also involve the communities.

2.1 Brief Description of the National/Sectoral/Sub-sectoral Context

The Philippines was among the first countries to embrace the sustainable development paradigm, adopting the Philippine Strategy for Sustainable Development (PSSD) in 1989. This was followed by the Philippine Agenda 21 (PA 21) in 1996 serving as the country's blueprint for sustainable development. The PA 21 was considered as the highest development policy document in the country encompassing all other national and sectoral development plans. It aims to achieve environment and development goals by:

1) Promoting sustainable development through trade liberalization;
2) Making trade and environment mutually supportive; and
3) Encouraging macroeconomic policies conducive to environment and development.

The vision and guiding principles set forth in the PA 21 were directed to be integrated into the Medium-Term Philippine Development Plan (MTPDP). The current MTPDP (2001 – 2004) envisions **"a sustainable development anchored on growth with social equity."** This vision is to be measured by poverty reduction and improvement in income distribution. The pursuit of the MTPDP vision entails political stability and a strong and more competitive private sector. The government sees itself as assuming the role of increasingly making competitive markets work to ultimately alleviate poverty. The use of land and natural resources is intended to proceed in a manner that yields the greatest economic benefit to both present and future

generations. The MTPDP focuses on achieving economic growth with social equity by: significantly reducing the number of poor families; enabling the regions outside the National Capital Region to contribute more to development; and creating a more internationally competitive business sector supported by an efficient public sector at the national and local levels.

Aside from the PSSD, the Government of the Philippines also adheres to the Social Reform Agenda, the results of the Conference on Human Ecological Security, the Anti-Poverty Summit, and the Manila International Conference for the Operationalization of Economics of Sustainable Development. Adherence to the above reflects the Philippines' international commitments.

On climate change, the country was one of the earliest to respond to the challenges of this global phenomenon. It established the Inter-Agency Committee on Climate Change (IACCC) by virtue of Administrative Order No. 220 signed by President Corazon C. Aquino in December 1991. The IACCC is composed of 15 government agencies and NGO representatives. It is co-chaired by the Department of Environment and Natural Resources (DENR) and Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA). It is mandated to coordinate various climate change related activities in the country, propose climate change policies and measures and prepare the Philippine positions to the UNFCCC negotiations. The Committee regularly meets to discuss current trends and issues on climate change. There are plans to further expand the membership and functions of the IACCC. Furthermore, it has undertaken various activities and projects (elaborated on in Section 2.3) showing the government's commitment and contributions toward the achievement of the goals and objectives of the Climate Change Convention.

On the Kyoto Protocol, although the Philippines, as a non-Annex 1 country party, has no obligation to reduce its GHG emissions, it has expressed willingness to do its share in mitigating national emissions. This is reflected in the various projects and activities previously and currently being undertaken, which are mostly supported by the Global Environment Facility (GEF) through the UNDP and bilateral support, geared towards GHG mitigation in the context of the country's sustainable development agenda.

The CDM is one of the mechanisms under the Kyoto Protocol that Annex 1 country Parties can adopt to comply with their emission reduction commitments to the Convention in partnership with non-Annex 1 country Parties. The CDM is likewise meant to support the national sustainable development agenda of the non-Annex 1 country Parties and contribute to the ultimate global GHG emission reduction objective of the Convention. Although the Protocol has yet to enter into force, the Philippines would like to position itself this early to be a qualified and active player in the CDM process.

To be able to qualify and play an active role in the CDM market, the Philippines needs to put in place a competitive CDM operational framework at this point in time to be in step with other developing countries with whom it will have to compete for CDM projects. Considering, however, the array of more pressing national socio-economic and political problems competing for its meager financial resources, the equally serious environmental concerns are relegated to the back seat. The Philippines has not been a participant in any "Activities Implemented Jointly (AIJ)", which is similar in nature to CDM, making it inexperienced in crafting CDM fundable projects. While it is recognized that the National Authority and its accompanying administrative machinery is a necessary pre-requisite for participation in the CDM market, the government and other stakeholders have yet to unify their efforts towards this direction.

The Government of the Netherlands is in a position to provide the needed financial assistance to formulate and establish and capacitate the Philippine CDM National Authority and, at the same time, facilitate access to sources of proven environmentally sound and friendly technologies. The Government of the Netherlands, through the UNDP, is the preferred partner of the Government of the Philippines in this particular activity.

2.2 Relevant Prior and On-Going Assistance to the Sector

Relevant Completed Projects:

Asia-Least Cost Greenhouse Gas Abatement Strategy (ALGAS) Project
The Asia Least-cost Greenhouse Gas Abatement Strategy (ALGAS) project was carried out during 1995-1998. It was implemented under a regional technical assistance executed by the Asian Development Bank (ADB) and funded by the Global Environment Facility (GEF) through the United Nations Development Programme (UNDP). The project involved the participation of 12 Asian countries, which included the Philippines.

The development objective of ALGAS was to limit the growth of GHG emissions from Asia, and to build a substantial pool of expertise in the region for addressing issues on global climate change. Expertise were developed in areas such as the estimation and measurement of GHGs, identification of technologies and initiatives for reducing GHGs, and economic and social analyses for identifying cost-effective mitigation options. The ALGAS Project embodied a strong emphasis on regional cooperation. It has sought to enhance regional capabilities in a number of critical environmental and natural resource disciplines, which will ultimately allow the nations of the region to more effectively meet their commitments to the Framework Convention on Climate Change. The principal objectives of this project were to: (a) develop and improve the regional and national capacity to undertake, prepare, and present baseline and historical inventories of GHG emissions and sinks to meet the standards and requirements of the FCCC; (b) improve the reliability of GHG emission and sink inventories for the region; (c) develop national and regional capacities to identify, formulate, and analyze GHG abatement initiatives; and (d) develop and implement national and regional least-cost GHG abatement strategies.

Enabling the Philippines To Prepare A National Communication Program in Response to its Commitments to the UNFCCC
The project, conducted in 1997, was aimed at helping the Government of the Philippines build the capacity of various government agencies to prepare the country's initial communication to the United Nations Framework Convention on Climate Change. This was made possible with the financial assistance from the GEF through the UNDP. The main output of the project was the publication of the country's National Communication on Climate Change and its submission to the UNFCCC Secretariat. The project enabled the preparation of the 1994 greenhouse gas (GHG) inventory (baseline for non-Annex I Country Parties) using the guidelines prescribed under Article 12 of the Climate Change Convention and the decisions set by the Conference of the Parties. A series of training courses were conducted on GHG inventory to institutionalize the process among various agencies. Consultation seminars were also conducted involving other key players such as the private sector and industry, policy-makers, academe, non-government organizations and people's organizations. A database of climate change researches and other relevant activities was established at the Inter-Agency Committee on Climate Change (IACCC) Secretariat to consolidate all information gathered and facilitate efficient accessing of data.

During the multi-stakeholders consultation workshops conducted by the project, one of the recommendations was to establish or strengthen the appropriate mechanisms, structures and entities needed to implement the integrated abatement strategy. The need to draw up the policy and institutional framework relevant to mitigation of greenhouse gas emissions in the country was also stressed in these workshops. Training of critical sectors and groups was also recommended, particularly in the fields of renewable energy and energy efficiency.

Relevant On-going Activities:

Enabling Activity for the Maintenance and Enhancement of National Capacities to Prepare the National Communication on Climate Change
The Enabling Activity for the Maintenance and Enhancement of National Capacities to Prepare the National Communication on Climate Change, is a bridging project of the GoP, through the IACCC, between the "Enabling Activity to prepare its Initial National Communication on Climate Change" and the second enabling activity for the GoP to prepare its Second National Communication to the UNFCCC. This bridging project involves three major areas. First, it is meant to build the capacity to institutionalize the national communication preparation process with emphasis on the gaps and constraints identified in the initial enabling activity. Secondly, it is supposed to undertake capacity building for participation in systematic observation networks and identify capacity and technological needs in this area. Finally, the project is expected to strengthen/improve national activities for public

awareness and education and access to information, including information from international centers and networks.

Capacity Building to Remove Barriers in the Promotion of Renewable Energy in the Philippines
This project, which is just starting up, is the result of the findings and recommendations of a preparatory phase which: (1) identified the key barriers; (2) proposed activities to remove those barriers; and (3) prepared a full project brief and document seeking to remove those barriers at a national level. The PDF-B project further identified linkages and cooperation among donors to remove barriers to promoting renewable energy for the ensuing UNDP-GEF full project. The principal objective of the full project prepared from the PDF-B assistance is to reduce GHG emissions by identifying and removing the major barriers to the development and utilization of renewable energy to replace fossil fuel use in the Philippines. The proposed full project would achieve these objectives by:

1) capacity building of government agencies to formulate renewable energy policies;
2) information dissemination and public awareness raising;
3) institutional strengthening to increase coordination between organizations;
4) development of market strategy for utilization of renewable energy;
5) support program for renewable energy delivery mechanisms;
6) innovative financing schemes; and
7) development of standards, specification, testing, and certification for the renewable energy industry in the Philippines.

Funding for the project comes from the GEF, through the UNDP, with the Department of Energy as the Executing Agency. Local participating agencies and institutions provide counterpart funding.

Palawan Alternative Rural Energy and Livelihood Support Project
This project which is aimed at reducing the long-term growth of greenhouse gas (GHG) emissions through removing barriers to commercial utilization of renewable energy power systems to substitute for use of diesel generators in Palawan, is winding up. This project is intended to demonstrate the viability of the RESCO (Rural Energy Service Company) delivery mechanism of renewable energy systems, and economic activities of productive use of renewable energy services for rural communities. By the end of the project it is expected that there will be: 1) Increased capacity and recognition of renewable energy and RESCO at the local government level; 2) A range of financial incentives established; 3) A revised Provincial Energy Master Plan; 4) Increased public awareness of renewable energy systems and RESCO; 5) Increased information and services provided to potential investors in renewable energy; 6) A commercial and sustainable RESCO delivery mechanism set up to provide renewable energy services in Palawan; 7) A risk-sharing mechanism established to buy down the risks for the RESCO.

The Center for Renewable Resources and Energy Efficiency (CRREE), a non-government organization, serves as the executing agency with the Palawan Provincial Government as the cooperating agency. The financial support comes from the GEF and UNDP.

Philippines Efficient Lighting Market Transformation Project (PELMATP)
The undertaking is a project preparation activity (PDF-B), for a full project meant to overcome the technical and market barriers outside the main focus of the IFC's Efficient Lighting Initiative (ELI) Program and any other international lighting initiatives. The results of the preparatory phase were: 1) preliminary characterization of the Philippine markets for energy efficient lighting; 2) characterization of the stage of development in the legal, regulatory and fiscal frameworks setup by the GOP to promote end-use efficiency (including that of lighting); 3) identification of technical and market obstacles; and 4) proposed activities to help overcome those identified obstacles.

The Department of Energy, through its Fuels and Appliance Testing Laboratory (FATL) Division, is the executing agency with funding support from the GEF through the UNDP. This preparatory phase, which is being implemented by Geosphere Inc., is expected to be completed during the first half of 2003.

3. PRESENT SITUATION AND PROBLEM ANALYSIS

The Philippines is among the countries subscribing to the notion of sustainable development, a key pillar of which is a vibrant and resilient environment. Under the country's various plans, therefore, protecting and enhancing the environment, as well as, promoting the sustainable use of its natural resources has been underscored. According to the Philippine Agenda 21, the essence of sustainable development is the harmonious integration of a sound and viable economy, responsible governance, social cohesion and ecological integrity. It postulates that the extent of a country's economic productivity is determined by its environment's carrying capacity and the ability of its natural resources base to provide the basic materials. Economic profitability, therefore, could be increased by enhancing the environmental carrying capacity.

The Medium Term Philippine Development Plan (MTPDP) likewise echoes this concern by stressing that environmental sustainability is a key thrust. The objective is to arrest continuing degradation of the country's environment and natural resources, which is both a cause and effect of poverty in rural areas. The National Anti-Poverty Action Agenda (NAAA) also emphasizes the importance of attending to the ecological dimension because it is critical to the sustainable development of the country's productive resources, and consequently, the alleviation of poverty.

Despite these policy enunciations, however, poverty and unemployment remain the country's gravest economic problems. It is postulated that for these to be fully addressed at the end of the decade, the economy must grow on a sustained basis and across all sectors, while generating the greatest employment. There is a need, therefore, to harness and develop the full potentials of sectors contributing the most and the fastest to the growth of the Philippine economy. Business and industry sectors are seen as the primary engines of economic growth.

Historically, rapid growth and development proceeded unsustainably, most notably at the expense of the environment and natural resources sector. The growing consensus is that the sector has reached a critical stage. The Philippines has a total land area of 30 million hectares. However, as of 1996, only approximately 5.493 million hectares of forestlands remained with actual forest cover. Similarly, mangrove resources have been extensively exploited. The original estimate of 400,000-500,000 hectares of mangrove forests has been reduced to a total of 115,100 hectares in 1996. Further, the Philippines is already suffering from water shortages and air pollution and the situation is expected to worsen in the ensuing years. Moreover, many flora and fauna species face extinction in the uplands, wetlands, and coastal areas and overall, the major sub-sectors of the ENR sector are incurring significant damage.

Clearly, the sustained damage to an already critical environment has disastrous effects on natural resources and, accordingly, sustainable development and poverty alleviation within the Philippines. Although all of humanity suffers similarly due to depleted and damaged resources, people who rely on these resources for their livelihood, as in the case of the Philippines, are the most affected. These communities are usually the most poor and marginalized groups. The coastal and marine ecosystem of the Philippines is considered an important source of livelihood for about 70% of the country's municipalities. Accordingly, the MTPDP identifies that continuing degradation of the country's environment and natural resources, is both a cause and effect of poverty in rural areas. However, while the Philippines recognizes that resource use cannot continue unmanaged and be a major factor in the entrenchment of poverty of the nation, particularly of marginalized groups, such sustainable use requires substantial capacity on the part of the stakeholders. In turn, for this capacity to be built requires a significant amount of technical and financial resources which could realized through foreign assistance.

As discussed in the previous section, this critical condition of the country's environment and natural resources which have implications on the country's sustained socio-economic growth, stands to be further exacerbated by global environmental problems like climate change which has been brought about by the massive anthropogenic emissions of greenhouse gases from fossil fuel use. While the Philippines considers its GHG contributions to the atmosphere as insignificant, it is committed to do its part in abating/mitigating these emissions.

In 1994, the Philippines released a total equivalent amount of 100,738 ktons of CO_2 into the atmosphere. This is due to the combined effect of greenhouse gas (GHG) emissions from four sectors, namely, energy, industry, agriculture and wastes, and the net uptake (sink) of GHGs from the land-use change and forestry (LUCF) sector. In the global context, this national amount is minimal relative to the GHG emissions of other countries, especially those of developed country parties to the UNFCCC.

However, as climate change is a significant factor affecting the country, the Philippines recognizes that GHG emissions need to be mitigated and addressed. Many people live in coastal areas and are at risk from the impacts of climate change; extreme climatic events, sea level rise and degradation of marine ecosystems. The predicted negative effects of climate change on agriculture, forestry and water resources may also further entrench poverty and burden a struggling economy. Being an archipelago, with prevailing tropical climate, the Philippines is also highly vulnerable to the impact of climate change. Of the vulnerability assessments conducted in preparation for the Philippines' Initial National Communication on Climate Change, the simulation results showed that certain agricultural crops are projected to have a decrease in yield, and that key reservoirs and coastal ecosystems will be seriously affected. Changes in rainfall pattern may also increase the rate of conversion of forests to agricultural lands due to human migration from areas degraded by drought and erosion to more productive forestlands. Local biodiversity also may decrease and the effect of possible disease incidence needs to be studied further.

Thus, the Philippines, by signing of the UNFCCC, commits to contribute to the global effort to mitigate climate change through the reduction of GHG emissions. To begin implementation of the ultimate objective of the FCCC, which is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system," (Article 2, UNFCCC), the Philippines has begun initial activities to establish an inventory of GHG emissions and sinks, to develop measures to reduce emissions and facilitate adaptation to climate change, apply climate friendly technology, undertake sustainable management of GHG sinks, plans and programs for adaptation and protection of vulnerable areas, to incorporate climate change considerations in its national policies, research and systematic observation, and to develop an initial national communication which details the Philippines' implementation of the Convention.

Projects have also been undertaken to gain experience in climate change mitigation. The UNDP/GEF project, Asia Least-Cost GHG Abatement Strategy (ALGAS) highlighted the important role the energy sector can play in reducing future GHG emissions in the Philippines and identified renewable energy technologies (RETs) as a priority area in the country's GHG abatement strategy. Furthermore, the Philippines Agenda 21 also identified the need to develop and utilize RETs as the country's priority strategy and the National Action Plan on Climate Change proposed the gradual shift from the current fossil fuel-dominated energy mix towards NRE. However, as the "Capacity Development Initiative (CDI) Country Capacity Development Needs And Priorities- A Synthesis" report (UNDP-GEF, October 2000) outlines, six priority areas have been identified for country capacity development in climate change. These are: a) awareness/understanding, b) abatement, c) vulnerability and adaptation, d) the Clean Development Mechanism, e) Convention negotiations, and f) technology transfer.

The Philippines faces several constraints in these 6 areas. Identified constraints to the Philippines' capacity to assess its vulnerability to climate change and its adaptation options are the absence or weakness of an overall policy framework to direct what is, by necessity, an integrated multi-sectoral, multi-disciplinary approach to V&A. Such an integrated approach requires the clear definition of mandates and functions of those agencies (both government and civil society) tasked to undertake V&A. Another constraint is the inadequacy of critical human resources and analytical skills needed to undertake vulnerability assessments and adaptation planning. The shortage and inaccessibility of data from climate measurement/monitoring systems, together with the lack of institutions specializing in V&A are other impediments to effective action in this area.

A comprehensive awareness and understanding of the issue itself which seems to underpin many of the concerns and capacity constraints is needed for all sectors involved. Moreover, the capacity constraints associated with this priority area cut across all levels, (systemic, institutional, and individual), and focus largely on the lack of a managed system of information that can be attributed to a lack of human, financial, and information resources. Poverty also contributes to ambiguities in understanding climate change. These

constraints inhibit consensus building and the clear definition of mandates and programs in the national and local arena.

For the abatement of greenhouse gas emissions, in order for the Philippines to: a) reduce a growing dependence on fossil fuels; b) meet ambitious targets for reliable, economic supplies of grid electricity; and, c) realize widespread electrification and poverty relief in remote communities, new and renewable energy (NRE) sources of energy will have to be tapped over the next ten years. These are abundant throughout the country but relatively under-utilized.

Innovative financing and market delivery mechanisms will play a central role in providing the capital and access to the market required to meet expansion targets. Efforts in various facets of NRE development have been extensively pursued by the public sector. With meager resources, however, the government alone cannot sustain the development of the industry.

Recent years, however, have witnessed the growth in private sector participation in NRE development. There have been significant studies and projects, which have been undertaken on this area. However, despite these previous studies and projects, there exist both substantive and procedural barriers in the country's policies and laws, which inhibit private sector participation and public-private sector partnership necessary for sustainable NRE development. A general assessment however, leads to the conclusion that effective private sector involvement and partnership with Government and other sectors of civil society can take place on a broad and commercialized scale only if these barriers are adequately addressed.

Moreover, the lack of market strategies, economic incentives that can promote alternative energy systems or energy efficiency, and the lack of institutional coordination and commitment may also constrain the Philippines' efforts to undertake abatement measures.

The fourth area for which capacity development is needed is the clean development mechanism (CDM). The Philippines' participation in this mechanism is currently constrained, firstly by the absence of a National Authority for CDM, an operational framework for CDM to operate under and also by a lack of understanding of and information on CDM in general, of an institutional and legal framework, of technical infrastructure, of enforcement capacity, and of human resources needed to operationalize the mechanism. These capacity constraints and others mentioned under this section, create gaps in project negotiation and development skills, project baselining, monitoring, verification, auditing, and certification, setting up sustainable development indices, and cost-benefit assessments, etc.In this context, barriers to effective technology transfer for CDM may also be a constraint with the lack of a clear country policy and entity responsible for this area, the unavailability of local R&D infrastructure and professional expertise, the absence or incompleteness of the Philippines' assessment of its technological needs, the lack of information on local practices or traditional technologies, of motives and incentives for innovation.

Specific capacity development interventions needed to address the lack of overall national climate policy framework revolve mainly around clearly defining the mandates of various agencies engaged in climate change and thereafter, CDM; strengthening climate change focal points and establishing a national authority to coordinate climate change activities including CDM, instituting mechanisms of accountability to the public, and raising the level of public awareness on the issue. Moreover, there is the need to strengthen "relevant and key academic and research institutions and non-governmental organizations" (Annex, Decision 10/CP5) in their capacity to respond to the Philippines' issues and concerns on climate change. A fully integrated approach to V&A has been espoused, taking into account the socio-cultural and economic context that is inextricably linked to the vulnerability of the Philippines.

In terms of the absence of a legal or regulatory framework, the Philippines is close to ratification of the Kyoto Protocol and methods are explored within the project proposal to expedite the designation of the National Authority.

Some of the required economic measures related to CDM are being addressed through projects outlined below. Market mechanisms skewed towards fossil fuel utilization (because of their ready availability and familiarity) are identified to be a major constraint. Capacity needs in this area focus on market development, the

promotion, development, multiplication, and utilization of alternative energy systems beyond the pilot stage and in areas where feasible. However, in general, information, human, financial, and technical resources are needed to capably analyze the impact of subsidies and incentives, market mechanisms, and to enhance the public appreciation and use of these abatement systems. These needs are likewise stressed in areas where traditional fossil fueled systems are being renovated for greater efficiency.

