フィリピン共和国
環境天然資源省環境管理局

No.

フィリピン共和国
クリーン開発メカニズム（CDM）
事業推進のための
キャパシティ・ビルディング調査

ファイナル・レポート

平成 18 年 11 月
（2006 年）

独立行政法人
国際協力機構（JICA）

委託先
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クリーン・エネルギー・ファイナンス委員会

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＜略語一覧＞

AAU	: Assigned Amount Unit＝割当量単位
ADB	: Asian Development Bank＝アジア開発銀行
CCIC	: Climate Change Information Center
CDM	: Clean Development Mechanism＝クリーン開発メカニズム
CEF	: Carbon Emission Factor
CER	: Certified Emission Reductions＝認証排出削減量
DAO	: DENR Administrative Order
DNA	: Designated National Authority＝指定国家機関
DOE	: Designated Operational Entity＝指定運営機関
DOE	: Department of Energy＝エネルギー省
DOST	: Department of Science and Technology＝科学・技術省
DOTC	: Department of Transportation and Communication＝運輸・通信省
DTI	: Department of Trade and Industry＝通商産業省
EB	: CDM Executive Board＝CDM 理事会
ECC	: Environmental Compliance Certificate
EMB	: Environmental Management Bureau＝環境管理局
ERPA	: Emission Reduction Purchase Agreement＝温室効果ガス排出削減量購入協定
ERU	: Emission Reduction Unit＝排出削減単位
EU-ETS	: European Union-Emission Trading Scheme
FMB	: Forestry Management Bureau＝森林管理局
GEF	: Global Environment Facility＝地球環境ファシリティ
GHG	: Greenhouse gas＝温室効果ガス
IACCC	: Inter-Agency Committee on Climate Change
IGES	: Institute of Global Environment and Strategies＝（財）地球環境戦略研究機関
JBIC	: Japan Bank for International Cooperation＝国際協力銀行
JICA	: Japan International Cooperation Agency＝（独）国際協力機構
JKAP	: Japan Kyoto Mechanism Acceleration Programme
LFG	: Landfill Gas＝埋立地ガス
LGU	: Local Government Unit
METI	: Ministry of Economy, Trade and Industry＝経済産業省
NEDO	: New Energy and Industrial Technology＝（独）新エネルギー・産業技術総合開発機構
NPC	: National Power Corporation
NSWMC	: National Solid Waste Management Commission
OECC	: Overseas Environmental Cooperation Center＝（社）海外環境協力センター
OJT	: On the Job Training＝実地研修
PAD	: Project Application Document＝プロジェクト申請書
PCCI	: Philippine Chamber of Commerce and Industry＝フィリピン商工会議所
PDD	: Project Design Document＝プロジェクト設計書
PNCC	: Philippine Network on Climate Change
SDBD	: Sustainable Development Benefits Description
TEC	: Technical Evaluation Committee＝技術評価委員会
UNDP	: United Nations Development Programme＝国連開発計画
UNEP	: United Nations Environmental Programme＝国連環境計画
UNFCCC	: United Nations Framework Convention on Climate＝国連気候変動枠組条約
USAID	: United States Agency for International Development＝米国国際開発庁

フィリピン共和国クリーン開発メカニズム（CDM）事業推進のための キャパシティ・ビルディング調査

ファイナル・レポート
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1. イントロダクション

1.1 イントロダクション

三菱 UFJ 証券は、（独）国際協力機構（JICA）より、「フィリピン共和国 CDM 事業推進のためのキャパシティ・ビルディング調査」を 2005 年 11 月に受託した。これは、フィリピン政府の指定国家機関（Designated National Authority: DNA）に対するキャパシティ・ビルディング調査を実施するものである。

本調査の実施にあたっては、CDM の優秀な専門家を調査団員に配し、Terms of Reference に基づいて調査を遂行した。各調査団員は、スケジュールに則り、本調査が求める責任、成果等を果たすべく、活動に専心した。

1.2 本ドラフトファイナル・レポートの目的

本ファイナル・レポートの目的は、フィリピン政府に対し本調査の結果を纏めて報告し、運営委員会及び関係する同政府官僚が確実に本調査の具体的成果を持続させるよう支援することである。

1.3 背景

国連気候変動枠組条約（UNFCCC）署名以前の 1991 年 5 月、フィリピン政府は気候変動省庁委員会（Inter-Agency Committee on Climate Change: IACCC）を創設し、気候変動に関わる様々な活動の調整、気候変動対策の提案、UNFCCC との交渉におけるフィリピン側の見解の取りまとめ等を積極的に実施してきた。

その後 1992 年 7 月に UNFCCC に署名し、1994 年 8 月に批准した。また、京都議定書には 1998 年 4 月 15 日に署名し、2003 年 11 月 20 日に批准している。2004 年 6 月 25 日には環境天然資源省（Department of Environment and Natural Resources: DENR）を指定国家機関（Designated National Authority: DNA）とすることが正式決定（大統領令 320 号）し、これを契機にこれまで採算性等の問題で実現が困難であった事業が CDM により実施され、同国の持続可能な開発へ貢献することが期待されている。

JICA では 2003 年 11 月にプロジェクト形成調査団を派遣し、キャパシティ・ビルディングのニーズ及び調査で期待される領域について環境天然資源省の環境管理局（Environmental Management Bureau of the DENR: EMB-DENR）と協議した。この協議内容を受け、DNA の能力強化を目的にフィリピン政府より技術協力の要請が JICA に伝えられた。その後 2005 年 8 月には事前調査団が派遣され、調査実施のための合意文書（Implementing Arrangement: I/A）の協議及び調印が行われた。本調査は、I/A に基づいて、フィリピンにおける CDM 事業推進のためのキャパシティ・ビルディング調査を実施するものである（添付 1：フィリピン合意文書）。

1.4 本調査の目的

本調査の目的は、添付 1 の I/A に提案されている通り、下記項目の調査・活動を通して、フィリピンにおける CDM 促進の要である DNA の知見及び機能を拡充･強化することであった。

項目 1：CDM 促進のための方策の策定支援
項目 2：ヘルプデスクの設置
項目 3：情報クリアリングハウスの設置
項目 4：フィリピン国内における地方レベルでのワークショップの実施
項目 5：CDM 促進のための提言の策定

1.5 本調査の対象地域

前項に挙げた調査項目のうち、キャパシティ・ビルディングの中核をなす「項目 2：ヘルプデスクの設置」及び「項目 3：情報クリアリングハウスの設置」については、いずれも EMB-DENR の内部に設置されることから、調査は主としてマニラ首都圏で行われた。但し、本調査期間中、これら二つの項目を調査した結果として提供した CDM 関連の基礎情報サービスや相談支援の対象者は、この地理的範囲にとどまるものではない。

また、JICA は地方レベルでのキャパシティ・ビルディングの必要性に注目し、インセプション・レポートではルソン、ビサヤ、ミンダナオにおけるワークショップ（「項目 4」）の実施を提案した。

1.6 本調査実施の相手方

本調査実施における主要なフィリピン側カウンターパートは、EMB-DENR、特にその CDM 事務局であった。CDM 事務局の主たる任務は、提案された CDM プロジェクト活動に対するフィリピン国の承認プロセスを円滑に進ませることであり、Joyceline Goco 並びに Gigi Merilo という 2 名の EMB-DENR フルタイム職員が現在この業務を担当している。しかしその業務内容は DNA への申請書類やヘルプデスクへの問合せの受付けのみならず、UNFCCC へ提出する国別報告書（National Communication：気候変動への国家的取り組みを解説したもの）の作成にまで及んでいる。本調査においては、上記 2 名のフルタイム職員に加えて、2 名のローカル・コンサルタント（Charmion Reyes 及び Zarah Pilapil）を雇用した。しかし、彼らとの契約は JICA 調査が終了する 11 月末で終了する。このため、後述にある通り、CDM 事務局を担当する職員の増加が、本調査の持続性確保の観点から喫緊の課題である。

調査団はまた、気候変動省庁委員会（Inter-Agency Committee on Climate Change: IACCC）のメンバーである関係省庁と緊密な連係を取りながら本調査を実施した。IACCC は、気候変動関連活動の調整、気象変動政策の勧奨、及び UNFCCC との交渉においてフィリピンの立場を有利なものにするために設立された機関である（添付 2：IACCC 機構図）。

1.7　調査スケジュール

本調査は、2005 年 11 月中旬に開始後 12 ヶ月間で完了した。図 1 にこの 1 年間の人員配置計画を、図 2 に調査実施スケジュールを示す。

人員配置計画

	担当	氏名	所属	11月	12月	1月	2月	3月	6月	7月	8月	9月	10月	11月
現地調査	総括/温暖化対策 A	波多野　順治	三菱UFJ証券		4									
	温暖化対策 B	本間　仁美	三菱UFJ証券		7		12	7	7		8	6	1	5
	CDM情報整理（クリアリングハウス）A	縫部　敦子	三菱UFJ証券		16							4		
	CDM情報整理（クリアリングハウス）B	真野　秀太	三菱総研			7								
	CDM情報整理（ヘルプデスク）A	古田　尚也	三菱総研				13					4	6	3
	CDM情報整理（ヘルプデスク）B	栩川　恭子	CEF Consulting Ltd.		16		7	7			7			
	CDM投資促進A	西田　誠一郎	三菱UFJ証券		6									
	CDM投資促進B	宮田　健	三菱UFJ証券											
	CDM投資促進A	Matthew Setterfield	三菱UFJ証券									5	6	4
	CDM投資促進B	Cynthia Hendrayani	三菱UFJ証券									5	4	
	植林/再植林技術評価委員会向けキャパビル	Adrian Stott	三菱UFJ証券									4		
国内作業	総括/温暖化対策	波多野　順治	三菱UFJ証券	5				5	3	4	6	10	5	5
	温暖化対策	本間　仁美	三菱UFJ証券	5				10	10			10	10	10
	CDM情報整理（クリアリングハウス）	縫部　敦子	三菱UFJ証券	5				5				10		
	CDM情報整理（ヘルプデスク）	栩川　恭子	CEF Consulting Ltd.	3				10						10
	CDM投資促進 A	西田　誠一郎	三菱UFJ証券	3				5						
	CDM投資促進 B	宮田　健	三菱UFJ証券					5						
	CDM投資促進 A	Matthew Setterfield	三菱UFJ証券								10	10		
	CDM投資促進 B	Cynthia Hendrayani	三菱UFJ証券							5	5		5	
	報告書	(△=報告書)							△	○		○ ○	△	△
	ワークショップ	(○=ワークショップ)							IT/R	WS	WS	WS	DF/R	F/R

作業計画

年/月 作業計画	2005年度				
	11	12	1	2	3
第一次国内作業					
既存資料等の収集・整理・レビュー	.....				
現地コンサルタントへの再委託仕様書準備	.....				
インセプションレポート（案）の作成	.....				
インセプションレポート（案）の作成JICA本部への説明	△.....△				
第一次現地調査					
インセプションレポートのステアリング・コミティ及びテクニカル・ワーキング・グループへの説明・協議・合意		△.....△			
ベースラインデータの収集		■			
CDM推進メカニズム構築のための現地関係者ヒアリング		■	■		
ヘルプデスクでの活用に必要な情報の収集・整理		■			
クリアリングハウスに掲載する情報の検討・収集		■	■		
ヘルプデスク設立支援			■		
ヘルプデスクの設立発表			■		
クリアリングハウス設立支援			■		■
BOIを対象としたワークショップの開催			■		
DBPを対象としたワークショップの開催					■
第二次国内作業					
CDM推進のための方策の検討				□	
JICA本部への報告				□	
ヘルプデスク・スタッフのための教材の開発				□	

年/月 作業計画	2006年度							
	4	5	6	7	8	9	10	11
第二次国内作業								
インテリムレポート作成			□					
ERPAに関するマニュアルのドラフト作成				□				
第二次現地調査								
ステアリング・コミティ及びテクニカル・ワーキング・グループへのインテリムレポートの説明・協議・合意			△…△					
ヘルプデスクの設立（継続） - 既存の情報の収集・整理 - 他の機関とのインターフェース - ヘルプデスク・スタッフに対する実地研修の提供				■	■	■	■	
クリアリングハウスの設立（継続） - 情報クリアリングハウスに掲載する情報収集 - 情報クリアリングハウス開設				■	■	■	■	
地方ワークショップ				■		■		
プログラムCDM				■	■	■		
植林/再植林技術評価委員会（TEC)へのキャパビル					■	■	■	
ERPAに関するワークショップの開催							■	
モニタリング・マニュアルに関するワークショップの開催						■		
第三次国内作業								
JICA本部への報告			□	□	□	□	□	
地方レベルでの潜在的CDM案件を発掘するためのツールの構築						□		
モニタリング・事業者支援メカニズムの整備 - 事業者向けのモニタリングに関するマニュアルの作成			□		□		□	

年/月 作業計画	2006年度							
	4	5	6	7	8	9	10	11
第二次国内作業								
ERPAに関するマニュアルの作成（継続）				▭		▭		
ヘルプデスクの設立（継続） - ヘルプデスク・スタッフのためのトレーニング及び教材作成				▭			▭	
クリアリングハウスの設立（継続） - クリアリングハウス維持管理のためのマニュアルの作成						▭		
ドラフトファイナルレポートの作成 －各種マニュアルの整理 －各種資料の整理						▯		
CDM事業推進のための提言作成						▯		
第三次現地調査								
ステアリング・コミティ及びテクニカル・ワーキング・グループへのドラフトファイナル・レポートの説明・協議・合意							△┈△	
CDM推進のための提言（ドラフト）に関する協議							■	
第四次国内作業								
ファイナルレポートの作成・提出								▭

■ 現地調査　▭ 国内作業　△---△ 報告書　┈┈ その他

2. 調査結果

本調査は、フィリピン国内の CDM プロジェクトを促進し、ひいては同国の持続可能な発展に寄与するために、フィリピンの DNA の能力を向上させることを目指し、EMB-DENR 職員による積極的な参加を調査の基本的アプローチに沿えて実施された。調査期間中、EMB-DENR が確固たるコミットメントと本調査の目的に対する強い当事者意識を示したことは、本調査の目的達成に大きな力を発揮した。また、本調査団は、EMB の協力を得て、本調査団の手を離れても自立し存続し得る力を持ったヘルプデスク及びクリアリングハウスを設立すべく活動した。

2.1 CDM 事業促進のための方策

フィリピンには CDM として見込みある事業が多く、特に再生可能エネルギー（水力、風力、地熱等）及び廃棄物管理の分野に可能性を見出す事ができる。これらの可能性を最大限生かすため、本調査のインセプション・レポートでは、以下のような CDM 事業の促進策が提案された。

(A) 事業の CDM 化を促進するためのノウハウの構築、及び適切な方策の策定支援
(B) CDM 案件推進のための金融メカニズム構築の検討
(C) 地方レベルでの潜在的 CDM 案件を発掘するためのツールの構築
(D) フィリピンにおける登録済み CDM 案件のためのモニタリング・ガイドラインの作成、及びプロジェクト・デベロッパーが CDM プロジェクトとしての義務を遂行するための支援メカニズムの整備

加えて、インテリム・レポートの時点において、調査団は以下のような項目を CDM 事業促進策の策定に含むよう提言した。

（E）排出権売買契約（Emission Reductions Purchase Agreement: ERPA）に関する手引書の作成（プロジェクト事業者の観点から）
（F）植林/再植林の技術評価委員会（Afforestation/Reforestation Technical Evaluation Committee: A/R TEC）のためのキャパシティ・ビルディングワークショップの開催
（G）プログラム CDM

上記（A）～（G）の項目ごとの調査経過を、下記に述べる。

（A） 事業の CDM 化を促進するためのノウハウの構築、及び適切な方策の策定支援

2006 年 1 月 16－17 日、調査団は、貿易・産業省（Department of Trade and Industry: DTI）の投資局（Board of Investments: BOI）に対してキャパシティ・ビルディングワークショップ

を開催した。BOI がフィリピンへの投資勧誘に重要な役割を果たしている事から、調査団は、BOI 職員向けに国内での組織的な CDM 促進対策の構築に必要とされる段階について説明するワークショップを企画した（添付 3：BOI ワークショップ議事録）。

BOI は貿易・産業省の附属機関として同国内の投資促進の責務を主導的に負っている。その任務には、ワンストップ・アクションセンターを通して国内・海外投資を呼び込み、フィリピン人投資家及び海外投資家のため、同国内経済活動において投資家が希望する分野での起業及び事業成功への支援を行うこと等がある。

同国で実施される CDM 事業案件の増加に伴い、海外及び国内の事業投資を加速的に増加させるツールとして CDM を用いる事への BOI の関心は高い。

BOI 向けワークショップの参加者の関心は、事業の収入源としての認証排出削減量（Certified Emission Reductions: CER）の売却益によるインパクトに集まった。このため、ワークショップでは、CDM の紹介に加え、CO_2 換算 1 トン当たりの CER の価格変動が内部収益率（IRR）に如何に影響するかを実際の事業を例に挙げて比較・解説した。

CDM のルールと要件があまりに厳格なために当初は躊躇が見られた参加者も、CDM の実施過程におけるホスト国政府の役割及び PDD における投資分析上の注目点への理解が深まるにしたがって活発に議論するようになり、IRR の計算方法や公的資金を受けた事業の追加性などについて様々な質問が寄せられた。

また調査団は、CDM 事業促進策における戦略に関して 2006 年 10 月に IACCC 及び関連省庁と討議の場を設けた（添付 4：CDM 促進に関する IACCC ミーティング議事録）。同討議の場においては以下のような提案が提示された：

- DNA や他省庁の上級職員が、国内における CDM 促進とそれに必要は資金支援を獲得するためのマーケティングの中心的役割を担うべきである。また、四半期毎にオリエンテーションを実施する等、率先してローカル・レベルでの CDM 案件発掘を行うべきである。
- 2010 年までの中期フィリピン開発計画（MTPDP）の下期計画に、CDM の促進を一つの目標として入れ込む。
- 事業者が環境審査を申請するプロジェクトの CDM 化の可能性が検討できるようなメカニズムを導入し、環境影響評価（EIA）システムと連係して CDM の促進を図る。

EMB-DENR は討議で提示された案について、実施が比較的容易で資金面からの負担が軽い提案から実施を試みることに合意した。

（B） CDM 案件を推進する金融メカニズムの構築の検討

2005 年 11 月に実施したフィールド調査の期間中、調査団はアジア開発銀行（Asian Development Bank: ADB）、フィリピン開発銀行（Development Bank of the Philippines: DBP）、

フィリピンに拠点を持つ日本の民間銀行を含む金融機関を訪問した（添付 2)。面談の際、訪問先から多く提案されたのは、以下の二つのスキームであった。

- スキーム 1：DBP → 本邦民間金融機関 → CDM 事業者
  1. DBP が外貨建てで本邦民間金融機関にファイナンスを提供
  2. 本邦民間金融機関が直接 CDM 事業者にペソ建てで融資

- スキーム 2：本邦民間金融機関 → DBP → CDM 事業者
  1. 本邦民間金融機関が DBP に円建てでファイナンスを提供
  2. DBP が CDM 事業者にペソ建てで融資

スキーム 1 を実施する場合には、（独）日本貿易保険（NEXI）による海外投資保険の提供の可能性にも議論が及んだが、最終的には上記スキーム 2 に挙げたツーステップ・ローンのスキームの実現可能性がより高いという結論に至った。その理由は、すでにこのスキームが日本の国際協力銀行（JBIC）や民間商業銀行により DBP に提供されているためである。

2006 年 3 月 21－22 日、調査団は、CDM 促進のための適切な金融メカニズムの検討に役立てるべく、DBP に対しキャパシティ・ビルディングワークショップを実施した（添付 5：DBP ワークショップ議事録)。

DBP は、2003 年 11 月に承認された気候変動プログラムという環境政策の下に CDM を推進してきた。現在は同プログラムのスコープを拡充し、CDM 資金調達ファシリティ（CDM Financing Facility）を新たに設立し、炭素投資銀行業務を DBP の通常業務に組み込む計画を構築中である。

ワークショップで発せられた質問の多くは、DBP のパイプライン案件に関する追加性の問題や DBP のクレジット・ラインを CDM プロセスに融合するための適確なアプローチ、また DBP がカーボン市場に参加することのメリットなど、CDM に関する深い知見を必要とするものであった。ワークショップの最後には参加者を 2 グループに分け、各グループが実際の案件の CDM としての適格性を判断する模擬審査を実施した。それぞれのグループの代表が模擬審査での討議結果を発表し、お互いのコメントを出し合った。この模擬審査は、融資パイプラインにおいて、高品質の CDM 事業を選別するための DBP の能力向上に役立てることが出来た。

特筆すべきは、2006 年 3 月の上記ワークショップ開催後に、CDM 事業に特化した新しいファンドとなる炭素ファシリティプログラムが、同行の上席役員へ直ちに提案されたことである。しかし残念ながら、DBP 内における機構的な問題により、同提案は未だ実現に至っていない。したがって、現在のところ、資金調達に奔走する CDM 事業者にとっては、環境関連投資向けの「環境ローンファシリティ」が、フィリピン国内で唯一のプログラムとなる。

（C） 地方レベルでの潜在的 CDM 案件を発掘するためのツールの構築

次項で述べるように、地方でのワークショップ開催により、本調査団は潜在する CDM プロジェクトを発掘する事が出来た。この取り組みは、JICA 調査終了後も継続すべきものであると考える。EMB-DENR の地方事務所へのキャパシティ・ビルディングのさらなる促進は大変有益であり、これが継続されれば、地方事務所の現地職員が、通常業務を通じて各地の多様なステークホルダーに向けて CDM を普及させることにつながる。

（D） フィリピンにおける登録済み CDM 案件のためのモニタリング・ガイドラインの作成、及びプロジェクト・デベロッパーが CDM プロジェクトとしての義務を遂行するための支援メカニズムの整備

CDM 事業がフィリピン政府により承認され、国連に登録された後に必要となる義務の遂行に関し、当該事業者に対してモニタリング技術の指導及びその他の支援を行う事は重要な課題である。そのため、本調査団は、排出削減モニタリング・ガイドラインを作成することにより、事業が CDM 登録された事業者を、プロジェクト設計書（Project Design Document: PDD）に規定されたモニタリングの実施において支援することとした（添付 6：排出削減量のモニタリング及び報告ガイドライン）。

CDM 事業のモニタリング計画は、事業の CDM 登録前に、PDD の作成過程で入念に策定されるものである。同計画は、モニタリングすべき項目、モニタリング頻度、及び品質管理方法を特定するものであるが、すべての事業者がこのガイドラインを必要とするわけではない。通常規模プロジェクトの事業者の場合は、パラメータのモニタリングに内部規定を設けている所もあり、この場合は、CDM のパラメータを既存のモニタリング手順に組み入れる事も可能である。しかしながら、これは CDM の利用なくしては実施不可能とされるような小規模プロジェクトの事業者には当てはまらない。しかも、フィリピンの CDM 事業においては、そのような小規模事業が大半を占めるのである。

ガイドラインは、適切なモニタリングを行うための実践的な情報を提供することにより、PDD のモニタリング計画と現実の事業実施との間の隔たりを減ずるよう作成する。また、調査団は、ガイドラインに盛り込むデータ収集のため、2006 年 9 月に、主として実施可能性の高い CDM 事業を抱える事業者向けにワークショップを開催した。ベリフィケーションの実施経験豊かな指定運営機関（Designated Operational Entity: DOE）である TUV-SUD は、このガイドラインを審査すると共に、プロジェクト事業者に実用的なアドバイスを提供すべく、情報提供者としてワークショップに参加した。

このガイドラインは、完成次第、情報クリアリングハウスを通して公開される事になっている。実質的で計測可能な排出削減量を獲得すべく、信頼性の高いモニタリング計画を準備しているプロジェクト事業者に、本ガイドラインが役立つ事が見込まれる。

（E） プロジェクト事業者の観点からの温室効果ガス排出削減量購入協定（ERPA）に関

する手引書の作成（

ERPA は Emission Reduction Purchase Agreement1 の略で、取引される CER の価格及び量に関して買い手（プロジェクト事業者）及び CER を購入する売り手との間で締結される契約である。一般的に、ERPA の法務アドバイスは主として買い手側向けに提供されるため、売り手側は不利な状況に置かれており、多くのプロジェクト事業者は事業の CDM 化に踏み切れずにいる。

現在、多くのカーボンファンドや排出権買取りプログラムにより 10 種類以上に及ぶ ERPA の雛型が作られているが、調査団では、国際排出量取引協会（IETA）の ERPA を選び、これを基に ERPA の手引書を作成した（添付 7：温室効果ガス排出削減量購入協定：売り手の視点から）。

手引書作成に先立ち、調査団は事業者達と討議の場を設けた。会合には、既に様々な買い手と ERPA を締結済みの事業者も呼び、契約締結の経験や見識を他の参加者と共有してもらった。プロジェクト事業者達は、実際に見込みのある買い手と交渉に入る前に知っておくべき、或いは検討すべき問題を提示した。事業者から得た意見を基に、調査団は ERPA の手引書を完成し、2006 年 10 月下旬にワークショップを開催した。

(F) 植林/再植林の技術評価委員会（A/R TEC）のためのキャパシティ・ビルディングワークショップの開催

TEC は、事業の技術面及び持続可能な開発への寄与度を基準に、フィリピン DNA の内部で CDM 案件の評価を担う機関である。セクション 3.2.1 の図 2 に示すように、TEC は 3 つの部会から成る。しかし、A/R TEC である森林管理局（Forest Management Bureau: FMB-DENR）職員に向けてのキャパシティ・ビルディングは過去開催されたことがなく、本調査において初めて実現した

日本の新エネルギー・産業技術総合開発機構（New Energy and Industrial Technology Development Organization: NEDO）は、エネルギーの CDM 事業評価を担当するエネルギー庁（Department of Energy: DOE）及び廃棄物管理 CDM 事業評価を担当する EMB-DENR に所属する TEC 委員に向けてキャパシティ・ビルディングプログラムを実施した。

EMB-DENR の CDM 事務局及びそのヘルプデスクには、実施可能性の高い多くの森林プロジェクトの事業者より、そのプロジェクトの CDM 化の適格性についてこれまで多くの相談が寄せられている。この事実を踏まえ、調査団は、評価基準や評価手順の確立を目指し、A/R TEC 担当者に向けてキャパシティ・ビルディングワークショップを開催した。

ワークショップ第 1 セッション（2006 年 8 月 22～23 日）

第 1 セッションで取り上げたテーマは、CDM の基本から森林 CDM プロジェクトの要件概要、及び承認済みの A/R CDM 方法論に及んだ。各プレゼンテーションの後、出席者との活発な質疑応答が行われた。本ワークショップは、出席者参加型のセッションによって CDM

の基本概念及び A/R の技術的な問題を一度に吸収できるとあって、好評を博した。

第 1 回ワークショップの目的の 1 つは、提案された A/R CDM プロジェクトの評価方法について内部規則や手順を構築することであった。これを達成するため、A/R TEC に何が出来、何をしたいのかを参加者に明確化させた上で、調査団よりエネルギー・廃棄物管理に関する TEC の持続可能な開発基準及び評価手順を参考例として紹介した。

<評価基準>

他の TEC の規則や手順を学んだ後、A/R TEC のメンバーは A/R CDM プロジェクトにとって適切な評価基準は何かについて内部で議論し、下記に示す「フィリピンの持続可能な森林管理（Sustainable Forest Management: SFM）に関する基準と指標」に基づいて評価基準を作成する事で合意した。

- SFM のための許可条件
  SFM を実施可能にするのに必要な、全般的な制度上の要件
- 森林の範囲及び条件
  生産森林・保護森林双方の森林地帯の安定に関する条件設定
- 森林エコシステムの健全性
  森林エコシステムの健全な生物学的機能に関する事項
- 森林生産
  木製または非木製の森林製品の生産に関わる森林管理ユニット（FMU）の活動と関連した森林造成（これは FMB の主たる責務である。）
- 生物多様性
  エコシステム、種及び遺伝子レベルにおける生物多様性の保護と維持 : 及び、保護という観点においてマスタープランを肯定
- 土壌及び水質保全
  森林の生産力の保守につながる土壌及び水質保全を、下流の水質と流れを保持しつつ、FMB プログラムの下、流域管理を計画策定の基本資料として考慮。この基準は沿岸部近辺の森林地帯の管理にも適用。
- 社会的、経済的、及び文化的側面
  FMU の内外のコミュニティに提供される森林からの多大な便益に関するもので、オンサイトまたはオフサイトにおけるすべての便益を考慮。

<評価プロセス>

A/R TEC が合意した評価プロセスを下記に示す。このプロセスは、2006 年 8 月初旬に公布された A/R TEC 及びその事務局を指定する特別令に盛り込まれた機能構造と整合するものである。まず FMB-DENR 内事務局が CDM 事務局から受領した PDD 及びその他申請書類を TEC に配布する。TEC はそれらの書類に基づき案件の審査を行い、評価レポートを FMB-DENR 内事務局を通じで CDM 事務局に提出する。

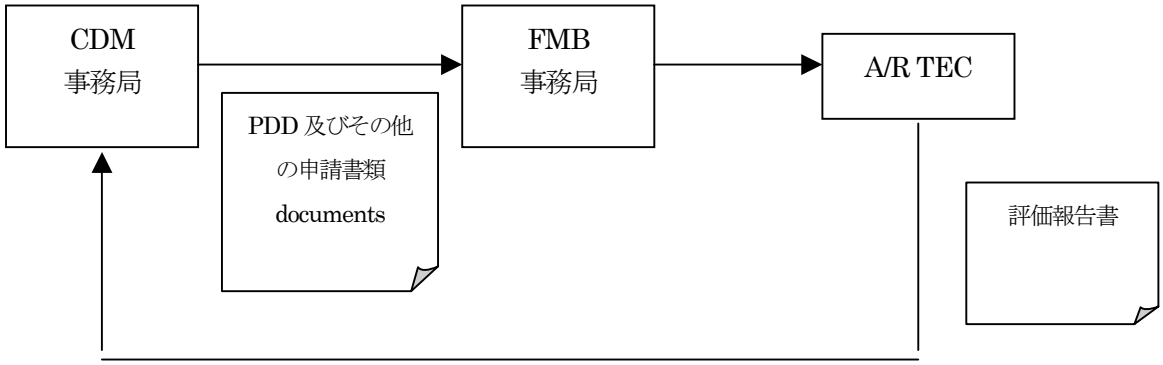


図 1：提案された A/R TEC 評価プロセス

ワークショップ第 2 セッション（2006 年 9 月 18～19 日）

第 2 セッションでは、実際の案件を用いてケーススタディを行う事により、第 1 セッションで決定した評価基準及びプロセスに則って評価のシミュレーションをする事ができた。調査団は、バリデーション段階にある 3 件の実在するプロジェクト、及び UNFCCC ウェブサイトでパブリック・コメントにかかっている PDD を第 2 セッションで提示した。

ケース 1: Reforestation of Severely Degraded Landmass in Khammam District of Andhra Pradesh, India under the ITC Social Forestry Project
ケース 2: Facilitating Reforestation for Guanxi Watershed Management in Pearl River Basin Project
ケース 3: Bageoalli CDM Reforestation Programme

A/R TEC は、評価シミュレーション体験において、第 1 セッションで合意された評価基準の適用を検証した。シミュレーションの結果、すべての SFM 基準が CDM プロジェクトに適用可能という訳ではないことに鑑み、FMB-DENR は、今一度基準についての見直しが必要と結論づけた。本件については、A/R TEC 内部でさらに検討し、2006 年 10 月末に予定されている第 3 回ワークショップで評価基準の改訂版を提示することとなった。

ワークショップ第 3 セッション（2006 年 10 月 27 日）

第 3 セッションは、前 2 回のワークショップからの課題であった、A/R TEC の評価基準に関する最終的な結論付けを行った。また、土地の適格性、低所得コミュニティの定義、森林の定義を含む A/R プロジェクトの重要な実施要件についての討議も行われた。本セッションの結果は下記の通りである。

＜評価基準（改定）＞

- 社会面
  - プロジェクト実施地域におけるプロジェクトの容認：プロジェクトは社会的に容認され、将来及び実施課程におけるあつれきや対立は防がれなければならない。

- 経済面
  - 雇用の創生：プロジェクト実施者はプロジェクトの計画段階で周辺地域に対する経済的なインパクトを提示しなければならない。地域住民の貧困削減の緩和対策、収入や雇用の創生に関する戦略を明記する必要がある。
  - 製品/収入の共有：プロジェクトによって生み出される製品や収入をプロジェクト計画に明確に記載しなければならない。
  - 排出権売却による利益：プロジェクト実施者は、プロジェクト実施者は排出権売却により利益（概算）と売却する可能性のある市場を提示しなければならない。
  - 資金・資本へのアクセス：どのようにしてプロジェクトを実施するのかその方策の提示しなければならない。