An enabling environment for investment in CDM and renewable energy systems depends on the availability of technically accurate energy resource assessments, endogenous capacity in the workforce to gain access to and absorb this alternative technology, and an "enlightened" population that can discern the value (for climate protection) of these alternative systems. There is need, also to internalize (on a systemic level) the external costs of global climate degradation through extensive training on the relatively new economics and science of this global issue. In this regard, capacity is likewise being sought to familiarize the various sectors in the country with the various policy instruments such as command-and-control and market based mechanisms being forwarded today in the climate arena. Capacity to discern the applicability of either or a mix of both in the unique social, economic, and political context of the Philippines is needed.

Policy statements in this area of energy that directly touch on climate change require more advocacy with the pending NRE Bill. Although, GHG mitigating systems under the outlined projects below also establish policies for the use of other viable sources of energy, lessening the dependence on fossil fuel.

The clean development mechanism, which provides for the participation of developing country parties in the climate protection effort through funding of their initiatives in sustainable development, will help to address some of these many constraints, partial solutions and needs. Although as mentioned above, capacity needs here include the establishment of institutional linkages, project development and implementation, development of sustainable development indicators, project negotiation skills, and other such aspects that are required for meaningful participation in this Kyoto Protocol mechanism.

The value of civil society or NGO participation in climate-related activities will also be evident, although capacity needs to focus on developing those relevant and key institutions by renewed infusion of financial and material resources and the expansion of a human resource pool of experts. Any lack of coordination within and among the different sectors of society (e.g. government, NGOs, civil society, private sector) will indicate that serious capacity needs exist in the area of management and leadership. Enabling the clear definition of institutional roles and functions through the establishment of an operational framework for CDM, is an important capacity need.

In addition to all of this, the need for enhancing management and administrative capacities is also evident. It also follows that developing management capacity entails training people in institutions to plan effectively and to evaluate policies and measures according to well-defined performance indicators.

Capacity is still needed to increase the level of participation of all stakeholders. The effectivity of any such participatory approach to decision making will also necessarily depend on the level of conscientization of all the participants in the policy formulation and implementation process. Capacity interventions are, therefore, needed to increase the participation and level of understanding of all the stakeholders in this issue.

Informed decision making is critical for management of CDM and it depends on the organized and managed flow of information. Such technology is currently lacking and therefore a constraint. Capacity is, thus, needed to enable agencies to set up managed systems of climate related information, to supervise and retain capacity that has been built up through information or training, and to institutionalize public access to publicly owned information.

Capacity is likewise needed to develop a large pool or "critical mass" of resource people in both government and civil society who are conversant with the multi-faceted issue of global climate change. Most of the capacity development constraints and needs at the individual level touch on the issues of human resource availability, awareness raising, information sharing, and skills training. The constraints that have been identified are the lack of human resources, the generally low level of public awareness, the lack of information dissemination, and the absence of requisite skills to address climate change.

A notable capacity gap at the individual level touches on the acquisition of skills in vulnerability assessment and adaptation planning, abatement analysis, project development and management, international negotiation, fund raising, and administrative skills such as strategic planning. Because the availability of such skills is also constrained by financial matters, capacity is, therefore, likewise sought to address this lack of funding while ensuring, as above, that the training received diffuses effectively.

Figures 1 and 2 reflect an analysis of the problem in Problem Tree Format.

FIGURE 1 – Problem Tree Analysis

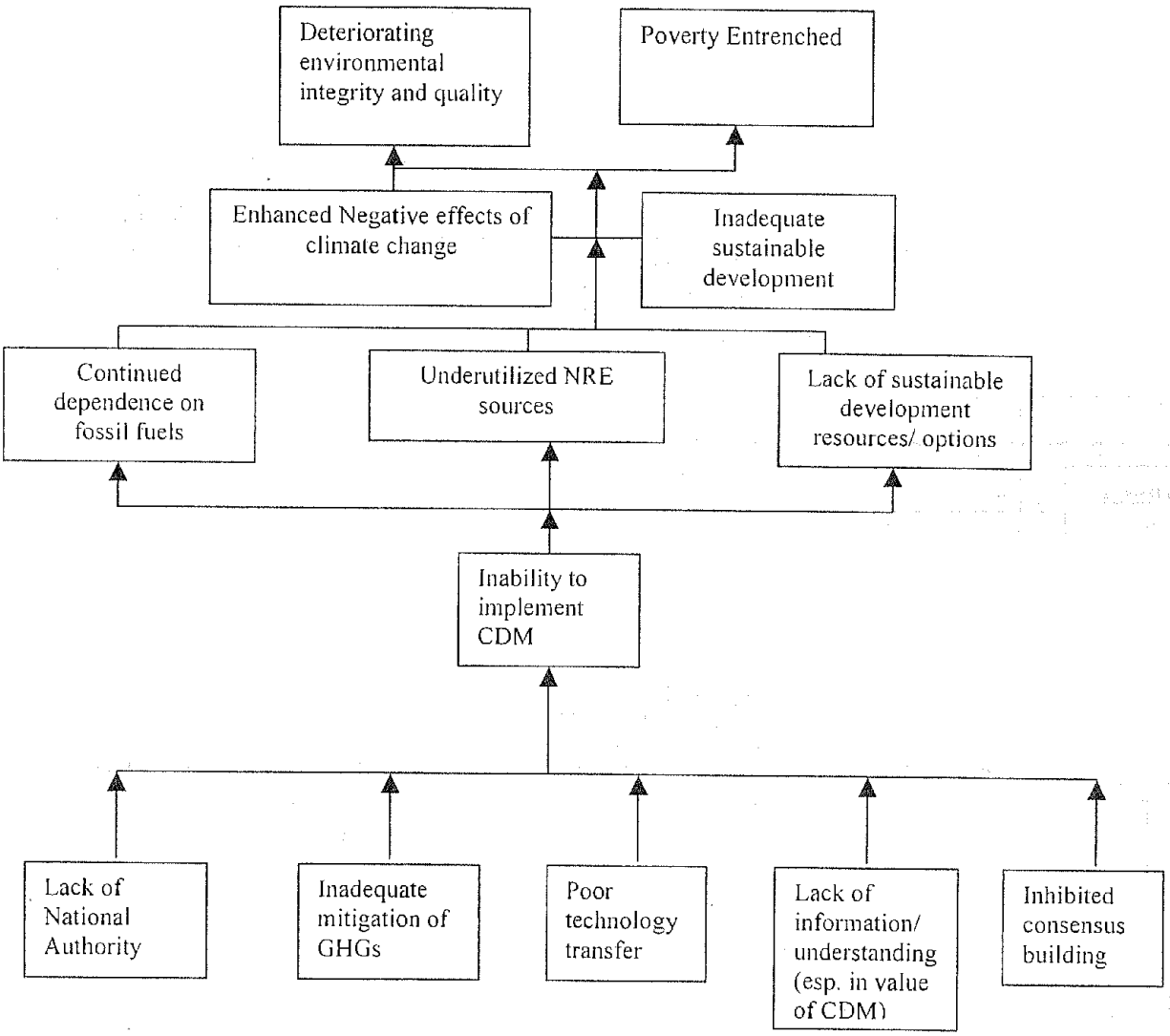

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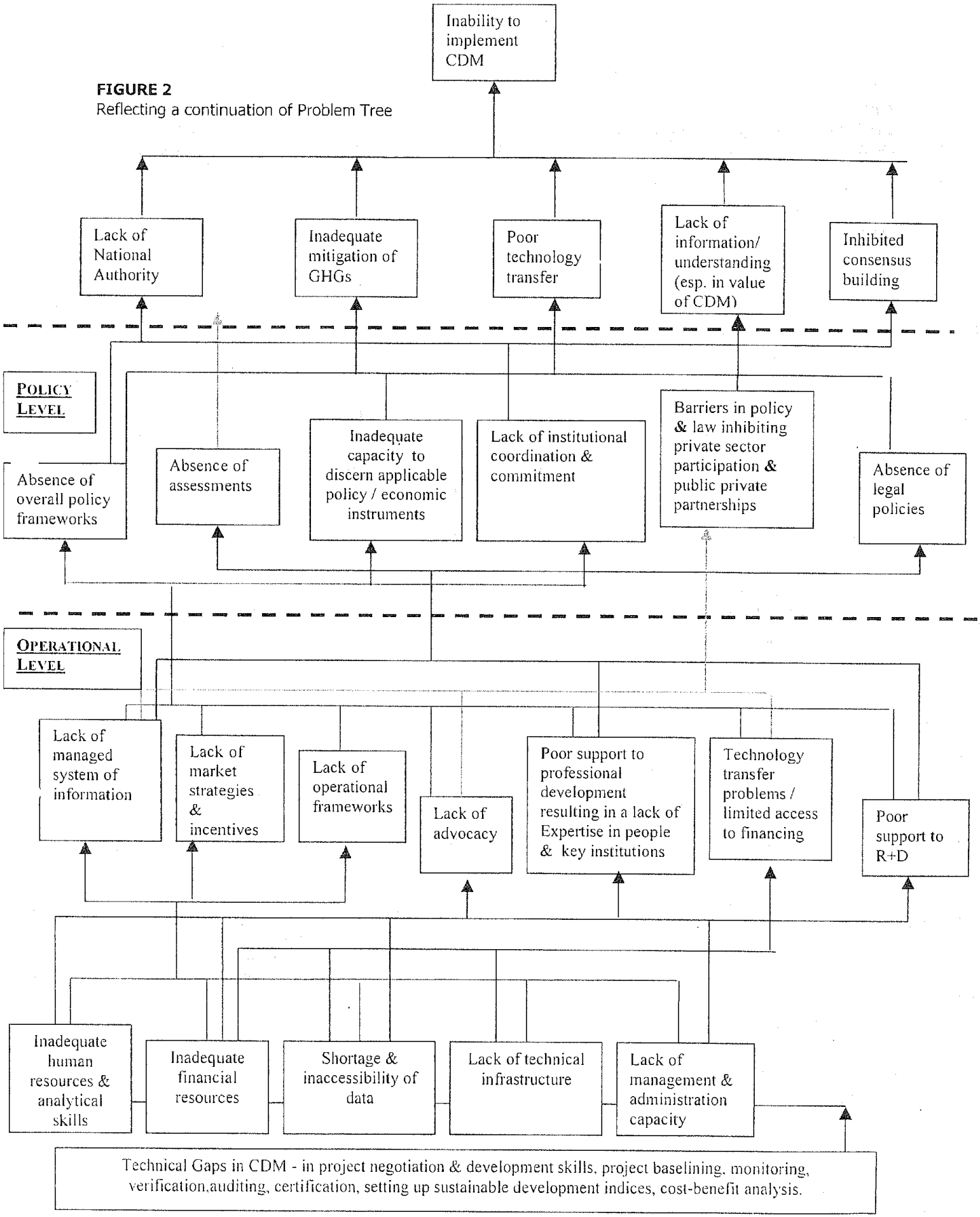
FIGURE 2
Reflecting a continuation of Problem Tree



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4. THE PROJECT

4.1 SCOPE OF THE PROJECT

The Project, "Establishment of the Clean Development Mechanism (CDM) National Authority, Operational Framework and Support Systems for the Philippines", seeks to create/establish the Philippine National Authority for CDM and establish the framework within which it shall operate.

Project Components

The Project shall cover two (2) specific areas, namely:

I. Establishment of the CDM National Authority
II. Development of the Operational Framework of the National Authority

I. Establishment of the CDM National Authority

The Kyoto Protocol requires non-Annex 1 country parties to designate a National Authority which shall endorse to the Executive Board, proposed CDM projects that support national sustainable goals. The legal document creating the National Authority will identify it as the entity responsible for overseeing the process of CDM implementation in the country, including the formal endorsements of CDM proposals to the CDM Executive Board. The output of this scope of work is a legal document defining what the National Authority is, identifying the institution designated as the National Authority, defining its functions and scope of authority. The most expedient path will be chosen. The possible legal options are discussed in greater detail in Section 4.6, "Project Approach and Strategies".

Parallel to the creation of the National Authority is the overarching need to push the ratification of the Kyoto Protocol. Presently, the "Instrument of Ratification" has been endorsed by the Department of Foreign Affairs to the Office of the President and is now with the Senate. This activity will follow through the process until the ratification is completed.

II. Development of the Operational Framework of the NA

The project shall set up an Operational Framework, which will include definition of the legal and administrative requirements and the prescribed systems and procedures for securing the NA endorsement, among others.

Securing the Certified Emissions Reduction (CER) certificate, which is equivalent to the amount of GHG emissions mitigated, requires a validation and monitoring scheme regulated by the Executive Board of the CDM. The validation scheme will require a Project Design Document (PDD) that provides objective evidence that there is indeed a valid GHG emission reduction resulting from the use of the clean technology, which would not happen without the benefit of CDM.

Whichever government agency will be designated as NA, the operational framework should already be worked out, ready for implementation once the Kyoto Protocol takes effect and the Philippines has ratified it.

4.2 PROJECT JUSTIFICATION

Participation in the Clean Development Mechanism requires a developing country to have in place an operational National Authority, which shall be the official entity to orchestrate the country's participation in CDM, following the criteria established in the Kyoto Protocol. Without the National Authority's approval and endorsement, no CDM project will happen in that country. Based on the outcome of COP7, the Marrakech Accord generated optimism that the Kyoto Protocol will enter into force anytime now. In view of this possibility, the country Parties including the Philippines, which have or are contemplating to ratify the Protocol, need to take immediate action to prepare for the required systems and procedures to allow them to participate in the CDM.

Viewing the CDM as an opportunity to achieve its investment targets for priority sectors like energy, this project is considered by the GoP as a high priority project because it will help put in place, the policy, technical and human infrastructure needed to make the mechanism operational in the Philippines.

4.3 LONG TERM OBJECTIVES

The projects over-all long term objective is the country's achievement of sustainable development goals through sustained economic growth anchored on a healthy and vibrant environment and the reduction of GHG, globally, resulting in the climate change mitigation. Its medium term objective is the alleviation of poverty by enhancing the capacity of certain sectors like energy, agriculture and forestry to increase their contribution to the country's economy through a mechanism like the CDM.

4.4 IMMEDIATE OBJECTIVES

The immediate objectives leading to the overall objective are the following:

1) Immediate Objective One: To secure the official designation of a national government entity (e.g. the IACCC) as the National Authority for CDM.

2) Immediate Objective Two: To formulate the CDM Operational Framework.

4.5 PROJECT BENEFICIARIES

The ultimate beneficiary is the global community and the country's general public with greenhouse gases avoided or abated worldwide and the Philippines' sustainable development goal achieved through specific development projects.

The establishment of the CDM process starting with the designation of the National Authority will usher the entry of an emerging global industry spearheaded by the private sector that makes possible the transformation of an environmental concern (GhG mitigation) into investment opportunities in support of the country's sustainable development aspirations. The direct benefit to the national economy may be initially insignificant due to the limited size of business transactions that may result. However, it may be expected that in due time, for as long as the bureaucratic hurdles in the operation of the CDM process are minimized, potential investors will recognize the advantages and benefits of transacting CDM business in the Philippines, resulting to more investments coming in, in the future.

The first line beneficiaries will be the national government agencies who will be involved in implementing the CDM process in the Philippines, as well as, the industries/ private sector and other CDM project proponents who will be the recipients of additional capacity building, new technologies and project funding. The second line beneficiaries shall be the consuming public who are the intended users of the resulting products and services generated by the CDM process. The more competitively priced products and services will make them more affordable and accessible to a greater number of target users.

4.6 PROJECT STRATEGY AND APPROACH

The project will utilize a variety of strategies and approaches to achieve its objectives. Among these are the generation of the necessary policy and legal issuances to institutionalize the operationalization of the CDM in the Philippines. Another is the establishment/ designation of the required mechanisms (e.g. NA).

The National Authority is the focal point for all CDM-related transactions. By the nature of its operation, the NA shall interface with various stakeholders from the different agencies and sectors including among others those from the energy, agriculture, forestry, and industry sectors. The multi-sectoral coverage of the functions of the NA is an important characteristic that must be given priority consideration in its identification. To facilitate immediate establishment of a workable CDM process within the country, the project will work for the

immediate designation of a national government entity or network of entities, which will respond to the above concern of multisectoralism, drawing in broad multi-stakeholder support through continuous and extensive consultations.

An initial assessment of the competencies of member agencies and institutions of the IACCC versus the requirements of the National Authority given in **Table 1 (Annex 1)** and elaborated in **Table 2 (Annex 2)** was conducted, including consultations to validate the same.

5. PROJECT IMPLEMENTATION

The following are the activities that shall be carried out in establishing the National Authority for Clean Development Mechanism (CDM) and making it operational in the Philippines. Under each activity is a description of what shall be done.

A1 ESTABLISHMENT OF THE NATIONAL AUTHORITY

Immediate Objective A1: To secure the official designation of the appropriate governmental entity as the National Authority for CDM in the Philippines.

Output A1. A Legal Issuance Designating the National Authority for the CDM process in the Philippines.

Notwithstanding the route to be selected based on the further consultations to be undertaken under the project, the projected output under this objective is a Legal Document (e.g. Legal Opinion from the Office of the President stating that the present mandate of the selected entity (e.g. IACCC as stipulated in AO No. 220) extends to cover the functions of the National Authority; or, as necessary, an amendment to the current legal issuance governing the functioning of that authority, explicitly stating that the mandate of that entity shall be extended to cover the functions and responsibilities of the National Authority or simply a memorandum order from the President designating the NA).

Activity A1.1 Through further consultations with the stakeholders, primarily the IACCC, and legal advice of experts, the preferred legal option for the NA designation will be selected. There are three possible options in securing the official designation of the most appropriate government entity (e.g.. the IACCC) as the CDM National Authority. One is a legal opinion from the Office of the President on the extent of coverage of the existing mandate of the contemplated entity. The second is a revision of the existing legal issuance, Presidential Administrative Order 220 creating the IACCC, governing the functions of the selected entity to specifically cover the discharge of the additional functions as NA. The third involves the mere issuance of the President a Memorandum Order to the designated NA for this additional task.

The project will then work through the formal mechanisms and concerned institutions to have the needed legal document issued during the initial phase of the project.

The appropriate and necessary organizational structure to implement the issuance will then be drawn up and institutionalization of the same effected.

A2 DEVELOPMENT OF THE NATIONAL CDM OPERATIONAL FRAMEWORK

Immediate Objective A2: To enable the optimum and efficient functioning of the NA through the provision of a clear National CDM Operational Framework.

Output A2.1. National Authority's Management System

Activity A2.1.1. Review past studies and available literature on the existing policies, legal and administrative requirements governing the entry of new projects/investments, identifying gaps and

constraints and providing recommendations to address these, to facilitate entry and implementation of CDM projects.

Activity A2.1.2. Craft new/supplementary policies and legal issuances to address the identified gaps and constraints for the optimum functioning of the CDM process in the Philippines.

Activity A2.1.3. Adopt national sustainable development criteria and indicators for use in the CDM assessment process.

Activity A2.1.4. Develop Systems and Procedures, with clear accountabilities and timeframes within the NA system, to implement CDM efficiently and optimally. A business "process map" may be drawn up to determine the optimal operating system for the NA. **Annex 3** depicts the CDM Project Cycle which could be the starting basis for the NA business map.

Activity A2.1.5. Develop protocols and supplementary tools to implement the systems and procedures.

Activity A2.1.6. Develop the documentary requirements of the NA to enable it to assess the CDM proposal and issue the necessary endorsement to the CDM Executive Board.

Activity A2.1.7. Pilot test the designed management system.

Activity A2.1.8. Prepare and issue the necessary legal and administrative issuances to operationalize the management system.

The Project Implementation Work Plan showing the timetable for the implementation of the above activities is given in ***Annex 4.***

6. PROJECT ORGANIZATION AND MANAGEMENT

The Department of Environment and Natural Resources (DENR), through the Environmental Management Bureau that serves as Secretariat to the IACCC, will be the executing agency and shall be responsible for the overall management of the project on a day-to-day basis. The IACCC Secretariat shall designate a Project Manager, two (2) regular technical staff and one (1) administrative staff of EMB to assist in the project implementation on a part time basis. These personnel shall serve as the government counterpart staff to the project. The IACCC Secretariat will ensure proper coordination and liaison between the Project and the UNDP, the Netherlands government and other national government departments and agencies and non-governmental institutions with which cooperation is needed for the efficient and successful operation and implementation of the project. Likewise, UNDP shall provide overall management and technical advice to the project.

To ensure continuity of the project implementation and provision of full-time staff, the project will hire one (1) Project Coordinator who shall be tasked to coordinate the activities of the project staff and consultants, one (1) technical assistant, and one (1) finance officer. The staff to be hired shall form part of a Project Management Office (PMO) directly under the guidance of the Project Manager-IACCC Secretariat (EMB). Various sub-contracts are likewise organised. These would require the services of consulting firms/consultants to undertake specific tasks. The services of expatriate consultants may be required since there is limited local experience in this new field, at present. The Terms of Reference (TOR) of each of the project staff and sub-contract is given as ***Annex 5.***

An organizational chart showing the overall project organization and management is presented as ***Annex 6.***

7. BUDGET

The total contribution for project activities being requested from the Netherlands Government, through the UNDP is US$ 170,000. The government contribution, on the other hand, which is in-kind from the IACCC members and the

DENR-EMB, is about PhP 1.367 M. Details of the Dutch contribution per UNDP Component Budget Line is presented in ***Annex 7*** including the breakdown of GoP counterpart.