- 環境面
  - 水質及び土壌保護を目的とした技術の活用：適切な技術の活用、及び適格な種並びに地質の選択によって、水と土壌の質並びに量が確保されなければならない。
  - 生物多様性の増進：プロジェクト実施者は保護地域とプロジェクト地域の境界を定め、生物多様性の管理計画を提示しなければならない。プロジェクト実施前・中・後のプロジェクト地域内外の生物多様性の状況を文書で報告しなければならない。
  - 適切な種の選択：プロジェクト実施者は優先的に在来種を活用しなければならない。
  - 森林保護システム

＜土地的確性の証明に必要な文書＞

- 公有地
  - 以下のような土地所有に関する法的文書の提示
    ① 地方公共団体（市・地方自治体、バランガイを含むLGU）が発行する保証書
    ② プロジェクトを実施する人民委員会、協同組合、民間企業の取締役会決議
    ③ PCSDが発行する保証書（パラワン地域に限る）
    ④ プロジェクト実施地区を明示した保有地区のベースマップ
    ⑤ 環境天然資源オフィサー発行の1990年以前は荒廃地であったことの証明書

- 私有地
    ① 私有地のスケッチ・プラン
    ② 土地所有権または納税申告証明書のコピー
    ③ 1998年12月31日以降荒廃地であったことを証明するCENRO発行の文書

＜低所得コミュニティの定義＞

プロジェクト主体が低所得コミュニティに属していることを証明するには、DAO05-17 に記

載されている低所得コミュニティの定義に基づき、CENRO が発行する証明書を PAD または PDD に添付して提出しなければならない。DAO05-17 では低所得コミュニティが以下のように定義されている。

“低所得コミュニティ及び個人とは、CDM プロジェクトが実施される土地の一部を現在耕作し、伝統的にその全てのまたは大部分の資源を活用し、プロジェクトが実施される土地の中または隣に居住し、実際に土地の一部を開発しているコミュニティまたは人々を指す。”

低所得コミュニティの定義を満たしているか否かを立証するために、プロジェクト実施者は下記の文書の提示を求められる。

- プロジェクト実施地域に隣接している森林居住者または森林コミュニティにのみ発行されるコミュニティベース森林管理合意文書（Community-Based Forest Management Agreement: CBFMA）のコピー
- CDM プロジェクトを実施する CBFMA 保有者または人民委員会の社会・経済活動に関するプロフィールのコピー

調査団は、本調査が A/R TEC である FMB-DENR に対するキャパシティ・ビルディングの目的であった「評価基準と評価プロセスの策定」を達成したと確信している。CDM 事務局は現在、最初の A/R プロジェクトのホスト国承認申請書を来年早々受領する見込みであるため、今後の課題は、A/R TEC が合意された規定の期間内に、本ワークショップで策定した評価基準やプロセスに則ってプロジェクトの評価を行うこととなる。

（G）プログラム CDM

2005 年 12 月にモントリオールで開かれた COP/MOP1 において、気候変動枠組条約及び京都議定書の締約国は、実際の政策または基準の実施を構成する活動を、方法論的要件が充足されていることを条件に CDM 活動として考慮する事を決定した。

“Decides that a local/regional/national policy or standard cannot be considered as a CDM project activity, but that project activities under a programme of activities can be registered as a single CDM project activity” (FCCC/KP/CMP/2005/L.7Para.20)

（地方国内地域レベルでの政策や基準は、CDM プロジェクト活動とはならない。しかしながら、活動プログラムの下でのプロジェクト活動は、単体の CDM プロジェクト活動として登録出来る。）

調査団は、インテリム・レポートにおいて、DOE、EMB-DENR、FMB-DENR を含む関連政府機関におけるプログラム CDM の概念についての認識を高め、可能性のある案件を発掘するよう提案した。しかしながら、方法論パネルが 2006 年 6 月末にプログラム CDM に関する問題点を提出し、CDM 理事会（CDM Executive Board: EB）に対してさらなる指導と明確化の実施を要請した。

EB は 2006 年 7 月の第 25 回定例会議で方法論パネルが提起した問題を検討し、同パネルに

対して、これらの問題への疑問点のオプション及び予想される影響を纏めるよう要請。特に、定義、バウンダリー、モニタリング、追加性、クレジット期間、大規模プロジェクトのバンドリングへのアプローチ及びバンドリングの手引きの各事項についてのリスト作りに重点が置かれた。

2006 年 8 月、本調査団は、プログラム CDM の現況を共有するために関係政府機関とコンサルテーション・ミーティングを行った。フィリピン政府が可能性あるプロジェクトを発掘する手助けとすべく綿密な討議をしたものの、この新しい概念に関する現在の EB の立場等が影響し、具体化しなかった。それでもなお、ミーティング参加者は、EB の方針が決まれば、下記に示すセクターや活動が最終候補者として選ばれる可能性を示唆した。

- 地方自治体（Local Government Unit: LGU）レベルでの ESCO（Energy Service Companies）プロジェクト
- DOE 主導によるバイオ燃料イニシアチブ
- 照明の効率化プログラム
- FMB-DENR の再植林/植林プログラム

2.2 ヘルプデスクの設立

インセプション・レポートでは、ヘルプデスク設立のために下記の 4 つの項目について調査を実施することとした。

(A)　ヘルプデスクで活用するための既存情報の収集及び選択
(B)　他の政府機関とのインターフェース
(C)　ヘルプデスク・スタッフのための研修教材及びマニュアルの作成
(D)　ヘルプデスク・スタッフに対する実地研修の提供

第一年次では上記のうち（A）から（C）を重点的に調査した。

(A) ヘルプデスクで活用するための既存情報の収集及び選択

現在 CDM に関する資料の多くはインターネットや書籍で検索・閲覧が可能であるが、情報量が膨大なため、CDM 専門家以外には取捨選択が困難である。調査団は、EMB-DENR 職員と共に多様な既存情報を収集、ヘルプデスク・スタッフが日常の業務で最も必要と思われる情報を選別し、ヘルプデスクとしての迅速な対応ができるようなツールの基盤を構築した。具体的には以下のような情報を収集した。

- 京都議定書、マラケシュ合意、CDM 理事会の決定事項等 CDM 案件を実施する上で必要な国際制度に関する情報
- フィリピン DNA の承認体制や事業者に周知する必要のある手続きに関する情報
- 通常及び小規模 CDM 案件のための PDD テンプレート並びに PDD 作成ガイダンス

- PDD 作成に必要な方法論（承認済み・承認待ちを含む）の概要と適用可能なプロジェクトのタイプ、ベースライン策定に必要なデータの収集
- CDM を実施するための資金調達の方法、国内外の投資の可能性・各先進国政府の CDM プロジェクト補助金制度の情報

また調査団は、他機関の情報ニーズを把握するため、CDM に関わるフィリピン国内のステークホルダー（DBP、BOI、NGO である KLIMA-Manila Observatory、現地事業者 5 社等）と面談した。

この面談の結果、様々なステークホルダーより、CDM 関連の照会を専門に対応する特化した機構作りを希望する声が聞かれた。ポテンシャルの高いプロジェクトを有する事業者が EMB-DENR 職員との直接コンサルテーションを希望する場合、ヘルプデスクの機能が生かされることが期待される。

面談の中には、ヘルプデスクの持続可能性に関する疑問もあった。これに対し、ヘルプデスク・マニュアルを作成し、本調査終了後も確実に存立させるようにすると調査団は回答した。

(B) 他の政府機関とのインターフェース

他機関の業務との重複を避けるとともに、本調査で設置するヘルプデスクの業務内容を CDM 関連事項に限定するため、調査団は他機関の既存の業務とヘルプデスク相互の合理化に努めた。その一環として BOI、DBP、エネルギー省（DOE）、及び KLIMA-Manila Observatory に対して面談を実施した。各機関の活動は以下の通りである：

- BOI : DTI の付属機関である BOI は、フィリピン国内の投資促進を担う政府機関である。BOI は、国内及び国外投資家がフィリピンにおける経済活動を支援している。
- DBP：DBP は、国内企業に対する中・長期的な財政支援を提供している。その支援は、特に農村部の中小企業に重点が当てられている。DBP は「環境ローン・ファシリティ」を通して、CDM プロジェクトに対する財政支援を積極的に行っている。
- DOE：DOE は国内のエネルギー関連政策及びプログラムの策定を担っている。また、技術評価委員会の一組織として、エネルギー関連 CDM プロジェクトを技術的に評価している。
- KLIMA：米国国際開発庁（USAID）の支援により、フィリピン気候変動プログラムの一環で IACCC と DOE のジョイント・ベンチャーとして 1999 年に設立された。KLIMA は国連環境計画（UNEP）のキャパシティ・ビルディング・プログラムである CD4CDM を実施し、CDM プロジェクト・サイクルに関するトレーニングや啓蒙活動を行った。

面談した各機関･団体の専門家達は、DNA 内におけるヘルプデスクの設立案について好意的であった。特に BOI は、BOI 窓口 (one-stop action center) に CDM に関する問い合わせが多数寄せられており、情報共有のためのメカニズムの構築（共同ワークショップの開催等）が課題であると指摘した。CDM ヘルプデスクの提供する業務範囲を周知させるために、調査団

は 1 ページものの簡易なパンフレットを作成し、他機関のヘルプデスクや EMB-DENR の主催行事の参加者に配布した。EMB-DENR 職員は、引き続きこの案内を様々なワークショップで配布する予定であり、ヘルプデスクの宣伝に一役買うことになろう（添付資料 8：ヘルプデスク・パンフレット）。

調査団は、関係諸機関、特に IACCC のメンバー機関と定期会合を設け、ヘルプデスク活動の現状、CDM の各段階（DNA 承認申請、DNA 承認取得、UNFCCC 登録済、など）におけるフィリピンのプロジェクトの現況などについて情報を更新するよう EMB-DENR に勧奨する。これにより、関係諸機関は CDM を積極的に受け入れているセクターを理解し、投資家に対して登録済プロジェクトを宣伝する事が可能となる。

(C) ヘルプデスク・スタッフのための研修教材及びマニュアルの作成（添付資料 9 : The フィリピン DNA ヘルプデスクのための CDM マニュアル）

ヘルプデスクは本調査によって初めて設立されることから、すべてのプロセスは実地訓練（learning by doing）のアプローチで実施された。当初は、調査第二年次において蓄積されたノウハウを関係者内で共有するという観点から、研修教材及びマニュアルを作成することを予定していた。しかし、2006 年 1 月にヘルプデスクを開設する運びとなったため、ヘルプデスク・スタッフが CDM 用語を理解し、外部からの問い合わせに迅速に対応することができるよう、開設前にマニュアルを作成した。

(D) ヘルプデスク・スタッフに対する実地研修の提供

調査後半には、ヘルプデスク職員と緊密に連係する事により、実際の問い合わせに対応するためのヘルプデスク・スタッフへの実地研修が集中的に実施された。この研修は、地元コンサルタントと共に開催した。

2006 年 1 月 19 日、ヘルプデスクが EMB-DENR 内に正式に開設された。プロジェクト事業者、マニラ駐在の日系企業、関係省庁職員を招いて開設式が執り行われ、プレス・リリースの配布も行い、ヘルプデスク開設のニュースは、電子メールによるニュースメディアである Climate-L によって配信された。同社は、専門家向けに気候変動問題及び京都メカニズムに関する最新情報を提供している。

ヘルプデスクに調査機関中寄せられた質問は、DNA 承認プロセス、申請必要書類や CDM プロジェクト・サイクルに関するものであり、2 名の EMB 正規職員及び JICA 調査で雇用した 2 名のコンサルタントがこれらに対応した。ヘルプデスク・マニュアルにより、職員はある程度技術的な質問にも対応することが可能であった。また、ヘルプデスクでは対応できない難問や、プロジェクトの CDM 適格性に関する質問は、本調査団へ照会するよう誘導した。ヘルプデスクが受け付けた質問数は月平均で 20～30 件であり、ヘルプデスク開設以来の訪問者ログを記録してきた（添付資料 10：ヘルプデスク訪問者ログ）。

第 4 章に述べるように、本調査終了後にヘルプデスクが直面する問題は、主として EB

決議や新方法論などの複雑な質問にどう答えていくかである。調査団では、今後技術的に複雑な質問が増加すると予想している。これは、プロジェクト事業者が CDM に関するビジネスとしての決断を下すのにそのような質問が重要だからである。一方、クリアリングハウスに公開される情報が充実するに従い、基本的な質問は次第に減少するであろう。

よって、調査が終了する 2006 年 11 月以降もヘルプデスクのサービスレベルを持続させるため、第 4 章に示すような代替的な支援の仕組みの必要性が増すこととなる。

2.3 情報クリアリングハウスの設立

インセプション・レポートでは、情報クリアリングハウス設立のために下記の 4 つの項目について調査を実施することとした。

(A) クリアリングハウスが使用する情報の収集と選別
(B) クリアリングハウス設立に関する技術支援の提供
(C) クリアリングハウスの開設
(D) クリアリングハウス職員のための保守管理マニュアルの作成

(A) クリアリングハウスに掲載する情報の収集と選別

調査団は、既に公開されている情報や他機関のウェブサイトを活用して、フィリピンのプロジェクト事業者にとって有益と思われる CDM や京都議定書に関する基礎情報を収集し纏めた。

また、地球環境戦略研究機関（IGES）の支援を得て EMB-DENR 職員が構築したベースライン・アーカイブ・データを、IGES の了解を得てクリアリングハウスに掲載することとなった。本アーカイブには各グリッドの規模や、二酸化炭素排出係数及び発電量等、PDD 作成に必要な情報が豊富に網羅されている。

さらに、KLIMA-Manila Observatory によって運営されている既存のウェブサイトの構成及びコンテンツを、どの程度本調査に活用することができるのかについて検討した。CD4CDM プログラムの下、KLIMA-Manila Observatory のウェブサイトには、国内の有効化審査段階にある CDM 案件リスト、ナショナル・ワークショップの議事録やプレゼンテーション資料、UNFCCC やポイント・カーボン等関連ウェブサイトのリンクなどが UNEP の支援を受けて掲載されてきた。クリアリングハウスが配信予定のコンテンツは、KLIMA-Manila Observatory が配信していたものと重複する面もあるが、EMB-DENR との協議の結果、KLIMA-Manila Observatory は非政府組織（NGO）であることから、本 JICA 調査によって DNA に構築されたウェブサイトこそ、フィリピンの正式な CDM ウェブサイトとして認識されるべきとする結論に至った。

さらに、EMB-DENR との協議により、当クリアリングハウスのコンテンツには、気候変動や京都メカニズム等の一般情報のみならず、DNA 承認プロセス・承認基準、CDM に関する

国内政策、PDD 作成等に必要なデータを含む、CDM に特化した内容を盛り込むことで合意した。

クリアリングハウスに関わる主要業務である、膨大なソースからの情報収集が達成された事は特筆に価する。クリアリングハウスは 2006 年 9 月 21 日に正式に発足した。したがって、情報公開に耐え得るようクリアリングハウスを常に更新していく事が肝要である。ここで考えられる課題は以下の 2 点である。

(A) CDM に関連する政策及び規制情報の更新
(B) CDM 理事会（EB）決議及び新方法論情報の更新

上記 2 点についての対策は、第 4 章で述べることとする。

(B) クリアリングハウス設立に関する技術支援の提供

調査団は、EMB-DENR 及び JICA との協議の結果、CDM ウェブサイトの構築においては、グラフィック・デザインやコンテンツ構築を含む専門技術の提供が可能なウェブデザイナーを現地コンサルタントとして採用することを決定した。

3 名のウェブデザイナーに面接を行い、各人に下記の調査項目に関するプロポーサルの提出を求めた。

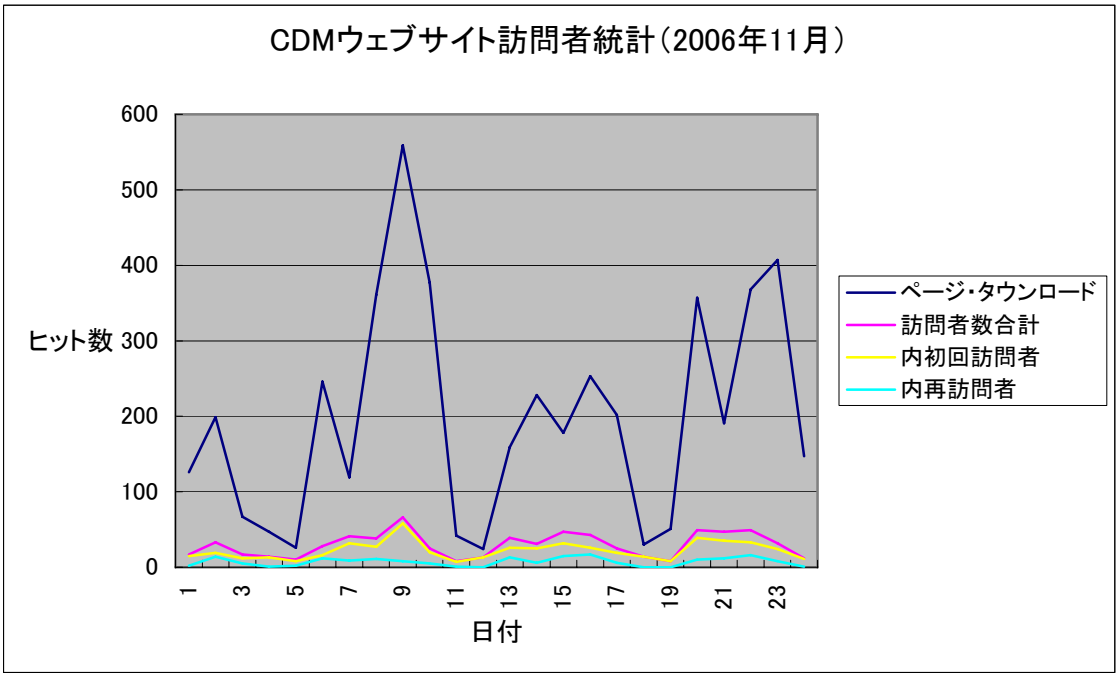
1. デザインとテンプレートの作成を含むウェブサイトの構築
2. ウェブサイトの維持管理マニュアルの作成
3. クリアリングハウス・スタッフを対象としたウェブサイトの更新等に関するテクニカル・ワークショップの開催
4. アフター・サービスの提供（2006 年 11 月まで）

EMB-DENR と本調査団との厳密な審査の結果、Sagric International 社の Ronnel Figracion 氏を本件のウェブデザイナーとして採用した。

(C) クリアリングハウスの開設

クリアリングハウスの開設式は 2006 年 9 月 21 日に執り行われた。プロジェクト事業者、政府関係者、プレス関係者等が出席し、DENR 上級次官の Bravo 氏が閉会の式辞を述べた。開設のニュースはフィリピンの主要新聞のひとつであるマニラ・ブレティンに掲載された（添付資料 11：マニラ・ブレティン記事）。

オフィシャルなウェブサイトアドレスは、http://www.cdmdna.emb.gov.ph である。開設後 10 月からアクセス数を記録できるカウンターを設けたが、2006 年 11 月 24 日現在で 1,350 件のアクセスが有り、同年 10 月の訪問者の統計が下記のようなグラフに纏められた。



グラフ 1：CDM ウェブサイト訪問者統計（2006 年 11 月）
（出所：フィリピン DNA クリアリングハウス）

(D) クリアリングハウス職員のための保守管理マニュアルの作成（添付 12）

採用したウェブデザイナーの助力を得て、調査団は保守管理マニュアルを作成した。この作成と共に、ウェブサイトの保守管理に関する研修ワークショップを開催し、本調査が完了しても、EMB-DENR 職員が自力でウェブサイトを更新する事が可能となることが期待される

ウェブサイトの定期的な更新は重要であるが、そのためにはウェブサイトのメンテナンスに専従できるフルタイム職員の確保が少なくともあと 1 名は必要である。現状の構造では、ヘルプデスクとクリアリングハウスの持続性を確保するのは困難であり、EMB-DENR にとっては大きな課題といえよう。このような状況を打開するための提案を第 4 章に記載している。

2.4 地方におけるワークショップの実施

これまで、フィリピンにおける CDM に関するキャパシティ・ビルディングワークショップは、主として中央政府高官及びマニラ首都圏を本拠とする民間企業、NGO を対象として実施されてきた。このことから、EMB-DENR は、地方に潜在するプロジェクト事業者及び CDM プロジェクトの発掘のために、地方レベルでのワークショップ開催を切望していた。

地方レベルでのワークショップの対象となるのは、LGU、EMB-DENR 、DOE、及び DOST

の地方事務所、地方金融機関、プロジェクト事業者、NGO などである。出来得る限り多くの CDM プロジェクトを発掘し、日本とフィリピン間の持続可能な協力体制の実現へ道を開くため、調査団は CDM の解説のみならず、およそ半日を費やして事業者との個別コンサルテーションを実施した。ワークショップは討論と具体例の研究を中心に行われ、フィリピンの事情に適合する CDM プロジェクトのタイプなどの提示も為された。

第 1 回ワークショップ（2006 年 7 月 25～26 日、ルソン島バタンガス市）

参加者 18 名の属するセクターは多岐に渡り、民間では鉄鋼、飲料、養豚、電力業などであり、公共部門では LGU、EMB 地方事務所、電力協同組合であった。CDM プロジェクトの実施経験を持ち、CDM についての知見も深い参加者も数名見受けられた（添付資料 13：ワークショップ参加者リスト及び議事録）。

第 1 回ワークショップにより、潜在性の高いプロジェクトとして見出されたのは、廃水処理場のメタンガス回収、小規模水力、鉄鋼産業の廃ガス利用、埋立地のメタンガス回収であった。

第 2 回ワークショップ（2006 年 9 月 11～12 日、ビサヤ島セブ）

第 2 回には、製糖工場、ヤシ油工場、飲料製造業、養豚、農業組合、電力協同組合、研究開発機関（家畜糞尿管理）、DENR 地方事務所などの各セクターより 27 名の参加があった。このワークショップを通じて見出されたのは、食品製造業の廃水処理、ヤシ油工場や食肉処理場の廃水及びバイオガス、再植林等の CDM プロジェクトであった（添付資料 14：ワークショップ参加者リスト及び議事録）。

第 3 回ワークショップ（2006 年 9 月 14～15 日、ミンダナオ島）

セメント業、養豚、製糖、及び DENR、DOI、DBP の各地方事務所、電力協同組合の各セクターから、38 名の参加を得た。有望な CDM プロジェクトとして、セメント工場のエネルギー効率化、ヤシ油工場の廃水処理、養豚場のバイオガス回収が見出された（添付資料 15：ワークショップ参加者リスト及び議事録）。

今般の地方レベルでのワークショップ開催により浮き彫りとなったのは、現地言語の重要性であった。フィリピンはビジネス上英語が通じる国として知られているが、地方において実りある議論を推し進めるには、現地語の使用が不可欠である。この点、本調査団の地元コンサルタントが、今回の現地語によるワークショップの成功に大きな役割を果たした。

本調査におけるローカル・ワークショップ開催の主目的は達成されたと確信している。ワークショップを通して、マニラ首都圏以外の小規模プロジェクト事業者は CDM に関する起訴知識を得ることができ、また EMB-DENR も良質な案件を発掘することができた。このような地方レベルでのワークショップの開催は、今後国内での CDM 促進の一助となるが、EMB-DENR が独自にこのような活動を遂行することができるかどうかは、今後の CDM 事務局の制度面及び構造面での改善次第である。

2.5 CDM 促進のための提言の作成

CDM を促進する上で EMB-DENR 職員が直面している課題は、ヘルプデスクでの問合せに対応し、クリアリングハウスの運営に従事する職員の不足である。本調査の開始以降、EMB-DENR は人材確保の必要性を訴えてきたが、未だに実現していない。本調査期間中のヘルプデスクの運営は、本調査で前年 11 月に 1 年契約で採用された 2 名の現地コンサルタントが、2 名の EMB フルタイム職員を支援するという体制で行われていた。しかしながら、本年 11 月の調査終了と同時に、この現地コンサルタントは任期満了となってこの業務から離れる。

したがって、体制を強化し、可能な限り迅速にヘルプデスク職員を追加することは必須である。ヘルプデスクとクリアリングハウスが確実に存続し、フィリピンの CDM をさらに促進するためにも、人材の手当ては重要な戦略であると言える。

この懸念事項を解決すべく、JICA のご助力により、調査団は EMB-DENR の主席・次席次官、局長、副局長と討議を行った。この討議結果を踏まえた、本調査の成果を持続させるための提言を本報告書の第 4 章に示す。

なお、フィリピン DNA は、調査開始直後の 2005 年 12 月に風力案件に対して承認を出したのを皮切りに、本調査実施中合計 8 件の CDM プロジェクトについて承認を発行した。調査を開始した 2005 年 11 月時点では、DNA による承認を取得したプロジェクト件数が皆無であったことに比べると大きな進歩である。それら DNA 承認を取得したプロジェクト合計 8 件のうち、2006 年 10 月までに 6 件が UNFCCC に登録され、登録数についてはトップ 10 入りを果たした。ASEAN 諸国の中ではマレーシアに次いで二番目の登録件数を誇っている。

このような進展は、CDM を推進したいという EMB-DENR 側の強いオーナーシップとコミットメントに拠るところが大きい。例えば、本調査の成果の一つであるヘルプデスクでは、各種ステークホルダーからの質問に迅速に対応し、必要であれば TEC を含む DNA 関係部門と適切にフォローをしてきた。これは登録を急ぐ事業者の支援となったばかりでなく、承認作業のスムーズな実施の一助ともなり、結果として国の持続可能な開発に貢献したことは明白である。調査団は、本調査を通してフィリピンにおける CDM 促進のための基礎作りに少しでも貢献できたことを光栄に思う。

3. フィリピンにおける CDM に関する概況

3.1 CDM 促進のための施策・政策

CDM の国内推進に向けたフィリピン政府のこれまでの取り組みを紹介する。

3.1.1 IACCC の設立

IACCC は気候変動に関する政策や UNFCCC との交渉について、省庁間の調整を図る機能として設立した。マラケシュ合意では、京都議定書を批准した参加国政府は承認機関として DNA を設立することと定められており、IACCC はフィリピンにおける CDM の枠組みの構築と DNA の設立に大きく寄与した。

3.1.2 大統領令（Executive Order: EO）No.320 の発令と DNA の設立

EO320 の発令により、DENR は 2004 年 6 月 25 日に正式に DNA に認定された。この大統領令のもと、DNA は以下の業務を担うことになっている。

1. 国の CDM 政策の構築
2. CDM 案件を評価するための基準、指標、規格、システム、手続き、及び評価ツールの構築
3. 京都議定書に基づいて UNFCCC へ提出する CDM 案件の審査及び承認
4. 国内における CDM 案件の進捗状況のモニタリング
5. CDM の国内促進に向けたその他の活動

エネルギー、植林/再植林、及び廃棄物管理に関する技術評価委員会（Technical Evaluation Committee: TEC）の創設も EO320 により決定された。TEC は、各案件が国の CDM 承認基準を十分満たしているかどうかを技術面から評価し、DNA の承認業務を支援する役割を担っている。

3.1.3 DENR 行政令 No. 2005-17 の発令

フィリピンにおいて CDM 案件を発掘・促進するために、2005 年 8 月に DENR 行政令（DENR Administrative Order: DAO）No. 2005-17 ”Rules and Regulations Governing the Implementation of Executive Order No. 320”が制定された。本行政令の主目的は以下の通りである。

1. 国の CDM 政策の明確化
2. フィリピン CDM の枠組の明確化
3. 申請された CDM プロジェクトに対する、透明性が高く、効率的で、参加方式を取り、且つ信頼性の高い承認手続きの実施

3.2 フィリピン DNA の組織構成と承認プロセス

フィリピン政府は、CDM が同国に多大な便益をもたらすことを認める基本政策を採っている。これは、CDM プロジェクトの実施によって海外からの投資、雇用、収益機会、環境改善に寄与するプロジェクトの推進、技術移転、及び附属書 I 国への CER の売却益が見込めるからである。

そのため、DNA としての DENR の基本政策では、以下に該当する CDM 案件を優先的に実施することが規定されている。

1. 人為的活動による気候変動への影響を絶ち、UNFCCC が目標とする温室効果ガス削減に寄与すること。
2. 環境に配慮した優秀な技術とノウハウの移転につながること。
3. 生物多様性保護と天然資源の持続的な活用に貢献すること。
4. その他の関連する法規制を遵守していること。
5. 持続可能な開発への一助として貧困の削減対策を示すこと。

上記の基本政策は、下記の原理に基づいている。

1. 国の持続可能な開発を進めるのは国家の役目である。
2. 透明性が高く、参加方式を取り、信頼性が高く、効率的な手順を踏む。
3. 変化する CDM の国際ガイドラインや国内法規制の影響を受けるプロジェクト実施者、政府、各ステークホルダーのニーズと要求に応えられるような政策的枠組を構築する。

3.2.1 DNA とその支援メカニズム

前節で述べた通り、DAO2005-17（別名 Rules and Regulations Implementing EO320）により、DNA が CDM 案件を審査･承認するための様々な支援メカニズムが設定されている。このメカニズムは、政府の関係省庁、民間及び NGO セクターから構成されている。

CDM 運営委員会（CDM Steering Committee）は、政府代表として DENR、エネルギー省（Department of Energy: DOE）、及び科学技術省（Department of Science and Technology: DOST）から各 1 名、民間代表としてフィリピン商工会議所（Philippine Chamber of Commerce and Industry: PCCI）から 1 名、NGO 代表としてフィリピン気候変動ネットワーク（Philippine Network on Climate Change: PNCC）から 1 名のメンバーで構成されている。Committee のメンバーは常任（副長官級）と非常任がおり、それぞれ同等の議決権を持っている。議長は、DENR 長官に任命された DENR 副長官がもう一人の非常任メンバーと共に務めている。CDM 運営委員会は TEC の評価結果を精査し、承認の場合は Commitee's Endorsement Report を、あるいは否承認または要再審議の審査結果を DENR 長官へ提出する任を負う。また同委員会は、長官に対してフィリピンの CDM 政策及び枠組の効率的な実施と改善に関するアドバイスを提供する役割も担っている。

TEC は DNA 承認申請をしている案件が、国の承認基準を満たしているかどうかチェックする機能である。3.1.2 で既述の通り、TEC は三つの部会に分かれ、エネルギー、植林/

再植林、廃棄物管理の各セクターに属する案件を審議する。

EMB 本部に CDM 事務局が設置されており、EMB 局長が統括している。CDM 事務局は、DNA の承認プロセスが遅滞なくスムーズに流れるよう、以下のような支援を提供している。

1. 承認申請書類の書類審査
2. 案件ごとに適切な TEC の選定
3. TEC が作成した評価報告書の CDM 運営委員会への提出
4. CDM 運営委員会の管理運営及び技術面で必要な支援の提供
5. 個別案件の審査状況のチェック及びプロジェクト事業者への連絡

DENR 長官による最終決定が下されるまでの間、CDM 事務局は TEC または CDM 運営委員会による審査内容を外部に漏らしてはならない。このような承認に関する支援業務に加えて、CDM に関する国内外の決定事項を速やかにステークホルダー及び DAO2005-17 の施行に必要とされる関係諸機関に配布する役割も担っている。