8. RISKS AND CONDITIONS

A potential problem analysis identified the following vulnerable areas of the project:

- Delay in the Ratification of the Kyoto Protocol
- Delay in the Creation of the National Authority resulting from the current administration's priority for 2004 election-related preparatory activities.

Preventive measures are identified to address the vulnerable areas that are controllable.

One of the major concerns of the project is the possible delay in the official designation of the NA, which may push the project duration within the vicinity of the 2004 election period. However, all the other activities, particularly those relating to the development of the operational framework can proceed even while the NA designation is being worked out, .

A vulnerable area beyond the control of the project is the ratification of the Kyoto Protocol. The IACCC is closely monitoring the ratification process and would provide a very significant lobbying force, especially when awareness on CDM opportunities needs to be brought to the attention of the decision makers in the Legislative and Executive Bodies of government.

9. MONITORING, EVALUATION AND REPORTING

The EMB, acting as the IACCC Secretariat, will be the agency responsible for the implementation monitoring and evaluation of all the activities throughout the duration of the Technical Assistance. It shall also be responsible for reporting the results of the monitoring and evaluation to the UNDP. The UNDP, on the other hand will provide a copy of these reports to the Netherlands Government through its Embassy in Manila.

A detailed annual and quarterly work and financial plan shall be prepared by the EMB, indicating the activities targeted to be implemented for the said period and will serve as the basis for evaluating the progress of the project activities. The work and financial plan shall be reviewed and revised whenever necessary in consultation with the UNDP.

9.1 Reporting

In accordance with the UNDP procedures, the designated Project Coordinator shall prepare an updated Annual Progress Report (APR) after the fourth (4) month and a final report 15 days before the final ninth (9) month. The final report will serve as an input to the Tripartite Project Review (TPR). The semi-annual progress report and the quarterly progress and financial reports (prepared separately) will be based on the approved work plan and submitted to the UNDP. The TPR will be participated by representatives from the UNDP, DENR, members of the IACCC, private sector and the Netherlands Government. Supplementary meetings may be convened as the need arises.

The project Terminal Report will also be prepared by the IACCC Secretariat. It will be reviewed during the final TPR and final evaluation meeting. A draft terminal report shall be prepared in advance to allow for the review and technical clearance from the UNDP and the Project Steering Committee, at least one (1) month in advance prior to the terminal meeting of the TPR of the project. The terms of reference of review and evaluation shall be submitted by the UNDP to the Netherlands Government, through its Embassy, for review and approval.

9.2 Impact Monitoring and Evaluation

A measure of effectiveness of the project is the establishment of the NA and the operationalization of the Framework.

10. ACTIONS TO BE TAKEN PRIOR TO THE START OF THE PROJECT

There are certain prerequisites that have to be undertaken prior to the start of the project. They are:

- Identification of seconded personnel, office and office facilities and other operational support needed by the National Authority.
- Identification of Consultancy Firm(s) for activities to be subcontracted.

The EMB , as secretariat of the IACCC will be responsible for undertaking the above prerequisites.

ANNEX 1

Table 1. Existing IACCC Competency vs. Competency Requirements of the National Authority

National Authority Functions	Competency Requirements	IACCC Member Agency/ Institution	IACCC Member Agency Competency	Competency Gap
1. Evaluation and Approval of CDM Proposals				
1.1. Review of Key International Criteria				
a. Eligibility of Project Type ▪ Consistency with UNFCCC Decisions	▪ Understanding of criteria defined in Bonn, Marrakech, & those forthcoming from the Executive Board	Department of Environmental and Natural Resources	▪ Participates as part of Philippine delegation in COP meetings and is fully aware of related decisions and developments	None
b. Additionality ▪ Review of quantitative baseline assessment ▪ Review of qualitative description & justification of baseline scenario	▪ Expertise in the technical review of emissions in the baseline and alternative scenarios	Department of Environmental and Natural Resources Department of Energy Department of Science and Technology	▪ Reviews Environmental Impact Assessment Applications ▪ Establishes Environmental Standards ▪ Prepares the Philippine Energy Plan with projections on future energy supply mix ▪ Does technology assessment of energy projects	May require capacity enhancement in actual preparation and analysis of baseline and alternative scenarios
c. Measurability ▪ Review of quantification of impacts of project intervention on carbon stock and flows (difference between baseline & alternative scenarios)	▪ Environmental Impact Assessment Expertise	Department of Environmental and Natural Resources	▪ Monitors projects with approved ECC, EIS ▪ Has mature database on pollution load to environment	None

National Authority Functions	Competency Requirements	IACCC Member Agency/ Institution	IACCC Member Agency Competency	Competency Gap
		Department of Energy	▪ Prepares EIS of energy projects ▪ Performs technical performance evaluation of renewable energy and energy efficiency projects	None
▪ Review of projections on carbon stocks and flows & accounting principles for quantification of emissions reductions and carbon offsets generated & accumulated over the project life ▪ Review of accounting provisions for dealing with permanence and reversibility of project interventions	▪ Financial review of baseline and alternative scenario assumptions	Department of Energy	▪ Has technical knowledge of renewable energy and energy efficiency technologies ▪ Has database of macro energy consumption of various sectors	May need capacity enhancement on the whole range of NRE options
		National Economic and Development Authority	▪ Conducts macro-economic and project specific studies ▪ Has database for sectoral assumptions used in macro-economic planning and sensitivity	
d. Externalities ▪ Review of provision for the management of leakage	▪ Expertise in assessment of consumer behavior in rural electrification projects	Department of Energy	▪ Actively involved in implementation of rural electrification project analysis	May need capacity enhancement on actual project assessment
National Authority Functions	Competency Requirements	IACCC Member Agency/ Institution	IACCC Member Agency Competency	Competency Gap

▪ Review of provision for the management of risks related to carbon stocks and flows	▪ Financial expertise for assessing the financial viability of proposed CDM Projects		▪ Does financial evaluation of projects on case-to-case basis	May need capacity enhancement on financial evaluation in context of climate change
e. Securing Carbon Benefits ▪ Review of Monitoring Plan ▪ Review of provisions in the Monitoring Plan for preparing & facilitating periodic verification & final certification of emissions reductions	▪ Technical expertise in meteorology/ instrumentation	Department of Environment and Natural Resources Department of Energy	▪ Monitors projects with approved ECC, EIS ▪ Conducts energy audits	None
1.2. Review of CDM proposals based on National Criteria	▪ Knowledge of relevant development priorities ▪ Legal and regulatory expertise	Department of Environment and Natural Resources Department of Energy Department of Trade and Industry National Economic and Development Authority	▪ Enforces environmental laws and regulations ▪ Assists in formulation and enforcement of energy related laws and regulations ▪ Provides incentives to investments ▪ Regulates business/ project enterprises ▪ Identifies National development priorities	None

National Authority Functions	Competency Requirements	IACCC Member Agency/ Institution	IACCC Member Agency Competency	Competency Gap
2. Tracking and Reporting				
2.1. Development & submission of annual report on national CDM activities to the UNFCCC Secretariat	▪ Information and data tracking system for CDM activities (i.e. registering & tracking the holding and transfer of CERs)	Department of Environment and Natural Resources	▪ As co-chair of the IACCC, it is capable of undertaking this task with the support of the committee members	None
3. Optional functions				
3.1. Capacity Building for CDM Project Development[1]				
3.2. Marketing CDM Projects	▪ The marketing of CDM projects by the NA shall mainly be through the web-based listing of projects that have been included in the National Registry. However, some of the members of the IACCC by virtue of their mandates are in the best position to promote the opportunities for CDM investment in the Philippines to the local and international market. Specifically, these agencies are the DFA and the DTI. The ability to help promote CDM investments in the Philippines is a natural consequence of their mandate and daily operations	Department of Trade and Industry Department of Foreign Affairs	▪ Has links with local and international business community looking for opportunities for investment in the Philippines ▪ Has international link with the network of embassies ▪ Commercial attaches/consuls are linked to business/ commercial networks of each country	Needs capacity building in the context of CDM marketing

[1] The National Authority shall coordinate the national capacity building program for CDM. It may implement capacity building programs or engage the services of qualified external groups like the Climate Change Information Center (CCIC).

ANNEX 2

Table 2
COMPETENCY REQUIREMENTS OF THE NATIONAL AUTHORITY

1.0 Educational Background of Staff

Graduates of Engineering, Economics, Physics, Chemistry or Forestry are preferred for Project Design Document Evaluators.

2.0 Knowledge and experience in assessing CDM Technologies

The knowledge and experience identified in the following fields are needed to understand the technical merits of potential proposals that will be submitted to the National Authority. The PDD evaluator must have sufficient training or experience in the fields below to give a credible assessment of the PDD based on the National and International Criteria:

- Renewable energy technologies particularly those that are commercially ready. Examples are solar water heaters, photovoltaics, micro/minihydro, wind turbines, biomass technologies such as biogas, and alternative fuels or fuel substitutes such as cocodiesel and alcodiesel.
- Energy conservation and Energy Efficiency technologies such as, waste heat recovery, combustion efficiency add-ons, high efficiency burners, co-generation technology packages, demand side efficiency programs such as use of capacitor banks, variable flow control of airconditioning units, use of efficient lighting luminaries, use of suitable lighting reflectors and others.
- Forest Management, Agriculture and related fields of endeavor

3.0 Knowledge of Government Plans and Programs

The role of the National Authority in CDM Project Cycle shown in **Annex 3** is to determine if the CDM Project falls within the National Criteria. The National Criteria will require that the CDM Proposal be aligned to the government's Plans and Programs for sustainable development. It is therefore a MUST that the PDD Evaluator should be familiar with the Plans and Programs of the Government and should know who in the appropriate agency must be consulted for more details of specific plans/programs that are relevant to the PDD being reviewed.

4.0 Competency in reviewing the baseline of the PDD

One of the possible functions of the National Authority* is to promote CDM projects to investors and buyers of Certified Emissions Reductions (CERs) credits. After checking if the proposed project is within the National Criteria, the next task is to review the technical aspects of the PDD particularly the baseline and project assumptions. While it is the task of the Designated Operating Entity to validate related assumptions used, the National Authority reviewer must also be technically knowledgeable to determine the acceptability of the assumptions used in order to establish its credibility to the proponents. It must be emphasized, however, that the National Authority must aim to quickly pass on the PDD review to the DOE who shall do the detailed technical validation.

Key to discern the good projects from the bad is the ability to determine the acceptability of the assumptions used in establishing the PDD's Baseline. The review must look into hidden risks inherent in the assumptions and the range of uncertainties of the figures used in the parameters of the baseline. This competency can be acquired through training and guidance from an experienced practitioner. What can be imparted in training would be the standard methodologies used which are basically combustion equations, typical values of power plant efficiencies and heating values of different fuels. This may also include knowledge of Conventional Combustion Technologies such as boilers, furnaces, dryers, kilns, internal combustion engines and others.

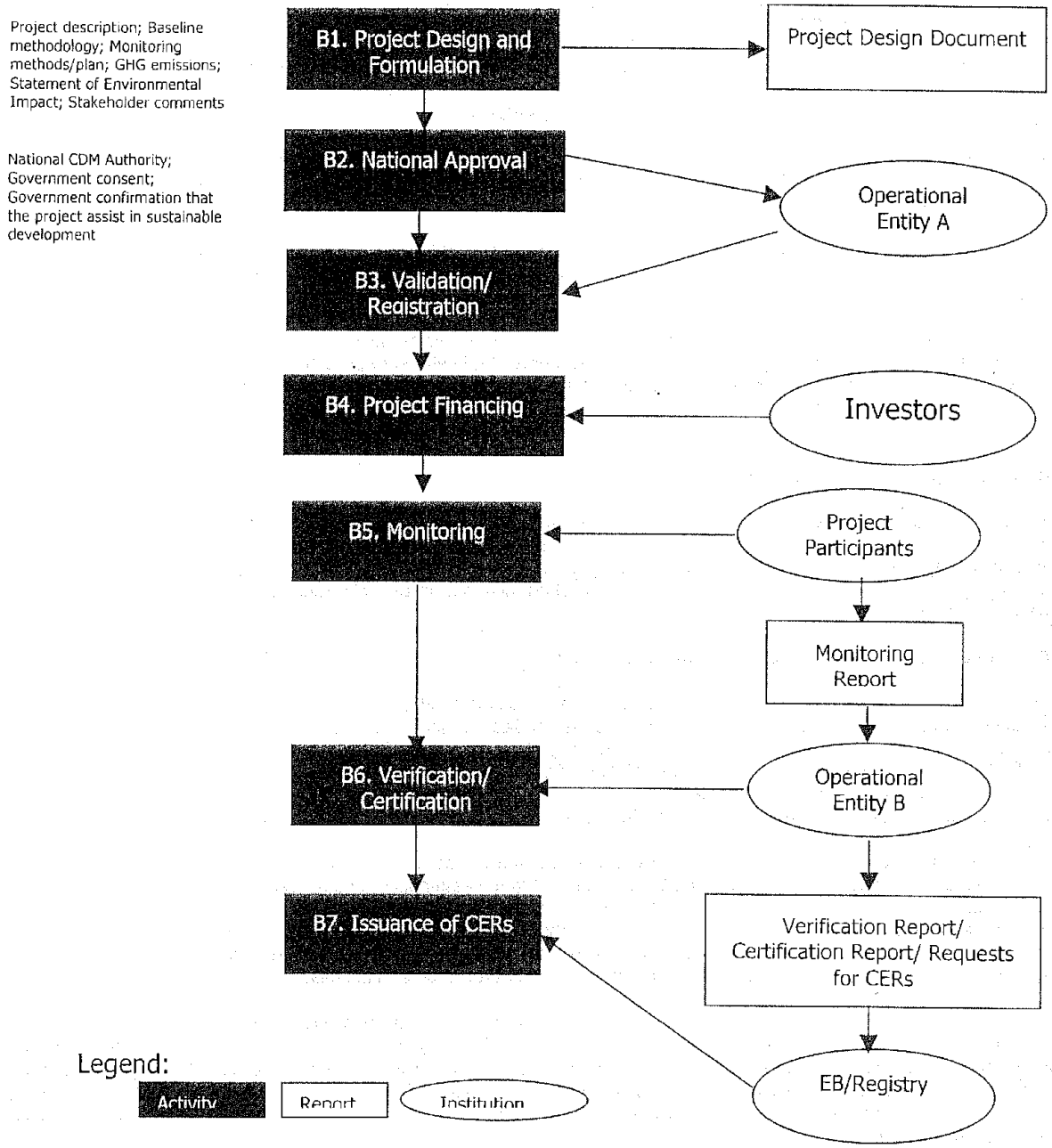
There are however, certain aspects of the competency requirement that cannot be acquired through training, such as defining the system boundary of the baseline, identifying leakages, and identifying key data sources that would clarify the boundary of the baseline and reduce the uncertainties of assumptions used in the baseline. These can only be acquired through actual practice and experience in developing the baseline from one project to another. These project characteristics are most of the time unique to the project by virtue of the technology, the local environment, the location, the local culture and practices, and the seasonality of certain baseline parameters, etc.

5.0 Competency in Project Feasibility Studies

The National Authority must have the capability to discern the feasibility of the proposed CDM Project considering the assumption that the project will remain viable throughout the crediting period during which the CERs will be sold. This capability will be based on competencies needed in making project feasibility studies. This will include among others financial/economic computations, sensitivity analysis, risk analysis, project management and management systems audit and other methodologies related to project design and feasibility analysis.

*Could be an entity outside the NA

ANNEX 3
CDM Project Cycle



The CDM project cycle shown on above has seven basic stages namely: project design and formulation, national approval, validation and registration, project finance, monitoring, verification/certification and issuance of CERs. The first four are performed prior to project implementation while the latter three are performed during the lifetime of the project.

B1 Project Identification and Formulation

The first step in the CDM project cycle is the identification and formulation of potential CDM projects. A CDM project must be real, measurable and additional. To establish additionality, the project emissions must be compared to the emissions of reasonable reference case, identified as the baseline. The baseline is established by the project participants according to approved methodologies on a project-specific basis. The baseline methodologies are being developed based on the three approaches in the Marrakech Accord:

- Existing actual or historical emissions;
- Emissions from a technology that represents an economically attractive investment; or,
- The average emissions of similar projects undertaken in the previous years under similar circumstances and whose performance is among the top 20% of their category.

CDM projects must also have a monitoring plan to collect accurate emission data. The monitoring plan, which constitutes the basis of future verification, should provide confidence that the emission reductions and other project objectives are being achieved and should be able to monitor the risks inherent to baseline and project emissions. The monitoring plan can be established either by the project developer, or by a specialized agent. The baseline and monitoring plan must be devised according to an approved methodology. If the project participants prefer a new methodology, it must be authorized and registered by the Executive Board. The project participants must choose whether the crediting period shall be 10 years or 7 years with a possibility to be renewed two times (a maximum of 21 years).

B2 National Approval

All countries wishing to participate in the CDM must designate a National CDM Authority to evaluate and approve the projects, and serve as point of contact. Although the international process has given general guidelines on baselines and additionality, each developing country has the responsibility to determine the national criteria for approval. Together with the investor, the host country must prepare a project design document with the following structure:

- General description of the project;
- Description of the baseline methodology;
- Timeline and crediting period;
- Monitoring methodology and plan; Calculation of GHG emissions by sources;
- Statement of environmental impacts;
- Stakeholder comments

The National Authority issues the necessary statements: that the government participates voluntarily in the project and confirms that the project activity assists the host country in achieving sustainable development.

Figure A3-1 below shows the process of reviewing the PDD to determine if it is within the national criteria.

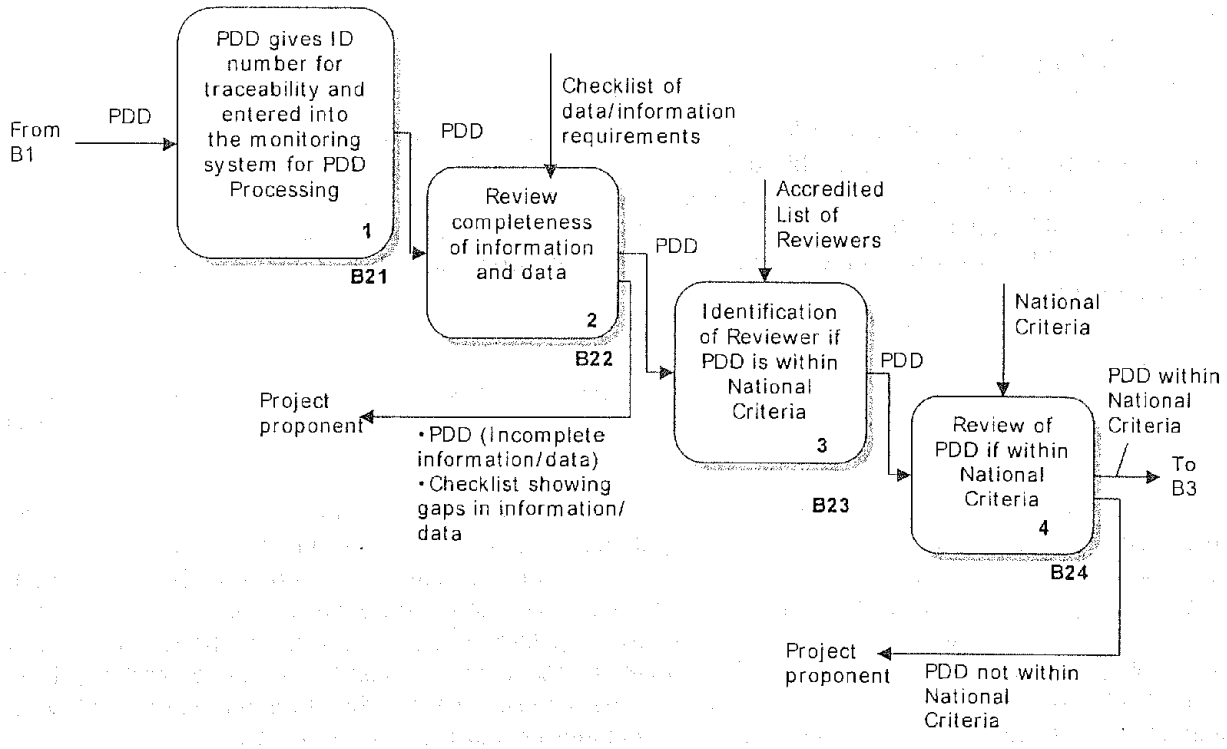


Figure A3-1. National Approval Process

Upon receipt of the Project Design Document the National Authority shall review the completeness of the data and information and the project's alignment with the national criteria. Any gaps in the information or data requirement will be identified and brought to the attention of the project proponent. A "Checkist of information and data requirements for PDD Applications" will aid the review. The accomplished checklist will be used to document the gaps in information and data needed to process further the PDD Application. The checklist, which will be given a unique identification number, will identify the person who made the review. This identification number will be used for tracking the status of the application. This system will facilitate providing responses to queries from project proponents on the status of their applications. The National Authority shall establish a monitoring system that will track the duration and status of processing of applications as a way to review the efficiency of application processing and a means to prevent unnecessary or unintended delays in processing.

For those applications that are complete in information and data requirements, the National Authority shall identify the "Reviewer" who will be responsible for determining if the application is within the National Criteria. The Reviewer shall be chosen only from an "Accredited List of Reviewers for the CDM National Criteria". Accredited Reviewers must undergo orientation and training on Clean Development Mechanism and the National Criteria for CDM. The National Authority shall define other Qualification Requirements relevant to establish a competent and independent review process. This may include educational attainment, job experiences in selected fields relevant to CDM technologies, background review of the candidate and others. The National Authority shall assure that the review process will be independent and impartial. This can be done by giving code numbers to the Reviewers so that the reviewer's name is not declared while still being able to trace the identity of the reviewer in the records and in the Application Monitoring System. A "Maximum Period for Review" shall be defined by the National Authority so as to control the processing time of applications. Reviewers who fail to meet the deadline shall be rated "unsatisfactory". This status shall be recorded in the "Accredited List of Reviewers for the CDM National Criteria". Reviewers with "unsatisfactory" ratings shall only be used when no other reviewer is available. Reviewers thrice rated "unsatisfactory" shall be delisted from the accredited list and shall be registered in the "List of Delisted Reviewers".

All applications submitted to the National Authority and their corresponding records of review (from the review of information and data requirements to the review against the National Criteria shall be open to the public. This can be done by through a website where the records can be accessed or through a physical archive where interested parties can visit and look through the file folders. Only the pending applications will be shown in the website. Those Applications that have been terminated or completed can be accessed upon request whether electronically or by mail. The "Application Monitoring Scheme" shall be in electronic form and shall be part of the website of the National Authority.

Those PDD Applications satisfying the National Criteria shall be registered in the "Register of Project Design Documents that Meet the National Criteria". This list shall also be a part of the website of the National Authority.

ANNEX 4

ACTIVITIES	Year 1			
	1Q	2Q	3Q	4Q
A1 Creation of the National Authority Consultations with stakeholders Selection of Preferred Option for NA (Legal) And Issuance of Legal Document				
A2 Formulation of the National CDM Operational Framework and the National Registry of GHG Emissions A21 National Authority's Management System Stakeholder consultations Review the Legal Framework				

United Nations Development Programme

Department of Environment and Natural Resources –
Environmental Management Bureau (DENR-EMB)

and

The Philippine Inter-Agency Committee on Climate Change (IACCC)

Establishment of the Clean Development Mechanism (CDM) National Authority, Operational Framework and Support Systems for the Philippines

Manila, PHILIPPINES

July 11, 2003
(Final Draft)

4. THE PROJECT

4.1 SCOPE OF THE PROJECT

The Project, "Establishment of the Clean Development Mechanism (CDM) National Authority, Operational Framework and Support Systems for the Philippines", seeks to create/establish the Philippine National Authority for CDM and establish the framework within which it shall operate.

Project Components

The Project shall cover two (2) specific areas, namely:

I. Establishment of the CDM National Authority
II. Development of the Operational Framework of the National Authority

I. Establishment of the CDM National Authority

The Kyoto Protocol requires non-Annex 1 country parties to designate a National Authority which shall endorse to the Executive Board, proposed CDM projects that support national sustainable goals. The legal document creating the National Authority will identify it as the entity responsible for overseeing the process of CDM implementation in the country, including the formal endorsements of CDM proposals to the CDM Executive Board. The output of this scope of work is a legal document defining what the National Authority is, identifying the institution designated as the National Authority, defining its functions and scope of authority. The most expedient path will be chosen. The possible legal options are discussed in greater detail in Section 4.6, "Project Approach and Strategies".

Parallel to the creation of the National Authority is the overarching need to push the ratification of the Kyoto Protocol. Presently, the "Instrument of Ratification" has been endorsed by the Department of Foreign Affairs to the Office of the President and is now with the Senate. This activity will follow through the process until the ratification is completed.

II. Development of the Operational Framework of the NA

The project shall set up an Operational Framework, which will include definition of the legal and administrative requirements and the prescribed systems and procedures for securing the NA endorsement, among others.

Securing the Certified Emissions Reduction (CER) certificate, which is equivalent to the amount of GHG emissions mitigated, requires a validation and monitoring scheme regulated by the Executive Board of the CDM. The validation scheme will require a Project Design Document (PDD) that provides objective evidence that there is indeed a valid GHG emission reduction resulting from the use of the clean technology, which would not happen without the benefit of CDM.

Whichever government agency will be designated as NA, the operational framework should already be worked out, ready for implementation once the Kyoto Protocol takes effect and the Philippines has ratified it.

4.2 PROJECT JUSTIFICATION

Participation in the Clean Development Mechanism requires a developing country to have in place an operational National Authority, which shall be the official entity to orchestrate the country's participation in CDM, following the criteria established in the Kyoto Protocol. Without the National Authority's approval and endorsement, no CDM project will happen in that country. Based on the outcome of COP7, the Marrakech Accord generated optimism that the Kyoto Protocol will enter into force anytime now. In view of this possibility, the country Parties including the Philippines, which have or are contemplating to ratify the Protocol, need to take immediate action to prepare for the required systems and procedures to allow them to participate in the CDM.

Viewing the CDM as an opportunity to achieve its investment targets for priority sectors like energy, this project is considered by the GoP as a high priority project because it will help put in place, the policy, technical and human infrastructure needed to make the mechanism operational in the Philippines.

4.3 Long Term Objectives

The projects over-all long term objective is the country's achievement of sustainable development goals through sustained economic growth anchored on a healthy and vibrant environment and the reduction of GHG, globally, resulting in the climate change mitigation. Its medium term objective is the alleviation of poverty by enhancing the capacity of certain sectors like energy, agriculture and forestry to increase their contribution to the country's economy through a mechanism like the CDM.

4.4 Immediate Objectives

The immediate objectives leading to the overall objective are the following:

1) Immediate Objective One: To secure the official designation of a national government entity (e.g. the IACCC) as the National Authority for CDM.
2) Immediate Objective Two: To formulate the CDM Operational Framework.

4.5 Project Beneficiaries

The ultimate beneficiary is the global community and the country's general public with greenhouse gases avoided or abated worldwide and the Philippines' sustainable development goal achieved through specific development projects.

The establishment of the CDM process starting with the designation of the National Authority will usher the entry of an emerging global industry spearheaded by the private sector that makes possible the transformation of an environmental concern (GhG mitigation) into investment opportunities in support of the country's sustainable development aspirations. The direct benefit to the national economy may be initially insignificant due to the limited size of business transactions that may result. However, it may be expected that in due time, for as long as the bureaucratic hurdles in the operation of the CDM process are minimized, potential investors will recognize the advantages and benefits of transacting CDM business in the Philippines, resulting to more investments coming in, in the future.

The first line beneficiaries will be the national government agencies who will be involved in implementing the CDM process in the Philippines, as well as, the industries/ private sector and other CDM project proponents who will be the recipients of additional capacity building, new technologies and project funding. The second line beneficiaries shall be the consuming public who are the intended users of the resulting products and services generated by the CDM process. The more competitively priced products and services will make them more affordable and accessible to a greater number of target users.

4.6 Project Strategy and Approach

The project will utilize a variety of strategies and approaches to achieve its objectives. Among these are the generation of the necessary policy and legal issuances to institutionalize the operationalization of the CDM in the Philippines. Another is the establishment/ designation of the required mechanisms (e.g. NA).

The National Authority is the focal point for all CDM-related transactions. By the nature of its operation, the NA shall interface with various stakeholders from the different agencies and sectors including among others those from the energy, agriculture, forestry, and industry sectors. The multi-sectoral coverage of the functions of the NA is an important characteristic that must be given priority consideration in its identification. To facilitate immediate establishment of a workable CDM process within the country, the project will work for the

immediate designation of a national government entity or network of entities, which will respond to the above concern of multisectoralism, drawing in broad multi-stakeholder support through continuous and extensive consultations.

An initial assessment of the competencies of member agencies and institutions of the IACCC versus the requirements of the National Authority given in **Table 1 (Annex 1)** and elaborated in **Table 2 (Annex 2)** was conducted, including consultations to validate the same.

5. PROJECT IMPLEMENTATION

The following are the activities that shall be carried out in establishing the National Authority for Clean Development Mechanism (CDM) and making it operational in the Philippines. Under each activity is a description of what shall be done.

A1 ESTABLISHMENT OF THE NATIONAL AUTHORITY

Immediate Objective A1: To secure the official designation of the appropriate governmental entity as the National Authority for CDM in the Philippines.

Output A1. A Legal Issuance Designating the National Authority for the CDM process in the Philippines.

Notwithstanding the route to be selected based on the further consultations to be undertaken under the project, the projected output under this objective is a Legal Document (e.g. Legal Opinion from the Office of the President stating that the present mandate of the selected entity (e.g. IACCC as stipulated in AO No. 220) extends to cover the functions of the National Authority; or, as necessary, an amendment to the the current legalissuance governing the functioning of that authority, explicitly stating that the mandate of that entity shall be extended to cover the functions and responsibilities of the National Authority or simply a memorandum order from the President designating the NA).

Activity A1.1 Through further consultations with the stakeholders, primarily the IACCC, and legal advice of experts, the preferred legal option for the NA designation will be selected.
There are three possible options in securing the official designation of the most appropriate government entity (e.g.. the IACCC) as the CDM National Authority. One is a legal opinion from the Office of the President on the extent of coverage of the existing mandate of the contemplated entity (The second is a revision of the Administexisting legal issuance governing the functions of the selected entity to specifically cover the discharge of the additional functions as NA. The third involves the mere issuance of the President of a Memorandum Order to the designated NA for this additional task.

The project will then work through the formal mechanisms and concerned institutions to have the needed legal document issued during the initial phase of the project.

The appropriate and necessary organizational structure to implement the issuance will then be drawn up and institutionalization of the same effected.

A2 DEVELOPMENT OF THE NATIONAL CDM OPERATIONAL FRAMEWORK

Immediate Objective A2: To enable the optimum and efficient functioning of the NA through the provision of a clear National CDM Operational Framework .

Output A2.1. National Authority's Management System

Activity A2.1.1. Review past studies and available literature on the existing policies, legal and administrative requirements governing the entry of new projects/investments, identifying gaps and

constraints and providing recommendations to address these, to facilitate entry and implementation of CDM projects.

Activity A2.1.2. Craft new/supplementary policies and legal issuances to address the identified gaps and constraints for the optimum functioning of the CDM process in the Philippines.

Activity A2.1.3. Adopt national sustainable development criteria and indicators for use in the CDM assessment process.

Activity A2.1.4. Develop Systems and Procedures, with clear accountabilities and timeframes within the NA system, to implement CDM efficiently and optimally. A business "process map" may be drawn up to determine the optimal operating system for the NA. **Annex 3** depicts the CDM Project Cycle which could be the starting basis for the NA business map.

Activity A2.1.5. Develop protocols and supplementary tools to implement the systems and procedures.

Activity A2.1.6. Develop the documentary requirements of the NA to enable it to assess the CDM proposal and issue the necessary endorsement to the CDM Executive Board.

Activity A2.1.7. Pilot test the designed management system.

Activity A2.1.8. Prepare and issue the necessary legal and administrative issuances to operationalize the management system.

The Project Implementation Work Plan showing the timetable for the implementation of the above activities is given in ***Annex 4.***

6. PROJECT ORGANIZATION AND MANAGEMENT

The Department of Environment and Natural Resources (DENR), through the Environmental Management Bureau that serves as Secretariat to the IACCC, will be the executing agency and shall be responsible for the overall management of the project on a day-to-day basis. The IACCC Secretariat shall designate a Project Manager, two (2) regular technical staff and one (1) administrative staff of EMB to assist in the project implementation on a part time basis. These personnel shall serve as the government counterpart staff to the project. The IACCC Secretariat will ensure proper coordination and liaison between the Project and the UNDP, the Netherlands government and other national government departments and agencies and non-governmental institutions with which cooperation is needed for the efficient and successful operation and implementation of the project. Likewise, UNDP shall provide overall management and technical advice to the project.

To ensure continuity of the project implementation and provision of full-time staff, the project will hire one (1) Project Coordinator who shall be tasked to coordinate the activities of the project staff and consultants, one (1) technical assistant, and one (1) finance officer. The staff to be hired shall form part of a Project Management Office (PMO) directly under the guidance of the Project Manager-IACCC Secretariat (EMB). Various sub-contracts are likewise organised. These would require the services of consulting firms/consultants to undertake specific tasks. The services of expatriate consultants may be required since there is limited local experience in this new field, at present. The Terms of Reference (TOR) of each of the project staff and sub-contract is given as ***Annex 5.***

An organizational chart showing the overall project organization and management is presented as ***Annex 6.***

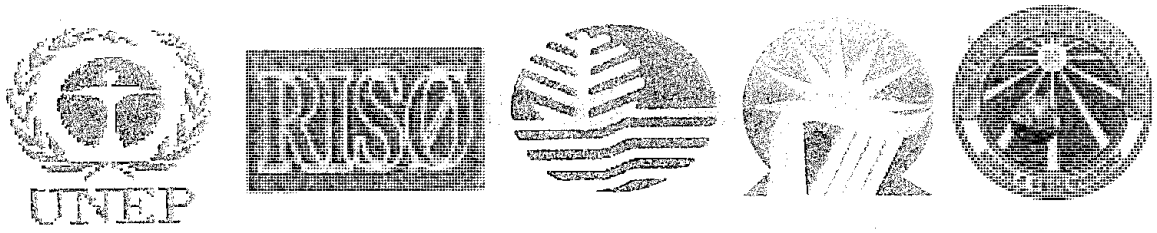
資料 3　現地収集資料

(6) Capacity Development for the Clean Development Mechanism (CDM) in the Philippines

Work Plan (2003-2005)

CCIC 提供

FINAL VERSION
(April 2003)



CD4CDM – Philippines

CAPACITY DEVELOPMENT
for the
CLEAN DEVELOPMENT MECHANISM (CDM)
in the
PHILIPPINES

WORK PLAN

(2003- 2005)

UNEP Collaborating Centre on Energy and Environment
Risø National Laboratory
Philippine Inter-Agency Committee on Climate Change
Climate Change Information Center (Philippines)
Manila Observatory

February 2003

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CAPACITY DEVELOPMENT for the CLEAN DEVELOPMENT MECHANISM in the PHILIPPINES

WORK PLAN (2003-2005)

1. Background and Context

Financially supported by the Dutch Government, the United Nations Environment Programme has launched the project Capacity Development for the Clean Development Mechanism. The UNEP Collaborating Centre on Energy and Environment (UCCEE), at the Risø National Laboratory, Denmark is the supporting organization contracted by UNEP to implement the project.

The project will help to establish greenhouse gas (GHG) emission reduction projects that are consistent with sustainable development goals, particularly projects in the energy sector. It will develop national capabilities so that persons in the countries are at the project's conclusion capable of analyzing the technical and financial merits of projects and negotiating possible finance agreements with Annex I (developed) countries or investors.

The project aims at 1) generating in participating developing countries a broad understanding of the opportunities offered by the Clean Development Mechanism (CDM), and 2) developing the necessary institutional and human capabilities that allow them to formulate and implement projects under the CDM.

Twelve countries have been selected to participate in the project. Cambodia, Vietnam and the Philippines are Asian countries participating in the project.

In the Philippines, the project is being implemented by the Inter-Agency Committee on Climate Change (IACCC), which is the focal point for climate change in the country. UCCEE has contracted the Climate Change Information Center, Manila Observatory (CCIC-MO), Ateneo de Manila University to assist the IACCC in carrying out the project and to conduct the day-to-day implementation of the project.

The project preparation phase was conducted from September to December 2002. The main output of this phase is a **Work Plan** for Capacity Development for the CDM in the Philippines. This multi-year Work Plan covering 2003-2005 is the blueprint for the activities that will be conducted under this project.

CCIC-MO is responsible for drafting this Work Plan. The Work Plan is a consolidation of elements gathered through research, data gathering, interviews, consultations, meetings, seminars and conferences.

A draft Work Plan was presented as the principal document for discussion and comment at a National Workshop held from 9th to 11th December 2002. This draft was revised taking into account the comments and suggestions made during the National Workshop.

2. Tasks of Capacity Development

The Work Plan aims to carry out the following tasks of Capacity Development for CDM in the Philippines arranged under five broad categories.

1 Conduct information campaign and awareness raising.
2 Strengthen the capacity of policy-makers
  2.1 Generate the interest and support of senior national policy-makers
  2.2 Develop the capacity of mid-level policy-makers
3 Establish the institutional framework for the CDM
  3.1 Establish the CDM National Authority
  3.2 Develop the capacity of the CDM National Authority
4 Strengthen the capacity of private and public sector players
  4.1 Develop the capacity of project developers
  4.2 Develop the capacity of project financiers
  4.3 Develop the capacity of NGOs, Local Communities, National Research Institutions, and Academe
5 Create a pipeline of CDM projects
  5.1 Establish a CDM promotions office
  5.2 Facilitate the development of CDM-Eligible Projects

For each of these tasks, an objective is defined, an indicator is formulated, expected outputs are stated.

For each output, a list of activities that will produce this output is presented.

For each activity, the purpose, target beneficiaries, responsible entities and timeline are outlined.

TASK 1 CONDUCT INFORMATION CAMPAIGN AND AWARENESS RAISING

Objective
Sensitize relevant stakeholders on the benefits of CDM and encourage their participation in the CDM.

Indicator
Agreement by relevant stakeholders to participate in a CDM capacity building program.

Output: Multi-year program of various activities which provides information and raise awareness of the different stakeholders regarding the benefits of CDM and of the ways by which they can participate.

For Year 2003, the following information materials will be prepared:

a. 2 Brochures: One on the CD4CDM Project in the Philippines and another on the program and schedule of seminars/workshops that will be offered in 2003
b. 1 Primer: Questions and Answers on CDM in the Philippines with glossary
c. 1 Booklet: Introduction to the CDM (published by UNEP) supplemented with information relevant to the Philippines.

Information materials for the subsequent years, 2004 & 2005 will be specifically planned for towards the end of the previous year.

For Year 2003, five (4) public briefings or roundtable discussions will be conducted, with at least one (1) each in Metro Manila, Luzon, Visayas and Mindanao. The briefing and discussion will focus on "**Introduction to CDM**" covering the following topics:

a. Climate Change: Science and Impacts
b. UNFCCC and the Kyoto Protocol
c. Overview of the CDM – Players, Benefits and Costs
d. Overview of the CDM Project Cycle

Public briefings and roundtable discussions for the subsequent years, 2004 and 2005 will be specifically planned for towards the end of the previous year.

Activities:

1.1 Identify relevant stakeholders.
1.2 Formulate a strategy for awareness–raising
1.3 Prepare information materials (e.g., primers, brochures, general guidebooks).
1.4 Identify priority areas for public briefings and consultations (at national and regional levels).
1.5 Conduct public briefings or roundtable discussions.
1.6 Prepare an illustrative set of example CDM projects that clearly demonstrate the national value and benefits associated with CDM projects.
1.7 Develop and maintain a CDM website.
1.8 Write feature articles on CDM for national newspapers and magazines. Issue press releases on CDM projects.

TASK 2 STRENGTHENING THE CAPACITY OF POLICY MAKERS

Task 2.1 GENERATE THE INTEREST AND SUPPORT OF SENIOR NATIONAL POLICY- MAKERS

Objective
Sensitize senior level policy makers on the benefits of CDM and generate their support.

Indicator
Emergence of CDM Champions; senior level government officials (e.g. cabinet secretaries, undersecretaries, bureau directors) who support CDM in general and a CDM capacity building program in particular.

Output 2.1.1: Documentation that helps demonstrate the national value and benefits of participation in the CDM and the procedures involved.

Activities:

2.1.1.1 Prepare a briefing kit for senior level government officials on the CDM (using materials prepared in Task 1.3, 1.4 and 1.5).

2.1.1.2 Prepare an executive summary of the CDM Project Cycle.

Output 2.1.2: Senior level government officials who are aware of the benefits of CDM for the Philippines and the CDM Project Cycle.

Activities:

2.1.2.1 Conduct executive briefings with senior policy-makers on the opportunities and challenges of CDM in the Philippines.

2.1.2.2 Solicit the concurrence of senior policy-makers for their departmental staff to participate in a CDM capacity development program.

2.1.2.3 Conduct action planning with senior policy-makers on steps they can take to make CDM viable and successful in the Philippines (e.g. ratification of the Kyoto Protocol, assignment of key departmental staff to specialize in CDM, creation of CDM National Authority, etc.).

For the Year 2003, at least three (3) executive briefings on CDM will be conducted. Target audience for these executive briefings would be the senior officials of the following entities: Cabinet Investment Coordinating Committee, Department of Trade and Industry, Land Bank of the Philippines, Department of Environment and Natural Resources. National Economic and Development Authority, and Department of Foreign Affairs.

Executive briefings for the subsequent years, 2004 & 2005 will be specifically planned for towards the end of the previous year.

Task 2.2 DEVELOP THE CAPACITY OF MID-LEVEL POLICY-MAKERS

Objective
Develop the capacity among mid-level policy makers to formulate a regulatory framework to deal with the regulatory, legal, financial and technical issues that are unique to CDM projects.

Indicator
Existence of a trained cadre of mid-level policy makers and government representatives who are available to support the CDM framework.

Output:Government policy makers in key departments and agencies with the requisite skills and capabilities to formulate regulatory and legal frameworks needed for operationalizing the CDM at the national level.

Activities:

2.2.1 Define capacity needs of key government departments and agencies with regard to the formulation of the regulatory and legal framework for operationalizing the CDM at the national level.

2.2.2 Carry out capacity assessments and identify and inventory capacity needs within key government departments and agencies.

2.2.3 Develop training materials that relate to the capacity needs and necessary regulatory and legal requirements for establishing an operational CDM at the national level.