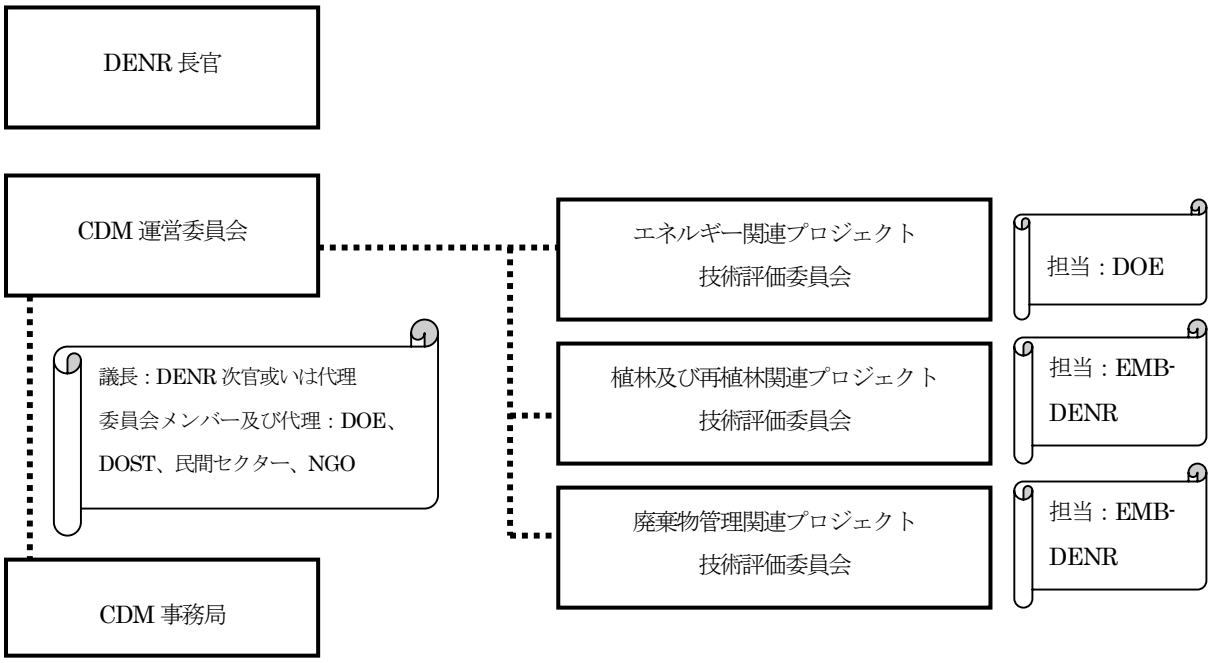


図 2：DNA 組織図（出所：フィリピン DNA ヘルプデスク）

3.2.2　DNA 承認プロセス

DNA の承認プロセスは下記のフローチャートの通りである。

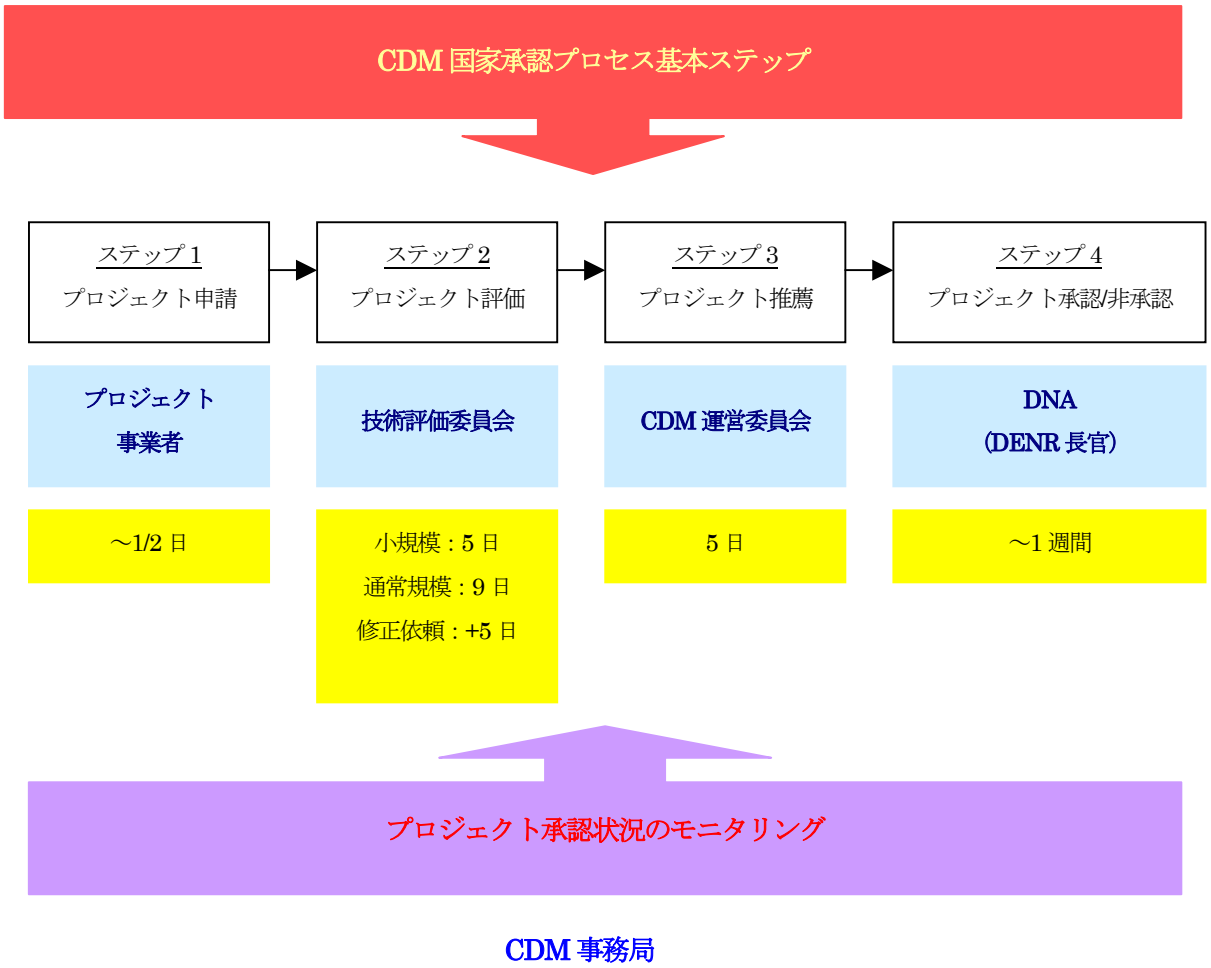


図 3：フィリピン DNA 承認プロセス（出所：フィリピン DNA ヘルプデスク）

3.2.2.1　プロジェクト申請書（PAD）とプロジェクト設計書（PDD）の準備

事業者は DNA 承認を申請するための提出書類として PAD（Project Application Document）[1]または PDD（Project Design Document）[2]を選択し、CDM 事務局に提出する。CDM 事務局はまず、提出書類に齟齬がないかを審査する。PAD とは、PDD の簡略版である。PDD を提出する場合は、持続可能な開発による便益についての説明書（Sustainable Development Benefits Description: SDBD）[3]、ステークホルダー協議[4]の詳細やプロジェクト参加事業者の

[1] DAO 2007-17 の 5.31 に記載されている通り、PAD は事業者が作成しなければならない。記載すべき内容の項目は DAO2007-17 のアネックス II に掲載されている。

[2] CDM 理事会に認定されている PDD を提出する場合、SDBD、事業者の登記簿、ECC または CNC といった書類の提出も義務付けられる。PDD とその他必要書類を提出した場合、PAD の提出は不必要である。

[3] 当該案件の持続可能な開発へのインパクトについて、DNA 承認申請をする事業者が作成しなければならない。SDBD は PAD に不可欠な構成部分であるが、PDD 提出の場合にも、必須の添付資料として別途作成が義務付けられている。

[4] PAD の一部として或いは PDD の添付資料として、CDM 事務局への提出が義務付けられている。協議がどのように開催され、コメントはどのように収集されたかを既述しなければならない。必要最低限の記載内容は、(a) 書面による

行為能力の証書[5]もあわせて提出しなければならない。また PAD 或いは PDD の提出に関わらず、当該プロジェクトに関する環境審査の結果をまとめた Environmental Compliance Certificate（ECC）、或いは ECC は必要でないことを証明する Certificate of Non-Coverage（CNC）[6]の提出が必須となっている。また、申請書類の提出にあたっては、公証人による書類の公証が必要である。

小規模案件については、SDBD に記載しなければならない必要最小限の項目は DAO 2005-17 の第 3 章[7]に記載されている。通常規模案件については、当該 CDM プロジェクトに起因する悪影響が生じた場合に必要な措置、及び当該プロジェクトの持続可能な開発による主要なインパクトのモニター方法も記載しなければならない。

事業者は、DAO2005-17 によって社会、経済、環境という 3 つのカテゴリーでそれぞれ定められている持続可能な開発の基準に沿って SDBD を作成する。また、プロジェクト実施地域の住民にとって何が便益となるのかを TEC が評価できるよう、プロジェクトレベルの適切な指標を特定することが要求される。

3.2.2.2 必要書類の CDM 事務局への提出

事業者は、承認申請に必要な全書類（添付資料及び図表、写真、地図、スキャンした書類などの電子コピーを含む）を揃え、CDM 事務局に申請を行うべく、EMB 本部へ持ち込む。事務局は、チェックリスト[8]に基づいて、提出書類に齟齬がないかを確認する。この書類審査により申請の完了見込み有りと確認されたところで、事業者は支払い支持書に従い、登録申請料として、小規模案件の場合は 5,000 ペソ、通常規模の場合は 10,000 ペソを基本料 600 ペソに加えて EMB の出納課に支払う。事業者は、支払い書類及び領収証を受領後、最終書類を作成し、CDM 事務局へ正式な申請書類を提出する。

申請書類に不備があった場合は、CDM 事務局は申請を受け付けず、事業者は完全な書類を携えて再度申請を行わなければならない。

3.2.2.3 プロジェクト評価

事業者から提出された申請書類は、CDM 事務局の書類審査を経て TEC に回覧される。エネルギー関連案件は DOE、廃棄物関連案件は EMB-DENR、植林/再植林関連案件は FMB-DENR の TEC メンバーに届けられる。埋立地からのメタンガス回収（Landfill Gas: LFG）案件等二つのセクターにまたがる案件の場合は、関連するそれぞれの TEC へ申請書類が回覧される。TEC の審議には、小規模案件であれば 5 営業日、通常規模であれば 9 営

協議開催通知、(b) 参加者リスト、(c) 協議議事録、(d) 参加者からの質問・コメント、(e) 参加者からの質問やコメントへの対応案、(f) ロケーション・マップ、である。

[5] 会社概要、認可の有無、及び代表者による宣誓書と、定款や付随定款等の事業者の法的能力を証明する書類の提出が必要である。

[6] DAO には定義されていないが、ECC 或いは CNC は当該プロジェクトの環境影響を推察する上で役立つ資料である。

[7] (a) プロジェクト概要、(b) 経済的側面、(c) 環境的側面、(d) 社会的側面、(e) 当該案件の持続可能な開発への影響

[8] CDM 事務局スタッフが、提出書類に齟齬がないかチェックするために用いるリスト。

業日を要する。

TEC は、SDBD に記載されている内容をチェックし、国だけでなく、プロジェクト実施コミュニティの持続可能な開発への当該案件の貢献度を審査する。また、ステークホルダー協議の内容も審議し、住民の参加が規定通り行われているかを確認する。この点において、ECC は、当該案件がフィリピンの環境政策及び環境基準に適合するかどうかを判断するのに良い指標となる。

TEC は審査終了後、審査結果及び推薦理由などを含む評価報告書を作成し、CDM 事務局を通して CDM 運営委員会に提出する。評価報告書では、ステークホルダー協議で指摘された問題への事業者による取り組み内容についての評価も行う。評価報告書を受領次第、CDM 事務局は報告書を取り纏めて CDM 運営委員会へ提出すると共に、同委員会に対してミーティングを召集する。

TEC は、審査期間中であれば必要に応じて、審査期間（小規模案件は 5 営業日、通常規模案件は 9 営業日）が経過する前に、事業者に対して、提出書類の修正、説明、及び追加情報を修正要請書（要請書のコピーを CDM 事務局へ回覧）によって要求できる。この場合、事業者は要請書を受領してから 15 営業日以内に TEC の要求に回答しなければならず、15 営業日を経過しても回答しない場合には、当該事業者は案件の承認申請を放棄したとみなされる。或いは、TEC から要請書を受領して 5 営業日以内に、事業者はいつまでに回答を提出するか明記した今後の取り組み予定を書面で提出することもできる。この場合も、記載されている期日までに回答を提出することができなかった場合、当該事業者は案件の承認申請を放棄したとみなされる。

TEC は事業者からの修正回答を得た後、この回答に基づいて 5 営業日以内に再度審議を行い、CDM 事務局を通じて評価報告書を CDM 運営委員会に提出する。

3.2.2.4 プロジェクトの推薦

CDM 運営委員会は、TEC からの評価報告書を審査し、審査から 5 営業日以内に審査結果をまとめた推薦レポートを CDM 事務局経由で DENR 長官へ提出する。CDM 運営委員会は、TEC による案件の推薦を適用しないと判断した場合には、書面でその理由を提示しなければならない。また、案件が二つの TEC によって審査され、方針の異なる二つの評価報告書が出された場合には、どちらの TEC の審議結果をベースに審査をするかをその理由と共に決定せねばならない。

3.2.2.5 プロジェクト承認/否承認/再審議

DNA のトップである DENR 長官は、CDM 運営委員会の案件是認報告（Endorsement Report）を受領次第審理し、申請されている CDM 案件の承認[9]または否承認[10]を決定しなけ

[9] 承認レターは次のような内容である。「フィリピンは 2003 年 11 月 20 日に京都議定書を批准している。PAD または

ればならない。なお、承認レターが発行されても、フィリピンの他の適用法規を順守するという事業者の義務が消えることはない。長官の承認/否承認レターは、CDM 事務局を通じて事業者に通達される。

否承認となった事業者が再審を要求する場合は、否承認書の受領後 15 日以内に長官室まで再審請求を出さなければならない。

3.3 カーボン市場の概況

カーボン市場とは、京都メカニズムで定められた削減目標を達成するために、各国が削減割当及び削減クレジットを取引する市場である。クレジットの対価の支払いは、現金、エクイティの提供、デットの提供、温室効果ガス排出を抑えるための技術提供のような現物出資、またはそれらを組み合わせる方法があり得る。

排出量取引は、主に以下の二つのグループに分類することができる。

- 削減割り当ての取引：キャップ・アンド・トレード方式のもと、バイヤーが割当量（AAU）や JI から創出される排出削減単位（EUA）といった削減割り当てを取引する仕組み。キャップ・アンド・トレード方式は、設定されている削減目標を達成するための柔軟な取引メカニズムであり、環境面での信用度が高い。
- プロジェクト・ベース取引：バイヤーが認証された削減クレジットを購入する仕組み。京都議定書で定められた CDM プロジェクトの CER や JI プロジェクトの ERU（Emission Reductin Unit）の取引がこれに当たる。プロジェクト・ベース取引も、承認方法論を基にプロジェクトが設計され、第三者機関によるクレジット認証を得ることから、環境的信用度が非常に高い。

京都議定書の中で、フィリピンのように削減目標が課せられていない非附属書 I 国（主に発展途上国）が参加可能な仕組みは CDM である。本項では、フィリピンに関係のあるプロジェクト・ベース取引の市場トレンドの中でも特に CDM について述べることとする。

プロジェクト・ベース取引における 2005 年の取引量は、合計 3 億 7,400 万 tCO_2e（CO_2 相当トン）であり、前年度の 3 倍と大きく伸びた。2006 年 3 月末時点で、7,900 万トン以上の削減クレジット（主に CER）が 2006 年第一四半期に契約締結されている[11]。取引量増加の主な理由の一つは、実現可能性の高いプロジェクトの供給増にある。2005 年末の段階で、有効化審査のパブリック・コメント取得段階まで到達したプロジェクトは 900 件に上った。中国やブラジルのように、プロジェクト・ベース・メカニズムに対して、政府として積極的に支援をするホスト国も出てきた。さらに、大規模プロジェクトの数も増加しており、2005 年に

PDD の記載内容の審査結果、当該案件はフィリピンの持続可能な開発に貢献すると判断し、当該 CDM 案件への当該事業者の自主的参加を承認する。」

[10] 非承認レターには、「当該案件はフィリピンの DNA 承認基準を満たしていないと判断された」旨、記載される。

[11] 世界銀行「カーボン市場の現状とトレンド 2006」p21

は4件のHFC-23分解プロジェクトについて契約が交わされた。

EU ETS市場もCDM市場における価格上昇傾向に拍車をかけた。プライマリー市場のCER価格は2004年で1トン当たり5.15米ドルだったのが、2005年には7.04米ドル、2006年第一四半期には11.56米ドルに上昇した。その後、2006年4月後半のEUA価格の下落に伴い、CER及びERU需要への影響を見極めようとする動きが強まり、売り手、買い手双方とも取引のペースを落とした。

これまでのカーボン市場は買い手市場であった。しかし、2005年に締結された契約では、むしろ売り手が価格形成者として台頭し、売り手側により有利に運ぼうとする傾向がみられた。しかし、この傾向も最近のEU ETS市場の価格下落に伴い、今後の動向は不透明である。

2005年1月から2005年3月に締結された取引量では、アジアが全体の73%と最大のシェアを占めている。南米は17%であり、締結したERPAの数で見てみると、中国、インド、及びブラジルが主な売り手国となっている。中国で取引量が多いのは、HFC-23分解プロジェクトが数件実施されているためである[12]。

3.4 フィリピンにおけるCDMプロジェクト

2005年11月以降、EMB-DENRへ28件のCDMプロジェクトがホスト国承認申請をしており、このうち8件がホスト国承認を受けている。また、既に風力プロジェクト1件、廃水処理プロジェクト1件がUNFCCCに登録されているのに加え、家畜糞尿管理プロジェクト5件、及び地熱プロジェクト1件が登録を申請中である。

表1　フィリピンにおけるCDMプロジェクト（出典: フィリピンDNAヘルプデスク）

	カテゴリー	プロジェクト名	ホスト国承認	登録	年間推定削減量 (トン CO_2 換算)
1.	廃棄物管理	Rocky Farm Methane Recovery	承認申請中		3,397
2.	廃棄物管理	D&C Farm Corporation Methane Recovery	承認申請中		1,498
3.	廃棄物管理	Superior Methane Recovery	承認申請中		2,209
4.	廃棄物管理	Paramount Integrated Methane Recovery and Electricity Generation Project	2006年6月30日承認	登録申請中	7,582
5.	廃棄物管理	Lanatan Methane Recovery	承認申請中		3,986
6.	廃棄物管理	Unirich Farm Corporation Methane Recovery	2006年6月30日承認	2006年10月28日登録	2,929
7.	廃棄物管理	Everlasting Farm and Sentra Farm	承認申請中		4,086

[12]世界銀行「カーボン市場の現状とトレンド2006」p28

		Corporations Methane Recovery and Electricity Generation Project			
8.	廃棄物管理	Gold Farm Corporation Methane Recovery and Electricity Generation Project	2006 年 6 月 30 日承認	2006 年 10 月 21 日登録	2,929
9.	廃棄物管理	Goldi Lion Farm Corporation Methane Recovery and Electricity Generation Project	承認申請中		3,262
10.	廃棄物管理	Red Dragon Farm Corporation Methane Recovery and Electricity Generation Project	承認申請中		1,494
11.	廃棄物管理	Red Dragon (II) Methane Recovery and Electricity Generation	承認申請中		2,954
12.	廃棄物管理	Joliza Methane Recovery	2006 年 6 月 30 日承認	2006 年 10 月 23 日登録	3,656
13.	廃棄物管理	Bondoc Realty Methane Recovery	承認申請中		3,471
14.	廃棄物管理	Jhon & Jhon Methane Recovery	承認申請中		1,420
15.	廃棄物管理	Gaya Lim Methane Recovery	2006 年 6 月 30 日承認	2006 年 10 月 30 日登録	3,130
16.	廃棄物管理	Santo Domingo Methane Recovery	承認申請中		2,997
17.	廃棄物管理	Pig City Confined Swine Feeding Operations Methane Capture and Combustion from Improved Animal Waste Management System	承認申請中		23,855
18.	再生可能エネルギー	33 MW North Wind Bangui Bay Project	2005 年 12 月 16 日承認	2006 年 9 月 10 日登録	56,788
19	埋立地メタンガスのエネルギー利用	Cebu landfill gas to energy project	承認申請中		21,500
20	地熱	20 MW Nasulo geothermal project	2006 年 6 月 30 日承認		81,009
21	Waste Handling and Disposal	Wastewater treatment using Thermophilic Anaerobic Digestor at An Ethanol Plant in the Philippines	2006 年 6 月 30 日承認	2006 年 10 月 1 日登録	95,896
22	廃棄物管理	Amigo farm methane recovery and electricity generation project	承認申請中		14,777
23	廃棄物管理	Excel farm methane recovery and electricity generation project	承認申請中		19,464
24	再生可能エネルギー	San Carlos Renewable Energy Project	承認申請中		37,608
25	再生可能エネルギー	Sipangpang 1 MW mini-hydropower project	承認申請中		2,471
26	バイオマス	First Farmers Holding Cooperation bagasse cogeneration plant	承認申請中		120,040

27	再生可能エネルギー	Burgos 40 MW Wind Power Project	承認申請中		62,872
28	廃熱のエネルギー利用	Philippine Sinter Corporation Sinter Cooler Waste Heat Recovery Power Generation Project	承認申請中		54,643

3.5 フィリピンにおいて温室効果ガス削減に潜在性のあるセクター及びプロジェクト

フィリピンはその島嶼国であるという特徴から資源が豊富であり、そのような資源を活用したプロジェクトをCDM事業として実施することも可能である。、例えば、非電化の遠隔地やバランガイ[13]における小規模のオフ・グリッド技術による電力供給などにプロジェクトのCDM化の可能性が見出せる。地形的特徴から、再生可能エネルギーの促進はCDM案件実施の上でポテンシャルが高い分野であり、海岸線は風力発電に適しており、既にCDMとして実施されているプロジェクトもある（例：Bangui Bay Northwind Power Project in Ilocos Norte）。また、北部（ルソン）と南部（ビサヤ及びミンダナオ）の山間部では水力発電プロジェクトのポテンシャルが高い（例：Ambuklao Hydro Power Project in Ifugao及びthe Sibulan Hydro Power Project in Davao）。

フィリピンの主要産業が農業であることから、農業廃棄物を活用した発電事業やコジェネレーション技術の導入も有力なセクターである（養豚場のメタンガス回収、籾殻やバガス発電等）。また、同国は多くの火山を有することでも有名であり、地熱発電事業も実施可能性の高いセクターである（例：Nasulo Geothermal Energy Project）。

また、埋立地ガス回収及び発電事業も有力である（例：20MW Inawayan LFG to Energy Project in Cebu）。特に一般廃棄物管理法9003（RA9003）の施行により、分別の導入、自治体LGUの廃棄物処分の責任、野積み埋立地から衛生埋立地への転換、廃棄物管理費用の汚染者負担が明文化された。

これに伴い、LGUが処分する廃棄物については、コンポストでの処理、衛生埋立地での最終処分過程では、メタンが出にくい処理方式を取った上で、発生したメタンガスについては、可能な限りエネルギー利用するよう定められた。経済性の理由からあまり進んでいない埋立地におけるメタンガス回収及び発電利用も、CDM事業として実施すれば、クレジット獲得というインセンティブが働くため、今後LGUが同法のもとで積極的に取り組んでいくことが期待される。結果的にRA9003の導入はフィリピンCDM事業推進にとって「追い風」となったといえよう。

南部（特にビサヤ）にはさとうきび工場が多く、廃棄物によるバイオ燃料の生産、及び輸送やボイラーへのバイオエタノールの利用もCDM事業として実施できる可能性が高い。

[13] バランガイとはフィリピン政府が定める最小の地域単位である。

植林/再植林セクターでは、流域森林の再建及び増大事業が最もポテンシャルの高い CDM 事業である（例：Streambank Rehabilitation and Ecological Enhancement in Tanay Micro-watershed, Rizal Province）。

3.6 2005 年の認証排出量（Certified Emission Reductions: CER）取引量及び今後の価格

前章で述べたように、2005 年の CER の取引量は、前年比約 3 倍であった（下表参照）[14]。プロジェクト・ベース取引市場は、京都議定書や EUETS といった国際的あるいは域内の取り決めの遵守に有効なクレジットを取引するマーケットと、オーストラリアのニュー・サウス・ウェールズ州のように、法律の遵守に有効なクレジットを取引するマーケットに大別される。

表 2：プロジェクト・ベース市場の取引量と価格
（出所：世界銀行「カーボン市場の現状とトレンド 2006」）

	2004		2005		2006	
	量 (MtCO2e)	価格 (MUS$)	量 (MtCO2e)	価格 (MUS$)	量 (MtCO2e)	価格 (MUS$)
遵守制度計	107.07	534.59	368.30	2,665.31	79.12	906.14
内						
CDM	97.00	485.01	346.15	2,544.30	75.61	886.85
JI	9.10	54.19	17.78	82.41	3.29	19.29
その他	0.96	4.39	4.37	38.59	-	-
自主的・小売市場	2.82	5.57	6.05	43.03	0.08	0.55
合計	109.99	549.16	374.34	2,708.34	79.19	906.69

CER の価格は需要と供給によって決定され、オフィシャルな価格といったものは存在しない。発行された CER であれば、少なくとも現在 EU ETS 市場での取引価格と同等の価値があるというのが多くの専門家の見るところである。CER の価格は、下表が示す通り契約の種類によって異なる。

表 3：契約のタイプと CER 価格（出所：三菱 UFJ 証券）

タイプ	契約	CER デリバリー	支払い	プライシング
I	現時点	即時	即時	ディスカウントなし
II	現時点	将来	将来（デリバリーと引き換え）	ある程度のディスカウント
III	現時点	将来	即時（前払い）	大幅なディスカウント

[14]世界銀行「カーボン市場の現状とトレンド 2006」p24

未発行の CER には下記のようなリスクが伴う。

- CER は UNFCCC に認定され、発行されて初めて法的に有効となる。実際のクレジット量は、プロジェクトのパフォーマンス（及びベリフィケーション）、実際の CER の発行に左右され、買い手の国家登録簿にクレジットを移転するためには、国際取引ログが機能していることが条件となる。
- クレジットは附属書 I 国の国家登録簿に記載されて初めて当該国の達成目標にカウントすることができる。
- 国家登録簿に移転されたクレジットは、2008 年まで取引することができない。

CER の価格は、上記のような様々なリスクがあるため、今後の予測が難しいところである。しかし、ポイント・カーボンが実施したアンケート調査によると、70%以上の回答者が、2006 年の CER 価格は 2005 年 12 月時点と比較して上昇すると予測している[15]。

3.7 他のドナーによるフィリピン DNA を対象としたキャパシティ・ビルディング・プログラム

DNA のキャパシティ向上は CDM を推進する上で欠かすことのできない要素である。多くのドナー国や機関が非附属書 I 国政府を対象とした CDM に関するキャパシティ・ビルディングを実施しており、フィリピンもそのような取り組みの恩恵を受けている。

インセプション・レポートにも記載した通り、本調査は既存のプログラムとの連携を通して、支援分野の重複をさけ、フィリピン政府が様々なプログラムの成果を最大限有効活用できるような環境作りに努めている。この観点から、本調査団は IGES が実施したナショナル・ワークショップでヘルプデスクの開設を参加者に説明し、また（社）海外環境協力センター（OECC）が開催した東京－マニラ間の CDM に関する TV 会議にもスピーカーとして参加した。

下記は、フィリピン DNA に対して様々な支援機関により現在までに実施されたキャパシティ・ビルディング・プログラムの概要である。

3.7.1 第二次国別報告書作成のためのキャパシティ・ビルディング

- 支援機関：地球環境ファシリティ（GEF）（国連開発計画 UNDP 経由）
- 目的：(1) 温室効果ガス・インベントリーの改善に必要な支援の提供、(2) 気候変動を削減するためのアクション・プランの構築、(3) UNFCCC に提出する第二次国別報告書の作成準備、(4) 国内における気候変動問題に関する啓蒙・普及活動
- プロジェクト構成：(1) 現状評価、(2) 2000 年温室効果ガス・インベントリーのアップデート、(3) 二酸化炭素排出係数に関するデータの整備、(4) 二酸化炭素削減技術の移転に関するニーズ・障壁・機会調査、(5) 気候変動の影響調査及びその対策措置の優先順位、(6) 第二次国別報告書の作成
- 実施機関：IACCC（EMB-DENR 経由）

[15] ポイント・カーボン「カーボン 2006」p45

3.7.2 CDM のための能力構築（CD4CDM）

- 支援機関：国連環境計画（UNEP-RISOE）
- 目的：CDM に関わる様々なセクター（DNA、民間企業、他の政府機関、市民団体）に対するキャパシティ・ビルディング
- 活動内容：ワークショップの開催、PAD 作成支援、コンサルテーションの実施
- 実施機関：IACCC（EMB-DENR 経由）

3.7.3 温室効果ガスのインベントリーの制度設計（2001 年）

- 支援機関：GEF（UNDP 経由）
- 実施機関：IACCC（EMB 経由）
- 目的：(1)「第二次国別報告書作成のためのキャパシティ・ビルディング」の延長プログラム、(2) 定期的且つ体系的な温室効果ガス排出インベントリーの構築

3.7.4 DNA 設立及びその枠組とフィリピンのプロジェクト支援システム確立のためのキャパシティ・ビルディング（2003 年～2005 年）

- 支援機関：オランダ大使館（UNDP マニラオフィス経由）
- 目的：DNA の設立に向けた法的枠組みの構築、DNA の運営のための枠組の確立
- 成果：EO320 と DAO2005-17 の制定
- 活動内容：関係機関とのコンサルテーション及びインタビューの実施、ワークショップの開催
- 実施機関：IACCC（EMB-DENR 経由）

3.7.5 CDM 推進のための包括的なキャパシティ・ビルディング（2003 年～2005 年）

- 支援機関：IGES
- 目的：民間事業者に対する CDM に関する啓蒙活動、民間事業者への PDD 作成支援、案件の評価に関する DNA 支援メカニズムの強化、ベースライン・データの構築、CDM 案件の具現化への支援
- 成果：CDM カントリー・ガイド作成、2 件の PDD の作成
- 活動内容：DNA や民間企業に対するトレーニング・ワークショップの開催、CDM パイプライン構築を目的とした地方向け研修ワークショップの開催、PDD 作成のための技術セミナーの実施
- 実施機関：IACCC（EMB-DENR 経由）

3.7.6 CDM 技術評価委員会（TEC）のためのキャパシティ・ビルディング（2004 年～2005 年）

- 支援機関：NEDO
- 実施機関：三菱証券株式会社
- 目的：(1) エネルギーと廃棄物関連 TEC のメンバーを対象としたプロジェクト審査能力強化のためのキャパシティ・ビルディング、(2) CDM 案件の評価推進のための内部規則及びプロセスの構築支援

- 活動内容：トレーニング・ワークショップの開催
- 対象とした機関：DOE（エネルギー関連 CDM プロジェクト）、EMB-DENR（一般廃棄物管理関連 CDM プロジェクト）

3.7.7 フィリピンにおける再生可能エネルギー促進のためのキャパシティ・ビルディング（CBRED）

- 支援機関：GEF（UNDP 経由）
- 目的：再生可能エネルギーによる化石燃料の代替を促進する上での障害の特定による温室効果ガスの削減
- 活動内容：(1) 再生可能エネルギー政策構築のための政府機関に対するキャパシティ・ビルディング (2) 情報発信と啓蒙活動、(3) 省庁間の調整強化のための制度構築、(4) 再生可能エネルギー活用促進のための市場戦略の制定、(5) 再生可能エネルギー支援プログラムの構築、(6) 革新的な金融メカニズム、(7) 再生可能エネルギー産業の基準、規格、検査及び認証方法の構築
- 実施機関：DOE

3.7.8 フィリピン省エネ型照明への転換プロジェクト（Philippine Efficient Lighting Market Transformation Project :PELMATP）

- 支援機関：GEF（UNDP 経由）
- 目的：(1) 修正されたディマンド・サイド・マネジメントプラン対応のための電力会社及び電力協同組合への支援提供、(2) DBP と ESCO のキャパシティ・ビルディング、(3) 省エネ型照明導入のための貧困層向け小規模金融（マイクロファイナンス）の枠組み構築、(4)、省エネ型照明に関する指導の学校教育への組み込み、(5) 民間セクター支援強化のための、省エネ型照明の国家諮問委員会の活動と、省エネ型照明の政府規格及び政策技術部会との統合
- 実施機関：DOE の Fuel and Applicance Testing Laboratory (FATL)

3.7.9 気候変動のためのアクション・プラン

- 支援機関：USAID
- 目的：(1) 気候変動問題の国家政策への組み込み、(2) 気候変動インパクトへの対応策の検討、(3) 気候変動問題の緩和策構築
- 成果：緩和策における優先項目の特定に関するガイダンスを提供するための枠組として機能
- 実施機関：IACCC（EMB-DENR 経由）

3.7.10 再生可能エネルギー、エネルギー効率、及び温室効果ガス削減の促進能力の開発（2002 年）

- 支援機関：ADB
- 目的：再生可能エネルギー、省エネ、排出源削減プロジェクト促進のための能力開発
- 実施機関：DOE

3.7.11 フィリピン気候変動削減プログラム (1998 年～2001 年)

- 支援機関：USAID
- 目的：(1) 発電事業におけるクリーン燃料の導入による温室効果ガス排出の軽減、(2) 発電・配電・利用における効率の改善
- 成果：気候変動情報センター（CCIC、現在の KLIMA-Manila Observatory）の開設
- 実施機関：DOE（IACCC と連携）

3.7.12 気候変動プログラム (1998 年)

- 支援機関：GEF（UNDP 経由）
- 目的：UNFCCC に提出する第一次国別報告書作成のための各関係機関向けキャパシティ・ビルディング
- 成果：1994 年温室効果ガス排出インベントリーの作成と気候変動枠組条約第 12 条に定められた報告義務への対応の準備
- 実施機関：IACCC（EMB-DENR 経由）

3.7.13 Asia Least-Cost Greenhouse Gas Abatement Strategy (ALGAS) Project（1995 年）

- 支援機関：GEF（UNDP 経由）
- 技術支援：ADB
- 目的：(1) アジア域内の温室効果ガス排出の制限、(2) 気候変動問題に関するアジア地域における専門的なノウハウの蓄積、(3) 多くの深刻な環境問題に対応するための域内協力の重視
- 実施機関：IACCC（EMB-DENR 経由）

3.7.14 温室効果ガス・インベントリー (1990 年)

- 支援機関：USAID（更新されて第一次フィリピン国別報告書に組み込まれた米国国別研究プログラムの下で実施）
- 目的：温室効果ガス排出削減と CDM の実施可能性に関する計画立案のための基盤作り
- 実施機関：PAGASA (Philippine Atmospheric Geophysical Astronomical Services Administration) -DOST

4. CDM 促進のための提言

フィリピンには京都メカニズムの利用により便益を見込める事業が潜在していることから、本調査により設置されたヘルプデスク及びクリアリングハウスの持続性を堅持する事は極めて重要である。しかしながら、現況ではヘルプデスク及びクリアリングハウスの支援体制が十分であるとは言い難く、これは EMB-DENR にとって重要な課題である。この課題を克服するために最も留意すべき点を、以下に提言として示す。

制度的側面

ヘルプデスクを運営し、クリアリングハウスを維持上で中心的役割を担う CDM 事務局の制度的構造を強化すべきである。現況では、ヘルプデスクの業務にフルタイムで従事できる同事務局の EMB 職員は 2 名のみである上、その業務内容は DNA への申請書類やヘルプデスクへの問合せの受付けのみならず、UNFCCC へ提出する国別報告書（National Communication：気候変動への国家的取り組みを解説したもの）の作成、適応に関する方策の策定、また IACCC 事務局の中心スタッフとして様々な気候変動関連問題に対処している。

以上の事に鑑み、慢性的な人員不足を解消し、ヘルプデスク及びクリアリングハウスの効率を高めるためには、有用な制度構造、所謂「気候変動オフィス」の構築に関する提案の実現化が十分に検討されるべきである。同提案は 2005 年夏に、政府の合理化政策のための一案として提示された。EMB-DENR 局長の管轄下にある現在の IACCC 事務局と CDM 事務局を合体して気候変動オフィスとすることが盛り込まれている。同オフィスには気候変動ユニット並びに CDM ユニットの二つの機能を設け、国内または海外の支援によるプロジェクトの実施と DNA の承認業務を担うことが提案されている。

なお本調査期間中、度重なる要請にも係わらず、担当職員の増員は実現されなかった。調査終了後も引き続き職員増加への努力は継続されるべきであるが、当面そのような手当てが行われなくともヘルプデスク及びクリアリングハウスの業務が継続されるよう以下の方策の実施を推奨する。

技術的側面

[ヘルプデスク]

調査団として、EMB-DENR 職員の基本的な知見は、本調査期間中におけるヘルプデスク・マニュアルの完成及び実地研修によって十分なレベルに達したと確信するものである。さらに、一般的な質疑応答（Frequently Asked Questions: FAQ）はクリアリングハウスのウェブサイトに公開されており、ヘルプデスクのスタッフは質問者を FAQ へ誘導することが出来るようになっている。したがって、現在の体制下でも、EMB-DENR 職員が基本的な質問に対応する事は可能と考える。

課題はむしろ、フィリピンの CDM プロジェクトに影響する新方法論や EB 決議に関する複雑な問い合わせに如何に対応するかにある。このような質問へ回答するには、高い専門知識を有する CDM コンサルタントと同様のレベルが要求される。したがって、技術的に複雑な質問について、KLIMA-Manila Observatory、Preferred Energy Incorporated、三菱 UFJ 証券といった内外の専門家へ EMB-DENR 職員が照会できる仕組みを確立すべきである。

この他に EMB-DENR 職員を CDM の国内促進において支援するツールとしては、DNA その他の関係機関に来訪する投資家向けに、CDM の可能性があるプロジェクトのポートフォリオを構築しておく事が挙げられる。現時点では JICA 調査の領域外ではあるが、このようなポートフォリオは、見込みのあるセクターの地球温暖化ガス（GHG）の削減を評価し発掘することにより構築する事が可能である。この課題は今後、フォローアップが必要となる事項であろう。

[クリアリングハウス]

クリアリングハウス業務上、困難と考えられるのは、多様な情報ソースからの情報収集及びウェブサイトの構成とスキームの構築であるが、これらは 2006 年 9 月 21 日のクリアリングハウスの正式な発足をもって完了している。今後は、クリアリングハウスの公開情報の継続的な更新が重要となり、以下の分野について課題を見出せる。

（A） CDM に関連する政策及び規制情報の更新
（B） CDM 理事会（EB）決議及び新方法論情報の更新

これらの課題の解決策として、以下のことが考えられる。

(A) CDM に関連する政策及び規制情報の更新

政策などが修正される頻度は極めて限定的なものであるため、現況の 2 名の職員体制で更新に対応することが可能である。

(B) EB 決議及び新方法論情報の更新

通常、EB は 2 ヶ月に 1 度定例会議を開き、閉会後 1 週間以内にその議事録を公開する。これを受け、利用者に最新の EB 決議を提供するために、クリアリングハウスのウェブサイトトップページに公開議事録へのリンクを設定した上で、最新議事録が公開された旨を告知すべきである。この業務については、今般の JICA 調査により配置された 2 名の EMB-DENR 職員により遂行が可能である。

一方、EB 決議の中からフィリピンのプロジェクト事業者に関連する重要事項を選別するには、EB の討議内容への理解と CDM 及び方法論に関する知見が深くなければならず、EMB-DENR 職員には困難な業務である。この問題の解決策として、定評ある CDM コンサルタントや専門家に対し、重要な EB 決議及び予想されるフィリピン CDM プロジェクトへの影響に関する要約記事の寄稿を依頼することを提案したい。そのためには、EMB-DENR が国内・海外の CDM 業界との既存のネットワークを拡充し、協力を得られるよう CDM コンサルタン

トに打診を開始することが必要である。

[その他の調査結果]

- 地方レベルでのワークショップの開催：地方でのワークショップ開催を通して、本調査期間中潜在性の高い CDM 案件を発掘することができた。このような試みは調査終了後も継続されるべきである。また、温室効果ガス削減評価と潜在性の高いセクターのマッピングを行い、DNA や関連機関に問い合わせた投資家に対して紹介できるようなメカニズムの構築も一考である。
- モニタリング・ガイドラインと ERPA 手引書の活用 : 本調査中に作成したモニタリング・ガイドラインと ERPA の手引書を活用し、定期的にアップデートすることが重要である。
- プログラム CDM：プログラム CDM の定義に関する CDM 理事会の決議が早々にも出されることが期待されている。CDM 理事会の動向をチェックし、プログラム CDM の遂行をすぐに実施できるような体制を整備することが肝要である。
- A/RTEC に対するキャパシティ・ビルディングのフォローアップ：定期的に FMB とコンタクトを取り、本調査の成果の一つである評価基準やプロセスを踏まえて、A/RTEC が機能しているかどうかをフォローすることが必要である。

5. 他類似プロジェクトへの提言

本調査では、調査結果としての成果物すなわちヘルプデスクの設立や情報クリアリングハウスの立ち上げの完成のみならず、調査実施の課程においてカウンターパート機関である EMB-DENR が CDM 推進に係る能力を向上させることを目指して実施された。他国で実施する同様の調査においても、この点を基本方針の中心に沿えて実施されることを提唱したい。また、調査の成果が調査終了後も持続されるよう、各種ガイドラインやマニュアルの作成も非常に重要であると考える。

フィリピンの DNA 担当職員は、本調査以外にも国際機関や日本といった二国間ドナーが提供するキャパシティ・ビルディング・プログラムに参加した経験を有し、また調査開始の頃には DNA の承認体制もある程度確立されていたことから、本調査の開始タイミングとしては好機であり、結果として比較的スムーズに調査を実施することができたのは有効であったと思われる。しかし、他国において、カウンターパート機関にフィリピン同様のある程度の土台が調査開始前から出来上がっていることは非常に稀であろうし、また人員の異動もあるであろうことを鑑みると、まずかなりの時間をかけてカウンターパート機関の CDM や京都メカニズムといった国際的なフレームワークに関する知識の土台作りが必要ではないかと考える。

ヘルプデスクや情報クリアリングハウスの設立といった DNA による情報提供の仕組みの整備支援については、カウンターパート機関のみならずその他の関係諸機関が連携して必要情報を提供できる仕組み作りが必要である。フィリピンでは IACCC という組織が存在しており、同枠組を活用して積極的に情報交換を行った。このような組織がない国においては、調査のステアリング・コミッティなどを活用することを提案したい。また特に、PDD 作成に必要なデータの整備においては、各国のエネルギー省或いはそれに準ずる機関との提携は必要不可欠である。なお、調査開始直後から、構築された情報提供の仕組みの持続性をいかに維持するかを念頭に置き、必要な実施体制の構築を検討し、同体制が調査終了後も機能するような配慮が必要である。

CDM の国内促進については、地方レベルでのワークショップの開催、国内外の投資を司る機関並びに国内の開発金融機関等との連係が重要である。更には、本調査で追加項目として実施を提案した植林/再植林技術評価委員会へのキャパシティ・ビルディングのように、DNA 承認プロセスの迅速化の一助となるようなプログラムの導入も望まれる。というのも、DNA の承認プロセスが透明且つ迅速であればあるほど、国内外の CDM 事業主体や投資家の信用を獲得することができ、結果として当該国の CDM の促進につながるからである。

最後に実施体制への提言であるが、本調査では現地コンサルタントに活躍してもらい、フィリピン側の CDM 関係者全体のエンパワメント及び底上げの向上を試みた。対象国によっては有能な現地コンサルタントの発掘は困難であるかもしれないが、出来れば予備調査の段階で潜在性の高い現地コンサルタントをリストアップし、本格調査に参入してもらえるような道筋をつけることも、このような調査の成功の鍵ではないかと考える。

6. 調査報告書

本調査では以下の報告書を英語で作成し、フィリピン政府に提出する。

(1) ドラフトファイナル･レポート

ドラフトファイナル・レポートは、本調査結果全体を纏めたものであり、フィリピン現地における最終調査終了後に提出される運びである。フィリピン政府（CDM 運営委員会）は、同レポート受理後 11 月 10 日までにその内容について調査団にコメントを提示する。

(2) ファイナル・レポート

ファイナル・レポートは、フィリピン政府受領したドラフトファイナル・レポートへのコメントをもとに、11 月 17 日までに作成し。JICA に提出する。JICA は 11 月 24 日までにコメントを調査団に提出し、調査団は同コメントをもとにフィリピン政府と最終調整後 11 月 30 日までにファイナル・レポートの最終版を JICA に提出する

(3) 報告スケジュール

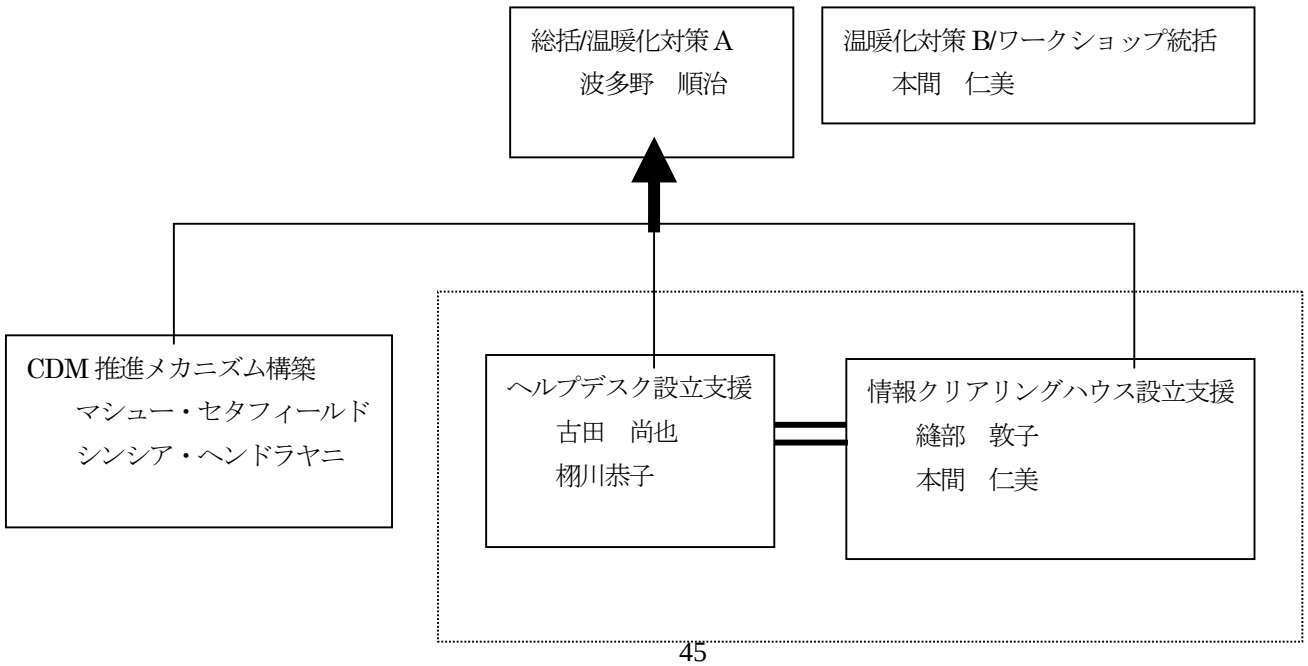
レポート	提出日	部数
ドラフトファイナル・レポート	2006 年 10 月	20 部 (英文) 5 部（和文）
ファイナル・レポート	2006 年 11 月	20 部 (英文) 10 部（和文）

7. 調査団員及び調査体制

調査団員は、三菱 UFJ 証券株式会社クリーン・エネルギー・ファイナンス委員会委員長である波多野　順治を団長とし、同委員会及び株式会社三菱総合研究所に所属する 7 名の CDM 専門家で構成される。

	氏名	所属・役職	担当
1	波多野　順治	三菱 UFJ 証券クリーン・エネルギー・ファイナンス委員会　委員長	総括 / 温暖化対策 A
2	本間　仁美	三菱 UFJ 証券クリーン・エネルギー・ファイナンス委員会　CDM/JI シニアコンサルタント	温暖化対策 B/クリアリングハウス B/地方でのワークショップ
3	縫部　敦子	三菱 UFJ 証券クリーン・エネルギー・ファイナンス委員会　CDM/JI シニアコンサルタント	クリアリングハウス A
4	古田　尚也	三菱総合研究所　海外事業推進センター国際戦略研究チーム兼海外事業推進室主任研究員	ヘルプデスク A
6	栩川　恭子	C.E.F. Consulting Ltd. 代表	ヘルプデスク B
7	マシュー・セタフィールド	三菱 UFJ 証券クリーン・エネルギー・ファイナンス委員会　CDM/JI コンサルタント	CDM 促進 A
8	シンシア・ヘンドラヤニ	三菱 UFJ 証券クリーン・エネルギー・ファイナンス委員会　CDM/JI コンサルタント	CDM 促進 B
9	エイドリアン・ストット	三菱 UFJ 証券クリーン・エネルギー・ファイナンス委員会　CDM/JI コンサルタント	A/R TEC のためのキャパビル

調査は以下の体制で実施される。



添付 1: フィリピン合意文書 (IA)

IMPLEMENTING ARRANGEMENT

FOR

THE STUDY

ON

CAPACITY BUILDING TO PROMOTE CDM PROJECTS

IN

THE REPUBLIC OF THE PHILIPPINES

AGREED UPON BETWEEN

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Manila, 1st August,2005

Mr. Armando de Castro
Undersecretary for Management and Technical Services
Department of Environment and Natural Resources
The Republic of the Philippines

Mr. Kiyoshi Masumoto
Team Leader
Preparatory Study Team
Japan International Cooperation Agency
(JICA)

I. INTRODUCTION

In response to the official request of the Government of the Republic of the Philippines (hereinafter referred to as "the Government of the Philippines"), the Government of Japan decided to conduct the Study on Capacity Building to Promote Clean Development Mechanism (hereinafter referred to as "CDM") Projects in the Philippines (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of the Philippines.

The present document sets forth the Implementing Arrangement with regard to the Study and will be valid after notification of approval by JICA Headquarters through JICA Philippines Office to the Philippine party.

II. OBJECTIVES OF THE STUDY

The objective of the Study is to assist the Environmental Management Bureau of Department of Environment and Natural Resources (hereinafter referred to as "EMB/DENR") to enhance its capacity to promote CDM projects.

III. STUDY AREA

The Study will cover the entire area of the Philippines.

IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the scope of the Study shall cover the following items:

Item 1: Assistance in the formulation of CDM promotion measures

To assist EMB to promote development of CDM projects in support to the national approval process.

This activity includes:

- To study the appropriate measures to promote CDM projects, including small scale CDM projects
- To study the appropriate financial mechanisms to promote CDM projects, in particular in local areas
- To study the effective use of various existing resources/programmes to promote CDM projects
- To assist to formulate monitoring and supporting mechanism for approved projects

Item 2: Establishment of helpdesk

To assist to develop the function of the helpdesk. This activity includes:

- To assist establishing helpdesk in EMB/DENR
- To develop necessary materials for the training of helpdesk staff and further use at helpdesk activities, such as helpdesk manuals and Questions and Answers (Q & A)

- To compile/arrange relevant materials for the use of helpdesk
- To train the staff for helpdesk

Item 3: Establishment of information clearinghouse

To support the establishment of clearinghouse for assistance for project proponents within the EMB website under EMB/DENR. This activity includes:

- To identify and collect the information to be compiled
- To assist to design and establish the clearinghouse
- To assist the maintenance and development of the clearing house, with particular focus on the sustainability of the clearinghouse after the project, including preparation of manuals for maintaining the clearinghouse

Item 4: Implementation of workshops at local level

To implement workshops targeting at local stakeholders. This activity includes:

- To assist to design workshop plans
- To prepare necessary materials for the workshops
- To support in the conduct of workshops

Item 5: Formulation of recommendations for CDM promotion

To prepare recommendations for CDM promotion in the Philippines, based on the activities mentioned above. This may include following activities:

- To analyze the gaps/constraints which prevent CDM projects from smooth development
- To study the measures to solve these problems
- To prepare recommendations for CDM promotion in the Philippines

V. SCHEDULE OF THE STUDY

The Study will be carried out in accordance with the tentative schedule as attached in the Appendix. The schedule is subject to change upon agreement of both parties when any necessity arises during implementation of the Study.

VI. REPORTS

JICA shall prepare and submit following reports to the Government of the Philippines.

1. Inception Report:

   Twenty (20) copies will be submitted at the beginning of the first work period. This report will contain the schedule and methodology of the Study.

2. Interim Report:

   Twenty (20) copies will be submitted at the beginning of second work period.

3. Draft Final Report:

   Twenty (20) copies will be submitted at the end of the last work period in the Philippines. The Government of the Philippines shall submit its comments within one (1) month after the receipt of the Draft Final Report.

4. Final Report:

Twenty (20) copies will be submitted within one (1) month after the receipt of the comments on the Draft Final Report from the Government of the Philippines.

VII. UNDERTAKINGS OF THE GOVERNMENT OF THE PHILIPPINES

1. To facilitate the smooth conduct of the Study; the Government of the Philippines shall take necessary measures:

(1) To permit the members of the Team to enter, leave and sojourn in the Republic of the Philippines for the duration of their assignments therein and exempt them from foreign registration requirements and consular fees;
(2) To exempt the members of the Team from taxes, duties and any other charges on equipment, machinery and other material brought into the Republic of The Philippines for the implementation of the Study;
(3) To exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the team for their services in connection with the implementation of the Study;
(4) To provide necessary facilities to the Team for the remittance as well as utilization of the funds introduced into the Republic of the Philippines from Japan in connection with the implementation of the study;

2. The Government of the Philippines shall bear claims, if any arises, against the members of the 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 team.

3. EMB shall act as a counterpart agency to the Team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. EMB shall, at its own expense, provide the Team with the following, in cooperation with other organizations concerned :

(1) Security-related information on as well as measures to ensure the safety of the Team;
(2) Information on as well as support in obtaining medical service;
(3) Available data (including maps and photographs) and information related to the Study;
(4) Counterpart personnel;
(5) Suitable office space with necessary equipment; and
(6) Credentials or identification cards.

VIII. CONSULTATION

EMB and JICA shall consult with each other in respect of any matters that may arise from or in connection with the Study.

Tentative Work Schedule

Month	1	2	3	4	5	6	7	8	9	10	11	12	13
	2005 11	12	2006 1	2	3	4	5	6	7	8	9	10	11
Schedule													
Work in Japan													
Item 1 Assistance for formulation of CDM promotion measures													
1-1 To study the appropriate measures to promote CDM projects, including small scale CDM projects													
1-2 To study the appropriate financial mechanisms to promote CDM projects, in particular in local areas													
1-3 To study the effective use of various existing resources/programmes to promote CDM projects													
1-4 To assist to formulate monitoring and supporting mechanism for approved projects													
Item 2: Establishment of helpdesk													
2-1 To assist establishing helpdesk in EMB/DENR													
2-2 To develop necessary materials for the training of helpdesk staff and further use at helpdesk activities, such as helpdesk manuals and Questions and Answers (Q & A)													
2-3 To compile/arrange relevant materials for the use of helpdesk													
2-4 To train the staff for helpdesk													
Item 3: Establishment of clearinghouse													
3-1 To identify and collect the information to be compiled													
3-2 To assist to design and establish the clearinghouse													
3-3 To assist the maintenance and development of the clearing house, with particular focus on the sustainability of the clearinghouse after the project, including preparation of manuals for maintaining the clearinghouse													
Item 4: Implementation of Workshops at local level													
4-1 To assist to formulate workshop plans													
4-2 To prepare necessary materials for the workshops													
4-3 To support to hold workshops													
Item 5: Formulation of recommendations for CDM promotion													
5-1 To analyze the gaps/constraints which prevent CDM projects from smooth implementation													
5-2 To study the measures to solve these problems													
5-3 To prepare recommendations for CDM promotion in the Philippines													
Report Presentation	▲ IC/R					▲ IT/R						▲ DF/R	▲ F/R

Note: The work indicated above will be conducted by Japanese consultant team and /or local consultants in cooperation with EMB/DENR

IC/R: Inception Report
IT/R: Interim Report
DF/R: Draft Final Report
F/R : Final Report

MINUTES OF MEETING
ON
IMPLEMENTING ARRANGEMENT
FOR
THE STUDY ON CAPACITY BUILDING
TO PROMOTE CDM PROJECTS
IN
THE REPUBLIC OF THE PHILIPPINES

AGREED UPON BETWEEN
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES OF
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

In response to the request of the Government of the Republic of the Philippines (hereinafter referred to as "the Philippines", Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Preparatory Study Team (hereinafter referred to as "the Team") headed by Mr. Kiyoshi Masumoto from July 25 to August 3, 2005, to discuss and determine the Implementing Arrangement for the Study on Capacity Building to Promote CDM Projects in the Philippines (hereinafter referred to as "the Study").

During its stay in the Philippines, the Team visited several sites and organizations related to the Study, and had a series of discussions on the draft Implementing Arrangement submitted by the Team with the authorities concerned, in particular with Environmental Management Bureau, Department of Environment and Natural Resources (hereinafter referred to as "EMB/DENR"). The main issues on the discussions regarding Implementing Arrangement are as shown in the attached document.

Manila, 1st August, 2005

Mr. Armando de Castro
Undersecretary for Management and Technical Services
Department of Environment and Natural Resources
The Republic of the Philippines

Mr. Kiyoshi Masumoto
Team Leader
Preparatory Study Team
Japan International Cooperation Agency
(JICA)

ATTACHED DOCUMENT

I. STUDY CONTENTS

The Team and EMB/DENR (hereinafter referred to as "both parties") agreed that the study will be conducted in the following manners.

1. Establishment of Helpdesk at EMB

The helpdesk staff, who will be trained through the Study, will be designated by EMB/DENR before the commencement of the Study. These EMB Personnel will be given hands-on training by the Japanese and/or local consultants.

2. Establishment of Information Clearinghouse

The clearinghouse is a web-site which provides information related to CDM. This clearinghouse would provide the following data, but not limited to;

(1) General Information on CDM

1) Policies and regulations:
- Executive Order (EO) 320 Designating the DENR as the National Authority for CDM in the Philippines
- Rules and Regulations Governing EO 320 Designating the DENR as the National Authority for CDM in the Philippines
- Procedural Manual on the CDM-DNA Approval Process
- Relevant National Policies

2) Updates and Links to Relevant Partners and CDM Websites such as:
- UNFCCC website
- UNEP website
- DOE website
- Manila Observatory-Klima website
- Carbon Facilities
- (OECC) Kyoto Mechanisms Information Platform

(2) Technical Data on CDM
- Energy Regulatory Commission [ERC]
- National Power Corporation [NPC]
- National Transmission Corporation [TRANSCO]
- National Electrification Administration [NEA]
- Distribution utilities and other stakeholders in the power industry sector
- Database of GHG emission inventory
- Other relevant data

(3) Administrative Data for the CDM/DNA
- Status of documents in the whole approval process of CDM projects
- List of potential projects and a registry of approved projects, including CER

- Project portfolio: This is a list of potential/ongoing CDM projects in the Philippines with their key information. This portfolio will be newly prepared, and may be utilized for project monitoring, approximately fifty projects.

Since significant volume of data useful for CDM promotion is already available, the contents of existing web-sites and other sources will be fully utilized. Sustainability of the clearinghouse after the project is a great concern for both parties and thus the handover strategy should be deliberately prepared.

3. Implementation of Workshops at Local Level

The workshops will target at local stakeholders, such as Local Governmental Units (LGUs), regional offices of EMB, local financial institutions, local business owners, NGOs and civil societies. The workshops will be conducted three times during the Study period. The tentative venues are Tarlac or Baguio in Luzon, Cebu in Visayas, and Cagayan De Oro or Davao in Mindanao. The final decision will be made in due course after consulting with both EMB/DENR and JICA.

Each workshop may consist of two parts; the first part is a seminar for general information of CDM and the latter half will be more specific on sectors and/or types of participants, aiming at practical input for CDM project formulation.

4. Formulation of Recommendations for CDM Promotion

Through the above mentioned activities during the Study, gaps and issues to promote CDM projects in the Philippines will be identified. Practical measures to solve these gaps and issues will be examined and compiled as a set of recommendations in the Study report. Main focus of recommendation will be, but not limited to, the activities within the mandate of EMB/DENR.

5. Use of Local Consultants

The Study will utilize local consultants as subcontractors to complement the work of Japanese consultants.

II. STEERING COMMITTEE

Both parties agreed that for the smooth implementation of the Study and effective use of the Study results, the Steering Committee will be organized at the commencement of the Study. This Steering Committee will be chaired by the undersecretary of the DENR, and shall be composed of the representatives from the following agencies:

- DENR [EMB and Foreign Assisted Special Projects Office (FASPO)]
- Department of Energy (DOE)
- Department of Science and Technology (DOST)
- Department of Trade and Industry (DTI)
- Department of Foreign Affairs (DFA)
- National Economic and Development Authority (NEDA)
- NGO
- Private sector, and
- JICA

And the other agencies or organizations deemed necessary.

III. TECHNICAL WORKING GROUP

Both parties agreed that, for the smooth implementation of the Study and effective use of the Study results, EMB/DENR will set up the Technical Working Group at the commencement of the Study. The Technical Working Group will be chaired by the EMB director, and composed of the representatives from the following agencies:

- EMB
- DOE [Energy Utilization and Management Bureau (EUMB)],
- DOST [Industrial Technology Development Institute (ITDI)],
- DTI [Board of Investments (BOI)]
- NEDA, and
- JICA

And the other agencies or organizations deemed necessary.

IV. REPORTS

JICA shall prepare all reports/materials of the Study in English.

V. COUNTERPART TRAINING IN JAPAN

EMB/DENR expressed their interest in availing of further counterpart training in Japan for their staff. The Team explained that their request might be considered if EMB/DENR will employ/appoint a permanent staff to work for the Study.

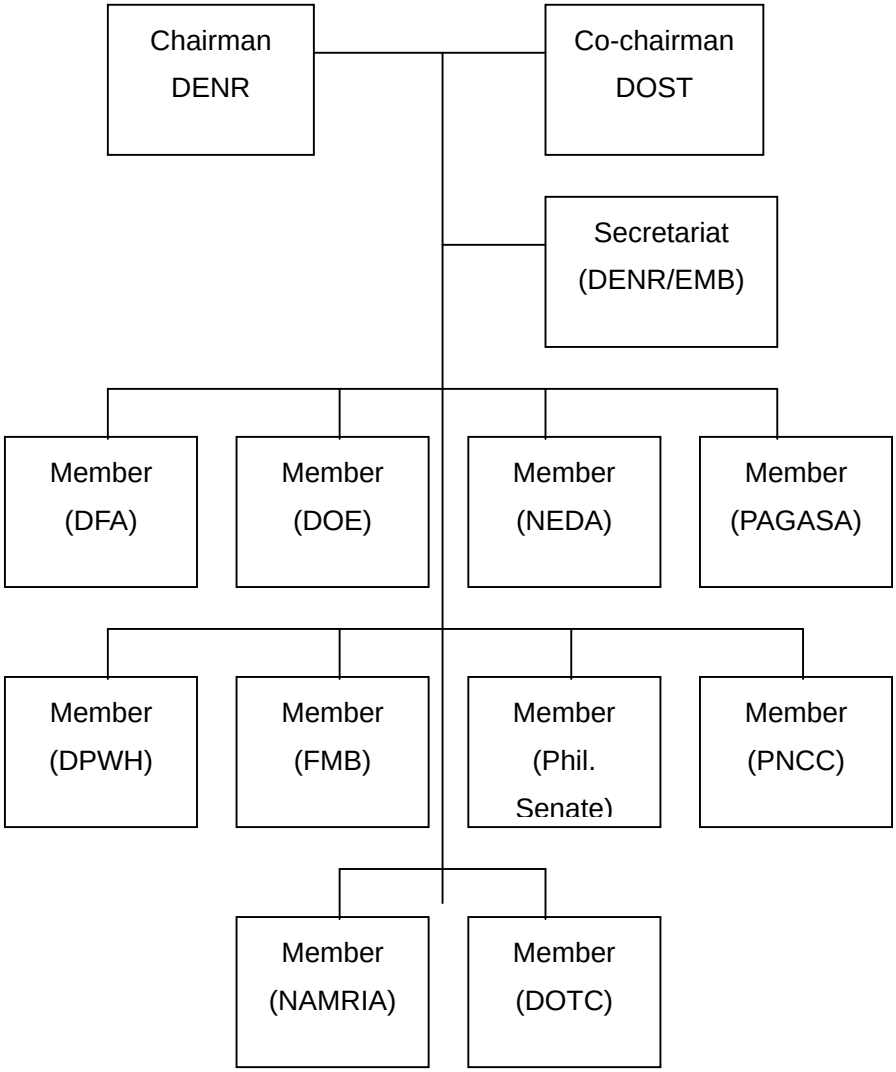
VI. UNDERTAKINGS OF EMB/DENR

EMB/DENR agreed to provide the JICA Study Team the following;

1) Counterpart personnel, in particular, permanent staff in charge of the helpdesk
2) Office space with furniture, air-conditioning, telephone lines, and electricity for the use by the Study Team

添付 2：IACCC 構成

Structure of the IACCC



添付 3：BOI ワークショップ議事録

BOI OFFICIALS' WORKSHOP – CDM BRIEFING
16-17 JANUARY 2006
BOI AUDIO VISUAL ROOM, DTI-BOI, SEN. GIL PUYAT AVENUE, MAKATI CITY

DAY 1: 16 JANUARY 2006, MONDAY

Introduction / Rationale of the Activity
Hitomi Homma, Mitsubishi UFJ Securities
JICA Study Team

Ms. Homma, of Mitsubishi UFJ Securities, the organization tasked to conduct the Study for the JICA project, presented the Program Overview for the benefit of the participants to the workshop. *(Please refer to Annex 1 for details)*

Welcome Remarks
Raul Angeles, Executive Director
Department of Trade and Industry - Board of Investments (DTI-BOI)

Mr. Angeles gave the opening remarks. In his presentation, BOI, as lead investments agency, can contribute to CDM under the following premises:

a. For investors, as the first stop for investors in the country, the BOI can act as front-liners who could impart information on CDM and opportunities for the investors to take advantage of in the Philippines
b. For industry associations, the BOI can provide direction to the industries and co-plan with the private sector to enable the latter to compete in the global market. CERs are very important additional revenues to improve industry's competitiveness, particularly industries to reduce carbon emissions
c. Interface with local government agencies – national agencies and local government units – will help in raising awareness and integration into national governmental action plans

Hence, he encouraged participants to take advantage of the training in order for the agency to help promote environment-friendly projects and ensure sustainability of such activities after the training is over.