2.2.4 Conduct training workshops that make it possible for government policy makers to formulate the regulatory and legal policies necessary for operationalizing the CDM at the national level.

Task 2.2 will be carried out by a separate and specific project sponsored by the United Nations Development Program (UNDP) funded by the Dutch Government and conducted by the Philippine Inter-Agency Committee for Climate Change.

Details of how Task 2.2 will be carried out are found in the work plan for this specific project.

The UNEP Project needs to be coordinated closely with the UNDP Project so as to avoid overlaps and maximize the synergies between the two projects.

TASK 3 ESTABLISH INSTITUTIONAL FRAMEWORK FOR THE CDM

Task 3.1 ESTABLISH THE CDM NATIONAL AUTHORITY

Task 3.1 will be carried out by a separate and specific project sponsored by the United Nations Development Program (UNDP) funded by the Dutch Government and conducted by the Philippine Inter-Agency Committee for Climate Change.

Details of how this task will be carried out are found in the work plan for this specific project.

The UNEP Project needs to be coordinated closely with the UNDP Project so as to avoid overlaps and maximize the synergies between the two projects.

The UNEP Project should fill the capacity building gaps of the UNDP Project.

Task 3.2 DEVELOP THE CAPACITY OF THE CDM NATIONAL AUTHORITY

Objective
Support the establishment of a national and institutional framework to identify, assess, validate, and implement CDM projects; that also facilitates subsequent project monitoring, verification and certification.

Indicators
Adoption of regulatory, legal, financial, and technical guidelines for defining baselines, determining project additional and assessing CDM projects; baseline parameters. Existence of a functioning CDM National Authority that helps identify, develop and approve eligible CDM projects and that is capable of assessing proposed CDM projects against established international guidelines for approving CDM projects.

Output 3.2.1: Clearly defined national procedures [regulatory, legal, financial and technical guidelines that will govern the development, validation, implementation, monitoring, verification and certification of] for CDM project activities.

Activities:

3.2.1.1 Study guidelines developed by other National Authorities and CDM-EB

3.2.1.2 Develop with the CDM National Authority specific regulatory, legal, financial and technical guidelines that can be applied to the key activities in the CDM project cycle.

3.2.1.3 Present, discuss and amend the guidelines through consultative national and regional workshops that bring the key stakeholders and CDM project proponents.

3.2.1.4 Prepare and issue the operational guidelines for proposed CDM projects that apply at the national level.

Output 3.2.2: Clearly defined baseline parameters for CDM projects.

Activities:

3.2.2.1 Work with the CDM National Authority to develop guidelines for defining and projecting national, sectoral, and project baseline parameters in a manner that is consistent with the decisions of the parties to UNFCCC and Kyoto Protocol and the CDM Executive Board on determining "additionality" and baselines.

3.2.2.2 Study guidelines and other documents prepared in other countries on baseline parameters.

3.2.2.3 Identify where country specific approach is required, analyze alternative approaches, prepare the guidelines and present in a workshop to the different stakeholders to generate concurrence with CDM stakeholders on the baseline parameters to be used.

Outputs 3.2.1 and 3.2.2 will be produced by a separate and specific project sponsored by the United Nations Development Program (UNDP) funded by the Dutch Government and conducted by the Philippine Inter-Agency Committee for Climate Change.

Details of how these outputs will be produced are found in the work plan for this specific project.

Output 3.2.3: Operational CDM National Authority that is responsible for the evaluation and approval of CDM projects and tracking the subsequent monitoring, verification, and certification of resulting emission reductions.

Activities:

3.2.3.1 Develop capacity within the CDM National Authority for: 1) approving CDM projects, 2) development of procedures for dealing with cases by the National Authority in a transparent manner, 3) information management of the National Authority and 4) tracking subsequent project support activities (monitoring, verification, and certification of resulting emission reductions) through the following:

- 3.2.3.1.1 Identification of the capacity needs of the National Authority.
- 3.2.3.1.2 Preparation of a set of strategies to address the identified needs.
- 3.2.3.1.3 Preparation of training materials to address the needs.
- 3.2.3.1.4 Training workshops and seminars for the National Authority personnel.

3.2.3.2 Periodically review the operation of the CDM National Authority and identify areas for strengthening of capacity through specific training.

3.2.3.3 Assist the CDM National Authority in developing a fee for service structure that ultimately allows these entities to be financially sustainable.

3.2.3.4 Design and carry out periodic national workshops and participate in Asian regional training workshops that allow members of national CDM entities to share their respective experiences and lessons learnt as well as to build their knowledge base and capacity and improve their operational roles.

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TASK 4 STRENGTHEN THE CAPACITY OF PUBLIC AND PRIVATE SECTOR PLAYERS

For Year 2003, seven (7) training workshops will be conducted to build the capacity of public and private sector players. These workshops will be offered to project developers, project financiers, NGOs, academe, local community organizations and government officials interested in CDM. One (1) workshop will be conducted for each of the following topics:

1. **CDM Project Design Document**
2. **GHG Emissions Reductions Calculations**
3. **Baselines and Monitoring Plans**
4. **Sustainable Development Indicators**
5. **Financial Mechanisms for CDM**
6. **Small-scale CDM Projects**
7. **Technology Needs Assessment**

Once the CDM National Authority has promulgated the guidelines and procedures for CDM in the Philippines, four (4) seminars will be conducted on the "**Legal and Regulatory Framework for CDM**". The workshops will be conducted in Metro Manila, Luzon, Visayas, and Mindanao.

Training workshops for the subsequent years, 2004 and 2005 will be specifically planned for towards the end of the previous year.

Possible topics to be covered in the subsequent years, 2004 and 2005 could include:

1. Project Negotiation Skills
2. Uncertainty and Risk Analysis
3. Data Acquisition and Knowledge Banking

Task 4.1 DEVELOP THE CAPACITY OF PROJECT DEVELOPERS

Objective
Strengthen the capabilities of public and private sector, big and small scale project developers to identify, formulate, develop and implement CDM projects.

Indicator
Existence of public and private sector, big and small scale project developers who are committed to the process of identifying, developing and implementing CDM eligible projects; existence of CDM project developers/brokers at the national level.

Output: Better information about existing skills and specific needs of CDM project developers; high quality training materials for improving skills/capabilities on a variety of CDM topics; and developers whose capabilities are strengthened by participating in workshops.

Activities:
4.1.1 Conduct public briefings on sustainable development goals of the Philippines.
4.1.2 Develop a manual on the required CDM Project Design Document.
4.1.3 Conduct a series of training workshops on CDM-related topics such as:
   1) CDM Project Design Document
   2) GHG Emissions Reductions Calculations
   3) Baselines and Monitoring Plans
   4) Sustainable Development Indicators
   5) Financial Mechanisms for CDM
   6) Small-scale CDM Projects
   7) Technology Needs Assessment
4.1.4 Develop a manual on detailed procedures in meeting CDM-related requirements of the Philippine government.
4.1.5 Conduct seminars on regulatory and policy framework and legal issues confronting CDM-eligible projects.
4.1.6 Maintain a registry of big and small scale project developers.
4.1.7 Conduct workshops on enhancing the participation of local communities in CDM projects.

Task 4.2 DEVELOP THE CAPACITY OF PROJECT FINANCIERS

Objective
Strengthen the capabilities of the financial sector to identify and provide financing for CDM projects.

Indicators
Existence of players from private and public financial institutions who are committed to the process of identifying and financing CDM eligible projects; an active market for CDM projects and their resulting emission credits; existence of CDM project financial brokers.

Output 4.2: Better information about existing skills and understanding and specific needs regarding the CDM in financial institutions, high quality training materials for improving skills/capabilities on a variety of CDM topics tailored to financial decision-makers; and finance sector individuals whose capabilities are strengthened by participating in workshops.

Activities:

4.2.1 Prepare papers on financing issues, policies, mechanisms (e.g. carbon funds, carbon risk funds, etc.) and instruments for CDM projects.

4.2.2 Conduct a series of training workshops on CDM-related topics such as:

1) **CDM Project Design Document**
2) **GHG Emissions Reductions Calculations**
3) **Baselines and Monitoring Plans**
4) **Sustainable Development Indicators**
5) **Financial Mechanisms for CDM**
6) **Small-scale CDM Projects**
7) **Technology Needs Assessment**

4.2.3 Conduct seminars on regulatory and policy framework and legal issues confronting CDM-eligible projects.

4.2.4 Organize and conduct forums on range of funding sources for CDM-eligible projects.

Task 4.3 DEVELOP THE CAPACITY OF NGOs, LOCAL COMMUNITIES, NATIONAL RESEARCH INSTITUTIONS AND ACADEME

Objective
Strengthen the capabilities of non-governmental organizations, local communities, academe, and national research institutions to identify, formulate, develop and implement CDM projects.

Indicator
Existence of players from NGOs, local communities, academe, and national research institutions who are committed to provide assistance and facilitation of the process of identifying, developing and implementing CDM eligible projects

Output 4.3: Better information about existing skills and specific needs for CDM of NGOs, local communities, academe, and national research institutions; high quality training materials for improving skills/capabilities on a variety of CDM topics; and individuals from the NGOs, local communities, academe and national research institutions whose capabilities are strengthened by participating in workshops.

Activities:

4.3.1 Prepare a paper on the role of NGOs, local communities, academe and national research institutions in the CDM process.

4.3.2 Conduct a series of training workshops on CDM-related topics such as:

1) **CDM Project Design Document**
2) **GHG Emissions Reductions Calculations**
3) **Baselines and Monitoring Plans**
4) **Sustainable Development Indicators**
5) **Financial Mechanisms for CDM**
6) **Small-scale CDM Projects**
7) **Technology Needs Assessment**

4.3.3 Conduct seminars on regulatory and policy framework and legal issues confronting CDM-eligible projects.

4.3.4 Organize a national exhibit and forum on clean technologies in the Philippines.

4.3.5 Conduct workshops on enhancing capabilities of NGOs and local community organizations for promoting cleaner technologies in their localities.

4.3.6 Assist in consultations with local communities for CDM projects in different localities.

TASK 5 CREATE A PIPELINE OF CDM PROJECTS

Task 5.1 ESTABLISH A CDM PROMOTIONS OFFICE

Objective
Establish an office that will promote CDM projects.

Indicator
Existence of a functioning CDM promotions office that encourages the development of CDM projects; that serves as a link among the public, private, and the financial sectors in the development and financing of CDM projects; that links project developers and CDM investors from Annex I countries.

Output 5.1: A CDM promotions office established to promote CDM projects in the Philippines.

Activities:
5.1.1 For the duration of the CD4CDM project (2003-2005), CCIC will serve as a promotions office for CDM Projects
5.1.2 Identify an appropriate agency which can serve as a CDM promotions office after 2005. Help prepare terms of reference and determine the organizational structure for this office.

Output 5.2: A multi-year program of promotion activities for CDM projects.

Activities:
5.2.1 Identify primary and secondary target markets (local or foreign investors; private or government institutions; CER brokers).
5.2.2 Prepare promotional materials
5.2.3 Develop a CDM Investment Guide in the Philippines.
5.2.4 Organize a CDM market forum for local investors and project developers (including Visayas and Mindanao).
5.2.5 Organize a CDM market forum for foreign investors and project developers.
5.2.6 Facilitate the participation of project developers and investors in Asian and international CDM market forums and in promoting the Philippine portfolio of CDM eligible project in such forums.
5.2.7 Provide consultancy services on pre-feasibility studies and research on specific investment prospects; and aligning such prospects with investor's plans and profile.

Task 5.2 FACILITATE THE DEVELOPMENT OF CDM-ELIGIBLE PROJECTS

Objective
Facilitate the development of a pipeline of CDM eligible projects that are attractive to potential CDM investors and that are approved by the CDM National Authority.

Indicators
List of CDM eligible projects that have been validated and approved; number of investments made in CDM projects.

Output 5.2.1: Published national portfolios of validated CDM eligible projects.

Activities:

5.2.1.1 Provide initial technical assistance to proponents so they can identify, develop, and validate CDM eligible projects.

5.2.1.2 Provide assistance to project developers in preparing Project Design Documents for specific projects.

5.2.1.3 Help project developers identify and secure financial resources necessary to develop proposals for CDM projects.

Output 5.2.2 Investments in CDM eligible projects.

Activities:

5.2.2.1 For financially sound projects, conduct investment promotion visits to Annex I countries that have stated an interest in investing in CDM projects.

Output 5.2.3: National public and private sector financial institutions with international counterparts support potential CDM projects.

Activities:

5.2.3.1 Organize and conduct national CDM investment promotion seminars in which international parties interested in the development, financing and brokering of CDM projects are introduced to national CDM project opportunities and counterpart project developers and bankers.

3. National and Regional Workshops

The national workshops aim to bring together various CDM stakeholders in order to develop and reinforce collaborative partnerships; and to provide a venue for the exchange of ideas, information and experiences on CDM implementation in the Philippines, in particular and CDM developments, in general.

The regional workshops aim to establish cross-country links between the different national project teams. These workshops provide a venue for the exchange of ideas among the different participating countries so that they can learn from the experiences of each country and effectively build synergies from the activities conducted in the national levels.

For year 2003, two (2) national workshops will be conducted in the Philippines for the CD4CDM project. The Philippine project team will also participate in the various regional workshops convened by the UNEP-UCCEE for the CD4CDM project.

The first national workshop specifically aims to present an inception report on the activities to be conducted or are being conducted for the CD4CDM project in the Philippines. The 2nd national workshop which will be held at the end of the year, aims to present, discuss and evaluate the activities done for 2003 and present future plans for the CD4CDM project implementation in the Philippines.

The national team will then present the results of these national workshops as well as discuss the activities done for the Philippines in the regional workshops to be held on June, 2003 in Vietnam and January, 2004 in Cambodia respectively.

4. Implementation of the Work Plan

The Implementation of the Project Work Plan will be supported by the **UNEP Collaborating Centre on Energy and Environment (UCCEE)**, Risø National Laboratory, Denmark.

In Asia, project implementation will be assisted by the **Asian Institute of Technology (AIT)**, Thailand, contracted as a regional centre of excellence. AIT will act on UCCEE's behalf to assist the three Asian participating countries (Cambodia, Vietnam, Philippines) in implementing the various components of the capacity development project.

The government agency formally responsible for implementing the project in the Philippines is the **Inter-Agency Committee on Climate Change (IACCC)**. The IACCC is composed of representatives from: Department of Environment and Natural Resources, Philippine Atmospheric, Geophysical and Astronomical Services Division, Department of Energy, Department of Foreign Affairs, Department of Trade – Board of Investments, Department of Transport and Communications, National Economic Development Authority, Department of Public Works and Highways, Philippine Network on Climate Change, Institute of Climate, Energy and Environment, Greenpeace International, and Manila Observatory.

Climate Change Information Center – Manila Observatory (CCIC-MO), Ateneo de Manila University is the institution in the Philippines contracted by UCCEE to assist the IACCC in carrying out the project. The day-to-day implementation of the Work Plan will be the responsibility of CCIC-MO as defined by a contract and scope of work with UCCEE and under terms of a Memorandum of Understanding with IACCC.

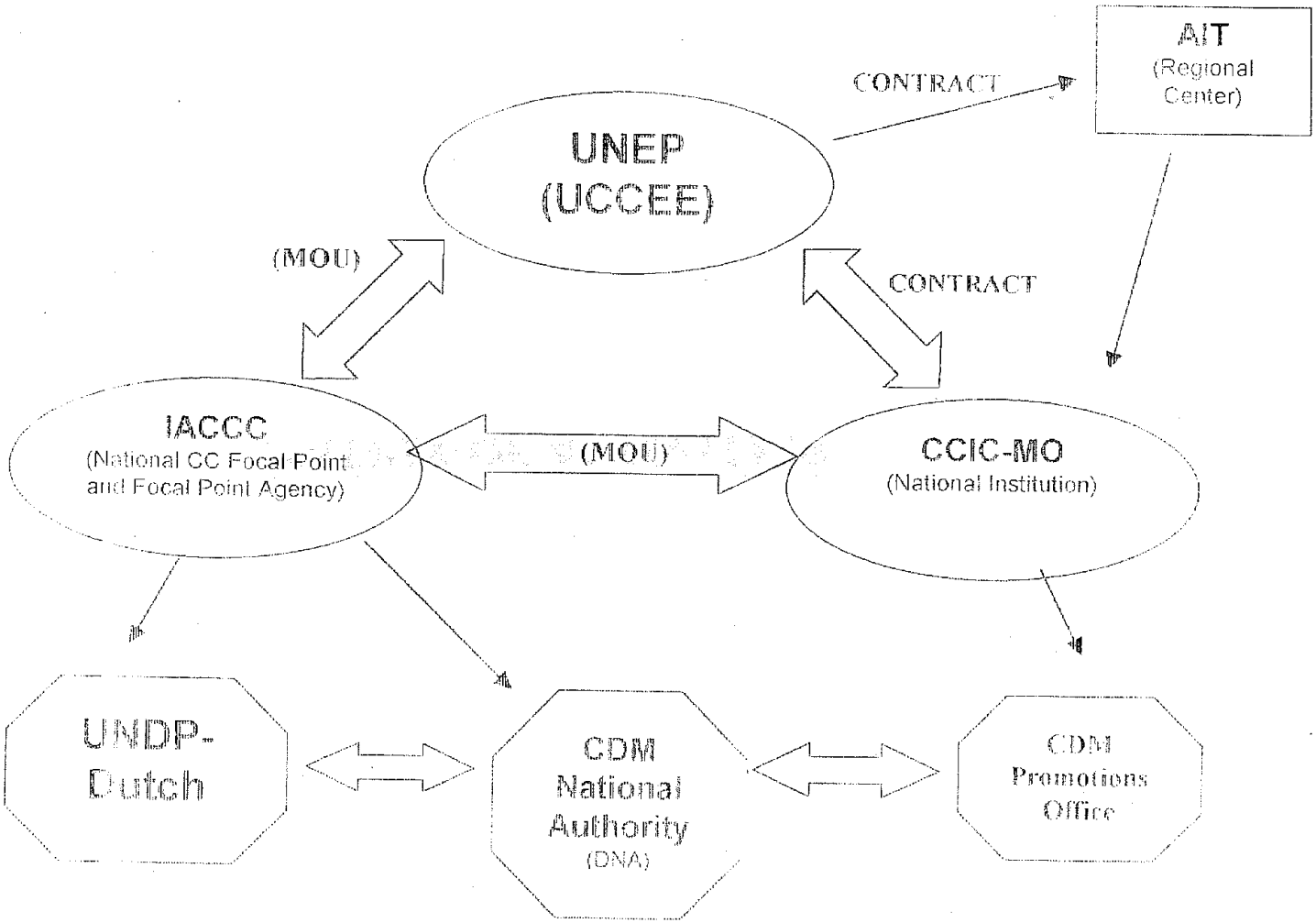
Relationship between institutions in the project

UCCEE
UNEP Collaborating Centre on Energy and Environment

AIT – Asian Institute of Technology

IACCC
Inter-Agency Committee on Climate Change

CCIC-MO
Climate Change Information Center-Manila Observatory



MATRIX OF ACTIVITIES

Task 1: Conduct Information Campaign and Awareness Raising				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
1.1	Identify relevant stakeholders	To design specific information materials and consultation forum		IACCC & CCIC
1.2	Formulate a strategy for awareness- raising	To design a strategy for awareness raising tailor fitted to the different stakeholders in the country	Identified stakeholders	CCIC
1.3	Prepare information materials (e.g. primers, brochures, general guidebooks)	To disseminate information regarding CDM; To serve as a guide for stakeholders wanting to participate in CDM	Community leaders, project proponents, project developers, investors, general public	CCIC
1.4	Identify priority areas for public briefings and consultations (at national and regional levels)	To identify areas with great potential for CDM projects; with interest in CDM projects	Local stakeholders, community leaders, local investors, NGOs, LGUs	IACCC & CCIC
1.5	Conduct public briefings, roundtable discussions	To bring CDM issues and concerns into focus	Policy and decision makers; private institutions; community leaders; project developers; financial institutions, investors, general public, NGOs, concerned government agencies	IACCC & CCIC

Task 1: Conduct Information Campaign and Awareness Raising				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
1.6	Prepare an illustrative set of example CDM projects that clearly demonstrate the national value and benefits associated with CDM projects	To gather a set of "best practices" from co-participators, both on the regional and international scale, in the CDM and determine significant points for replication into the local context.	Senior and mid-level policy makers; potential investors and proponents	CCIC
1.7	Develop and maintain a CDM website	For easier access to information and communication	Local, regional and international stakeholders	CCIC
1.8	Write feature articles on CDM for national newspapers and magazines. Issue press releases on CDM projects	To raise public awareness and attract potential investors	General public; potential investors and proponents	CCIC

Task 2.1: Generate the Interest and Support of Senior National Policy-Makers				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
2.1.1.1	Prepare a briefing kit for senior level government officials on the CDM	To devise a set of program and structure for sensitizing senior level policy makers on the benefits of CDM; To provide relevant information on the national values and benefits of CDM in the Philippines that will generate the interest of senior national policy makers to participate in the CDM	Senior national policy makers	CCIC
2.1.1.2	Prepare an executive summary of the CDM Project Cycle	To provide relevant information on the CDM project cycle in order for senior level policy makers to have a thorough understanding of the CDM process	Senior national policy makers	CCIC
2.1.2.1	Conduct executive briefings with senior policy-makers on the opportunities and challenges of CDM in the Philippines	To provide senior level policy makers basic and essential information on the values and benefits of CDM, the CDM project cycle and opportunities and challenges brought about by Philippine participation in the CDM	Senior national policy makers	IACCC & CCIC