Keynote Message
Kiyofumi Takashima, Assistant Resident Representative
Japan International Cooperation Agency (JICA)

Mr. Takashima gave the keynote message. He gave a brief background of the JICA study as a response to national government request, through the DENR, to capacitate national government on CDM. He briefly discussed the rationale behind the establishment of the clearinghouse and helpdesk. He also recognized the importance of establishing such mechanisms but emphasized the importance of involving the private sector in the whole CDM

process to ensure sustainability of the CDM. He then concluded with the hope that the activity will help develop appreciation on the participants towards the CDM and to impart to the private sector whatever will be picked up from the workshop for investment opportunities. Further, he also expressed hope that the activity will lead to the promotion of sustainable development in the country.

CDM in Practice
Kyoko Tochikawa, Mitsubishi UFJ Securities
JICA Study Team

Ms. Tochikawa gave a presentation on "CDM in Practice." The presentation contained a basic introduction of CDM, the concept of CER revenues, how CDM will assist project financing, requirements under the CDM, procedures that the project proponent will undergo under the CDM project cycle, costs of CDM finance, and first-hand experiences with regard to the development of CDM projects. *(Please refer to Annex 2 for details)*

The floor was opened for questions from the participants.

QUESTIONS / COMMENTS	RESPONSES
Which sector is responsible for promoting all these things? Are these the only type of technology they can invest in (energy)? Is it a technology-type of investment – is there a certain type of technology that they need to invest in? *(Nida Dihan from One-Stop Action Center)*	One of the most lucrative CDM projects are those that would involve methane destruction since methane GWP is greater by 21 times. Landfill gas capture and destruction, municipal solid waste management, biogas from animal waste stream have relatively small upfront costs but with great returns. Renewable energy and energy efficiency are also qualified projects. In the context of the Philippines, fuel switching may consist of the use of biofuels/bio-ethanol. At the end of the day, what would be qualified as a CDM project would be any proven technology that could be used to reduce emissions
Can you further elaborate the definitions of BAU and CDM status? *(Raul Angeles, BOI)*	One basic example can be simple landfill gas capture where the usual practice would be adding piping and flaring landfill. With CDM, the proponent can invest in LFG capture equipment, instead of merely flaring it. The project then becomes eligible as a CDM project. The revenues from the CERs will cover the project's initial cost. In this context, BAU is when methane is emitted freely. But with CDM, the proponent is encouraged to capture the methane because of incentives that the project may give. Government already mandates LFG capture therefore making methane capture a business-as-usual scenario. With CDM, there is an expected certain significant amount of returns which will be acceptable to investors.
If, for example, I have a project on rice husk which I plan to be converted into power without the	That will qualify depending on circumstances concerning financials, rice husk availability, etc. But definitely, if it meets 2-3 requirements, there is a good chance of attaining CDM status and we

QUESTIONS / COMMENTS	RESPONSES
CDM yet in mind. If, upon familiarity with the CDM later I tell the investors to take a look at CDM and see if it would be advantageous to them, will that qualify? *(Raul Angeles, BOI)*	will be very happy to look at the information (1-page brief) regarding the technology used and the plant size to enable us to make an initial assessment if it will qualify. *(Mr. Angeles promised to prepare a brief to be consulted with Mitsubishi UFJ Securities)*
Will CDM projects only be consist of those that cannot be funded by government? *(Minnie Dacanay, JICA)*	This would be difficult to answer. Other barriers (other than investment barrier), such as technological barrier, need to be looked at. Even if a proponent has financing/funding, but if the proponent has no previous experience, and since technology usually comes from the US and Europe, there may be technology barriers
What is the relationship of CDM to ISO 9001?	There is no direct relationship as such. ISO has a set of own environmental standards that include criteria other than GHG reductions. CDM focuses on GHG reductions. Although there are plans to develop a GHG inventory system that would address other environmental hazards, there is yet no direct relationship bet ween the two
Regarding payments after the CERs, who will be the ones to pay?	The proponent can find a buyer willing to pay for the transaction costs. Depending on the package, Annex 1 country governments and companies will be the buyers where players will be composed largely of power companies and there will also be brokers in the field
Follow-up to previous question: Will the technology I'm going to employ for my project be offered?	All of this will be up to negotiations. But simplest one after the developer applies for a loan for the implementation of a project, and CERs are issued, the developer can sell these CERs to Annex 1 countries. That would be lucrative hopefully for buying equipment. With CDM, what proponents are getting are increased revenues from CERs. Others can become equity investors as well. CERs serve as a cash flow to the project's financial projection.

CDM Current Overview and A/R CDM Discussion
Naoya Furuta, Mitsubishi UFJ Securities
JICA Study Team

Mr. Furuta provided the participants with an overview of CDM which covered how CDM has evolved through the years, the balance between the type of projects that have been submitted as CDM projects, the distribution of CDM projects across regions, approved methodologies, accredited Designated Operational Entities (DOEs), carbon funds/programs for CDM and carbon credit types. He also provided an update on the afforestation/reforestation sector and the new approved methodologies issued by the CDM Executive Board. *(Please refer to Annex 3 for details)*

After the presentation, the floor was opened for questions by the participants.

QUESTIONS / COMMENTS	RESPONSES
What is the definition of anthropogenic emissions?	The definitions are available on the UNFCCC website.
Is there some sort of ownership over the methodologies or can this be used by other groups?	The use of such methodologies can be likened to public goods. They are open to anyone. So once it is approved, many project proponents can use the methodologies as approved. But if there are no available methodologies for your own project, the project proponent can formulate new methodologies. But this is more difficult and is a tedious and time-consuming process.
The Philippines seems to have a very low number of CDM projects. Does it mean that we are not very active in CDM? Are we lagging behind?	The Philippines is actually active in this area but in terms of APPROVED project activities from the CDM EB, there are none yet. Currently, we have the Northwind already awaiting approval from the CDM EB. Also, since the DNA has just been recently established, Northwind has been the first project given national approval by the DNA. In retrospect, the Philippine DNA has been very quick and prompt in their approval process especially considering that the DNA has only been promulgated in September and the Northwind has been approved last December. In reiteration, the Philippines is the third most active in the Asia-Pacific region with India having more than 100 projects, and China with 22.
How long does it take to finish the cycle? *(Minnie Dacanay, JICA)*	This would depend on several factors such as the project scale (SSc or non-SSc), methodology (if the project needs a new one, then it would definitely take longer). This doesn't mean, however, that one cannot move on to other parts of the project cycle but major steps in the cycle significantly related to CDM will take a long time. If the proponent knows how to use the technology and has all the information needed, then the project document will prove to be quicker to prepare. If everything goes smoothly, the project cycle can be finished in 6-8 months all in all
What are the legal requirements with respect to CDM registration?	There are no specific legal requirements from the CDM process itself. But on the part of the CDM DNA, there will be legal requirements. The UN does not impose new legal requirements. Such requirements are very much dependent on the host country
Can existing projects qualify for CDM?	Yes and no - depending on the project circumstances. For the project to claim CDM status, it has to say it is additional even though it has already started. A good example is the Northwind project because the World Bank has been developing the project with the CDM in mind when they implemented it. If the proponent can provide evidence that the CDM has been considered before implementation, then the proponent can be eligible for CDM. Other considerations will have to be taken in as well such as the timeline of the project, among others
With regard to the project cycle, if the PDD has not been approved	The methodology is taken care of by Meth Panel. The host country and investing parties have no such responsibility/involvement

QUESTIONS / COMMENTS	RESPONSES
by the investing parties, can they design the new methodology of the project? If the methodology has not been approved by the host or investing parties, can they change the methodology?	
Looking at the regional balance, particularly on the Philippines and India share, what are the differences between the Philippines and India? Why are there so many projects in India? *(JICA)*	There are many factors to be considered. One of them being in relation with the development and establishment of the DNA. Another is because in India there are many CDM project developers actively developing new CDM projects throughout the country. Hence, the big difference between the countries
Where are the methodologies available? *(Minnie Dacanay, JICA)*	They are available at the UNFCCC website
What will the benefits on the part of buyers of CERs?	CERs are Annex 1 countries' means to meet their legal obligations
What is the ideal rate for viability of the project?	This would be very much up to the developers and investors themselves. Different investors require different profit levels. There are no set rules with regard to this
Do different projects have different CERs as well?	The amount of CERs will depend on the size of the project. Bigger projects logically have bigger CERs. Another thing to consider is the project's Publicity value where the proponent increases his potential to attract investors simply because it is a CDM project. A CDM project has publicity value in that investors, with CDM, tend to look beyond merely the feasibility/profitability of the project and focus on the fact that it is "CDM-able" so it would be worthwhile to invest. Currently, there is a supply crunch (considering that as a market, it is dependent on demand and supply).
Why do we have to convert cropland into forest land to be eligible for CDM? Is crop land not a clean development area? Farmers would rather have a crop land than a forest land How many hectares do you need to qualify as a forest area for CDM? If I only have crop land, how many hectares do you need to qualify as forest for CDM?	Crop land is not a forest. Based on the definition of forest under the UNFCCC, croplands are not qualified as CDM projects The forest can store more carbon dioxide than crop land. Hence, if a cropland is converted into forest land, then there is concrete CO2 emissions reduction in the forest. This depends on the vegetation to capture emissions. It would also depend on the ecological condition of the region and countries. The measurement varies from country to country. You can refer to the Administrative Order or Memorandum Circular of the Forestry Management Bureau, but this has to be officially submitted to the UNFCCC as a legal definition of FOREST for the Philippines first
Can BOI have more detailed	For today and tomorrow's workshops, we only provide the basics of

QUESTIONS / COMMENTS	RESPONSES
training workshops in the future? Especially for most of us who are very new to this program, so we'd like to be more equipped to entertain investors	CDM. Actual projects will be discussed at tomorrow's function. At the moment, we only have these two sessions under the JICA program

National CDM Approval Process
Charmion Grace Reyes, CDM Helpdesk
Environmental Management Bureau

As part of the national CDM approval process, Ms. Reyes gave emphasis on the fact that the Philippine DNA gives its approval on CDM project applications considering its contribution to the country's sustainable development goals. In this regard, she proceeded to discussing the national Sustainable Development criteria, the national approval procedures and the documentary requirements necessary for project proponents to comply with for processing of project proponents' applications, as contained in the CDM-Rules and Regulations or DAO 2005-17 of Executive Order 320 Designating the DENR as the CDM-DNA. In closing, activities such as the finalization of the CDM Manual of Procedures, continuous conduct of inter-agency dialogues, supplementary issuances, archiving of baseline data, IEC activities, establishment of the CDM Helpdesk and the development of the CDM Clearinghouse were mentioned as the CDM DNA's next steps in furthering CDM in the Philippines. *(Please refer to Annex 4 for details)*

After the presentation, the floor was opened for questions by the participants.

QUESTIONS / COMMENTS	RESPONSES
Can you please share the DNA's Northwind approval experience	It was generally a smooth process. Although we had quite a bit of difficulty in the preliminary stages because the different support mechanisms were still putting things into place. During that time, the PDOE, as the Technical Evaluation Committee for Energy-related projects, did not have offices in place for the TEC yet. At the end of the day, however, the TEC was able to comply with the timeline of 9 working days for a non-small scale project, even with the many layers of review they had to conduct within the department. For the CDM Secretariat, revisions on the documentary templates to accommodate comments made by stakeholders prior and post-IRR were conducted. Northwind followed the guidelines in the drafting of a PDD, was able to fill up the SDBD and complied with other proofs of legal capacity (SEC registration, ECC, etc.) enabling the approval process to proceed smoothly. There was not much of a problem except for the convening of the members.
There seems to be a lot of documentary requirements on the	The IRR, during its development, went through a lot of consultations with project developers. The system presented has actually been

QUESTIONS / COMMENTS	RESPONSES
part of proponents. BOI has reduced steps in the evaluation and enlisting of projects from 20 to 10 and now 3 working days. We also reduced the number of requirements to make it easier for the applicant to register with the BOI. We would like to suggest for the DNA to make the procedure as simple as possible. Reduce the number of signatories in the process. We can brainstorm on this since you will be inviting BOI to one-on-one discussions for this. Being in the shoes of the applicant investor, we have to make it easier on their part	considerably lessened. The components are there already. The payment documentation is internal, however. If you would look at the timeline, it would only take 15-20 days for small-scale project activities; and 20-25 days for non-small scale project activities. The Philippines is considerably the fastest in comparison with other ASEAN neighbors.
We would like to suggest a feedback system so the DNA will know in which areas it needs to improve	The DNA is in its initial stage and has undergone a pilot testing phase. Majority of the proponents preferred the preparation of the PDD over the PAD even if it is more tedious because it is the international requirement and in the end, it will be the document submitted to the CDM-EB. They were also agreeable with the other requirements needed to be submitted together with the project document.

Japan Carbon Finance
Ryuta Suzuki, Representative Office in Manila
Japan Bank for International Cooperation (JBIC)

Mr. Suzuki gave a presentation on JBIC in relation to the JCF. His material introduced to the participants JBIC's profile, underlying finance involved in CDM and loans that JBIC extends to implement CDM projects. On the other hand, he also discussed JCF's company profile, the services it gives to its clients, how the organization operates and merits for its projects. *(Please refer to Annex 5 for details)*

After presentation, the floor was opened for questions by the participants.

QUESTIONS / COMMENTS	RESPONSES
For those who will qualify for JBIC financing, will those applying without Japanese counterparts still qualify under the export loan? For example, if Filipinos want to export to your	The export component of these export loans is the export from Japan to Philippines. If a project imports from Japan, even if the business is purely Filipino-owned, we will still give export loan to the company. As long as the equipment is Japanese-manufactured, then it is ok. The question here should be: *Will it entail physical transfer of*

QUESTIONS / COMMENTS	RESPONSES
country, and without Japanese counterpart, do we still get a loan?	*equipment from Japan?* If Filipino company imports something from a Japanese company, we can extend the loan here.
What if the Japanese company where we want to buy the equipment is located somewhere, how are the loan applications to be processed?	If it is within the Philippines, then you may approach another facility.
What are your interest rates?	It would depend on the type of loan facility to be provided. If we are to extend an export loan, we will have to oblige/comply with OECD guidelines which is usually around 1.5% as of this moment (if in Yen) and somewhere between 0.5% to 4.5% (if in USD). If project is with political significance such as the CDM, then the proponent can apply for a loan at very low interest rates
Can you please provide our trade department of your interest rates so we can promote the facilities of JBIC?	Yes I will
Does your office in Manila merely here to accept applications?	We are willing to accept applications and conduct consultations with our clients at our office in Citibank Towers, Makati. Mr. Tamaki of the BOI OSAC is very familiar with JCF finance
Considering that there are a lot of CDM projects that are small-scale in nature, is there a minimum amount to qualify for a loan?	None. A lower interest rate may be given. But you have to consider loan preparation efforts that would incur costs in the process. It would depend on customer-client preference.
What are your terms of payment?	This is dependent on the loan facility. In the case of ODA loan, it depends on the government. It may be between 20-30 years payment. For export loans, we give up to 10 years. For overseas investment loans, it depends on the cash flow of the project. Maybe we can give 10-15 years

Eligibility Criteria for CDM Projects
Hitomi Homma, Mitsubishi UFJ Securities
JICA Study Team

Ms. Homma presented the three main criteria to make projects eligible under the CDM which are as follows:

- ♣ The project is not a baseline scenario
- ♣ The project is "additional"; and
- ♣ The project contributes to sustainable development of a host country

For the first criteria, she gave a definition of baselines, how to determine baseline emissions, and gave examples of baseline scenario. For the second criteria, she gave a CDM-specific definition of additionality, correlated the concepts of additionality and baseline, demonstrated the use of an additionality tool, and defined how the project is additional. For the third criteria, she referred to the Philippines' own sustainable development criteria and the dimensions underlying the said criteria and gave examples of CDM eligible project types. *(Please refer to Annex 6 for details)*

After the presentation, the floor was opened for questions from the participants.

QUESTIONS / COMMENTS	RESPONSES
Going back to the objectives of the activity, what is BOI's role in all of this? How active can we be active on this?	The CDM is a relatively new market. The CDM Helpdesk is also still starting and we have to refine our frameworks in order to determine how actively each agency can participate in the whole CDM field. Little by little, partner agencies in the Philippines will be able to firmly define and strengthen each one's roles to facilitate the implementation of CDM projects in the Philippines. Hence, capacity building programs, such as this one, are being conducted to capacitate all concerned in the CDM market.

DAY 2, 17 JANUARY 2006

Impact of CER Revenues
Kyoko Tochikawa, Mitsubishi UFJ Securities
JICA Study Team

In her presentation, Ms. Tochikawa discussed their experience with a project in Bali, Indonesia on Integrated Solid Waste Management (PT. NOEI – GALFAD) to demonstrate the impact of CER revenues. To demonstrate the concept of baseline, a differentiation between the current practice and what the practice will be with CDM was demonstrated. She then proceeded to describing the sources of emissions in the area, an estimation of the baseline emission, projected emission and leakage, monitoring requirements, the added value CDM offers to the whole facility, and the revenues that will be gained after the CERs are claimed. In closing, she summed up CDM in the following points:

- In terms of the CDM, projects such as these may not be as attractive in comparison to simple landfill gas projects, which are lower cost.
- However, there are significant long-term benefits in terms of waste reduction, sanitation, etc.
- Also, if the new methodology NM0127 is accepted, these projects can enjoy more certainty in terms of expected CERs.
- Trade off. May also consider doing in phases *(Please refer to Annex 7 for details)*

After the presentation, the floor was opened for questions by the participants.

QUESTIONS / COMMENTS	RESPONSE(S) BY PRESENTORS
Is it the project developer that comes up with the new methodology?	CDM consultants take care of the methodology component
Are the methodologies incorporated into the PDD?	It is a separate component but is attached to the PDD
In relation to the development of these projects, can LGUs undertake these projects by themselves? If so, the program needs to promote CDM to the LGUs as well because of problems potential to these kinds of projects.	Noted. We'll highlight that point.
Follow up question regarding the LGUs: What kind of assistance, if any, can the team extend to the LGUs? In our municipality, for example, this is one oppressing problem that we have. If you have assistance to give, it can be good to offer to them	As a consulting company, we do consultancy and help proponents come up with emission projections and costing then take project documents to potential investors for financing. Financing can come from financial institutions both locally and internationally. In short, we offer a combination of consultancy and investment component. If people know where to look, it will be helpful for them to know as well. Hence, BOI's role as a promotional partner to the CDM.
Can it be a joint-venture undertaking? Can your	Most CDM consultants' involvement would be in CER purchase agreement (ERPA). It is a very rare case that consultants run the

QUESTIONS / COMMENTS	RESPONSE(S) BY PRESENTORS
organization be part of the project in terms of financing? Otherwise, it might not be an effective undertaking at all. To make the project more effective in management, it would also be helpful if Mitsubishi Securities can help out.	projects themselves because this is not part of CDM consulting. The consultants can only introduce proponents to other multilateral / international equity investors (extent of CDM consultants in terms of project development). Of course, we are trying to get the CDM helpdesk from the EMB to provide this kind of function as well. The helpdesk can point the players to the consultants to facilitate discussions with potential investors, if needed.
How do you purchase CERs and quantify them?	This depends on the methodology. For most projects, we are not sure about the exact amount before project implementation. We can only come up with good estimates. Electricity data from the grid, for example, will be equivalent amount of electricity generated times the amount of source used. There is a baseline methodology that will give a good estimate of CERs. As regards buying of CERs, multilateral organizations look at project and validates the contents of PDD. The buyer usually looks at the PDD, verifies it and names the percentage that they will buy
What will JCF benefit from purchasing the CER?	It can use CERs to fulfill Japan's obligations to the UNFCCC.
How much will Mitsubishi Securities charge?	Depends on the project type, size and CERs that the project will get, and the technology to be used. Payment can be in the form of cash fees, success fees, and skills of the consultants themselves
If the project is denied or disapproved, will you ask for fees still?	It depends.
Why is it that the transport sector has no approved methodology especially since Japan is a car manufacturer?	Transport is a good sector for GHG reduction but is very difficult because it is mobile and the project boundary is difficult to define. Unlike power plants which are stationary. Even if there is a production of bio-fuel or unleaded petrol, it is still hard to determine where the reductions are occurring. But we are very certain that methodologies will come up to handle this issue

Case Study 1: Jaroensompong Corporation, Rachathewa LFG to Energy Project
Hitomi Homma, Mitsubishi UFJ Securities
JICA Study Team

Ms. Homma discussed their experience of writing a PDD for a Thailand LFG project. She first gave a project background containing Thailand's usual practice of handling their wastes and policies that support such schemes. The project outline contained the profile of the company, the technology to be employed and the project site. This was followed by a description of the approved methodologies used (ACM 0001 and AMS 1.D), a demonstration on the additionality tool used, definition of the project boundary and possible project leakage, estimates for emissions calculation, environmental impacts of the project parallel to Thailand's environmental standards, stakeholder comments which did not have any negative outcome, and the project's contribution to Thailand's sustainable development goals. *(Please refer to Annex 8 for details)*

After the presentation, the floor was opened for questions by the participants.

QUESTIONS / COMMENTS	RESPONSE(S) BY PRESENTORS
Based on the ER calculation, it shows that you have computed the figures on a per year basis, is it different every year?	Site 1 is closed so it decreased gradually. It depends on the site operation
It is very likely that if BOI is to promote the projects, we can probably tap the foreign investors who come to the office and tell them that these are the types of projects that they can go into. These are capital-intensive projects which might be difficult for local investors to invest in. Although it can take the form of joint ventures, there is only a small portion who can participate from the Philippines. Mostly the SMEs here would like to think of something that can generate revenues for themselves because they are small and are not so much concerned about the environmental aspect. Hence, the concern is focused on profit gaining and operations. If the BOI, therefore, is to promote CDM and invite investors, then tap big investors from large corporations	Indeed, it is important to tap annex 1 countries to reduce emissions and meet obligations. For SMEs, there may be some potential SME investors in the Philippines who, in the long run, can acquire CERs and earn revenue from such. There is still potential to attract investors locally. Regarding SMEs, 17 small-scale projects have already submitted their PDDs to the CDM Secretariat. SMEs are actually very interested to participate in the CDM. So we can say that awareness is starting but there is still a great need to spread geographically. Hence, more seminars will be conducted in the Visayas and Mindanao regions since many areas in the country are off-grid sites which can avail of CERs through CDM projects.
As a follow-through to the above response, we would like to emphasize here that if you want us to do something to attract investors, we have to enlist them in the IPP for them to enjoy perks in the process, such as income tax holidays. We would also like other environmental projects to enjoy incentives. However, not all are able to enjoy incentives because not all environmental projects are revenue-based	

therefore they are not enlisted (comment made by a BOI representative)	
Is the LFG project enjoying any support in the form of incentives from the government?	No incentives from the Thai government. However, the OEPP is very supportive of the project. Even without incentives, but considering the environmentally friendly nature of the project, it will receive DNA approval once the Thai DNA has been set up
Any tax holidays provided for such a project?	No tax holidays have been provided by the government as of yet. This is the reason why we need assistance from BOI people so that when you talk to local investors, you can introduce the benefits of CDM. This is also one of the features aimed in the establishment of the helpdesk
As a follow through to your response, it is, therefore, important for a higher level of awareness on CDM to further promote interest in investing for the CDM. Otherwise, investment promotions will be futile	There are actually a lot of international buyers all over and they know what they are looking for. What we need to do in the Philippines is to raise awareness on the project developers' side to say that when they do CDM projects, they can be ready for investors. It is of equal importance on the part of project developers (makers of projects) and investors (project financiers) to have a high level of awareness on CDM so they know what they are entering into
Who's buying and involved in initial capital investment for this project?	There are no buyers yet since there is no DNA yet. The project will first look at DNA approval then look for investors. Capital investment is at USD 1 million. The project received a loan from a commercial bank. If the company is large enough to fund its own activities, they can attract a much higher price. If a project enters into a partial, pre-project price, then CER prices for negotiations will be lower. The project wants to be more competitive in terms of pricing so they decided at employing capital investment at a later time
This has been a very helpful workshop since, as a representative of the One-Stop-Action-Center, we are frontliners for the BOI. We face local and international investors involved in waste management projects	The results of the workshop will also serve as additional outputs for IEC activities especially since the project is trying to produce a manual for CDM
Taking a concrete project into perspective, talking to the owner of a balloon manufacturing business in the Philippines for export, what would be my advise to the client in so far as compliance with DENR is concerned?	DENR would be willing to help in this respect. We can forward your concerns to the specific DENR office servicing queries such as these. You can also seek advice from PEZA.
Will you have another round of capacity building workshops for other groups?	We will be conducting a DBP workshop in March. Then there will be regional workshops in Visayas and Mindanao later this year.

We suggest that you include private sectors. BOI can assist in giving you a list of corporations. Also, please invite LGUs with less selection criteria to maximize number of participants to the workshops *(pertaining to former Dutch project that had qualification selection wherein some were not included)*	Yes of course. There will be no selection criteria in our case

Case Study 2: Grid-Connected Power Generation Project Using Biomass from Plantations in Thailand
Kyoko Tochikawa, Mitsubishi UFJ Securities
JICA Study Team

Ms. Tochikawa started out by describing the project as a 300-MW net grid-connected biomass power project using a well-known and internationally-proven circulating fluidized bed technology. Should the project be implemented, it is projected to be one of the largest biomass plants worldwide at a project cost of approximately USD480 million. She then proceeded to discussing the baseline scenario, and the new baseline methodology submitted for evaluation by the CDM Meth Panel (NM0133), project leakage and effects of CDM on the project. In closing, Ms. Tochikawa described the project's sustainable development contributions and cited, as remaining hurdles, the project's scale (difficulty in looking for investors for a project as large as the plant) and the lack of Thai DNA approval. *(Please refer to Annex 9 for details)*

After the presentation, the floor was opened for questions by the participants.

QUESTIONS / COMMENTS	RESPONSE(S) BY PRESENTORS
When has the project been implemented?	It has not yet been implemented. Currently, the project is undergoing a roadshow as it look for equity investors
Is there a big chance of this project being implemented?	There is. It is a very sound company considering the big scale of the plant (300MW). It would take a long time to look for investors but I see no reason why their efforts won't pay off
How would you compare Philippine DNA with that of the Thai DNA?	Considering the track record, I would commend the Philippine DNA over the Thai DNA. We are still awaiting Thai approval for the first quarter of the year. DENR officials recognize CDM as a good mechanism to address climate change. Hence, the CDM-DNA is not entirely regulatory in nature, especially since host country approval would look more on the sustainable development component of the project

添付４：DBP ワークショップ議事録

CAPACITY BUILDING WORKSHOP FOR THE DEVELOPMENT BANK OF THE PHILIPPINES (DBP)
21-22 MARCH 2006
Executive Lounge, 12/F DBP Building, Makati City

DAY 1: 21 MARCH 2006, TUESDAY

ACTIVITY RATIONALE
Hitomi Homma, JICA Study Team (Mitsubishi UFJ Securities)

Ms. Homma, of Mitsubishi UFJ Securities, the organization tasked to conduct the Study for the JICA project, presented the Program Overview for the benefit of the participants to the workshop. The capacity building workshop aims to have achieved the following targets for the DBP participants:

- Understand CDM requirements
- Identify DBP's roles to play in promoting CDM projects in the Philippines
- Understand CDM eligibility criteria
- Identify potential CDM activities from the projects already in the pipeline
- Become familiar with the Philippine DNA approval process

She further explained the program structure stating that the current activity is being supported by the Japan International Cooperation Agency (JICA) under its project "Study on Capacity Building to Promote CDM in the Philippines." The Program is currently being facilitated by the Clean Energy Finance Committee of Mitsubishi IFJ Securities Co. Ltd in charge of providing CDM advisory, assistance in the production of the Project Design Document and financial advisory services such as equity, debt and CDM financing. The institution also maintains close relationships with major Japanese investors (both CER buyers and equity investors).

At the end of the day, she emphasized the importance of DBP's active participation to ensure the success of the program for the next two days. *(Please refer to Annex 1 for details)*

WELCOME REMARKS
Janet Ong, Vice President, Development Bank of the Philippines (DBP)

Ms. Ong, in her welcome remarks, views CDM as a signal of growth for the bank and for the clients. She told the group of the bank's initial introduction to CDM three to four years ago. From then on, the bank has always been fascinated with the idea of trading CERs. From the year 2003, DBP adopted its own policy for CDM and created a unit dedicated to the study of CDM and how it can be integrated into the bank's policy and mandate. However, it was not exactly a continuing because of three major reasons. First, top leadership support is needed for CDM to permeate into the different divisions/units of the bank. Second, the bank personnel lacked the necessary technical expertise to develop CDM further and integrate into the bank's mechanism. Third, the process of acquiring awareness was slow because there was not enough immersion in the process. Overall, there were a lot of debugging needed in the new concepts introduced. As an end result, therefore, the biggest geothermal project by PNOC initially transacted with DBP ended up with World Bank instead of the local development bank. Although DBP wanted to be included in the whole CER trading process even for a percentage, they did not have the skills that World Bank had, hence, the lost opportunity.

Ms. Ong sees CDM as a 3-step process: ORIGINATE, EXTRACTION and TRADING. Although the Bank doesn't have enough skills yet to go to the EXTRACTING and TRADING processes, it can start to originate where the knowledge of concepts will later go onto application.

CDM can be done by DBP as a bank through partnership with different partners who can shoulder transactional costs. Not to be forgotten as well is that the contract is between the buyer and the client and DBP sees its responsibility to entice the client to go into the process. DBP will be approached as a local financing institution, while others will approach DBP for retail loans. In the CDM regime, DBP expressed its desire to be the buyers and traders of carbon but, for the moment, cannot do it as of yet. She hoped and looks forward to the workshop providing, not only enthusiasm towards CDM, but also the necessary knowledge to do CDM in the country.

Keynote Message
Kiyofumi Takashima, Assistant Resident Representative
Japan International Cooperation Agency (JICA)

Mr. Takashima introduced the workshop as a component of the Capacity Building project between JICA and EMB where JICA assists DENR in the promotion of CDM through the establishment and development of the CDM helpdesk and clearinghouse. The Helpdesk will serve as one-stop shop for CDM activities while the Clearinghouse will be the website to visit for interested parties to the CDM. Developers and investors cannot readily enter into CDM without access to various financial institutions. Hence, JICA sees DBP as major stakeholder and key player for the financing sector for CDM in the Philippines. Further, he expressed hope that with the knowledge and active participation to the workshop, the DBP may be able to entice potential participants in the CDM which can serve as very good foundation for future business. In closing, he expressed the hope that such bilateral cooperation would lead to cleaner environment and sustainable development in the Philippines.

JICA CAPACITY BUILDING STUDY IN THE PHILIPPINES
Hitomi Homma, JICA Study Team (Mitsubishi UFJ Securities)

Ms. Homma gave an introduction of the JICA Study to Promote CDM in the Philippines. She discussed the study's objectives, area, schedule, approach, and structure. The Study will primarily assist the Philippines in its sustainable development goal through the formulation of CDM promotion measures. The Study will bear a technical and institutional approach where the establishment of the helpdesk, clearinghouse, and conduct of local workshops will help enhance partnership building with other CDM capacity building programs and strengthen partnership between and among relevant institutions in the Philippines. She also introduced the Study team (from Mitsubishi Securities) that will be working with qualified Philippine local consultants for the project. *(Please refer to Annex 2 for details)*

Considering that DBP is a financing institution (FI), the clients may also want to ask them as to how they can participate in the CDM. As an introduction to the upcoming presentations, Ms. Homma informed the participants that the presentations will involve eligibility criteria for the reference of DBP staff for future queries.