Task 2.1: Generate the Interest and Support of Senior National Policy–Makers				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
2.1.2.2	Solicit the concurrence of senior level policy-makers for their departmental staff to participate in a CDM capacity development program	To manifest the support of senior level policy-makers in the CDM process through their concurrence in allowing and supporting key staff of their offices to participate in a CDM capacity development program	Senior national policy makers	IACCC & CCIC
2.1.2.3	Conduct action planning with senior policy-makers on steps they can take to make CDM viable and successful in the Philippines (e.g. ratification of the Kyoto Protocol, assignment of key departmental staff to specialize in CDM, creation of CDM National Authority, etc.)	To generate the support and active participation of senior level policy-makers in making CDM viable and successful in the Philippines	Senior national policy-makers	IACCC & CCIC

Task 2.2: Develop the Capacity of Mid-Level Policy Makers				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
2.2.1	Define capacity needs of key government departments and agencies with regard to the formulation of the regulatory and legal framework for operationalizing the CDM at the national level	To formulate an effective framework that identifies the capacity needs of key government departments	Mid level policy makers (e.g. bureau staff, section managers, division chiefs); project proponents and other key stakeholders	UNDP –Dutch Project
2.2.2	Carry out capacity assessments and identify and inventory capacity needs within key government departments and agencies	To assess the current capabilities and the capacity needs for engagement in the CDM	Mid level policy makers (e.g. bureau staff, section managers, division chiefs); project proponents and other key stakeholders	UNDP-Dutch Project
2.2.3	Develop training materials that relate to the capacity needs and necessary regulatory and legal requirements for establishing an operational CDM at the national level	To develop training modules specifically tailored to address capacity needs to formulate necessary regulatory and legal requirements for establishing an operational CDM at the national level.	Mid level policy makers (e.g. bureau staff, section managers, division chiefs)	UNDP-Dutch Project

Task 2.2: Develop the Capacity of Mid-Level Policy Makers				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
2.2.4	Conduct training workshops that make it possible for mid-level policy makers to formulate the regulatory and legal policies necessary for operationalizing the CDM at the national level	To develop policy formulation skills for government policy makers to set the regulatory and legal policies necessary for operationalizing the CDM at the national level; To facilitate discussions of "best practices" in terms of policy making for CDM and, if possible, replicate into the national context under the CDM regime.	Mid level policy makers (e.g. bureau staff, section managers, division chiefs)	UNDP –Dutch Project

Task 3.1: Establish the CDM National Authority				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
	Cf. UNDP –Dutch Project	Cf. UNDP –Dutch Project	Cf. UNDP –Dutch Project	Cf. UNDP –Dutch Project

Task 3.2: Develop the Capacity of the CDM National Authority				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
3.2.1.1	Study Guidelines developed by other National Authorities and CDM-EB	To provide information on the practices that other CDM National Authorities implement in order to create a guideline suited in the Philippine setting	CDM National Authority officials and staff	UNDP –Dutch Project
3.2.1.2	Develop with the CDM National Authority specific regulatory, legal, financial and technical guidelines	To develop guidelines that can help accelerate the processing and implementation of CDM projects as are included under the project cycle.	CDM National Authority officials and staff	UNDP-Dutch Project
3.2.1.3	Present, discuss and amend the guidelines through consultative national and regional workshops	To ensure that the guidelines are transparent, streamlined and cost-effective.	CDM National Authority officials and staff	UNDP-Dutch Project
3.2.1.4	Prepare and issue the operational guidelines for proposed CDM projects that apply at the national level.	To promulgate operational guidelines for proposed CDM projects in the Philippines	CDM National Authority officials and staff	UNDP-Dutch Project

Task 3.2: Develop the Capacity of the CDM National Authority				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
3.2.2.1	Work with the CDM National Authority to develop guidelines for baseline parameters	To set the guidelines for approving baseline methodologies and parameters. To develop a standardized set of baseline parameters on the national, sectoral and project levels	CDM National Authority officials and staff	UNDP –Dutch Project
3.2.2.2	Study baseline parameters defined by other countries and assess applicability in the Philippines	To gather information on the guidelines set by other countries on baseline parameters in order to assess its viability and applicability in the Philippine context; To be able to standardize Philippine baseline parameters in reference with the baselines set by other countries for the CDM	CDM National Authority officials and staff	UNDP-Dutch Project
3.2.2.3	Identify where country specific approach is required, analyze alternative approaches, prepare the guidelines and present in a workshop to the different stakeholders to generate concurrence with CDM stakeholders on the baseline parameters to be used	To review baseline parameters defined by other countries, identify country specific approaches, prepare guidelines and to generate concurrence with the CDM stakeholders on the baseline parameters defined by CDM National Authority	CDM National Authority officials and staff	UNDP-Dutch Project

Task 3.2 Develop the Capacity of the CDM National Authority				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
3.2.3.1.1	Identification of the capacity needs of the National Authority	To identify the particular skills that need to be developed	CDM National Authority staff	IACCC & CCIC
3.2.3.1.2	Preparation of a set of strategies to address the identified needs	To design a strategy for effective capacity building for the DNA	CDM National Authority Staff	IACCC & CCIC
3.2.3.1.3	Preparation of training materials to address the needs	To produce training materials for use in the capacity development programs for the CDM National Authority	CDM National Authority Staff	CCIC
3.2.3.1.4	Training workshops and seminars for the CDM National Authority personnel	To provide an on-going training program for the CDM National Authority officials and staff	CDM National Authority Staff	CCIC
3.2.3.2	Periodically review the operation of the CDM National Authority	To address evolving capacity needs for more effective operations of the CDM National Authority	CDM National Authority and CDM project proponents	IACCC & CCIC
3.2.3.3	Assist the CDM National Authority in developing a fee for service structure	To formulate and formalize standard fees for services to be provided by the CDM National Authority.	CDM National Authority and CDM project proponents	CCIC

Task 3.2 Develop the Capacity of the CDM National Authority				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
3.2.3.4	Design and carry out periodic national and participate in Asian regional training workshops	To learn from CDM experiences in the Philippines and other countries in order to improve CDM operations	CDM National Authority and CDM project proponents; Regional partners	IACCC & CCIC

Task 4.1: Develop the Capacity of Project Developers				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
4.1.1	Conduct Public Briefings on sustainable development goals of the Philippines	To orient the different stakeholders on the thrust of the government on sustainable development so that planned projects are in line with the government's thrust	Senior and mid-level policy makers, project developers, project proponents, NGOs, academic institutions, financial institutions	CCIC
4.1.2	Develop a manual on the required CDM project design document for CDM eligible projects	To provide a guide in making a PDD; To familiarize project developers with the required structure of a CDM eligible PDD	Project developers, project proponents, NGO's, academic research institutions	CCIC
4.1.3	Conduct a series of training workshops	To provide skills and knowledge concerning different aspects of CDM	Senior and mid-level policy makers, project developers, project proponents, NGOs, academic institutions, financial institutions	CCIC
4.1.4	Develop a manual on detailed procedures in meeting CDM-related requirements of the Philippine Government	To assist the project developers and other stakeholders in processing required documents for approval of the government and to provide transparency of government procedures	Senior and mid-level policy makers, project developers, project proponents, NGOs, academic institutions, financial institutions	CCIC

Task 4.1: Develop the Capacity of Project Developers				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
4.1.5	Conduct seminars on the CDM regulatory and policy framework	To familiarize project developers with the required regulations and policies governing CDM projects	Project developers, project proponents, NGO's, academic research institutions	IACCC & CCIC
4.1.6	Maintain a registry of big and small scale project developers	To have a comprehensive list/ directory of big and small project developers; the list includes detailed information about the developers and their line of work	Senior and mid-level policy makers, project developers, project proponents, NGOs, academic institutions, financial institutions, general public	CCIC
4.1.7	Conduct workshops on enhancing the participation of local communities in CDM projects	To instill in the participants the value of local community participation in the project; To provide ideas on how to generate local participation in the project	Project developers, project proponents, local communities, NGOs	CCIC

Task 4.3 : Develop the Capacity of NGOs, Local Communities, National Research Institutions and Academe				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
4.3.1	Prepare a paper on the role of NGO, local communities, academe and national research institutions in the CDM process	To define the different roles that each stakeholder, particularly the NGOs, local communities, academe and research institutions has to play in the implementation of the CDM in the Philippines	NGOs, local communities, academe and research institutions	CCIC
4.3.2	Conduct a series of training workshops	To help NGOs, local communities, academe and research institutions understand CDM better	NGOs, local communities, academe and research institutions	CCIC
4.3.3	Conduct seminars on the CDM regulatory and policy framework	To familiarize NGOs, local communities, academe and research institutions with the required regulations and policies governing CDM projects	NGOs, local communities, academe and research institutions	IACCC & CCIC
4.3.4	Organize a national exhibit and forum on clean technologies in the Philippines	To encourage more research in the field of cleaner and efficient technologies	NGOs, local communities, academe and research institutions, students, project developers, project proponents, government agencies	CCIC

Task 4.2: Develop the Capacity of Project Financiers				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
4.2.1	Prepare papers on financing issues, policies, mechanisms, and instruments for CDM projects.	To gather best practices on financing mechanisms for possible replication into the Philippine context. To compare and contrast financing mechanisms on a local and international scale and look at possible areas for modification and improvement. To identify ways by which financial institutions and investment companies can participate in CDM.	Financial sector players CDM project proponents	CCIC
4.2.2	Conduct a series of training workshops.	To provide skills and knowledge concerning different aspects of CDM	Senior and mid-level policy makers, project developers, project proponents, NGOs, academic institutions, financial institutions	CCIC
4.2.3	Conduct seminars on the CDM regulatory and policy framework	To familiarize project developers and financiers with the required regulations and policies governing CDM projects	Financial sector players, Project developers, NGO's, academic research institutions	IACCC & CCIC

Task 4.3: Develop the Capacity of NGOs, Local Communities, National Research Institutions and Academe				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
4.3.5	Conduct workshops on enhancing capabilities of NGOs and local community organizations for promoting cleaner technologies in their localities	To foster cooperation between project developers, project proponents, NGOs, the local communities and the government to embrace cleaner technologies	NGOs, local communities, academe and research institutions, project developers, project proponents, government agencies	CCIC
4.3.6	Conduct consultations with local communities for CDM projects in different localities	To encourage community level participation for CDM projects	NGOs, local communities, academe and research institutions, project developers, project proponents, government agencies	CCIC

Task 5.1: Establish a CDM promotions office				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
5.1.1	For the duration of the CD4CDM project (2003-2005), CCIC will serve as a promotions office for CDM Projects.	To provide an interim clearing house and link between parties interested in CDM in the Philippines.	Parties interested in CDM in the Philippines	CCIC
5.1.2	Identify an appropriate agency which can serve as a CDM promotions office after 2005	To facilitate the preparation of the Terms of Reference for the a CDM promotions office after 2005	Senior officials, mid level policy makers, project developers, project proponents	IACCC & CCIC
5.2.1	Identify primary and secondary target markets (local and foreign investors; private or government institutions; CER brokers)	To determine priority activities and schedules		CCIC
5.2.2	Prepare promotional materials	To disseminate information on the local CDM market	Local and foreign investors, buyers of CERs	CCIC
5.2.3	Develop a CDM Investment Guide in the Philippines	To facilitate the making of an investment guide for CDM projects	Senior officials, mid level policy makers, project developers, project proponents, local and foreign investors, buyers of CERs	CCIC

Task 5.1: Establish a CDM promotions office				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
5.2.4	Organize a CDM market forum for local investors and project developers (including Visayas and Mindanao)	To provide background of situation; situate local investors in the projects; get inputs from potential investors	Government agencies, multinationals, private sector,	CCIC
5.2.5	Organize a CDM market forum for foreign investors and project developers	To identify and situate foreign investors in the projects; get inputs from foreign investors	Multinational corporations, Funding agency such as the Prototype Carbon Fund, Annex 1 countries	CCIC
5.2.6	Facilitate the participation of project developers and investors in Asian and international CDM market forums and in promoting the Philippine portfolio of CDM eligible project in such forums	To establish contacts and meet foreign investors and buyers of CERs	CDM investors and project developers	CCIC
5.2.7	Provide consultancy services on pre-feasibility studies and research on specific investment prospects; and aligning such prospects with investor's plans and profile	To determine the priorities of potential investors and widen the potential of the local CDM projects	CDM investors and project developers	CCIC

Task 5.2: Facilitate the development of CDM - Eligible Projects				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
5.2.1.1	Provide initial technical assistance to proponents so they can identify, develop and validate CDM eligible projects.	To enable local project developers to formulate project designs and proposals in line with CDM guidelines and procedures.	Project Developers	CCIC
5.2.1.2	Provide assistance to project developers in preparing Project Design Documents for specific projects	To familiarize project developers with the required structure of a CDM eligible project design document	Project Developers Project Proponents, NGOs, academic research institutions	CCIC
5.2.1.3	Help project developers identify and secure financial resources necessary to develop proposals for CDM projects.	To assist project developers procure financial assistance in developing proposals (e.g., feasibility studies, baseline studies, monitoring plan) for possible CDM projects	Project Developers	CCIC

Task 5.2: Facilitate the development of CDM - Eligible Projects				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
5.2.2.1	For financially sound projects, conduct investment promotion visits to Annex 1 countries that have stated an interest in investing in CDM projects.	To conduct investment promotion visits to Annex 1 countries that have stated an interest in investing in CDM projects.	Project developers	IACCC & CCIC
5.2.3.1	Organize and conduct national CDM investment promotion seminars in which international parties interested in the development, financing and brokering of CDM projects are introduced to national CDM project opportunities and counterpart project developers and bankers	To gather "best practices" from other national and regional partners implementing the CDM on a country and regional level for possible replication into the Philippine context; To showcase various investment opportunities in the country with emphasis on its national values and priorities and benefits from CDM project implementation. To create awareness for the part of international funding organizations for possible investment opportunities in the Philippines	Financial sector players and CDM project proponents, both local and international	IACCC & CCIC

National and Regional Workshops				
	Activities	**Purpose**	**Target Beneficiaries**	**Responsible Institution(s)**
	National Workshops	To present, discuss and evaluate the activities done for the CD4CDM project implementation in the Philippines.	All stakeholders	IACCC & CCIC
	Regional Workshops	To present the results of the national workshops as well as discuss the activities done for the Philippines; To foster cooperation and exchange of ideas among other CD4CDM participating countries	All stakeholders	UCCEE, AIT, CCIC & IACCC

TIMELINE

Task 1: Conduct Information Campaign and Awareness Raising

	Activities	Timeline																																	
		2003												2004												2005										
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1.1	Identify relevant stakeholders																																				
1.2	Formulate a strategy for awareness –raising																																				
1.3	Prepare information materials																																				
1.4	Identify priority areas for public briefings and consultations																																				
1.5	Conduct public briefings, roundtable discussions																																				
1.6	Prepare an illustrative set of example CDM projects																																				
1.7	Develop and maintain a CDM website																																				
1.8	Write feature articles and press releases on CDM																																				

Task 2.1: Generate the Interest and Support of Senior National Policy-Makers																																							
	Activities	Timeline																																						
		2003												2004												2005													
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D		
2.1.1.1	Prepare a briefing kit for senior level government officials																																					
2.1.1.2	Prepare an executive summary of the CDM Project Cycle																																					
2.1.2.1	Conduct executive briefings with senior policy-makers on the opportunities and challenges of CDM in the Philippines																																					
2.1.2.2	Solicit the concurrence of senior level policy-makers for their departmental staff to participate in a CDM capacity development program																																					
2.1.2.3	Conduct action planning with senior policy-makers on steps they can take to make CDM viable and successful in the Philippines																																					

Task 2.2: Develop the Capacity of Mid-Level Policy - Makers																																							
		Timeline																																						
	Activities	2003												2004												2005												
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
2.2.1	Define capacity needs of key government departments and agencies with regard to the formulation of the regulatory and legal framework for operationalizing the CDM at the national level	Timeline for this activity is found in the UNDP-Dutch Project																																				
2.2.2	Carry out capacity assessments and identify and inventory capacity needs within key government departments and agencies	Timeline for this activity is found in the UNDP-Dutch Project																																				
2.2.3	Develop training materials that relate to the capacity needs and necessary regulatory and legal requirements for establishing an operational CDM at the national level	Timeline for this activity is found in the UNDP-Dutch Project																																				

Task 2.2: Develop the Capacity of Mid-Level Policy - Makers																																					
		Timeline																																					
	Activities	2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
2.2.4	Conduct training workshops that make it possible for mid-level policy makers to formulate the regulatory and legal policies necessary for operationalizing the CDM at the national level	Timeline for this activity is found in the UNDP-Dutch Project																																			

Task 3.1: Establish the CDM National Authority																																					
		Timeline																																					
	Activities	2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
	Cf. UNDP – Dutch Project													Cf. UNDP-Dutch Project																							

Task 3.2: Develop the Capacity of the CDM National Authority

	Activities	Timeline																																		
		2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
3.2.1.1	Study Guidelines developed by other National Authorities and CDM-EB	Timeline for this activity is found in the UNDP-Dutch Project																																		
3.2.1.2	Develop with the CDM National Authority specific regulatory, legal, financial and technical guidelines	Timeline for this activity is found in the UNDP-Dutch Project																																		
3.2.1.3	Present, discuss and amend the guidelines through consultative national and regional workshops	Timeline for this activity is found in the UNDP-Dutch Project																																		
3.2.1.4	Prepare and issue the operational guidelines for proposed CDM projects that apply at the national level.	Timeline for this activity is found in the UNDP-Dutch Project																																		
3.2.2.1	Work with the CDM National Authority to develop guidelines for defining and projecting national, sectoral, and project baseline parameters	Timeline for this activity is found in the UNDP-Dutch Project																																		

Task 3.2 **Develop the Capacity of the CDM National Authority**

	ACTIVITIES	Timeline																																	
		2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
3.2.2.2	Study guidelines and other documents prepared in other countries on baseline parameters	Timeline for this activity is found in the UNDP-Dutch Project																																	
3.2.2.3	Identify where country specific approach is required, analyze alternative approaches, prepare the guidelines and present in a workshop to generate concurrence with CDM stakeholders on the baseline parameters	Timeline for this activity is found in the UNDP-Dutch Project																																	

Task 3.2 **Develop the Capacity of the CDM National Authority**

	Activities	Timeline																																			
		2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
3.2.3.1	Develop capacity within the CDM National Authority for: 1) approving 2) development of transparent procedures 3) tracking subsequent project support activities (monitoring, verification and certification of resulting emission reductions)	The conduct of this activity depends on the date of establishment of the CDM National Authority. It is expected that this activity will be finished within six to eight months after the establishment of the CDM National Authority.																																			

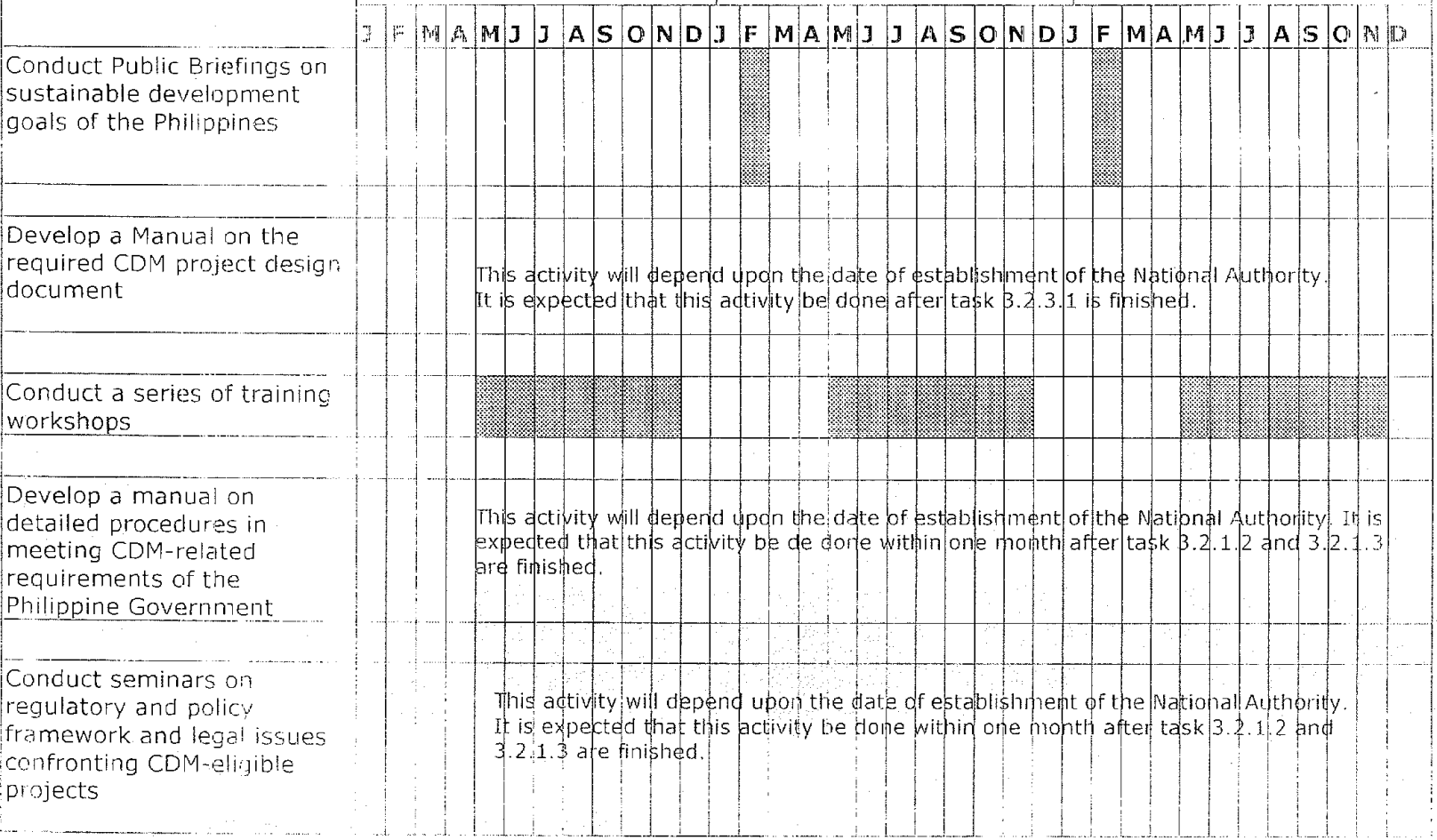
Task 3.2 Develop the Capacity of the CDM National Authority

	Activities	Timeline: 2003 (J F M A M J J A S O N D), 2004 (J F M A M J J A S O N D), 2005 (J F M A M J J A S O N D)
3.2.3.1.1	Identify the capacity needs of the National Authority	The conduct of this activity depends on the date of establishment of the CDM National Authority. It is expected that this activity be done within the first two months after the office has been established.
3.2.3.1.2	Prepare a set of strategies to address the identified needs	The conduct of this activity depends on the date of establishment of the CDM National Authority. It is expected that this activity be done within one month after the conduct of task 3.2.3.1.1.
3.2.3.1.3	Preparation of training materials to address the needs	The conduct of this activity depends on the date of establishment of the CDM National Authority. It is expected that this activity be done within two months after the conduct of task 3.2.3.1.1
3.2.3.1.4	Training workshops and seminars for the National Authority personnel	The conduct of this activity depends on the date of establishment of the CDM National Authority. It is expected that this activity be done within three months after the conduct of task 3.2.3.1.3 and once every four months, for three years, thereafter.
3.2.3.2	Periodically review the operation of the CDM National Authority and identify areas for strengthening of capacity through specific training	The conduct of this activity depends on the date of establishment of the CDM National Authority. It is expected that the first review be done after one year from the commencement of the CDM National Authority and once every six months, for three years, thereafter.
3.2.3.3	Assist the CDM National Authority in developing a fee for service structure that ultimately allows these entities to be financially sustainable	The conduct of this activity depends on the date of establishment of the CDM National Authority. It is expected that the initial determination of a fee be done within the first two months after the office has been established, as this should be part of the guidelines to be formulated by the CDM National Authority. A reevaluation of the fee structure should be done together with the first review of the National Authority's operations

Task 3.2 Develop the Capacity of the CDM National Authority																																									
	Activities	Timeline																																								
		2003												2004												2005															
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D				
3.2.3.4	Design and carry out periodic national workshops and participate in Asian regional training workshops that allow members of national CDM entities to share their respective experiences and lessons learnt as well as to build their knowledge base and capacity and improve their operational roles.	The conduct of this activity depends on the date of establishment of the CDM National Authority. It is expected that the first national workshop be done within a year after the commencement of the operations of the CDM National Authority. Participation in Asian regional training, on the other hand, should be encouraged strongly.																																							

Task 4.1 : Develop the Capacity of Project Developers

	Activities	Timeline
4.1.1	Conduct Public Briefings on sustainable development goals of the Philippines	
4.1.2	Develop a Manual on the required CDM project design document	This activity will depend upon the date of establishment of the National Authority. It is expected that this activity be done after task 3.2.3.1 is finished.
4.1.3	Conduct a series of training workshops	
4.1.4	Develop a manual on detailed procedures in meeting CDM-related requirements of the Philippine Government	This activity will depend upon the date of establishment of the National Authority. It is expected that this activity be de done within one month after task 3.2.1.2 and 3.2.1.3 are finished.
4.1.5	Conduct seminars on regulatory and policy framework and legal issues confronting CDM-eligible projects	This activity will depend upon the date of establishment of the National Authority. It is expected that this activity be done within one month after task 3.2.1.2 and 3.2.1.3 are finished.



Task 4.1 : Develop the Capacity of Project Developers																																					
	Activities	Timeline																																					
		2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
4.1.6	Maintain a registry of big and small scale project developers																																				
4.1.7	Conduct workshops on enhancing the participation of local communities in CDM projects																																				

Task 4.2: Develop the Capacity of Project Financiers

	Activities	Timeline																																	
		2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
4.2.1	Prepare papers on financing issues, policies, mechanisms, and instruments for CDM projects.																																				
4.2.2	Conduct a series of training workshops.																																				
4.2.3	Conduct seminars on regulatory and policy framework and legal issues	This activity will depend upon the date of establishment of the National Authority. It is expected that this activity be done within one month after task 3.2.1.2 and 3.2.1.3 are finished.																																			
4.2.4	Organize and conduct forums on range of funding sources for CDM-eligible projects.																																				

Task 4.3: Develop the Capacity of NGOs, Local Communities, National Research Institutions and Academe

	Activities	Timeline																																	
		2003												2004												2005										
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
4.3.1	Prepare a paper on the role of NGO, local communities, academe and national research institutions in the CDM process																																		
4.3.2	Conduct a series of training workshops.																																		
4.3.3	Conduct seminars on regulatory and policy framework and legal issues	This activity will depend upon the date of establishment of the National Authority. It is expected that this activity be done within one month after task 3.2.1.2 and 3.2.1.3 are finished.																																		
4.3.4	Organize a national exhibit and forum on clean technologies in the Philippines																																		

Task 4.3: Develop the Capacity of NGOs, Local Communities, National Research Institutions and Academe																																			
		Timeline																																			
	Activities	2003												2004												2005										
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
4.3.5	Conduct workshops on enhancing capabilities of NGOs and local community organizations for promoting cleaner technologies in their localities																																		
4.3.6	Assist in consultations with local communities for CDM projects in different localities																																		

Task 5.1: Establish a CDM promotions office																																					
		Timeline																																					
	Activities	2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
5.1.1	For the duration of the CD4CDM project (2003-2005), CCIC will serve as a promotions office.																																				
5.1.2	Identify an appropriate agency which can serve as a CDM promotions office after 2005 and help prepare terms of reference for such an office																																				
5.2.1	Identify primary and secondary target markets (local and foreign investors; private or government institutions; CER brokers)																																				
5.2.2	Prepare promotional materials																																				
5.2.3	Develop a CDM Investment Guide																																				

Task 5.1: Establish a CDM promotions office

	Activities	Timeline																																	
		2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
5.2.4	Organize a CDM market forum for local investors and project developers (including Visayas and Mindanao)																																				
5.2.5	Organize a CDM market forum for foreign investors and project developers																																				
5.2.6	Facilitate the participation of project developers and investors in Asian and international CDM market forums and in promoting the Philippine portfolio of CDM eligible project in such forums																																				
5.2.7	Provide consultancy services on pre-feasibility studies and research on specific investment prospects; and aligning such prospects with investor's plans and profile																																				

Task 5.2: Facilitate the development of CDM - Eligible Projects

	Activities	Timeline																																	
		2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
5.2.1.1	Provide initial technical assistance to national counterparts so they can identify, develop and validate CDM eligible projects.																																		
5.2.1.2	Provide assistance to project developers in preparing Project Design Documents for specific projects																																		
5.2.1.3	Help project developers identify and secure financial resources necessary to develop proposals for CDM projects.																																		

Task 5.2: Facilitate the development of CDM - Eligible Projects																																			
		Timeline																																			
	Activities	2003												2004												2005										
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
5.2.2.1	For financially sound projects, conduct investment promotion visits to Annex 1 countries that have stated an interest in investing in CDM projects.																																			
5.2.3.1	Organize and conduct national CDM investment promotion seminars in which international parties interested in the development, financing and brokering of CDM projects are introduced to national CDM project opportunities and counterpart project developers and bankers																																			

National and Regional Workshops

	Activities	Timeline																																			
		2003												2004												2005											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
	National Workshops																																				
	Regional Workshops																																				

資料４　2002 年度 CDM 研究会報告書(現地調査)

資料 4　2002 年度 CDM 研究会報告書（現地調査）

4.1　概 要

平成 14 年度に設置した「地球温暖化対策/CDM 事業研究会」のもとに、途上国（ホスト国）及び我が国民間企業によるCDMプロジェクトを円滑にスタートさせることを上位目標とし、①ホスト国窓口機関の体制整備に関するキャパシティビルディングの必要性（ニーズ）、②ホスト国における温室効果ガス削減ポテンシャル、データ整備の状況を把握するために、インドネシア、ベトナム、フィリピンの 3 カ国に置ける現地調査を実施した。

各国の CDM に関連した取組みを見ると、インドネシアが最も早く取組みを開始し、ベトナム、フィリピンと続くが、京都議定書に批准している国はベトナムのみである。各国ともに共通している状況は、①National CDM Authority の指名をめぐって、関連政府機関が競合していること、②欧州の先進国（オランダ、ドイツ等）や豪州が、世界銀行やUNEPの枠組みを利用して、キャパシティビルディングやプロジェクト形成に関する取組みを行っていること、③程度の差はあるが、CDM に関連した取組みに対する我が国による支援を期待していること、等が挙げられる。

世界銀行とGTZ により、最も先進的な取組みを進めてきたインドネシアは、GTZ の支援を受け、National CDM Authority を含む CDM の取組み体制・手続きの整備を環境省中心で確立しようとしており、CDM の受け入れ態勢としては最も進んでいる。しかし、かなり厳しい民間投資の状況の中でバリ島のテロ事件があり、我が国の民間企業の CDM プロジェクトに対する積極的な参加を図りにくい状況であることは否めない。

ベトナムは、京都議定書に批准したものの、省庁再編・人事異動と National CDM Authority の指名に関連した政府機関の競合が同時に生じており、CDM の取組み体制・手続きの整備は現時点では未定である。しかし、政府関係者のCDMに対する興味や期待と、順調に発展している経済状況を踏まえると、CDM の組織・制度・手続きが一旦整えば、急速に進展する可能性がある。

フィリピンは、議定書批准は先延ばしになっているものの、UNEP のキャパシティビルディングプロジェクトの実施とともに、関連省庁間の CDM に関する競合の顕在化を含めて、さまざまな動きがあり、その仕掛けはオランダが主導権を握っているが、我が国に対する期待も大きい。

以上から、我が国は、上記の 3 カ国に対して、国際機関や先進ドナー国の進出状況やその影響力、CDM の取組み体制・手続きの整備状況、CDM プロジェクトのポテンシャル、民間投資の環境等を総合的に勘案して、それぞれの国に適したキャパシティビルディングや CDM プロジェクトの実施戦略を策定していくことが望ましい。

3カ国の調査結果概要を、以下の表に示す。各国の調査結果の詳細については、次ページ以降に示す。

表 4-1　現地調査結果の概要

	インドネシア	ベトナム	フィリピン
京都議定書批准 CDM 関連手続き	議定書は未批准 CDM 関連手続きも検討中	議定書は 2002 年 9 月に批准 CDM 関連手続きは NSS を基盤として今後検討	議定書は未批准 CDM 関連手続きも気候変動省庁間委員会(IACCC)が中心となって検討中
省庁の取組	MOE:GTZ の支援を受けて CDM に関する取組の中心的役割を果たそうとしている。CDM プロジェクトのクライテリアを作成している。 MENR:CDM エネルギーセクターに関する委員会を設置している。CDM プロジェクトのクライテリアを作成している。 MoIT:NEDO との協力実績があるが、具体的な動きはまだない。	MNRE:旧 MOSTE より新設され、CDM の主導権をとる可能性が高い。 MOI:CDM に関する影響力の確保を希望している。 MOST:CDM に関する影響力の確保を希望している。	DENR:IACCC の共同議長・事務局であり、DNA に昇格することを提案している。 DOE:DNA のリーダーとなることを希望している。 ITDI:CDM の SD への貢献を検証する役割を主張している。
ドナー機関の動向	世銀:NSS の終了以降、休止状態。 GTZ:MOE に 1 名常駐して支援を行っている他、2 年間の CDM キャパビルを予定しているが、予算は限定されている。 オランダ:CERUPT 以外の組織的な動きは小さい。	AusAID:NSS の支援は行ったが、政府に直接的には関与していない。 その他の機関:GEF、UNDP、GTZ、フィンランド、スウェーデン等の温暖化関連の取組があるが、継続的な支援は行われていない。	ADB:PREGA による再生可能エネ、省エネのキャパビルを実施している。 UNEP-RISO:CDM に関するキャパビルを実施している。 UNDP:CDM キャパビルに関するレポートを 1998 年にまとめた他、UNEP-RISO の DNA 設立部分を担当している。 オランダ:上記の PREGA、UNEP、UNDP の取組に資金を提供している。
キャパシティビルディング	CDM に関する一般的な知見を有する担当者が、増えてはいるもののまだ限られている。政府関係者に対する基礎的知識、手続き、技術的課題等の情報提供、普及啓発が重要である。	CDM 担当者の多くは、CDM に関する一般的な知識を有していたものの、政策担当者を含む関係者への基礎的知識、手続き、技術的課題等の情報提供、普及啓発は、まだ重要であり必要性が高い。	オランダの主導によるキャパビルが行われているが、動きが急であり、十分な基盤は構築されていない。政府機関等に対するキャパビルを実施することが望ましい。

4.2　インドネシア

インドネシアは、2002 年 9 月 29 日～10 月 4 日において訪問し、現地政府機関、NGO、国際機関及び先進国大使館等のキーパーソン、及び我が国の政府関連機関等にインタビュー調査を実施した。

現地政府機関として、環境省、産業貿易省、エネルギー・鉱物資源省、インドネシア国家開発計画庁を訪問した。なお、同国の国家気候変動委員会にメンバーとして参加し、NSS の作成に携わった現地 NGO である PELANGI も訪問した。加えて、世界銀行インドネシア事務所、環境省内にポストを持つ GTZ、及びオランダ大使館を訪問した。

我が国の政府関連機関としては、JBIC、JETRO、NEDO にインタビューを実施した。また、JICA ジャカルタ事務所においては、さまざまな分野の専門家からアドバイスを受けた。

なお、JICA ジャカルタ事務所において、2002 年 10 月 1 日（火）14～17 時まで、ミニセミナーが開催された。セミナーには、インドネシア政府機関（環境省、BAPPENAS、エネルギー鉱物資源省）、インドネシア NGO（Pelangi）、日本側関係機関（JICA、NEDO、JETRO）、ドナー（GTZ、UNDP）と幅広い層からの参加があった。JICA から、連携促進委員会による研究成果の発表、WSSD 約束文書「CDM キャパシティビルディングに関する協力」の説明、CDM プロジェクト実施に必要な手続き・制度構築に関する説明を行った後、フリーディスカッション形式で CDM のキャパシティビルディングを中心とした議論が行われた。インドネシアにおける技術的、組織・制度的ニーズを抽出したことと合わせて、複数の関係省庁による横断的な取組みが求められる、新たなメカニズムである CDM について、関係者が一堂に会する機会を提供したこと自体も重要な成果であった。

インドネシア調査を概観すると、まず東南アジア諸国で最も早く NSS に取り組むとともに、CERUPT にも参加しているという CDM に関する先進性が挙げられる。加えて、NSS の作成から継続して、GTZ が環境省に技術及び政策支援していることも注目される。最近では、ドイツ（GTZ）の協力に、オランダの ODA が加わり、京都議定書批准の支援、NCCC（National Committee for Climate Change）や CDM クリアリングハウスの設立支援、プロジェクト計画書作成支援等を行っている。その一方で、いまだに京都議定書に批准しておらず、National CDM Authority が決定されていない。また、環境省とエネルギー・鉱物資源省では、それぞれ CDM プロジェクト承認のためのクライテリアを作成している。

このように、インドネシアは、環境省が GTZ、世界銀行の支援を受けて積極的に CDM に関連した活動を進めた結果、政府関係者の間ではある程度の知識や情報が集積した一方で、関係する各省庁間の競合が始まり、政府内部における調整段階に入ったと見ることができる。従って、調整が収束に向かえば、比較的早期の段階で、CDM の組織・制度的な実施環境は整備されると考えられる。また、有望な CDM プロジェクトも多いことから、我が国のホスト国としては有望ではあるが、民間の投資環境はいぜん厳しい状況であり、バリ島のテロ事件以降さらに悪化していることを考えると、我が国としての対処方針を明確にしつつ、政府機関主導の取組みを実施する必要がある。

以下に、インタビュー調査から得られた結果の概要を示す。

（1） 京都議定書の批准、CDM に関連した組織・制度・手続きの進捗状況等

インドネシア政府は、議定書に批准手続きを進めているが、現在は環境省から外務省に関連資料を提出している段階である。批准に関する時期の見通しなども明確には示されなかった。CDMに関する制度・手続きについては、NCCC や承認プロセスの具体的な組織手続きのフローが示されたが、これらも現在検討中（承認を得る過程）との説明がなされた。

組織・制度・手続きに関しては、GTZ 及びオランダの支援が行われることもあり、日本としては当面今後の動向を注意深く見守りつつ、連携の可能性を探ることが妥当であると考えられた。

なお、ODA 資金の流用に関する質問がインドネシア側やドナー側から出されたが、今後、類似の質問も予想されるため、わかりやすい説明メモ等の作成の必要性が示唆された。

(2) 省庁間の取組みと競合について

環境省は上記のように CDM に関する取組みの中心としての役割を果たそうとしている。一方、MEMR はエネルギーセクターに関する委員会を設置するなど、独自の取組みを進めており、CERUPT にも積極的に参加している。MoIT は、NEDO との協力実績があり、省庁の中では CDM に関する能力・ポテンシャルは高いと思われるが、まだ具体的な動きは始められていない。このように、現段階では省庁間の取組みは調整されておらず、一部競合する面も見受けられた。今後のインドネシア政府内での早期の体制整備図るためには、関係各省の主導権争いに留意しつつ、フォーカルポイントについて慎重な検討と関係省庁全体の底上げを図るような幅広い協力形態を模索する必要が示唆された

(3) キャパシティビルディングの必要性

昨年度調査における本年 2 月の訪問調査時と比較すると、CDM に関する一般的な知見を有する担当者は確実に増えているものの、いまだにほとんど知らない、もしくは複雑すぎて仕組みが理解できない、技術的な課題が多く具体的に自分たちが実施すべき事項を把握できない、または先進国から投資を得て大きな利潤を得るチャンスとしてのみ理解している等、政府関係者に対する情報提供、普及啓発の必要性、重要性が明らかになった。従って、基礎的な知識、手続き／様式、技術的な課題に関するキャパシティビルディングを実施する必要性は高い。このためには、長期の人材育成を目指しつつも当面は相当な規模での人員を比較的短期間で育成する必要があり、国内研修、インドネシア国内での研修会（セミナー）、地域ワークショップ等形態の異なる協力のツールを効果的に組み合わせた実施が適当と考えられる。なお、地方自治体の職員やローカルコンサルタントの育成についても要望があったが、これらはインドネシア中央政府が責任を持って対応することが、オーナーシップの観点からも不可欠であり、そのような活動を支援する形を取ることが妥当であると考えられた。

(4) ポテンシャル調査の可能性

MEMR においても MoIT でも、エネルギー消費量等に関する定量的・詳細なデータで、現時点で容易に入手できる資料は少なく、各担当部局に分散している状況であることが把握できた。しかし、MoIT、MEMR の両者とも CDM における定量的データの重要性を認識し始めており、JICA との適切な協力の元で、ある程度長期にわたり調査を行えば収集・整理することは可能と考えられた。

(5) 他のドナー機関の動向

世界銀行は植林に関する NSS がほぼ終了した現在、小休止の状態である。GTZ においても、CDM に関する 2 年間のキャパシティビルディングを実施予定であるが予算は限定されている。オランダ政府も、CERUPT 以外には組織的な動きは小さい。従って、NSS 等の実施により先行しているこれらの先進ドナー国等と協力の下に、JICA が重複を避けつつ、かつ得意分野においてキャパシティビルディングを実施する意義は大きいことが明らかになった。

(6) パートナーシップの形成促進

日本は、2 国間協力の性格もあり、従来当該国でパートナーシップの形成を主導するような立場を取ることは少なかったと思われる。しかし、今回ミニセミナーを開催して感じた点は、インドネシア政府内各省の情報共有・意見交換、ドナー間の連携、ドナーとインドネシアとの相互理解等を促進するような場を設けることの重要性である。JICA の具体的支援措置をツールとしつつ、「CDM パートナーシップ」等の名の下で、JICA が連携を主催することを検討することが望ましい。このような場に、JBIC、JETRO、NEDO 等も連携して参加することにより、日本のプレゼンスがいっそう高まると考えられる。

(7) インドネシアの投資環境

CDM プロジェクトに係る民間投資は、それ自体が固有のリスクを有しているが、インドネシアにおける投資はそれに加えて以下のような厳しい投資環境であることが明らかとなった。この中には、電力問題のように CDM プロジェクトにとり必ずしもマイナス要因とならないと思われるものもあるが、具体的プロジェクトの形成を促進するための環境整備を考える上で、これらの問題にも十分留意する必要がある。