CDM IN PRACTICE
Kyoko Tochikawa, JICA Study Team (Mitsubishi UFJ Securities)

Ms. Tochikawa gave a presentation on "CDM in Practice." The presentation contained a basic introduction of CDM, the concept of CER revenues, how CDM will assist project financing, requirements under the CDM, procedures that the project proponent will undergo under the CDM project cycle, costs of CDM finance, and first-hand experiences with regard to the development of CDM projects.

In the presentation, she also introduced the European Union's unique trading scheme (EUTS) which trades not only CERs but other carbon credits (AAUs, ERUs). CER prices for ISSUED CERs range between 20-25 euros to date[1]. Financing schemes most commonly practiced at the moment is payment against delivery. Payment strategies will depend on the buyer or seller or carbon.

As regards additionality, Thailand poses a good best practice sample. Some years ago, there have been no investments in the country on the renewable energy sector. But with the entry of CDM, it has become an attractive investment sector. *(Please refer to Annex 3 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
With regard to the crediting period slide: is each renewal equivalent to a whole new transaction cost?	YES. This is because of re-assessment activities that have to be conducted for baseline and monitoring methodologies every time the crediting period expires. This is something that has to be decided on a case-to-case basis
Who determines the crediting period?	The project developer / proponent chooses the crediting period based on the weighing of risks and the better option
Can you relate CERs and EUTS?	EUTS is the EU's own trading scheme. They have EU allowances where, within the EU, they trade carbon credits. But as part of that scheme, they're also allowed to bring in CERs for a certain portion of the allowances. So CERs can also be sold in the EUTS scheme but there are other forms of carbon credits traded within the scheme
So everything is for meeting the Kyoto Protocol commitments?	Slightly different but almost like a parallel scheme. It is a loosely-connected scheme. It is a voluntary scheme in line with meeting their Kyoto Protocol commitments. In the big picture of things, all schemes run under the umbrella of the Kyoto

[1] Will only apply for CERs issued after project verification and certification at the international level, ***NOT*** projected CERs as stated in the PDD

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
If the project is not viable, is it not additional?	IRR is not the only influencing factor in terms of viability. There are various reasons why you don't get a high IRR. Project developers may not be able to attract equity investment or secure debts. Or maybe there are technological barriers as well. If the IRR is rather competitive, and new technology is being introduced, it may then be very high risk on the part of the investor. Even if the technology has already been proven somewhere (e.g. Germany), it might not necessarily work in the Philippines. It is easiest to say that the IRR is not high enough. But even if it is, look at other factors for a more fact-based answer. In the final analysis, even if the IRR is not high enough, it doesn't necessarily mean that it is not viable. The proponent just has to find the right justification for such.
Can you clarify item 8.a stated as such: *"Identify why the project cannot be implemented on a BAU basis. Typical examples include:* · *Expected return too low for the risks involved.* · *Equity /debt investment available only on the condition that the project attains CDM status."* Per our experience, usually construction has already started. At the beginning, however, while the loan is being processed, the intention is that from the very start, CDM should have already been considered Should this be the case, we would require the proponent to send us a Letter of Intent from the beginning of the construction stage.	It is safest to start the project at the validation stage. That's where we would advise you to start if you have time to wait. In a lot of cases, however, the project has already started. This would not be realistic and additional. Quick answer to this question is that the project can still qualify as CDM but would have to go through a checklist of various criteria. When to actually being construction will depend on the documentation that the CDM has already been taken into consideration in the construction stage Should this be the case then it would mean that the project activity has a good chance of qualifying for CDM. But you should still also check the criteria
We have been looking at 3rd party prospects to shoulder transaction costs because usually the proponents cannot afford such costs	In the case that the intention has been written down, then the project has a fairly good chance contingent to the project meeting other requirements
CDM is considered gravy to the	The important thing is to never say that in public because

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
whole project, right? If CDM is not viable, how can it qualify? Contradicting, therefore.	once you say that it's gravy, then it become **not additional**. What you tell the bankers is different from what you say in the PDD. You state a less optimistic figure in the PDD. What you tell the bankers does not necessarily have to coincide with what is written in the PDD but should still be true to the project activity
Come validation time, however, the auditors will look at the data. They will find that records to finance the underlying project will show more optimistic figures. How does the validator reconcile this type of data?	That's where the DBP and the project owners come in. it is basically the project owners' point of view. Realistically, shareholders may have to share a different set of numbers. The PDD content doesn't have to reflect with what is presented to bankers but it will be up to the project developers to negotiate the price
If the project doesn't have financial viability, banks shy away from it. Then that's where CDM comes in. What confuses us is that, for example, we have a project (biomass to generate power and improve viability), is that project additional and therefore CDMable?	We have to go into the details. As a project concept, it will qualify. But the individual additionality of the project activity will have to be assessed. If you could give us a one-page summary of what the project is, then we would be happy to assess how the project will be CDMable
Is there already an exchange of trading floor for the CERs? And where?	Not only for CERs but also for EUTS that usually takes place within the EU region.

CASE STUDY 1: CDM PROJECTS IN THE PHILIPPINES FROM A PROJECT DEVELOPER PERSPECTIVE
Ricky Beltran, Philippine BioSciences, Inc.

As a brief background, Philippine BioSciences has been involved in a project with DBP and KFW in 1998 for Rocky Farms in Pililla, Quezon. Afterwards, there have been 16 projects developed and an additional 9 more in the pipeline for 2006. The piggery business comprises 80% of the total livestock sector. PhilBio focuses on the livestock sector with a core business on waste to energy. The company started in 1996 as a waste treatment company but nobody wanted to buy their products until they stumbled upon CDM. Because of CDM, PhilBio engaged in waste utilization for biogas and is now focusing on 5 sectors: piggery, then distillery sector (Luisita) for the boilers, then brewery (cassava waste-to-energy in Corat, Thailand for a 9MW WTE plant), then waste water treatment in Magallanes for Manila Water (5MW).

The technology that PhilBio is introducing to date is the CIGAR (covered in-ground anaerobic reactor) which is 100% Filipino technology. In the process of its development, New Zealand

provided the development assistance fund, UK provided the climate change fund, fiber liners (1 mm thick with a 10-year warranty) are from Chevron of Singapore, and the technology is German.

For the purpose of the DBP workshop, Mr. Beltran presented the Paramount Methane Recovery and Electricity Generation project, one of the projects submitted to the DNA for host country approval. The project's components consist of swine wastewater treatment, methane capture *(7609 CO2E /annum)*, and electricity production of 715,400 kWh. The project activity is a combination of Type III.D (ref AMS III.D) on methane recovery and Type I.D (ref AMS I.D) on renewable energy generation. The sustainable development parameters are those from Philippine Agenda 21 which served as a guide in the development of sustainable development criteria as reflected in the DAO 2005-17.

In the process of developing the project, several barriers have challenged the project proponents. First of which is the banks' lack of interest brought about by their lack of technical knowledge on the technology being introduced. There are a lot of unknowns whereby banks ask the project developers for guarantee but cannot give them such because of possible human errors that may be committed along the way (e.g. cleaners might accidentally pour Clorox on the CIGAR or someone might accidentally smoke and throw a cigarette in the lagoon which might result into combustion). Second, since it is a new technology, it is perceived a high risk technology by most farmers. Lastly, most farm owners would go for what's less expensive (flushing vs. CIGAR).

The project proponents chose a 7-year crediting period for the project activity. The meters will be supplied by Fuji Kenkei for electric metering needs and the biogas flow from the US. The gas flare is locally-made by PhilBio themselves.

The following have been the lessons learned in the process of submitting project documents for host country approval:

- Considering that new methodologies are now available to gain higher CERs, maybe amendments can be done with the Letter of Approval
- Bundling has already been approved hence, project proponents can, in the future, submit just one project application document for a whole set of projects and do transactions for just one comprehensive project. This is more cost-effective in the long run. However, several uncertainties also pose challenges when it comes to proponents considering bundling. If one farm gets a disease, it will definitely affect other neighboring piggeries. Questions on guarantees and liabilities attached to the bundling scheme will arise. For this, PhilBio's solution is to bundle it in terms of documentation but sell CERs separately. This is so that the project proponent gets to save on the PDD preparation and monitoring costs.
- Considering the experience that PhilBio has had with one of their consultants where the skills and expertise acquired in the development of the 16 project documents were used to put up his own firm, get away with one project from PhilBio and make use of a more recent methodology to get higher CERs, information security has been found key in this business. The current setup of PhilBio is that different consultants do different components where only one person knows about the whole PDD. Also, to avoid cutting and pasting of the technology material available on the website, the company has locked its website from possible end-users in the process.
- The company's current practice is that they development Project Application Documents (PAD) for host country approval purposes and if the project still has no CER buyers. Upon acquisition of the DNA Letter of Approval, the project becomes more marketable.

Upon selling, it would be up to the buyer to handle PDD preparation and other transaction costs that will be incurred in the process.

- ERPA cannot be collateralized. If not, it hopefully enhances the project because of lower costs in the process.
- The company also considers uncertainty beyond 2012. Working on this uncertainty, they chose the 7-year crediting period hence. *(Please refer to Annex 4 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
Are you handling only piggery projects?	We first do R&D. After which, we usually come up with the project template. We then commercialize our R&D. Rocky Farms became our template which we later commercialized. Hacienda Luisita became template for distilleries ethanol and cassava. We are now doing an ethanol in Thailand and Mindanao. Currently, we are doing 2 additional templates for Cebu and Manila Water (SDPs) for sewerage treatment plants (Magallanes 500KW plant) and moving onto other SDPs in the Philippines. Our landfill projects are bundled and sold for 100,000 tons of CO2e- for 7 years. So far, we have had 3 offers for our landfill projects.
When you offer this to any client, it will not entail any upfront cost until you are able to get the sharing? So how soon after will the sharing of CERs go?	We will start getting the CERs after the 7-step major CDM project cycle which is the registry. We still don't have any registered project here in Philippines. Our Vietnamese partner says it takes 3 months processing time after the release of CERs from Bonn.
What is your view on undergoing validation first before getting host country approval?	This is a risk on the proponent especially if the project is not approved by the DNA
Is the validation shouldered by the proponent? Is the 85% of paramount is net to paramount? The other15% is not?	Yes We are the contractors as well so we profited by the installation of equipment
For the next 7 years, you enjoy a 15% share every year. After the first 7 years, what happens?	Yes We renew.
Will the 7 years start in 2008?	It starts from the monitoring point / after CDM EB registry
You mentioned bundling 7 projects nationwide. What is the minimum value of residual waste to qualify for bundling?	Our 7 projects for bundling consist of 2 landfills and 5 controlled dumps. To qualify for bundling, there are currently no parameters. We focus on the urban centers to maximize our efforts

PROPOSED CDM STRATEGY AND GUIDELINES FOR DBP
Dr. Ramon Abracosa, DBP Consultant

Dr. Abracosa's presentation is composed of 2 parts. First of which is a presentation on the introduction of CDM. Second of which is his list of proposed CDM program implementation guidelines for DBP.

In DBP's pursuit of engaging into carbon investment banking, DBP's climate change program was started in November 21, 2003 with the big idea of engaging into carbon market participation. In September 2005, DBP came up with a "no cost to client / DBP strategy." Working on these contexts, he proposes the following recommendations:

- Carbon credits as collateral
- In the future, to establish a CDM facility for carbon investment window
- The Bank negotiates with prospective buyers where CERs are put into an ESCO account then for use as collaterals in the long run
- DNA to facilitate purchase agreements
- In cases of project registration delay, loan processing need not be affected; carbon credits are utilized as and when they become certified/paid
- If the project does not get registered, the Philippines can participate in non-Kyoto markets such as the Asia-Pacific CDM alternative with Australia and US *(Please refer to Annex 5 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
When do you expect the Board to approve the guidelines?	DBP's Climate change unit is currently crafting the mechanics. The Guidelines will show steps on who to approach and what to submit
What is JICA's experience in terms of coordination with other banks	We don't have that experience with any particular banks to date. We provide guidance to project owners and we can advise them on what terms they should seek. We think that the owners will look at profit financial source from commercial and government banks like DBP *(JICA Study Team)*
The bank's assistance in preparation of PDD will have to go hand-in-hand with loan allocation (e.g. sanitary landfill) Our assistance for CDM will only be available to the proponent if they are applying for a CDMable project. In general, we can only help prepare documents but not really for CDM (seeking grants from other investors; integral to a whole other bigger project), will DBP still assist them? *(JICA Study*	If the proponent needs help in the preparation of the PDD, we cannot help them because we are not the helpdesk We can provide loan assistance to auxiliary clients (e.g. garbage collection trucks if not CDM project per se) This is something that the bank does to enhance the credit process. If not enhanced, the bank will not get to play a facilitation role If the project is not viable, the bank will have to take double risk if they will have to rely on the CERs *(DBP)*

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
Team)	
The Bank needs to clarify between a project and project activity A sanitary landfill is not a CDM project activity; only a project (methane capture) On the other hand, a landfill project is viable making methane capture becomes viable CDM project activities will be judged according to their merits This will require proponents' creativity on the investment barrier aspect: "Who is to say that the project is not viable?" It will be the Bank who decides whether a project is viable or not. The proponents should be creative without undermining the rules. As far as financial viability is concerned, the bank has something to say to that, but only by getting the credits, that's when the project becomes additional	
If project is unviable at the underlying financing stage, does it mean that it is already not CDMable?	Yes But then again, if it is viable, then it is not additional anymore
What if the cogeneration plant is viable in itself?	Then the project proponent has to be creative in showing that even with a 17% IRR, the project will not push through without the CDM
What about hydro power? In itself, it is already viable. But do you consider this business-as-usual?	No. If this hydro power project has not been built, then the community could have continued relying on the grid. The proponent just has to convince the auditor that the hydro power displaces amount 'x' of fuel powered electricity from the grid A hydro project activity itself which reduces GHG by displacing fossil fuel is already eligible as a whole. But additionality is assessed on a project-by-project basis. It is important to look at the investment barriers, technological barriers, and common practice barriers first before one judges the CDMability of a project. It is hard to say that all project activities in the Philippines would be CDM-eligible *(MUS)*
The first step for the project proponent is the Letter of Intent addressed to DBP requesting the Bank to provide underlying finance for the CDM project activity	Define CREDIT ORIGINATION (simply that there is a potential for the client to borrow from the bank). Credit origination can be equated to marketing. At the time that you're marketing, CDM is on track. The project proponent can start first with the PIN then proceed with the CDM project later.
What's the status of the Northwind project, since it's the only DNA-approved project?	They're still awaiting for the final validation report because it is still the DOE who will request for the project's registration. Upon asking them why they haven't registered as of yet, they informed us that the World Bank still would like to get more CERs from the

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
	project so they are now undergoing re-calculations. I don't know what the World Bank is doing but that's the message that comes across. But we'd really like it to be registered because it will give the Philippines a place in the list of CDM-EB registered projects. With the extension of the cut-off time (December 31, 2005 to December 31, 2006) all 20 project activities can qualify for retroactive credits as long as they register by December 31, 2006. *(Joyceline Goco, EMB)*

JAPAN CARBON FINANCE
Ryuta Suzuki, Japan Bank for International Cooperation (JBIC)

Mr. Suzuki gave a presentation on JBIC in relation to the JCF. His material introduced to the participants JBIC's profile, underlying finance involved in CDM and loans that JBIC extends to implement CDM projects. On the other hand, he also discussed JCF's company profile, the services it gives to its clients, how the organization operates and merits for its projects. JBIC and JCF are both very active in supporting CDM activities in the country. Highlight was given on the four facilities to support CDM projects:

- Export loan
- Overseas investment loan
- Untied loan
- Official Development Assistance (ODA) loan

JBIC's capital contribution to JCF is used to purchase CERs from CDM projects. JCF's level of assistance will depend on the carbon credit volume. On the purchase of CERs, JCF will purchase basically 80% of carbon credits → remaining 20% can be purchased by other Japanese companies. *(Please refer to Annex 6 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
Would JCF be open to cooperating agreements? If we are to prepare a small CDM project activity, including bundling activities, would you be open to small-scale project activities?	No minimum or maximum limit for carbon credit The project itself has to conclude an agreement (ERPA) between project proponent and JBIC
What if DBP goes in between since it will take care of underlying finance, will you be open to such?	YES. Since JCF is a compendium of several financing institutions as well, the proponent needs to enter into an agreement between JBIC and DBP to cooperate, especially for DBP to give underlying finance. If JCF can get credit from the project preparation, they

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
	will support the preparation stage as well
We're now working on a 5 MW hydro power project in Mindanao. The proponent, being an electric cooperative, sounded off to us that although they have funds for the design, they are not able to put up equity (Php10-15 million). Can JBIC/JCF advance some funds to the client for the equity financing? Can they use cash advance for equity?	All JCF can make to the project is to provide cash for project preparation or payment for carbon credit in advance NO. Not possible JCF is a fund to purchase carbon credits so not possible to make contribution to project preparation
Is the World Bank LLDA project qualified?	I don't think so considering that this is bilaterally funded through the ODA so this cannot be used for the purchase of CERs. The LISCOP Project (the World Bank LLDA project in question) cannot be used to buy CERs. Term sheets depend on the carbon facility. The World Bank advances 20% of total CERs to use for upfront cost, unlike JCF which does payment upon delivery.
At what stage in the document process will the JCF come into the picture?	If you have the PIN, JCF can step in to enter into an ERPA with the proponent.
On slide 16: Even if the project is registered, is the project owner not required to pay you back?	Yes. The project owner is not required to pay. There is no offset mechanism under the JBIC/JCF scheme
For the project owner, do they have to sell all the CERs out of the project to JCF? *(Joy Goco, EMB)*	Not all. 80% of all CERs though should be sold to JCF JCF knows that it faces the risk of projects not getting registered
Remaining 20% sold to Japanese companies only? *(Zarky Pilapil, CDM Helpdesk)*	No. The proponent can sell it to other interested buyers But JCF can facilitate and introduce project owner to other Japanese companies/buyers

Eligibility Criteria for CDM Projects
Hitomi Homma, JICA Study Team (Mitsubishi UFJ Securities)

Ms. Homma presented the three main criteria to make projects eligible under the CDM which are as follows:

- ♣ The project is not a baseline scenario
- ♣ The project is "additional"; and
- ♣ The project contributes to sustainable development of a host country

For the first criteria, she gave a definition of baselines, how to determine baseline emissions, and gave examples of baseline scenario. For the second criteria, she gave a CDM-specific definition of additionality, correlated the concepts of additionality and baseline, demonstrated the use of an additionality tool, and defined how the project is additional. For the third criteria, she referred to the Philippines' own sustainable development criteria and the dimensions underlying the said criteria and gave examples of CDM eligible project types. *(Please refer to Annex 6 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
For fuel switching projects, who will claim the credits? Producer or the user? How about if the project owner is the producer?	The project owner will be the owner of the credit. The project owner can also be the producer or user at the same time. If this is the case, then it would be the producer who will claim the CERs
What is the economic size for a SSC in undertaking CDM projects? How much CERs is viable for a qualified CDM project?	If you can bundle enough of them then reduce the transaction cost, then that would be worth it. If you're to undertake it as one small single activity with a big transaction cost, then ideal figure is 1,000 CERs
In consideration of energy efficiency systems loss reduction programs for electric cooperatives, the CERs are relatively small but are viable. We're looking at 500 CERs per electric coop.	You can bundle 10 of them even if they are located in different parts of the Philippines. There should be stakeholders to claim the CERs
What is the acceptable amount of CERs that are viable (regardless of the presence or absence of bundling) to at least generate a considerable revenue out of it?	Depends on the perspective of project owner; but at least 1,000 – 2,000 CER for socially oriented projects. If it is an industrial project, CER requirement is definitely greater. So with electricity from the grid. Hence, it would heavily depend on the owners' perspective on what is worth it for them. It would be ambitious to start off with bundled project. A 5MW hydro project can work. Look at capital investment vs amount of CERs – weigh and balance the risks and profits that will be accrued in

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
	the process
On the additionality, would project proponents have to follow the additionality tool test? With the previous speaker, I think it was mentioned that the proponent need not go through the additionality test. Is it possible for the proponent not to undergo it? *(Joyceline Goco, EMB)*	It is standard nowadays to undergo additionality tool. In the past, proponents come up with their own tools. Now, since there are more CDM practitioners, there is a standard to be followed. It would be best to follow the prescribed tool. Otherwise, it will be a very big risk on the part of the proponent.
Is the additionality issue going to be resolved by the DNA? Or the CDM EB? Who will say that the project is additional or not?	The DOE will be the first set of eyes to look into the additionality component The PDD, after completion, has to be made public and accessible internationally. Hence, international comments and questions will be forwarded to proponent and which have to be addressed as well

DAY 2: 22 MARCH 2006

DNA NATIONAL APPROVAL PROCESS
Joyceline A. Goco, EMB / CDM Secretariat

As part of the national CDM approval process, Ms. Goco gave emphasis on the fact that the Philippine DNA gives its approval on CDM project applications considering its contribution to the country's sustainable development goals. In this regard, she proceeded to discussing the national Sustainable Development criteria, the national approval procedures and the documentary requirements necessary for project proponents to comply with for processing of project proponents' applications, as contained in the CDM-Rules and Regulations or DAO 2005-17 of Executive Order 320 Designating the DENR as the CDM-DNA. *(Please refer to Annex 7 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
Who's the DOE for the 20 projects submitted?	It is the DNV. 17 out of the 20 projects had DNV for their DOE. At the international level, 95% of all the projects are being validated by DNV
How old should the garbage be before it can effectively capture methane for CERs?	There is a test to be done to measure methane Depends on the garbage being decomposed
Right now, the solid waste team is talking with different LGUs for sanitary landfill project. Can this qualify for CDM?	It all depends. If the landfills are located in separate sites, then different treatment will be given per landfill site. The proponents/project engineers can give a projection as to when the landfills would generate such amount of methane for capture and carbon credits. Waste needs to be calculated then carbon credits afterwards
This early, the proponent would want to go into the CDM approval process. As a bank, when is the right time for us to really discuss entering into the whole thing?	The methane starts being generated fairly quickly. But if only 100 tons of waste is generated, then this is of no use. The project activity needs a significant volume to produce a considerable amount of methane. A considerable amount, at minimum, is 50-100 tons per day. If operated for over a number of years, e.g. 500 tons a day and operational for 5 years, it definitely deserves a look at. Gas will come out very quickly should the landfill be ready for methane capture.
The project proponent is now requesting funds from DBP to address leachate through piping	Just to give an idea, the 10KW target for Payatas is difficult to achieve because there is no considerable amount of methane and no proper piping as well
Do the TECs have NGOs as members?	None as of the moment Should the lead agency see the need to invite an NGO, they can do so But at the Steering Committee there is NGO representation

CASE STUDY 2: GRID-CONNECTED GENERATION PROJECT USING BIOMASS FROM PLANTATIONS IN THAILAND

Kyoko Tochikawa, JICA Study Team (Mitsubishi UFJ Securities)

Ms. Tochikawa started out by describing the project as a 300-MW net grid-connected biomass power project using a well-known and internationally-proven circulating fluidized bed technology. Should the project be implemented, it is projected to be one of the largest biomass plants worldwide at a project cost of approximately USD480 million. She then proceeded to discussing the baseline scenario, and the new baseline methodology submitted for evaluation by the CDM Meth Panel (NM0133), project leakage and effects of CDM on the project. In closing, Ms. Tochikawa described the project's sustainable development contributions and cited, as remaining hurdles, the project's scale (difficulty in looking for investors for a project as large as the plant) and the lack of Thai DNA approval. *(Please refer to Annex 8 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
How about plantations / trees around the project site? Is that inside the project boundary?	We left that out. Considering that it is owned by somebody else, it will be difficult to monitor. What we have to understand about leakage is that it might be reducing emissions because of the forests but it might also increase emissions in the long run if trees are cut down. The forest, however, is definitely outside of the project boundary. But if the owner wants to apply for a CDM project. since it is an eligible project, then it would have to be applied as a separate project
It seems that the sole purpose of the plantation is to generate biomass energy. The plantation must not have been a forest for the past 10 years so qualified for CDM? Will there be reforestation?	There will be reforestation but as has been said earlier, any net increase outside the project boundary (power plant site) will be handled separately. The plantation owner is different from the project owner so the forest and biomass CDM project activity cannot be integrated into one PDD
Can the plantation owner apply for CDM without the biomass component?	Yes. As a reforestation project
Will this not pose an issue of permanence since there is a plantation for biomass then for the planter?	At any one time that there will be about 30% of biomass on top of the plantation area at one time (won't be growing all at the same time). So the issue of permanence is covered.
With 300 MW, how many hectarage of plantation does this consist? If this was a forest in the past 10	800 square kilometers of plantation It is unused degraded land

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
years, what is the classification of the land at present?	Overexploited as an agricultural land Now, no real commercial value
Is this biomass project being converted directly to energy? Is a biomass energy converted to clean fuel (sugarcane to produce ethanol; or jathropa and palm oil to produce biodiesel)? So it is the user who can claim the carbon credit?	Yes Quick answer is yes 2 important notes to consider regarding this: First, reduction only occurs when you **use** the bioethanol. **Manufacturing only** will **not qualify** as a CDM project activity itself. There is an issue of who owns the CDM project activity – it may probably not be the person who uses the fuel. And because this reduction will only occur when it is used, if you export it, the reduction does not occur in the Philippines. Hence, it should only be consumed domestically. The user requires monitoring so it has to be used and measurable (e.g. amount put into vehicles) Yes
Example, our local gasoline station will buy ethanol then sell it, can Petron apply for CDM?	Yes but Petron has to monitor how much they are selling to motorists then claim for CDM. Example, you have a large bus company and say that it is run by bio-ethanol, then that bus company can apply for CDM
How about for bus companies using compressed natural gas (CNG) and liquefied petroleum gas (LPG) as a fuel-switching measure from gasoline and diesel?	Again, it's in the monitoring. But the proponent should be cautious enough to avoid double counting. If you have petrol station owner selling bio-fuel and says that they reduce "x" amount of emissions and motorists say they burn fuel from their cars, then there's an issue that needs to be resolved there. This will have to be evaluated and decided upon on a project-to-project basis
What if the power is generated by biomass, who can claim CER? If the bioethanol user can claim. How can that be qualified?	The power plant owner. Not the household owner Power plant owner makes effort to reduce emissions (what CDM is all about – incentive for person making the effort). For bioethanol, who's making the effort? Petrol station? User? Manufacturer? If the manufacturer produces biofuel, it basically cannot automatically claim CERs. But if it justifies that it is doing extra effort to make fuel price cheaper, then it can apply for CDM. But if the production of biofuel does not subsidize fuel prices (lower than market price), then it's the user that's making the extra effort. Hence, it really

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
	depends on a case-to-case basis.
What if it's compulsory/mandated to put the ethanol into the fuel mix? This puts no effort on the user because it is required	If the policy was introduced in 2005, then the quick answer is YES. Question however is who's making the effort? We have to go into the details to determine who claims the CERs. BAU is not eligible for CDM. But a lot of countries have been disgruntled by that because if they try to promote new regulations to accommodate CDM, they are penalized. To avoid such perverse incentives, the CDM EB recently said that any policy that reduces GHG and issued after year 2000 is not a baseline. This is where the Programmatic CDM comes in.
There's a Bill for the use of biofuel. So is that BAU?	Not anymore. You can hypothesize a situation where the bill may not be utilized. This is a positive decision by the CDM-EB actually.
In cases of fossil fuel switching projects such as biofuels, is it the one who makes the efforts who can claim credits. And the one who gets credits can make use of such to subsidize fuel price?	In some cases, manufacturer simply sells biofuel at market price. So there is no effort to make diesel prices cheaper / subsidize fuel prices. In this scenario, it is the user who makes the extra effort A good project to start with is where the manufacturer and user are the same. In Thailand, a construction company plants jathropa then mixes this with bioethanol into the diesel then replace diesel that is used countrywide. This is easier to monitor and not have to worry about the double counting issue
Going back to the topic of additionality, extra effort is placed on the plant owner because he/she is working in the context where the IRR is acceptable for him/her but where the IRR level is raised because the project is contributing to direct reduction of emissions. The user is not making any efforts (e.g. through higher tariffs) to use this carbon neutral electricity	
How can the user use CER? How can returns be calculated when there are no investments on the part of the user?	To date, if the production cost of biofuel is high. Then you might have to pay 20-50% more to buy the fuel. In that case, it is the user making the extra effort to buy bio-fuel. Hence, it is his effort to use the biofuel
What if the price of bio-ethanol fuels is cheaper than gasoline and diesel and it's considered market price? Therefore, there is no subsidy. Where does the CER go to?	CER owner in this case is the user. The CDM project activity is the combustion of biofuel that displaces fossil fuel. But at this point in time, you may have such a gray case. You'll need CDM assistance on the user and buyer part to make CDM work

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
BOTTOMLINE is, it is when you use the bioethanol that you have displaced fossil fuel and therefore reduce GHG emissions	
On the other hand, isn't it logical that if there is no producer, bioethanol use would not be possible?	In the validation, what validators look for is the emissions reduced. Validators look for metering as to how much is being reduced There is a new methodology in Thailand where they produce bioethanol from sunflower. The methodology was rejected because no user was identified. The rejection was due to the suspicion that the fuel may be exported to Japan, or sold to motorists who might be still be using diesel, or sold to power plant formerly using bunker fuel, and not for CDM. If, however, you've identified a pumping station and sold all fuel to the pumping station and the station can monitor, then this is fine because bioethanol usage can still be monitored
What if there is a contract between producer and petrol station	Probably they are going to share the CERs Bottomline for bioethanol: there has to be a producer and an end-user

CASE STUDY 2: METHANE EXTRACTION FROM WASTEWATER TREATMENT PLANTS AND POWER GENERATION PROJECT IN MALAYSIA
Hitomi Homma, JICA Study Team (Mitsubishi UFJ Securities)

Ms. Homma used a project in Malaysia that Mitsubishi UFJ Securities has helped to develop into a PDD. She first gave a background of the proposed project which will install a closed anaerobic biogas digester, install an electricity generator with a 1-1.5 MW capacity, combust the collected biogas to generate power or heat and utilize them on site and sell to the grid, flare the excess amount of biogas and reduce odors from POME decay in the long run. Since there was no applicable approved methodology at the time of project development, anew baseline methodology for the project was developed by Mitsubishi UFJ Securities ***[Forced methane extraction from organic waste-water treatment plants for grid-connected electricity supply and/or heat production" (AM0013)].*** This was followed by an enumeration of the emission reduction sources, CDM qualification points, emission reduction estimation, project emissions, emission reduction calculation, and a demonstration of the CER revenue from the project. In summation, Ms. Homma stated that the methodology, AM0013, can be used to support significant enhancement of wastewater treatment process and that the project of this type will be of interest to any industry which discharges wastewater with high organic content. *(Please refer to Annex 9 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
From the revenues created from the credits, what will be the IRR?	No calculation on that Without the CDM, 7.7% IRR is very low at the BAU level
In the 7-year period, are there no costs to be considered in computing for the CER revenue? What other transaction costs were considered?	Validation cost for each renewal point Verification cost depends on the proponents. If the proponent wants to have them verified every year, then costing will have to be accounted for every year of re-validation. If you calculate it on a per CER basis, it's usually less than a $1/CER and usually you can get the buyer to absorb a lot of the cost within that price
This project is methane capture – if you look at the figure at 7-years and 10 million → get ¼ of transaction cost return with 7-year project period → because methane is involved → smaller scale than the Thailand project but because of GWP, then higher IRR levels	

FORESTRY CDM PROJECT
Kyoko Tochikawa, JICA Study Team (Mitsubishi UFJ Securities)

Ms. Tochikawa, in her presentation, defined the terms **FOREST**, **AFFORESTATION** (conversion of land that has not been forested for a period of at least 50 years to forested land), and **REFORESTATION** (conversion of non-forested land to forested land) using the CDM-EB's terminology. She also illustrated the difference between long-term and temporary CERs to be claimed from forestry projects, and defined the advantages and disadvantages of each type of CER. She then proceeded to illustrating a hypothetical CDM A/R project, complete with scenarios with and without CDM, assumptions along with the sample project, and projected maximum potential revenue from credits. *(Please refer to Annex 10 for details)*

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
Are the lCERs and tCERs acceptable in the non-Kyoto market?	Yes There is a higher value attached to sink projects in terms of corporate image. People like trees being planted. In terms of Kyoto compliance, forestry projects are relatively cheaper
But is there still a market?	Yes. And slight premium attached if CDM project
When can you start applying for CERs? As soon as the forests are planted? Say we planted in 2005, if they are only 1m high, can we	Yes The sink potential starts absorbing once it starts growing Once it reaches maximum growth, all the more that it reaches saturation point for carbon absorption

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
start applying for CERs?	
Can you plant any type of tree?	No requirement Only difference will lie if fast or slow growing so affect projection in the first few years
Some plant trees and after 10-12 years, cut down for furniture	That becomes a reversal of the sinks This becomes very similar to the dedicated plantation for the biomass power plant. So you can claim that portion but can't claim a 100% CER
So what will be the income of investors in planting trees? Why would an investor plant 10,000 trees? No revenues	Any type of tree so if plant 10,000 fruit trees, then income
Is it a condition that the project owner should not earn income from it?	No You can grow fruit trees and derive income from that. In order to grow fruit trees, you have to treat land because it's degraded. It's not as if it's readily fertile. So there is special effort there and not BAU.
Would bundling also be considered in forestry? If DBP projects are all over the Philippines, can we bundle them altogether? So one PDD?	Yes Can be included in the Programmatic CDM
Considering the transaction costs that will be incurred in the A/R projects, is it still worth it?	On a personal opinion level, it has to be fairly big or it should be supported by the government as well You should have to monitor how fast the trees are growing and CERs capture since there is a fairly big transaction cost involved – especially in paying for validation costs

INPUTS ON THE PROPOSED DBP GUIDELINES FOR CDM
Hitomi Homma and KyokoTochikawa, JICA Study Team (Mitsubishi UFJ Securities)

- We usually don't deal with both seller and buyer in one single project. We usually deal with either, not both, in one single project. If our client is a seller, we will help the client sell carbon credits at a higher price. Hence, there is no direct link between debt lender and equity investor/buyer unless it is done indirectly through the whole transaction scheme because there might be indirect relationships existing between a lender and a buyer through the seller. This explains the logic that it is not possible to become a single project's financier and seller a the same time since there will be conflict of interest in the

long term. It is, therefore, important to determine one's role in the project: Who is your client? Are you working with the seller? Or with the buyer?

- ♣ On the "No Cost to Client or to DBP Strategy." There is no such thing as this policy. It is possible to say that there is a ***no cash cost to DBP or to the client*** but there will always be a cash flow in these transactions. There will always be the possibility of a hidden fee that will be incurred in the preparation of the PDD, or the consultants may expect to be paid in kind through cheap CERs maybe. It is important to note that in such arrangements, transactional costs may come in three types: hidden charges, success fee, CERs. At the beginning, there migh be a no cash cost option. But if this is offered to a third party, they would prefer cash cost in return. DBP might be interested in covering that transaction cost so that client would not be shortchanged
- ♣ The triangulation in the whole proposed structure is only to bridge the buyer and client

The floor was opened for questions from the participants.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
How is the carbon market going?	Similar to stock market. The carbon market is very much dictated by the law of supply and demand. In the EU, utilities have the option to burn either natural gas or coal in their power plants. If natural gas prices go up, consumers shift back to coal. This would then lead to a bigger gap between natural gas and coal prices. In this scenario, coal gets a higher incentive because there is a greater demand for coal. Hence, the higher the CERs to be complied with. But compliance can be met through the EUTS. Carbon credits can also be gained through other voluntary non-Kyoto markets between and among those country Parties who have not ratified the Kyoto.
If CERs came from Philippines with Mitsubishi Securities as brokers, and takers are from EU or Japan, will the Japan government just keep the CERs for themselves or after they buy it, if there is demand for the EU countries, will they sell CERs?	Japan is not in a position to sell CERs Japan will keep the CERs to comply with obligation A middle man /broker will be the one to sell CERs
Can the CERs be re-sold to the market?	This can be done through a middle man but not through the Prototype Carbon Fund (PCF). Eco Securities or CO2E, for example, are consultants and brokers.
The setting then should be that the brokers and traders may hold on to the CERs. But once the buying country has it, the country should keep it so that this signifies the end of the CER trading and that	Yes, this is right. The CDM EB has to monitor through CDM registry under the CDM EB. It has to strictly monitor the compliance of Annex 1 countries. Annex 1 countries can also use AAUs (under the ET) and ERUs (under the JI) to comply with targets. But they should also be reminded that flexibility mechanisms are

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
reselling is only in the hands of the broker	merely supplemental to domestic reductions. In actuality, the compliance mechanism is also still being negotiated among countries.
It was mentioned earlier that the selling will most probably be from the host country. So the Philippines, being a host country, does it have to go through a brokering body?	There are buyers like NEDO or JCF. The Philippines can go directly to them and skip all the middle men and go straight to seller and buyer. Other buyers could also be big companies accredited by the country Party to do the buying.
In reference to a news item in the Times: it is reported that Japan is coming up with a Japan Carbon Exchange similar to Asia International Exchange in Singapore. The DBP President asks, therefore, how DBP can be a part of the carbon trading market at this stage of carbon trading in the Philippines. Considering that there is only one project given LoA, how do we go about this? *(Ms. Mendoza, DBP)*	If you've got the rights to trade CERs, you can trade it on that exchange. But to have those rights, you either act on behalf of your client as a facilitator (by listing it on the exchange) or if you acquire CERs as a trader/broker of carbon credits then you can also sell it to the market. The key to participate in this scheme is having the RIGHTS TO DO SO. This can be done by owning carbon credits yourself or represent people who own it,
Like in any other stock exchange, we have to be registered with that stock exchange, so how do we do that?	We don't know requirements to be imposed on the participants
With regard to the DBP owning CERs, assuming that they will be getting funding for underlying finance from DBP, and offer CERs as collateral, can DBP keep it and have that accreditation or registration with the stock exchange?	As long as it is within the commitment period
To the other DBP colleagues: Just want to emphasize that before entering into trading, we have to OWN CERs; otherwise, we'll just do BROKERING. With this in mind, given the present status of CDM implementation in the Philippines, CER trading is a FUTURE activity and not a PRESENT activity. (Statement	The Helpdesk will not explicitly match. We can only refer the proponents to project developers Currently, we are just helping the client understand what CDM is on the basics: what should the PDD contain, other documentary requirements, the approval process, etc. This is because there are proponents not aware of how to prepare the PDD. The CDM Helpdesk is there to help out cover the basics.

QUESTIONS/COMMENTS SUGGESTIONS FROM THE DBP PARTICIPANTS	RESPONSE(S)
made to correct notion perceived from other proponents that the Philippines is ready for trading). At present, given DBP's knowledge on CDM, it can match the proponents with prospective buyers. But brokering at this time on the part of DBP may have some sort of "duplication" Now, DENR has a Helpdesk who can help proponents with PDD preparation *(Ms. Maghirang, DBP)*	

The participants were then divided into two groups for the workshop session. One team handled a bio-ethanol project and the other, a mini-hydro project (project concept briefs provided early on)

WORKSHOP SESSION

TEAM 1: BIO-ETHANOL PROJECT	TEAM 2: MINI-HYDRO PROJECT
• Methane as fuel and bagasse • Baseline: fossil fuel and bagasse → fossil fuel displacement from the grid • Additionality: cogeneration and wastewater treatment • Sustainable development contribution: support the farmer to plant more sugarcane since there are vast areas of unplanted land. In the long run, the farmer also saves foreign exchange thru utilization of renewable fuel	- barrier analysis using additionality tool ♣ step 1: identify 2 alternatives → project 1 using genset and use of mini-hydro ♣ step 2: investment analysis → for the genset, higher production cost, less yield; with hydro, IRR of 12.89% (but very minimal spread of 2. plus points) → HYDRO PROJECT IS ACCEPTABLE IN TERMS OF INVESTMENT ♣ step 3: barrier analysis → not very attractive to investors because of lack of equity from electric coops (actual scenario upon loan packaging); low return on investment (ROI) where small amount of ROI can be invested in other projects instead; first run-of-river type of technology; most investors are hesitant because of risk of success ♣ step 4: common practice analysis → tariff is regulated; for them to increase tariff rates, the project has to be approved by the ERC; foreseen problem with the onset of El Nino (affect operation of the project) → with CERs, greatly uplift profitability of

	the project Team's question posed to JICA Study team: Will the 900 KW project compensate for the transaction cost? **Comment by Ms. Homma**: The IRR is relatively high at 12.89% **DBP response**: The IRR is government bonds. **Follow up by Ms. Tochikawa**: Then this has to be inflated as a buffer to take account the risks posed by the project. you can add another 5-10% so the benchmark could actually go up to 15-20%. Hence, under BAU, it is still not viable

CLOSING REMARKS
Ms. Eufemia Mendoza, Vice President, DBP

Ms. Mendoza expressed hope that the workshop results and materials have helped enlighten and guide DBP in its quest for becoming a lead bank in the Philippines to promote CDM among project developers – especially as a fund provider for CDM project activities.

She also expressed her thanks for all the participants who were able to attend. Although she was looking forward to the DBP staff's maximum participation, she ensured the facilitators and organizers that participation will, indeed, be maximized for future workshops. CDM is rapidly evolving so updating is very badly needed on their end.

In closing, she expressed trust that all the question marks have been answered to signify impact of the workshop on the participants.

With that, the workshop was concluded and exchange of contact information took place afterwards.

添付５：CDM 促進に関する
IACCC ミーティング議事録

ROUNDTABLE DISCUSSION ON CDM PROMOTION MEASURES WITH THE INTER-AGENCY COMMITTEE ON CLIMATE CHANGE AND OTHER RELEVANT AGENCIES

JICA STUDY ON CAPACITY BUILDING TO PROMOTE CDM PROJECTS IN THE REPUBLIC OF THE PHILIPPINES
25 October 2006, Wednesday, 2:00 PM – 4:00 PM
Green Philippine Highways (GPH) Operations Center, 2nd Floor, DENR Main Building, DENR Compound, Visayas Avenue, Quezon City

Participants:

Please see attached attendance sheet.

Highlights of the Discussion:

Ms. Joyceline A. Goco of the CDM and IACCC Secretariat Offices of EMB-DENR welcomed the participants to the roundtable discussion, which aimed to explore potential measures for further promoting the CDM in the Philippines, particularly towards identifying and developing eligible project activities with substantial contribution to sustainable development. Ms. Hitomi Homma, Senior CDM Consultant and member of the JICA Study Team of the Mitsubishi UFJ Securities Co., Ltd. (MUS) likewise explained that in view of the underlying opportunity for the Philippines to continue to benefit form the CDM, the Study Team would like to take this opportunity to receive recommendations on the CDM promotion measures from the members of the IACCC and other relevant agencies who were already knowledgeable about the CDM and its merits.

Ms. Homma noted that the Study Team is currently completing a Final Report, which MUS will submit to the Philippine government and JICA. Recommendation for the promotion of the CDM constitutes one of the key components of the Report and Ms. Homma presented the initial set of recommendations that the Team has identified during the implementation of the Study. Please see attached presentation A.

To provide the participants with an idea on how other developing countries promote CDM, Ms. Goco presented an assortment of observations on host country success in attracting foreign and domestic investments through CDM promotion. She noted that these observations and suggestions would simply serve to initiate the discussion on what measures could be started at once and what would be doable in the short-term and long-term. Please see attached presentation B.

In the ensuing discussion, the participants articulated the following comments and suggestions:

Agency	Comments / Suggestions
1) FMB	➢ it would be good to aim for at least 3 PDDs or PINs for CDM afforestation/reforestation, covering Luzon, Visayas and Mindanao ➢ the top level officials of the DNA as well as other relevant agencies should act as the marketing arm for promoting CDM and acquiring the necessary financing; it is important that they take the lead in promoting the CDM at the field level – for example, conducting an orientation every quarter. ➢ proposed to have at least one workshop for each region intended for the Regional Technical Directors, the community-based forest management (CBFM) heads, and the Resource Conservation Directors at the regional level to help them in promoting the CDM to the private sector (e.g. the special land use areas and CBFM holders) ➢ it is also important to coordinate with the PENRO and CENRO officers in identifying potential areas, specifically in looking at compliance with existing laws, rules and regulations and with the additionality and land eligibility requirements
2) Klima – Manila Observatory	➢ explained that Klima-Manila Observatory is helping to promote CDM in line with the conduct of trainings under various projects such as the CD4CDM, IGES ICS-CDM, etc.; the center is not into active promotion per se but when invited to forums, the center provides information on CDM; the center also provides venues for possible training but it checks qualifications of target groups or participants to make the most out of potential; other activities of the center tackle climate change in general and it markets CDM in terms of IEC
3) FMB	➢ training of CDM preparers should also be looked into
4) CBRED-DOE	➢ the CBRED Project is looking into providing a project preparation fund for feasibility studies which would provide interest-free borrowing / lending up to PhP 5 million. In response to Ms. Goco's query, he affirmed that the PDD development under the CDM could qualify under the fund. ➢ The CBRED Project also has a market service center. ➢ The CBRED Project also has a database exchange system and the link to CDM and the DNA is included as part of the design of the related website. A memorandum of agreement has been signed with the DENR and database exchange keepers would have to be designated

5) Earth Savers Movement	➢ It is important to target a CDM niche market and make that into a promotion policy ➢ *Ms. Goco: more information and further studies, such as actual mitigation potential of each sector, are needed before this can be made into a policy*
6) FMB	➢ While the government is doing the initial promotion, it is also vital to identify private partners in promotion and determine when the private sector can come in as regards promotional activities of government agencies ➢ Setting up a fair for each sector would also be helpful in promoting CDM and identifying good projects and potential preparers or developers
7) Earth Savers Movement	➢ Integrate CDM promotion efforts with the Philippine EIS System – when a project proponent is applying for an ECC for a project that is eligible under the CDM, mechanisms to explore the possibilities should be in place ➢ Potential sectors, e.g. Philippine Rural Electric Cooperatives Association or PHILRECA, may also do promotion activities in partnership with the DNA
8) NEDA	➢ In an amendment for the period covering the last half until 2010, changes can be incorporated to include CDM in the Medium Term Philippine Development Plan (MTPDP), particularly in the energy and forestry sectors in order to strengthen policies on sectoral goals and plans and open avenues for availing of opportunities under the CDM.
9) Klima-Manila Observatory	➢ Promotional activities of the DNA may be included in the annual Energy Week activities of the DOE ➢ *CBRED-DOE: Unfortunately, the last Energy Fair was held two years ago and the present Secretary is not sold to the idea, hence no Energy Week was conducted last year* ➢ The DNA may also ride on the activities of other associations such as the ENMAP, PCAPI, etc. ➢ *Ms. Goco: the DNA is presently giving lectures on CDM to such associations and other groups to which the DNA is invited.* ➢ Klima-Manila Observatory was asked to provide IEC materials for the 2006 Ms. Earth Beauty Pageant in relation to this year's theme of global warming. The coronation night will be on 26 November and even just a buzzword through this avenue may

	help to create curiosity on CDM ➢ *Ms. Goco: it would be great if you could suggest that the candidates visit NorthWind, perhaps as a venue for the swimsuit pictorial, instead of conducting it by a pool* ➢ *Earth Savers Movement: or you could also provide a question on CDM for the question and answer portion* ➢ Capacitate Regional Offices of the DENR to equip them with the skills necessary for properly assessing and identifying potential CDM project activities to supplement past and present foreign assisted projects that provide trainings. ➢ *Ms. Goco: this will be proposed to JICA as a follow-up activity*

The participants also offered the possibility of submitting further suggestions for promoting CDM when they have consulted their respective offices. Ms. Goco and Ms. Homma welcomed the proposal and thanked the participants for a fruitful discussion.

添付 6：温室効果ガス排出削減量のモニタリング及び報告ガイドライン

GHG EMISSION REDUCTION MONITORING & REPORTING GUIDELINE

A PRACTICAL GUIDELINE

FOR THE IMPLEMENTATION OF THE MONITORING PLAN

AND THE REPORTING OF GHG EMISSION REDUCTION

Produced by

Clean Energy Finance Committee, Mitsubishi UFJ Securities

In association with:

Department of Environment and Natural Resources

Republic of the Philippines

And

Japan International Cooperation Agency

JICA Japan International Cooperation Agency

Department of Environment and Natural Resources
Kagawaran ng Kapaligiran at Likas na Kayamanan
denr.gov.ph
Republic of the Philippines

MUFG Mitsubishi UFJ Securities

Document History

Doc. Version		Issue Date
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Disclaimer

This Practical Guideline targets project proponents and CDM practitioners in the Philippines, specifically those engaged in the design and actual implementation of the monitoring plan of a CDM project activity. By producing this guideline, the JICA Study on Capacity Building to Promote CDM Projects in the Philippines aims to contribute to the development of credible procedures of monitoring and reporting emission reductions, through improving the quality of the design and implementation process based on acceptable standards However, the Guideline is intended to act merely as general guidance and should in no way be viewed as a sole reference for providing technical and organizational advice to meet the requirements of monitoring that would require the expertise of project-specific, qualified and experienced professionals. While the Guideline presents practical examples and suggestions, independent consultation should always be sought when undertaking a CDM Project, specifically in developing a reliable emission reduction monitoring and reporting system to suit the particular circumstances of an individual CDM Project.

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LIST OF ACRONYMS

Terms	:	Description
CDM	:	Clean Development Mechanism
CDM EB	:	CDM Executive Board
CER	:	Certified Emission Reduction
DNA	:	Designated National Authority
DOE	:	Designated Operational Entity
JICA	:	Japan International Cooperation Agency
MUS	:	Mitsubishi UFJ Securities
NM		New Methodology
PDD	:	Project Design Document
RIT	:	Registration and Issuance Team
UNFCCC	:	United Nation Framework Convention on Climate Change

1 INTRODUCTION

1.1 BACKGROUND & OBJECTIVE

This GHG Emission Reduction Monitoring & Reporting Guideline has been developed to assist project developers in the Philippines, specifically those with projects that were successfully registered as Clean Development Mechanism (CDM) project activities, to understand the basic issues and essential steps in implementing the Monitoring Plan constituted in the Project Design Document (PDD). Produced by the Mitsubishi UFJ Securities (MUS), this Guideline is one of the outputs of the Study called Capacity Building to Promote CDM Projects in the Philippines, intended for the Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DENR) as the recipient of this development assistance provided by the Japan International Cooperation Agency (JICA). . The TÜV Süddeutschland Industrie Service GmbH (TÜV-SÜD), a Designated Operational Entity (DOE) accredited by the United Nations Framework Convention on Climate Change (UNFCCC), has reviewed this document for effectiveness and accuracy.

A monitoring plan of a CDM project activity is constructed during the development of the project's PDD prior to the CDM registration. The plan specifies the variables mandatory to be monitored, the frequency of monitoring, and the manner of quality control. Paragraph 56 of Annex H of the Marrakesh Accords[R-1] states that the implementation of the plan is an obligation of a project developer or project operator and a condition for the issuance of Certified Emission Reduction (CER) units. Paragraph 60 of the same Annex further specifies that a project operator be required to issue a report detailing how this plan has been implemented and how much emission reduction is generated within the crediting phase at the end of every monitoring period.

It is up to the project developer to ensure that the reported emission reduction is dependable and accountable, while maintaining the practicability of the data collection process. Failure to comply with the registered monitoring plan means that the reported emission reduction may be disputed resulting in (a) delay in the CER delivery and (b) possible heavy discounting to maintain conservativeness, all of which may have consequences to the project's cash flow. This means that in addition to the participation in the local or international sustainable development, the success of a CDM project depends on the ability of the project operator to carry out the monitoring plan and report the emission reduction. It therefore feels necessary to provide practical guideline in this area for first-time project developers.

This guideline intends to close the gap between a monitoring plan and its implementation process by providing practical information on how to apply best practice. Valuable inputs from various parties such as the project developers, a Designated Operational Entity (DOE), as well as through informal consultation

with an instrumentation company, along with a number of related literature already available helped to enrich the contents of the guideline. It is written without an assumed knowledge of the CDM.

1.2 SCOPE OF THIS GUIDELINE

The complexity of the monitoring plan varies from project to project independent of its scale (large or small). Some projects need the monitoring of a single parameter whereas others require the monitoring of more than 30 parameters, with varying frequency and quality control, involving data collection from different departments in the company. In consideration of complexities in covering a broad range of project types and scale, this guideline provides a general outline of monitoring implementation such as pre-implementation strategy, management, and quality control/assurance, by presenting a hypothetical case as an example– rather than a project specific approach.

A short introduction of the CDM is provided under **Section 2**. This section explains the stages of CDM process, the parties involved, where to find information, and other practical guidance that may benefit the implementers of a monitoring plan.

Section 3 explains the steps and actions that a project developer is required to take as soon as the project achieves registration. This includes the need to construct an implementation strategy, ensure proper communication with all members of the company, and secure the appointment of a focal person in-charge of CDM activities or a so-called CDM Coordinator.

The responsibilities of a CDM Coordinator include the interpretation of the monitoring plan in the PDD into practical procedures deployable to field operators. These procedures should be workable and easy to understand. **Section 4** provides information that may assist a CDM operator in performing day-to-day monitoring. This section goes into details of a recommended mechanism to capture, reconcile, consolidate and archive data, account for error, and distribute tasks.

As the captured data eventually become the basis of calculation for the emission reduction, the monitoring plan generally applies strict quality assurance and control procedures. One periodic requirement is instrument calibration. **Section 5** discusses some basic calibration principles and standards that may assist the CDM coordinator in developing the necessary monitoring strategy that fits to his or her organization.

At the end of a monitoring period, the project operator is obliged to report the emission reduction that the project activity has delivered. **Section 6** covers a general guideline on how emission reductions are calculated and reported, and discusses the general reporting requirement using a standard template provided by TÜV-SÜD.

Over the project lifetime, the equipment may need to be modified, retrofitted, and repaired. In such a situation, the CDM Coordinator must be able to assess whether the impact of the proposed changes affects the validity of the PDD and its monitoring plan. **Section 7** describes the actions that need to be undertaken by a CDM Coordinator should such changes happen during the monitoring period.

Finally, all data obtained in the field and the results of calculation need to be verified by a Designated Operational Entity (DOE), an independent third party responsible for the review and ex post determination of emission reduction of a registered CDM project activity.,. The DOE looks into forms, data archives and procedures to ensure that the calculated emission reduction is accurate and consistent. **Section 8** contains the perspective of a leading DOE and lists problems that are commonly encountered during verification process, which may be valuable to the project operator.

2 CDM EXPLAINED

This section provides a **short** overview of the CDM for the benefit of the implementers of a monitoring plan..

2.1 CDM IN SHORT

CDM is one of the mechanisms devised by the United Nations Framework Convention on Climate Change (UNFCCC) under the Kyoto Protocol to mitigate the threat of global warming as a consequence of the release of greenhouse gases (GHGs) from human activities.

Under the CDM, the emission reduction is tradable between the following parties:

a. Annex I parties – industrialized countries and countries with Economies in Transition that are listed under Annex I of the UNFCCC; and

b. Non-Annex I parties – developing countries, and least industrialized countries that are not listed under Annex I of the UNFCCC

The Republic of the Philippines belongs to the Non-Annex I parties.

The Philippine government ratified the Kyoto Protocol in November 2003 and has made the initial step to become a host country for the CDM by establishing a body called the Designated National Authority or DNA. The DNA has the authority to issue a host country approval and therefore be able to support project(s) that mitigates greenhouse gas emissions to take part in the emission trading system. Information on how to obtain this approval is provided in the DNA website[R-2].

The amount of greenhouse gas that is reduced or absorbed by a CDM project activity located in a non-Annex I party can be converted into credits called **Certified Emission Reductions** or CERs, which are allowed to be traded to and amongst Annex I parties.

2.2 OBTAINING REGISTRATION

In order to gain CDM status, all proposed CDM Projects must go through a number of processes described in the next few paragraphs.

The first stage of CDM project development is **Project Identification and Planning**. During this stage, the project idea is assessed if it complies with the eligibility requirements in order to be implemented as a

CDM project. The eligibility criteria include an assessment of the project's additionality and contribution to sustainable development of a host country. Each host country has the sovereign right to develop its own set of approval criteria from the viewpoint of the country's sustainable development priorities and the Philippines has elaborated this in a departmental administrative order promulgated in August 2005. Full approval criteria of the Philippines can be obtained from the aforementioned DNA website.

Once the CDM eligibility of the project is confirmed, the next step is to prepare a **Project Design Document**, commonly referred to as **PDD**, a document central to the CDM process. The PDD contains all aspects of a project in detail including description, methods/formulae to account for emission reduction, the projected emission reduction, and monitoring plan. After the PDD is completed, the project must undergo a **Validation** process by an independent third party called the Designated Operational Entity (DOE). The DOE assesses all aspects of the project reported in the PDD and ensures that the project meets the CDM requirements and complies with a valid methodology previously approved by the UNFCCC.

The project also needs to obtain a **Host Country Approval** before proceeding to the registration. In the case of the Republic of the Philippines, this approval is obtained from the DNA established within the Department of Environment and Natural Resources (DENR) and its support mechanisms. The process of how to obtain this approval is explained in detail on the DNA website[R-2].

In the course of the validation process, the PDD must be published at the UNFCCC website for **Public Consultation** for 30 days.. Comments from Parties, local stakeholders and UNFCCC accredited non-governmental organizations would be taken into consideration. If the project activity fulfills the validation requirements, the DOE will then submit a formal validation report to the CDM Executive Board (EB) for **CDM Project Registration**.

2.3 CREDITING PERIOD

The crediting period is defined as the period at which the project starts reducing the anthropogenic greenhouse gas emissions. Project participants must select a crediting period for a proposed project activity from one of the following alternative approaches: (a) a maximum of 7 years, which may be renewed at most 2 times, or (b) a maximum of 10 years with no option of renewal. If the former crediting period is chosen, for each renewal, a DOE determines and informs the EB that the original project baseline is still valid or has been updated, taking account of new data where applicable In general, the crediting period of a project starts as soon as the project is registered with the UNFCCC, or at any suggested date after registration – although there are exceptional cases where the crediting period began before the project is registered.

2.4 MONITORING PERIOD

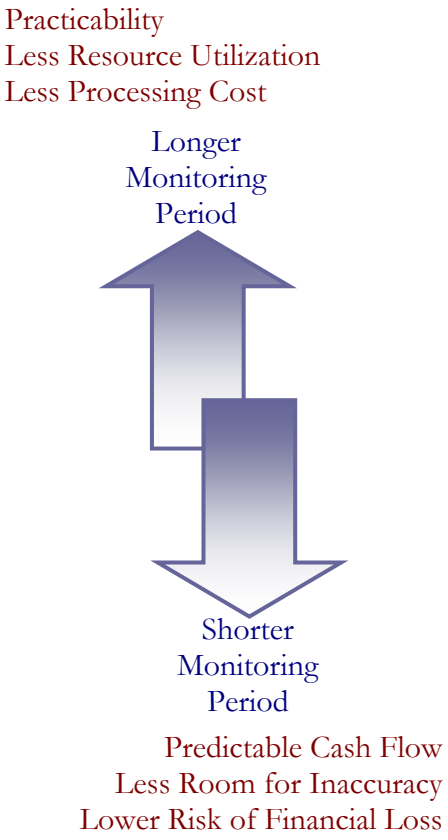

FIGURE 0 – OPTIMUM PERIOD

The monitoring period is divided into a shorter period called **Monitoring or Reporting Period.** The monitoring and reporting period is a period at which the project operator shall report its activities and its resulting emission reduction. The reported emission reduction will later be qualified as Certified Emission Reductions or CERs following a satisfactory Verification and Certification process as explained in the next section.

There is no general rule on the duration of the monitoring/reporting period. Each project should find its optimum duration depending on the size of the CERs, its cash flow or financing requirement, and practicability.

Typically, 1 calendar year is perceived as optimum by many project participants, although those with projects that generate large amount of CERs often choose a shorter monitoring period (e.g. bi-monthly). Most project participants generally regard a monitoring period coinciding with the annual or semi-annual maintenance shutdown as the ideal timing.

2.5 OBTAINING CERS

The series of processes to obtain CER starts with the project participants' submitting the monitoring report to the DOE for the **Verification** process. During this process, the DOE will check if monitoring plan has been fully carried out in accordance with the PDD and the reported emission reduction has been delivered.

If these two aspects are satisfactorily fulfilled, the DOE shall then certify the emission reductions by issuing a

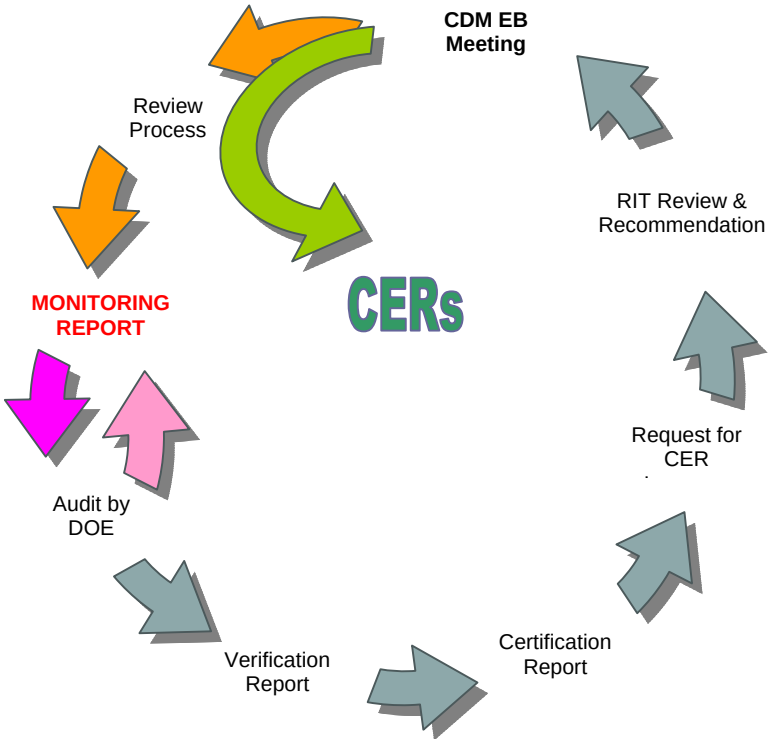

FIGURE 0 – STEPS TO CERS

Certification Report that assures the CDM project activity achieved the verified amount of emission reductions within the reported period.

Following the certification report, the DOE shall request the CDM EB to issue the verified amount of CERs (**Request for CERs Issuance).** This request will be reviewed by the Registration and Issuance Team (RIT) from the viewpoint of validity of the verification and certification process. The RIT shall then make a recommendation to the CDM EB. If no concerns are raised by at least three EB members, CERs can be issued automatically after the review period.

In some cases, the RIT may recommend a project to be put under review. If the CDM EB agrees to the recommendation for review, it will issue a decision concerning the scope of review and will request the project participants and the DOE to re-examine the monitoring /verification/certification process. Based on the results of such review, (1) CERs may be issued in the requested amount; (2) a correction in the emission reduction may be applied; or (3) in the worst case, the issuance may be rejected altogether.

2.6 PUBLICLY AVAILABLE LITERATURE

It is perhaps necessary for a project developer to keep updating himself/herself with the new decisions made by the CDM EB even after the registration. The **UNFCCC CDM website**[R-5] provides a wide range of information on various aspects of the CDM such as the process of obtaining registration, verification, certification, approved and new methodologies, etc. More importantly, the website contains information of projects on various stages including validation, registration, verification, certification, and issuance of CERs. The monitoring, verification and certification reports can also be downloaded from the abovementioned website.

The Intergovernmental Panel on Climate Change or IPCC publishes a number of reports related to the calculation of emission reductions. Two of the IPCC publications have been adopted by the UNFCCC and grew to be the main sources for methods and parameters applicable to several methodologies. These publications are the Revised 1996 and 2006 **IPCC Guidelines for National Greenhouse Gas Inventories**.

In 2002, the International Emissions Trading Association (IETA) and the World Bank Carbon Finance Group / Prototype Carbon Fund (WB PCF) initiated a process to establish a common CDM and JI Validation & Verification Manual that could be used by a wide range of stakeholders. The manual is a good source of information on the scope of validation and verification process – which may help project operators to understand the objective of the process. This document can be downloaded from the IETA website: www.vvmanual.info. The development of the manual was lead by Det Norske Veritas

Certification (DNV) with revision and comment provided by TÜV Süddeutschland and KPMG, as well as other certification bodies.

3 PRE-IMPLEMENTATION STEPS

One of the most common barriers for the successful implementation of a CDM project activity is the limited know-how within the project development organization. While the knowledge and benefit of the CDM may be kept to one or two persons, monitoring implementation requires support from many members of the organization. Thus, as the project proceeds to the operation stage, monitoring requirements need to be communicated across the organization.