- 法制度、司法制度の問題(運用の不透明さ、破産法の不備等)
- 地方分権化に伴う問題(税制・規制等の多様化、不透明化)
- 電力問題(2004 年には深刻な電力不足が生じるおそれ)
- 労働問題(労働に極めて有利な慣行の存在)
- 課税面の問題(外国資本が税を多く取られるような実態)

(8) 個別専門家との連携

今後関係各省との CDM 協力を効果的に進めていくためには、各省で活躍しておられる個別専門家の力を借りることが不可欠であることから、情報提供・意見交換を行いつつ、連携を強めていく必要性が示唆された。

4.3 ベトナム

ベトナムは、2002 年 10 月 5 日～12 日において訪問し、現地政府機関、NGO、国際機関及び先

進国大使館等のキーパーソン、及び我が国の政府関連機関等にインタビュー調査を実施した。

現地政府機関として、国家気象総局、科学技術省、計画投資省、貿易省、ベトナム貿易促進庁、エネルギー・環境研究センター、産業省、ベトナム商工会議所、水文気象局、国家環境庁を訪問した。加えて、NSS の実施を支援した AusAID を訪問した。我が国の政府関連機関としては、JBIC、JETRO、NEDO、日本ベトナム産業技術協力会（JAVITECHS）にインタビューを実施した。また、JICA ハノイ事務所においては、電力分野の JICA 専門家からアドバイスを受けた。

なお、2002 年 10 月 8 日（火）14～17 時にミニセミナーが開催された。セミナーには、ベトナム政府機関（環境省、科学技術省、産業省、貿易省）、他関連組織、公社等、日本側関係機関（JICA、大使館、NEDO、JETRO、ビジネスアソシエーション）等から、40 名以上が参加した。JICA から、連携促進委員会による研究成果の発表、WSSD 約束文書「CDM キャパシティビルディングに関する協力」の説明、CDM 実施に必要な手続き・制度構築に関する説明を行った後、ベトナムからも、CDM に関する取組みの現状に関してプレゼンテーションが行われた。フリーディスカッションでは、CDM に関する取組みが緒についた段階であるベトナム政府の関係者が、一堂に会し、情報を共有する機会を提供したことが、最も大きな成果であったと考えられる。

ベトナム調査を概観すると、まずベトナム政府は、アジア諸国の中でも比較的早い、2002 年 9 月 21 日に京都議定書に批准したことが特徴に挙げられる。インドネシアよりは遅れたものの、NSS もオーストラリアの支援で実施している。インドネシアと異なる点は、インドネシアにおける GTZ の存在に比較して、AusAID がベトナム政府に関与していないことである。CDM に関する制度・手続きについては、インタビュー調査によれば、「NSS における検討を進める予定ではあるが、NSS の担当官庁である環境省が首相に提出した単なる調査報告と位置づけており、国としての戦略は今後検討される」としていることからも理解できる。一方で、省庁再編が実施されたばかりであり、当分の間、CDM に関連した各省庁の役割分担等は確定されない可能性がある。従って、National CDM Authority の指名、CDM の組織・制度・手続きに関しては、NSS を基盤にはするものの、政府内の調整等に今後かなりの時間を要する可能性がある。

また、ミニセミナーの参加者数（約 50 人）や内容からも理解できるとおり、政府関係者は CDM に関する興味を有しており、期待は大きいものの、知識、情報はかなり限定されており、今後の普及啓発活動の重要性が示唆された。

このように、ベトナムは、議定書を早々に批准したが、CDM に関する競合が省庁再編と相まって顕在化している状況であり、先進ドナー国の強力なイニシアティブもないことから、調整に時間を要する可能性が伺えた。しかし、ベトナムの政府関係者の CDM に対する興味や期待と、順調に発展している経済状況を踏まえると、CDM の組織・制度・手続きが一旦整えば、急速に進展する可能性があることに留意したい。なお、我が国の民間企業にとって良好な投資環境が今後も継続するのであれば、ベトナムは官民一体となった CDM 実施戦略を策定して、オランダ等他の先進諸国に遅れを取らないように積極的に取り組むべきであると考える。

以下に、インタビュー調査から得られた結果の概要を示す。

(1) 京都議定書の批准、CDM に関連した組織・制度・手続きの進捗状況等

ベトナム政府は、2002 年 9 月 21 日に京都議定書に批准した。CDM に関する制度・手続きにつ

いては、NSS における検討を進める予定ではあるが、NSS を担当官庁である環境省（旧 MOSTE から独立）が首相に提出した単なる調査報告と位置づけており、国としての戦略は今後検討されるとしている。このため、現段階では明確なイメージは示されなかった。従って、CDM に関連した組織・制度・手続きに関しては、NSS を基盤にはするものの、これから各省庁間の交渉が行われることを考えると、省庁再編の直後であることもあいまって、具体的な制度構築には、今後かなりの時間を要する可能性がある。日本としては、NSS の資金提供者であるオーストラリア等他のドナーの動向に注目しつつも、クリアリングハウスに関連する支援も含め、CDM にかかる中心的な制度面に対する支援の可能性を模索していくことが望ましい。

(2) 省庁間の取組みと競合について

新設された環境省（MNRE）の下に、National Office for Climate Change and Ozone Protection が移ったため、CDM に関する取組みの主導権は MNRE がとる可能性が高いが、MOST（旧 MOSTE）、産業省（MOI）も何らかの形で強い影響力を確保できるよう望んでいる。他の省庁も、CDM が自組織に利益を生むとなれば、省庁間の競合が激しくなる可能性がある。今後のベトナム政府内での早期の体制整備を図るためには、多くの省庁と既にコンタクトしている NEDO/JETRO との連携を深め、関係各省間の競合に留意しつつ、今後の協力の窓口について慎重な検討を行うと共に、関係省庁全体の底上げを図るような幅広い協力形態を模索する必要性が示唆された。

(3) キャパシティビルディングの必要性

面談したベトナム政府機関の関係者は、CDM に関する一般的な知見を有してはいたが、ほとんどの面談者から「政策担当者を含む関係者への情報提供、教育・啓発の重要性・必要性」を聞くことができた。ベトナムの民間企業の団体である VCCI（ベトナム商工会）からも、情報提供、教育・啓発の重要性が指摘された。従って、CDM に関する基礎的な知識、手続き／様式、技術的な課題に関するキャパシティビルディングを実施する必要性は高い。このためには、長期の人材育成を目指しつつも、当面は相当な規模での人員を比較的短期間で育成する必要がある。既にさまざまなキャパシティビルディングの計画を持ち、順次実施している NEDO/JETRO と協力しつつ、国内研修、ベトナム国内での研修会（セミナー）、地域ワークショップ等形態の異なる協力のツールを効果的に組み合わせて実施することが期待された。

また、他のドナーの制度面に係る支援が具体化していないと見られることから、合わせて制度面のキャパシティビルディングの可能性も検討することが望ましい。

(4) ポテンシャル調査の可能性

エネルギー分野の CDM の実施に不可欠な鉱工業分野、発電分野におけるエネルギー消費量等のデータに関しては、現時点で容易に入手できる資料は少なく、各担当部局に分散している状況であることが把握できた。また、省庁間の縦割り意識が強く、省庁間でのデータ・情報の連携が少ないため、データベースが構築しにくい環境であることが明らかになった。MOI 等の関係機関は CDM における定量的データの重要性は認識しているが、網羅的なデータ収集を含むポテンシャル調査を実施した場合、膨大な労力が要求されるとともに、投資の確約がない分野に関しては、ベト

ナム側の協力が得られない可能性があるため、慎重な検討が必要であることが示唆された。

(5) 他のドナー機関の動向

オーストラリアが NSS を実施しており、その他 GEF、UNDP、GTZ、フィンランド、スウェーデン等さまざまなドナーが、温暖化に関連する取組みを実施しているが、これらのうち特定のドナーが継続的に CDM キャパシティビルディングについて支援している状況にはない。一方、NEDO はこれまでにさまざまな政府機関の協力関係を構築してきており、かかる実績を踏まえつつ NEDO 等との連携・協力を図り、支援の方針を検討する必要がある。

(6) 調査結果のフィードバック

今回開催したミニセミナーは、CDM に関する今後の協力について検討するためのキックオフミーティングとも言うべきものであった。このため、セミナーとしての提供情報は制限せざるを得ず、詳細かつ具体的な情報を期待する CDM 関係者には、今後別の機会を設けることが適当と考えられた。また、各機関に対して面談の結果がどのように扱われたか、日本で検討されたかを、適切にフィードバックすることも重要と考えられる。このため、本調査の結果に加え、最新の CDM 関連情報(例えば、今後の COP 等での決定内容等)をベトナムの CDM 関係者に伝えるような機会を適切な時期(例えば MNRE の組織が確定した時期)に持つことが望ましいと考えられた。

4.4 フィリピン

フィリピンは、2002 年 12 月 8 日～13 日において訪問し、現地政府機関、大学、国際機関等のキーパーソン、及び我が国の政府関連機関等にインタビュー調査を実施した。

現地政府機関として、天然資源環境省(DENR)、エネルギー省(DOE)、科学技術省(DOST)、フィリピン国家石油公社(PNOC－EDC)を訪問した。また、UNEP-RISO が実施している CDM キャパシティビルディングに関するワークショップに参加し、フィリピン側のカウンターパートであるアテネオ大学の Climate Observatory に所属する CCIC(Climate Change Information Center)と面談した。加えて、ADB、UNDP マニラ事務所を訪問した。我が国の政府関連機関としては、JBIC、JETRO マニラセンターにインタビューを実施した。また、産業及び林業分野の JICA 専門家からアドバイスを受けた。なお、フィリピンにおける調査は、インドネシア、ベトナムと異なり、現地におけるミニセミナーは実施せず、インタビュー調査結果を総合的に判断して、JICA の既存スキーム(開発調査等)において実施可能なプロジェクト候補を抽出することに主眼を置いて進めた。

フィリピン調査を概観すると、東南アジア諸国の中で CDM に関して出遅れていたフィリピンにおいて、この1年ほどの間に、さまざまな動きが急速に進展してきていることが特徴として挙げられる。特に、オランダの資金提供により UNEP-RISO が実施する CDM キャパシティビルディングプロジェクトが開始されたことが進展の大きな要因と考えられる。

京都議定書の批准に関しては、昨年末という情報を得ていたが、「2003 年の早い時期」というように遅れ気味であり、National CDM Authority の設立や CDM の関連した組織・制度構築は全て批

准後に行われる予定である。現在の UNFCCC の窓口である IACCC（Inter-Agency Committee on Climate Change）の事務局であるDENRとエネルギー分野を担当するDOEの間において、National CDM Authority に関する競合があり、今後もその動きには留意する必要がある。

フィリピンは、NSSを実施していないが、UNEP-RISOの上記プロジェクトが開始され、ADBに赴任しているオランダ人の専門家がこれを後押ししている状況から推測すると、オランダが主導権を握りつつあると考えられる。なお、DOEは、CERUPTのプロジェクトを実施することを望んでいたことが明らかになっている。また、JBICからの円借款により風力発電プロジェクトを実施しているPNOC-EDCは、地熱、風力等の再生可能エネルギー利用の CDM プロジェクトを実施する意欲がある。

このように、フィリピンは、議定書批准は先延ばしになっているものの、関連省庁間の CDM に関する競合の顕在化を含めて、さまざまな動きがあり、その仕掛けはオランダが主導権を握っている。しかし、その動きが急であり十分な基盤が構築されていないこと、ODA や民間投資を通じた我が国の存在が大きいことから、例えば UNEP 等との協力の下に、CDM 関連の支援を行うことは、我が国主導の CDM プロジェクトを推進していく上で有効と思われる。但し、フィリピンの投資環境が優れない状況の中で、まずはフィリピン政府機関等に対するキャパシティビルディングやポテンシャル調査の実施等、日本政府機関主導の取組みを進めることが望ましい。

以下に、インタビュー調査から得られた結果の概要を示す。

(1) 京都議定書の批准、組織・制度・手続き状況

フィリピンの京都議定書への批准は、2002 年末の予定であったが、最近の IACCC（Inter-Agency Committee on Climate Change）の会議の結果によれば、来年（2003 年）の早い時期になる可能性が高いということが、本調査により明らかにされた。National CDM Authority については、同様にIACCCにおいて議論されているが、議定書批准後に事務的に設立される予定である。National CDM Authority の組織/構成に関しては、DENR（Department of Environment and Natural Resources）が検討中である。IACCC の事務局をつとめている DENR は、当該事務局が"Climate Change Office"に昇格して、暫定的な National CDM Authority の役割を果たす案を提案している。一方で DOE（Department of Energy）は、CDM がエネルギー分野のプロジェクトが多いことを理由に、DOE が National CDM Authority のリーダーとなることを望んでいる。また、DOST（Department of Science & Technology）の傘下にある ITDI（Industrial Technology Development & Technology）は、CDMプロジェクトにおいて持続可能な発展に貢献する技術であるかどうかを検証する役割を担う機関として、自らの重要性を主張している。このように、現在は National CDM Authority をめぐって、IACCC の元で、DENR、DOE 等が議論を重ねている状況である。CDMプロジェクトの承認手続きに関しては、同様に検討段階である。

(2) 政府機関等の取組状況

気候変動枠組条約（UNFCCC）に関連する政府機関により構成されるIACCCは、上記のとおり、京都議定書への批准、National CDM Authority の設立、CDMプロジェクト承認制度の構築等に関して議論を重ねている。主なアクターは、DENR、DOE、DOST（ITDI）である。

IACCC の共同議長と事務局をつとめるDENRは、UNEP-RISO が実施しているCDMキャパシテ

ィデベロップメントプログラムにおいて、オランダ政府の資金により UNDP が担当している National CDM Authority 設立及びキャパシティデベロップメントのカウンターパートをつとめている。DENR は、この他に UNDP のキャパシティビルディングプロジェクトのカウンターパートをつとめた。また、National Communication（NC）や GHG インベントリー作成を担当している。NC に関しては、第 1 回報告書を 1999 年 12 月に作成している。現在は第 2 回報告書の作成のための資金を得るために GEF に申請している。

DOE は、ADB が実施している PREGA（Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement）のカウンターパートをつとめている。さらに DOE は、PREGA の前身である ALGAS（Asia Least-cost Greenhouse Gas Abatement）のカウンターパートでもあった。USAID の支援による Philippine Climate Change Mitigation Program（PCCMP）は、DOE がカウンターパートであったが、2001 年に終了した。

DOST（ITDI）は、UNIDO が実施している産業分野の CDM ケーススタディのカウンターパートである。CDM に関する R&D の推進、クリーナープロダクション、GHG 削減策としてのバイオマス/クリーンエネルギーの利用を掲げている。

PNOC-EDC は、地熱、風力、小規模水力等の再生可能エネルギーの CDM プロジェクトを推進する方針を掲げている。現時点では、オランダや世界銀行等との協力関係は特にない。

(3) ドナー機関の取組状況

ADB は、REACH（Renewable Energy, Energy Efficiency, and Climate Change）のもとに、①オランダのファンドによる PREGA、②カナダのファンドによる GHG 削減、吸収強化、及び適応に関する取組、③デンマークのファンドによる再生可能エネルギー及び省エネの 3 つのプロジェクトを実施している。PREGA は、15 カ国を対象として、再生可能エネルギー、省エネ等に関するキャパシティビルディングを実施するプロジェクトである（2 (2) ADB 参照）。フィリピンの National Counterpart Agency は DOE である。

UNEP-RISO は、世界 12 カ国を対象として、CDM キャパシティビルディングの大規模なプロジェクトを進めており、フィリピンにおいては、"Capacity Development for the CDM in the Philippines"を進めている。アテネオ大学の Climate Observatory に所属する CCIC（Climate Change Information Center）が、このプログラムの管理担当組織として UNEP と契約しており、同時に IACCC と MoU を取り交わしている。本プログラムの Draft Work Plan を検討するため、CCIC の主催により 2002 年 12 月 9 日～11 日に 3 日間のワークショップが開催された（2 (3) UNEP 参照）。

UNDP は、DENR をカウンターパートとして 1998 年に"Capacity Building in CDM Project activities: Philippines"をまとめている。現在は、UNEP-RISO のキャパシティデベロップメントの中で、National CDM Authority 設立部分を担当している（前述）。

オランダ政府は、上記の UNEP-RISO の活動に対する資金提供、同活動における National CDM Authority 設立部分に対する UNDP への資金提供等、フィリピンにおける CDM に関係した活動の中で、重要な位置を占めつつある。なお、オランダ政府は、ADB に対して"CDM Facility"設立を呼びかけており、2003 年 4 月頃には ADB の最終的な判断がなされると予想されている。

(4) GHG インベントリー等のデータ整備状況

GHG インベントリーは、1999 年の NC において 1994 年の GHG 排出量を記載している。なお、DENR によれば、1999 年の GHG 排出量は算定済みとのことであったが、COP8 における基準年が 2000 年となったことから、今後は第 2 回 NC の作成と並行して、2000 年の排出量を算定する予定である。

エネルギー分野の GHG 排出量は、1996 年の米国による US Country Study Program におけるエネルギーセクターの GHG 排出量算定用ワークブックを教科書として、DOE が実施している。なお、DENR は、IPCC が 1996 年に改訂出版した GHG 算定マニュアルをフィリピンの国情を踏まえたガイドラインに改訂出版している。今回の調査では、GHG インベントリーを作成するためのデータの取得主体、方法等の詳細情報を得ることはできなかった。

(5) 日本側関係機関の動向

JETRO マニラセンターは、専門家派遣や現地民間企業の日本での研修を行っており、今年度は食品加工工場の省エネを対象として実施した。

JBIC は、北ルソンの風力発電所建設事業に関する円借款案件を仮想 CDM プロジェクトに見立てて検討を行い、課題を抽出する調査を行っている。また、DENR をカウンターパートとして、過去 10 年にわたり植林に関する事業を実施してきた。現在は、得られた成果等を踏まえて、次のステップを検討中である。

(6) JICA の活動状況(CDM に関連するもののみ)

1)開発調査

DOE をカウンターパートとして、PDP(電力開発計画)策定支援及び電力投資促進室の支援を行うことを目的に 2002 年 10 月から 2003 年度後半まで「電力構造改革のためのエネルギー省キャパシティビルディング開発調査」を実施中である。電力需要想定から政策提言までの支援を行うこととし、データ・業務フローを確立していくものである。

2)専門家派遣

DOE には玉川専門家(小水力開発)、DTI-BOI には玉置専門家(投資促進)、DENR には田中専門家(林業)が精力的に活動中である。また 2003 年 3 月からは、大田専門家(環境政策)が DENR に派遣される予定となっている。

(7) 今後の取組みについて

今回の調査を通じて検討した、考え得る技術協力(案)について以下に述べる。

1)プロジェクト例 1:「CDM の可能性を勘案した総合エネルギー計画の策定」

＜技術協力の目標＞

エネルギーの効率的な利用、省エネを含む総合エネルギー計画(PEP)を作成する。その過程で GHG インベントリー調査をあわせて行い、エネルギー分野における CDM 活用戦略の提言を行う。

＜成果＞

① より効率的なエネルギーの活用を含む、総合的なエネルギー開発計画（PEP）が作成される。
② エネルギーを開発する上で、より経済性を高める CDM を活用する基本戦略が作成される。
③ 定期的に見直す必要のある GHG インベントリー調査の手法が確立される。
④ インベントリー調査の結果を公開することにより、IPP 事業、地方電化事業に CDM の視点が加わり、経済性が改善されることからそれらの事業が促進される。

＜協力の内容＞

① 主要なエネルギー消費分野における GHG インベントリー調査（データ収集の手順の確立とデータベースの構築）
② 電力開発計画（PDP）のレビュー
③ 投資促進室での情報公開（GHG インベントリー調査結果の公開）

＜必要な Input とスケジュール＞

・開発調査（2003 年度後半からスタート、2004 年の PEP 作成を支援する）

2）プロジェクト例2：「村落コミュニティ／中小工場の小規模 CDM プロジェクトの支援」

＜技術協力の目標＞

小規模 CDM プロジェクトの実施者となる村落コミュニティまたは中小企業をターゲットとして、彼らが実施する小規模 CDM プロジェクトがスムーズに進捗するための技術的支援を行う。

＜成果＞

小規模 CDM プロジェクトを通じて、技術移転、村落コミュニティまたは中小企業における環境管理に関する組織制度構築、及び炭素クレジットの獲得による運営資金の確保等から、コミュニティや中小工場が持続可能な発展が達成される。

＜協力の内容＞

① 小規模 CDM プロジェクト（特に社会林業、省エネを含む工場の環境対策等）を実施する意欲のある途上国の事業者（村落や中小工場主）を募り、当該小規模 CDM プロジェクトを実施・支援する日本の NGO、地方自治体、民間企業に紹介する。
② 草の根技術協力、プロポーザル型技術協力等の既存のスキームを拡大して、日本の小規模 CDM プロジェクトの実施者を資金的・技術的に支援する。
③ 小規模 CDM プロジェクトのプロジェクト計画書の作成を支援し、バリデーション、ベリフィケーション、サーティフィケーション等 CDM プロジェクトの手続きに必要な技術的な支援を行うとともに、資金的な支援も行う。

＜必要なインプット＞

① 小規模 CDM プロジェクトの実施者の応募
② 日本の実施者に対する、日本人専門家による技術的（植林技術、省エネ技術等）支援体制の構築
③ 日本人専門家による、CDM プロジェクト特有な技術的課題に対する支援体制の構築

＜実施のための前提条件＞

① 京都議定書が批准されていること。
② CDM 窓口機関、承認手続きが決定されていること。
③ フィリピン政府が、小規模 CDM プロジェクトに対して理解があること。