Another barrier to the successful implementation is that the monitoring requirements specified in the methodology and the PDD is often not straightforward for a project developer to interpret. This creates confusion and leads to under standard performances, resulting in unverifiable emission reductions. These dilemmas are usually discovered at the later stage of the project implementation and any efforts to rectify inaccuracy and errors either are in vain or delay the onset of the expected CDM revenue.

It is therefore crucial for the project developer to call for a team as soon as the project achieves registration, and develop a monitoring strategy to ensure a smooth data gathering and reporting process, which meet the stringent monitoring requirements.

3.1 MANAGING A CDM PROJECT: WHO SHOULD BE INVOLVED?

The amount of effort required to implement a CDM project activity is comparable to developing and launching a new product. Indeed, CERs are a form of a new product to the project developer. In order to put this product into a market it is important to come up with a proper plan and strategy for production, quality control, accounting, marketing and trading. Continuous commitment on the part of the project developer and a good management structure, together with an adequate resource allocation are more important than ever for the successful implementation of the CDM project activity.

It is difficult to generalize the level of involvement vis-à-vis the CDM activity required for the different units/departments of a company. This is because no two companies are the same and some companies have a more structured operational system than others have. The following list presents different tasks envisaged by various units/departments of a company:

1. **Technical/Engineering/Maintenance Department**; Project operator may already practice equipment monitoring and maintenance as part of the Standard Operation/Maintenance Procedure. In such a case, it may be worthwhile to consider an integration of CDM monitoring/instrument maintenance/quality control requirements into the existing practice, and an identification of areas

where improvement is necessary to meet the monitoring requirements particular to a CDM project activity

2. **Accounting/Sales/Purchasing Department**; Several CDM data are needed to be crosschecked, reconciled or consolidated with multiple sources whenever possible. For example, if a project exports electricity to grid, it is recommended that the data obtained from the electricity meters be crosschecked against the sales receipts issued by a grid operating company. It is also suggested that this kind of reconciliation activity be recorded properly as a DOE may request for such information during the verification.
3. **Finance Department**; CERs are either cash flow or equity related. The finance department may find it necessary to monitor the amount of emission reduction to estimate the financial risks/potential revenue. In such a case, the finance department may feel the need to monitor CER production closely.

3.2 The Central Role of a CDM Coordinator

It is crucial to have one central person to lead and coordinate the CDM activities in the company. The responsibility covers supervision for:

1. Monitoring equipment compliance check, ensuring that instrumentations and devices are available and properly suited to perform its function for emission reduction monitoring;
2. Development, execution, analysis and improvement of the Standard (CDM) Monitoring/Reporting Procedures;
3. Deployment of the procedures through trainings, ensuring that these procedures are fully complied with;
4. Communication and coordination between and among multiple departments in a company to disseminate CDM related information;
5. Calculation and reporting of the emission reductions and;
6. Liaison with a DOE during the verification.

The consideration for whether or not the above role needs dedicated personnel varies from one organization to another. It depends on such factors as (a) the degree of integration of the above CDM specific requirements with the existing organization functions and (b) the potential revenue from CERs to justify a dedicated role.

It is important to include the scope of work, reporting line, and routines of a CDM Coordinator in the existing Standard Monitoring/Reporting Procedures or the Quality Management (QM) document. This is to prevent the acquired knowledge from being lost and to encourage information sharing among employees whenever there is a rotation of personnel during a crediting period.

3.3 CHECKING INSTRUMENTATION/RESOURCE COMPLIANCE

For pioneers in the field of the CDM, the decision to implement a CDM project activity was skewed toward financial rewards and depended less on monitoring costs and resources. Many PDDs were geared toward methodological development, relying on the existing approved methodology that was written for another project. Unfortunately, no two projects are exactly alike to result in interpretable requirements in the monitoring plan. Many implementers usually find this situation confusing and the lack of coordination often leaves it unchecked until the time for reporting. It is therefore crucial that this situation is clarified at an early stage by ensuring that all devices and resources for monitoring are available and ready to perform the required tasks. The following example highlights the need to perform a pre-implementation check.

An Animal Waste Management System (AWMS) project involves flaring of (excess) biogas. In addition to the measurement of the biogas flowrate, the monitoring plan requires the project owner to measure the effectiveness of the flaring process. The monitoring plan in the PDD specifies that the measuring procedure constitute the combination of two methods: (a) continuous monitoring of the flare operation and (b) annual measurement of the methane content in the exhaust gas – without further specifying the details of implementation measures.

Considering the requirements, a satisfactory monitoring implementation involves two basic devices: (1) a simple time recorder that monitors the flare's switch position (on or off) and (2) gas analyzers to measure the methane content in the flare exhaust gas. Implementers are often not sure about the implementation procedure due to lack of specific or ambiguous instructions, unavailability of measuring devices, lack of understanding of CDM process to request changes or obtain advice, or a combination of all.

Consequently, they often apply measures that – although has little impact to measurement accuracy, is considered as defying the monitoring requirements by the DOE or the RIT. Such measures include replacement of the required values with a figure provided by the flare manufacturer or partial implementation of the monitoring requirement.

One of the most crucial checks in the pre-implementation steps is the identification of all measuring devices and the consideration of their suitability. For example, if a project operator already owns an apparatus to analyze the gas concentration for other purpose, it is still necessary to check if this device can meet its CDM monitoring function. This is because a device can only provide an accurate measurement within the range of which it has been designed and calibrated for. For example, a gas analyzer is designed

for measurement of methane concentration within ppm[1] level – this device is not suitable to determine methane concentration in biogas, which is within 40% to 60%. It shall be noted that re-adjustment and re-scaling of devices are not acceptable practices and a new device is required.

Pre-implementation device checking would have identified any non-compliance or insufficiency of available devices before the start of the crediting period. In the above example, if no gas analyzer is available on-site, project operator should have considered and investigated other possible implementation measures, such as performing sample analysis in a laboratory and implementing this measure under the monitoring procedure. Ideally, the identification of the monitoring needs, compliance and procedure should involve all relevant departments.

3.4 Equipment & Instrumentation Mapping and Labeling

If the project operator has not yet established an equipment naming and labeling system, it is necessary to start doing so. For CDM purposes, it does not need to meet engineering or international standards but it should allow equipment and instruments to be easily referred to onsite and accurately labeled for documentation purposes. The naming and labeling of the equipment and instrument should be unique and clear, preferably using materials that will not be damaged by heat or moisture.

In minimum, the naming and labeling system should be accompanied with a map that indicates:

a. Major equipment with a unique name;
b. Major pipe network to which the instrumentations are attached indicating the material flow;
c. Location of instrumentations relative to the major equipment with a unique name;
d. Location of any sampling points relative to the major equipment with a unique name.

Figure 1 illustrates a simple process flow diagram (PFD) of a hypothetical biogas extraction system for electricity and heat generation from an effluent stream. The biogas from effluent stream is extracted from an anaerobic digester, AD-101, before being fed to a power generation system, GE-101, and heat generation system, HE-102. Excess gas is flared in unit FL-101. The position of all instrumentations, indicators, sampling points relative to major equipment, and direction of material flow are indicated in the diagram.

[1] Part per million

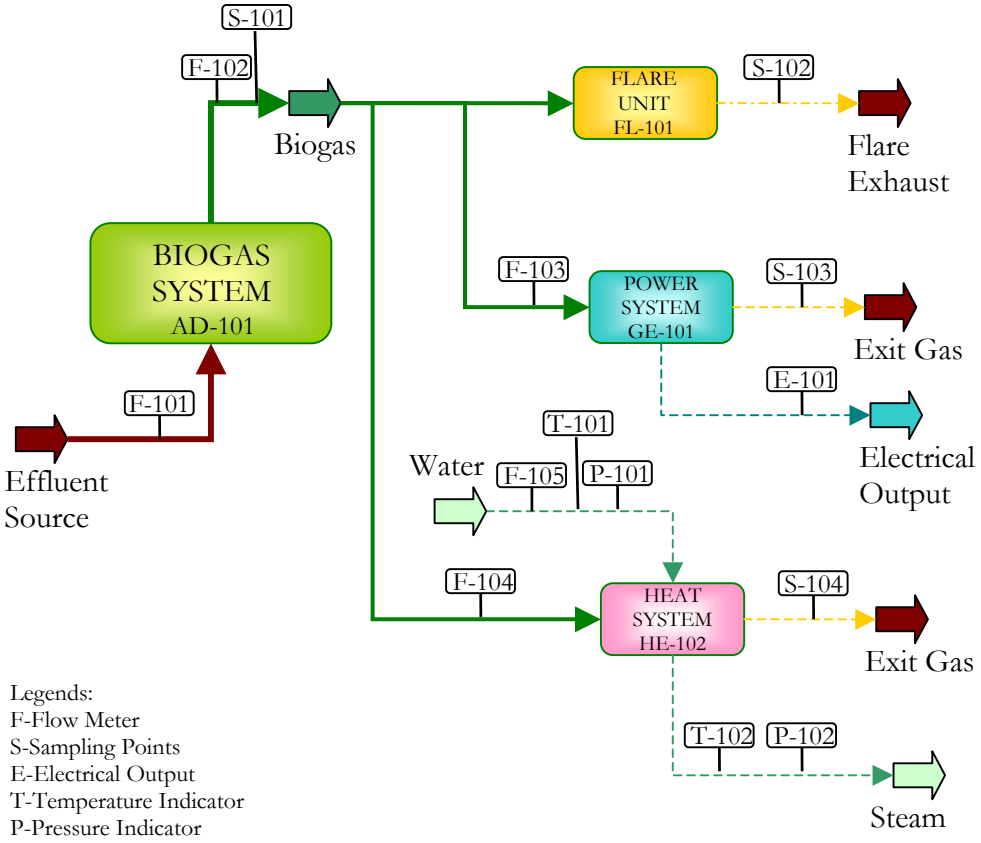

FIGURE 1 - PROCESS FLOW DIAGRAM

3.5 ESTABLISHING AN IMPLEMENTATION STRATEGY

In addition to checking the readiness of your data sources and resources, it is important for a project operator to devise a detailed strategy on how the monitoring plan should be implemented. Some aspects that should be covered under this strategy are:

A. **Distribution of Data Collection Tasks**. For every data that is mandated to be recorded, the personnel in charge should be identified. Step-by-step instructions on how the data should be measured, logged, consolidated and archived shall be provided to these personnel.

B. **Distribution of Equipment Calibration Tasks**. For every instrument or device that is used for CDM monitoring, its associated calibration means, standard, and requirement should be identified and a procedure should be established to ensure its compliance to the monitoring plan.

C. **Mechanism for Data Reconciliation**. The project operator needs to identify which data is required to be reconciled from other sources and integrate this step as part of the standard procedure for monitoring.

D. **Archiving Data and Reports**. In general, CDM requires data to be maintained for a minimum of 2 years after the crediting period. However, there are cases where the monitoring plan applies a stricter requirement such that data will need to be kept up to 5 years after the crediting period has ended. In order to meet this obligation, the project operator must establish the means of data keeping and maintenance that ensure the survival of data for the required period.

E. **Emission Reduction Calculation & Reporting**. Ideally, a calculation and reporting format report should have been established at the early stage and this can be adopted throughout the crediting information with minimum effort. This adoption can significantly reduce the volume of data consolidation and facilitate reporting prior to the verification process.

F. **Personnel Trainings and Procedure Compliance.** If tasks are well delegated, it is important that human resources be empowered to perform the tasks in the appropriate manner. The project operator should identify trainings that might be required to ensure that the tasks can be carried out smoothly. For example, the person in charge to perform gas sampling should have a good understanding on how the sample should be taken and handled to minimize contamination. They should also have a good understanding of statistical knowledge to perform the tasks within the confidence required by the monitoring plan.

It is important that the project implementation strategy is fully documented and maintained. The above aspects should ideally be covered in a **Standard Monitoring/Reporting Procedure**. Every organization is dynamic and their commitment to maintain CDM should be consistent throughout the 10 years or 21 years of crediting period. Proper documentation of procedure and strategy not only ensures that the procedures survive, but also demonstrates that the project operator creates or maintains a good standard of monitoring implementation. The presence of the document itself may add some level of credibility into the annual emission reduction report.

4 DEVELOPMENT OF STANDARD PROCEDURES

At pre-implementation steps, the mechanism of data capture, archiving, and reporting has to be identified and established by translating the monitoring requirements into an infrastructure in the form of a Standard Monitoring/Reporting Procedure. This section explains in detail, through example – information that may be applicable to perform this function.

4.1 INFORMATION IN THE MONITORING PLAN

Version 5 of the guideline for completing CDM PDD and CDM New Methodology mandated the monitoring plan in PDD to contain detailed information on how to collect & archive relevant data for the (1) estimation or measurement of emission from the project within the project boundary; (2) determination of baseline emission; and (3) identification and measurement of emissions outside the project boundary. The monitoring plan typically satisfies this purpose by listing and detailing data in a format shown inTable 1[2].

The "Data/Parameter" heading describes the notation or 'ID' of the data related to its emission reduction calculation method. The "Data Unit" specifies the unit in which the data must be reported which may not necessarily correspond to the unit in the actual instrument. If conversion is required, conversion method should be provided during data collection/reporting to minimize possible errors.

The "Source of Data" entry describes where the data should be taken and recorded, and the manner by which the data should be obtained is specified under "Measurement Procedure**"** and **"**Monitoring Frequency**"**. These entries are typically very brief and often subject to interpretation as illustrated in the next few examples.

TABLE 1

	Example of Entry (taken from AM002 Version 02)
Data/Parameter	EG_{PJY}
Data Unit	MWh (annual)
Description	Quantity of electricity generated by the project during year y
Source of Data	1. Onsite measurement 2. Electricity Sales Receipt
Measurement Procedures (if any)	Onsite electricity meter

[2] This presentation format applies for PDD complying with Version 5 of the guideline. Earlier versions use a slightly different format.

Monitoring Frequency	Continuously
QA/QC Procedures	Meter should be calibrated regularly according to manufacturer guideline. Measurement results should be cross-checked with the quantity of invoices from the grid operator

The Quality Assurance and Quality Control ("QA/QC") Procedure provides the requirements to ensure that the reported data has taken efforts to eliminate possible major errors either through consolidation/reconciliation from other sources or through instrument maintenance (calibration). However, similar to the Monitoring Procedure, it requires careful interpretation.

4.2 ACCURACY IN MEASUREMENT

In some cases, the QA/QC requires that data must be reported with its measurement uncertainty to ensure reporting accuracy. Although this requirement seems to vary from one plan to another, it is a good practice to include the measurement uncertainty in the monitoring process. With this consideration, it is necessary to provide brief information about the sources of measurement errors and its propagation for the purpose of procedural development.

4.2.1 Type of Error

Accuracy is defined as the closeness of agreement between the result of a measurement and a true value of the measure. The disagreement of measurement or error results from all aspects of measurements, and can be distinguished into two types: (1) Systematic error and (2) Random error.

Systematic error describes errors in the output readings of a measurement system that are *consistently on one side of the correct reading* therefore the error are all positive or all negative. This type of error arises from system disturbance during measurement such as the changes in environmental input (for example, change in humidity may affect the reading of certain instruments). It also largely arises from an un-calibrated instrument for which reading has drifted from true value because of the declining characteristics.

Random errors are a perturbation of the measurement on *either side of the true value.* Random error is caused by random and unpredictable effects such that positive errors and negative errors occur in equal number in a series of measurement. To a large extent, random errors can be overcome by taking the same measurement a number of times and extracting a value using statistical techniques.

4.2.2 Efforts to Minimize Error in Monitoring Plan

The Quality Control and Quality Assurance (QA/QC) portion of the monitoring plan deals with the requirement to tackle error during measurement. It is important to realize that errors cannot be fully eliminated but can largely be minimized through application of good monitoring practices.

Systematic errors from transient processes, change of environment and change in input are part of equipment operations and are usually hard to control or impractical to correct. Systematic errors from instrument drift, on the other hand, can be minimized through regular instrument calibration and this is covered as part of the QA/QC in the monitoring plan, and discussed further in Section 5.

The monitoring plan takes into account the presence of **random errors** and prescribes a requirement to minimize this type of error by specifying that certain parameters must be reported within a specified confidence level. For example, a parameter is reported to deviate ±2% with 95% confidence level.

It is therefore necessary for the success of the CDM that the project operator can integrate steps to minimize and report errors in their monitoring practice. One way to address this is by providing clear and concise information on how to carry out the task in an efficiently designed data log form that will be discussed in a later section.

4.2.3 Errors Propagation During Reporting/Calculation

The built-in errors are propagated during reporting and calculation of a measurement as a measurement system often consists of several separate components, each of which is subject to errors. When the measurement systems are combined during mathematical operations (addition, subtraction, multiplication and division), the error is aggravated and thus, should be taken into account.

The followings are practical methods to account for errors propagation from two measurement readings: X=x ± ax and Y=y ± by. X and Y are uncorrelated values.

Error in Addition, A=X+Y, A=(x+y) ± e where $e = \sqrt{ax^2 + by^2}$

EQUATION 1

Error in Subtraction, S=X-Y, S=(x-y) ± e where $e = \sqrt{ax^2 + by^2}$

EQUATION 2

Error in a Product, P=X.Y, $P=x.y \pm e$ where $e = \sqrt{a^2 + b^2}$

EQUATION 3

Error in Division, D=X÷Y, $D=\frac{x}{y} \pm e$ where $e = \sqrt{a^2 + b^2}$

EQUATION 4

Examples of the calculation are integrated in the next sections.

4.3 INTEGRATING QA/QC INTO THE DATA CAPTURE FORM

In order to fully comply with the QA/QC procedures, it is recommended that these procedures be applied right from the source of the data itself. One mechanism to do this is by integrating the procedure into the design of the data capture form or log.

Form 1 on page 21 is a generic template form that serves as an example of the integration of the QA/QC into the data capture process. The template form is designed with the following common underlying principles:

(a). Ensure that the data collector takes measurement from the correct instrument;

(b). Ensure that the data collector checks if the instrument involved has been calibrated;

(c). Ensure that the data collector knows what do before and after data has been collected, during normal and abnormal periods;

(d). Attempt to maintain consistency between the monitoring plan in the PDD, Data Archives, and Monitoring Report.

The form is normally divided into four general areas (1) the General Information: (2) Instrument Information (3) Monitoring Instructions and (4) Data Log.

The General Information provides three types of information: (1) the archive reference source, (2) document number and (3) the measurement objectives. A template should ideally be developed for each monitored parameter. The "FORM TYPE" information provides an indication of the original template from which the form is created or sourced.

For document control purposes, each form issued will have a reference number, and this is indicated in the "FORM NUMBER" field. This reference number will be useful during the reporting time as data for

calculation can be easily referred to this source whenever necessary. Additionally, this would allow any supporting document to be easily searched for during verification time.

The "DATA TO BE MEASURED" field provides brief information of the measurement objective corresponding to the monitoring plan. The associated "CDM ID" is displayed for clear variable reference to the associated method or formulae described in the monitoring plan.

In order to ensure that readings are not taken from the wrong instruments/units- in particular, for projects that have multiple equipment of the same type, the relative location of the measurement point for a major equipment should be clearly displayed. In Form 1, this is displayed under the "DESCRIPTION OF LOCATION". For example, the reference "GE-101" refers to the Gas Engine of the Power System in the process described in Figure 1 on page 13.

The person who is responsible for managing the accuracy of the data is identified and displayed in the "PERSON RESPONSIBLE" field, preferably with the name of the department to which he belongs. Additional information such as the person who supervises the data mining activity can be included.

Under the "INSTRUMENTATION INFORMATION" area, instrumentation specifications are displayed for internal/external supervisory or auditing purposes. The "INSTRUMENTATION ID" provides a reference or a link to any other maintenance documents such as Calibration Record (Form 6, page 40). The instrumentation type, manufacturer and model, and serial number provide specific information about the instrumentation to allow data miners to verify the instrument itself before data taking began. This process is particularly important for projects involving numerous instrumentations of the same type. When necessary, this process should be included as part of the monitoring instructions.

The "INSTRUMENT CALIBRATION INFORMATION" field allows data takers to verify if the instrument has been calibrated. If the calibration period expires, the data miners should request calibration to be performed and the request procedure should be included as part of the monitoring instructions.

The "UNCERTAINTY LEVEL" records the random error level of the measuring device *just after calibration*. This uncertainty level information is provided as a reference for the "MAXIMUM REPORTING UNCERTAINTY" information provided under the Monitoring Instructions area and may be relevant for data where the monitoring plan applies a maximum uncertainty level of propagated error. If, due to various reasons, the combined uncertainty level exceeds the reporting requirement, correction measures should be taken either by discounting the reported value or by tightening the uncertainty level of the instrument.

The "MEASUREMENT RANGE/UNIT" reflects the reading capacity and reporting of the instrument itself. This limit information provides additional supervisory measure to check the suitability of the unit for the measurement purposes. It allows the supervisor to ensure that the readings are not too near the end of the measurement capacity of the instrument. For example, if the counter has a range between 0 to 100 units, and the recorded periodic measurement is 90 to 98, then the instrument is recording data near the upper limit and there is a possibility that it will re-roll to zero or stop counting when it reaches 100. In such a case, the supervisor should adjust by either shortening the monitoring period or installing a new counter with greater measurement range.

MONITORING FREQUENCY and the MAXIMUM REPORTING UNCERTAINTY requirement (if any) is marked under the MONITORING INSTRUCTIONS. The instructions should also provide clear information of what to do before, during and after reading as well as steps that needs to be carried out during an abnormal situation. Data takers must read and understand all of these instructions before carrying out the activity.

BEFORE DATA READING provides steps that need to be taken, and information that should be read and understood before the activity is performed. Such information may include verification of instrument at ID and calibration check, preparation steps, notification requirement before sampling, etc.

AFTER DATA READING provides steps required after the activity is completed. Such information may include re-zeroing of a counter; error check level; re-installation of anti-tampering device; re-service and storage instructions for off-line devices; archiving instructions or reporting requirement, etc.

ABNORMAL SITUATION provides steps required during abnormal situations such as maintenance shutdown, instrument re-calibration, instrument change, etc. The standard requirement for such a situation is to archive the current form and re-start with a new form at start-up.

Certain instruments do not provide accurate readings during abrupt transient processes such as shut down or start up or capacity change. Any measurement taken during these periods ,may fluctuate and may be deemed meaningless. In such cases, these periods should be eliminated from the reading and clear instruction on the elimination process should be provided under this heading.

The requirement to reconcile data from other sources is provided under "SPECIAL REQUIREMENTS". If data needs to be obtained from different departments then the submission instructions should be provided. Alternatively, if the same person is responsible for both data collection and reconciliation, reconciliation instructions can also be included under this heading. For example, "Reconcile using form XXX". More on reconciliation is provided under Form 5 (p. 31).

The "DATA LOG" area is where the data is recorded or calculated. It is important, when designing a form, that the "DATA LOG" area should reflect raw data collection process in the subsequent order. This allows data to be easily recorded during the process without the need for unit conversion that may distract or create room for error during recording.

It is also important to leave a space for "NOTE", so that data taker can leave pertinent information. For example, if the combined error is greater than the required limit. data takers can leave a note that a correction measure has been requested. Another example is if the instrumentation reading shows abnormality, investigation should be carried out and findings can be noted in this space.

FORM 1 - DATA COLLECTION TEMPLATE

GENERAL INFORMATION	
FORM TYPE:	FORM NUMBER:
DATA TO BE MEASURED:	CDM ID
DESCRIPTION OF LOCATION:	PERSON RESPONSIBLE FOR DATA LOGGING: NAME: DEPARTMENT:
INSTRUMENTATION INFORMATION	
INSTRUMENT ID:	INSTRUMENT TYPE:
MANUFACTURER/MODEL:	SERIAL NUMBER:
MEASUREMENT RANGE AND UNIT: UPPER MEASUREMENT LIMIT: LOWER MEASUREMENT LIMIT:	INSTRUMENT CALIBRATION INFORMATION: LAST CALIBRATION DATE: NEXT CALIBRATION DATE: UNCERTAINTY LEVEL:
INSTRUCTIONS	
REQUIRED MONITORING FREQUENCY:	MAX. REPORTING UNCERTAINTY
BEFORE DATA READING:	ABNORMAL SITUATION:
AFTER DATA READING:	SPECIAL REQUIREMENTS:
DATA LOG	

During implementation, the above generic template should be adjusted to reflect the actual practice in the project organization. The next few sections provide examples of how the above form is adjusted for the purposes of data logging for a:

1. Direct instrumentation reading;
2. Parameter that requires estimation;
3. Parameter that requires sampling;
4. Data reconciliation purpose

4.4 DIRECT INSTRUMENTATION READING

Form 2 provides an example on the utilization of Form 1 (p.21) for the monitoring of electricity output from the plant described in Figure 1 (S. 3.4, p. 13). The monitoring requirement for this data is provided in Table 1 (p.15). The monitoring plan requires that *the quantity of electricity generated by the project during year y* should be captured using an electricity meter continuously. Electricity output measurement is generally quite straightforward as the electricity meter is an online instrument and functions as a (cumulative) counter.

FORM 2 – EXAMPLE OF ELECTRICAL OUTPUT LOG FORM

GENERAL INFORMATION			
FORM TYPE:	ELO-1	FORM NUMBER:	ELO-06-1000
DATA TO BE MEASURED:	ELECTRICAL OUTPUT	CDM ID	EG_{PJY}
DESCRIPTION OF LOCATION: POWER GENERATOR, GAS ENGINE GE-101		PERSON RESPONSIBLE FOR DATA LOGGING: NAME:	DEPARTMENT:
INSTRUMENTATION INFORMATION			
INSTRUMENT ID:	E-101	INSTRUMENT TYPE:	ELECTRICITY METER
MANUFACTURER/MODEL:	COMPANY XYZ	SERIAL NUMBER:	SN.007.XYZ..XXX
MEASUREMENT RANGE AND UNIT: UPPER MEASUREMENT LIMIT: 99,999 KWH LOWER MEASUREMENT LIMIT: 0 KWH		INSTRUMENT CALIBRATION INFORMATION: LAST CALIBRATION DATE: 28 MAY 2006 NEXT CALIBRATION DATE: 28 JANUARY 2008 UNCERTAINTY LEVEL: 1%	
INSTRUCTIONS			
REQUIRED MONITORING FREQUENCY:	WEEKLY	MAX. REPORTING UNCERTAINTY	±2%
BEFORE DATA READING: 1. VERIFY INSTRUMENT ID AND SERIAL NUMBER 2. CHECK CALIBRATION DATE. REQUEST FOR CALIBRATION IF NEXT CALIBRATION DATE IS WITHIN A MONTH OF LOG DATE		ABNORMAL SITUATION: 1. ARCHIVE THIS FORM AND RESTART WITH A NEW FORM EVERY EQUIPMENT SHUT-DOWN (MAINTENANCE OR EMERGENCY), OR INSTRUMENT CHANGE OR RECALIBRATION	
AFTER DATA READING: 1. ZERO INSTRUMENT AFTER READING 2. RE-INSTALL TAMPER-PROOF LOCK AFTER READING 3. CUMULATIVE ERROR SHOULD BE BELOW MAX. REPORTING		SPECIAL REQUIREMENTS: 1. SUBMIT A COPY OF THE COMPLETED FORM TO ACCOUNTING FOR RECONCILIATION WITH SALES DATA	

UNCERTAINTY, REQUEST FOR READJUSTMENT IF CUMULATIVE ERROR EXCEEDS THIS LIMIT 4. RETURN TO ARCHIVE					
DATA LOG					
WEEK NO.	WEEK START DATE	WEEK END DATE	READINGS (KWH)	ACCUMULATION (KWH)	NOTE:
1	30 JUNE 2006	6 JULY 2006	14,523 ± 291	14,523 ± 291	
2	7 JULY 2006	13 JULY 2006	17,678 ± 354	32,201 ± 458	
...					
12					
(A) TOTAL ELECTRICAL OUTPUT IN THIS PERIOD IN KWH					
(B) TOTAL ELECTRICAL OUTPUT IN THIS PERIOD IN MWH = (A)/1,000					

As a counter, the electricity meter already satisfies the "continuous" monitoring requirement. Therefore, frequency of periodic data logging is determined by the equipment measuring range, in this case it is decided that weekly logging is deemed sufficient.

Under the monitoring instruction in Form 2, the data miner is required to verify the instrument ID and Serial Number with the information provided in the form to ensure that he/she takes data from the correct electricity meter. The data miner is also required to note the next calibration date to make sure that the instrument has been calibrated at the time of reading. Instruction also request that instrument is to be re-zeroed and anti-tampering device must be re-installed.

The reading is recorded in the data log area where the data miner can immediately calculate the accumulated output. Recording data with its uncertainty should be made a standard practice. This practice allows that any uncertainty level greater than the maximum allowed can be identified during the data mining activity- and early correction can thus be carried out.

4.5 Parameter Monitoring with Estimation

Many monitored parameters require a combination of direct data reading and report estimation. This is common in the monitoring of a thermal output in projects that generate heat as a form of energy. For the hypothetical process described in Figure 1 (p. 13), the thermal energy is generated as steam in a biogas-

fuelled boiler. The thermal energy is therefore equivalent to the amount of heat being captured by the water during the steam production process.

The requirement to monitor this data is presented in the following table taken from ACM0010 version 10.

TABLE 2

	This examples is taken from ACM0010 Version 01
Data/Parameter	$HG_{PR,Y}$
Data Unit	MJ
Description	Heat used by project AWMS
Source of Data	Project Proponent
Measurement Procedures (if any)	Archive electronically during project plus 5 years
Monitoring Frequency	At start of project
QA/QC Procedures	Fuel purchased records to be cross checked with estimates

The above monitoring plan requires the measurement of the amount of heat from the project. In this case, thermal energy indication cannot be obtained through direct instrument measurement but through observation of the steam pressure and temperature, using a standard engineering tool called "steam table" for which further calculation needs to be performed to calculate the thermal output. Hence, the monitoring of thermal output is a combination of parameter monitoring and calculation.

Form 3 provides an example of how the data capture template (Form 1, p.21) is used to capture this type of information. It is pertinent to note that the calculation method conveyed in the form may not be applicable to all processes as this varies from project to project. The method to calculate the thermal output is not typically provided in the PDD, and must be established with advice from a qualified engineer.

The measurement of thermal heat output ("THO") involves the monitoring of five instruments. Referring to Figure 1 (p. 13), these are a flow meter (F-105), two thermocouple (T-101 and T-102), and two pressure indicators (P-101) and (P-102). These meters are non-counter type but its readings are recorded in a continuous data-recording device. This device records the instrumentation readings at a given interval.

It is accepted that the thermal parameter are going to be calculated using the following sequence:

1. Calculate the monitoring duration, M in seconds
2. Average the water flowrate (F-105) within this period, F_av(kg/s)
3. Calculate total flowrate during duration F_tot (kg) = F_av * M
4. Average the water inlet (T-101) and outlet temperature (T-102) as Tin_av (degC) and Tout_av(degC)
5. Average the outlet pressure (P-101) and inlet pressure (P-102) as Pin_av(kPa) and Pout_av(kPa)

6. Using steam table find inlet specific enthalpy, Hin (Tin_av, Pin_av) in kJ/kg
7. Using steam table find outlet specific enthalpy, Hout (Tout_av, Pout_av) in kJ/kg
8. Calculate enthalpy difference between inlet and outlet, deltaH = Hout-Hin in kJ/kg
9. Calculate thermal energy output, THO=deltaH * F_tot

The above method is reflected in the DATA & CALCULATION LOG area of Form 3.

The monitoring plan in Table 2 also requires THO to be crosschecked against the "fuel purchase record". Presumably, this refers to the amount of fuel used to fire the boiler. However, in order to make a meaningful comparison, it is necessary to convert THO into its equivalent fuel value (EFV_THO) using the fuel net calorific value (NCV_F). Therefore, EFV_THO = THO ÷ NCV_F. This method is reflected in the form.

It is pertinent to note that the equivalent fuel usage calculated as EFV_THO should always be lower than the actual fuel feed into the boiler because this calculation does not consider the boiler efficiency. EFV_THO greater than the actual fuel feed indicates there is something wrong in the calculation or reporting method.

FORM 3 – THERMAL OUTPUT LOG

GENERAL INFORMATION					
FORM TYPE: THO-1			FORM NUMBER: THO-06-1000		
DATA TO BE MEASURED: THERMAL HEAT OUTPUT			CDM ID $HG_{PR,Y}$		
DESCRIPTION OF LOCATION: HEAT GENERATION SYSTEM, BOILER HE-102			PERSON RESPONSIBLE FOR DATA LOGGING: NAME: DEPARTMENT:		
INSTRUMENTATION INFORMATION					
INSTRUMENT ID	F-105	T-101	P-101	T-102	P-102
INSTRUMENT TYPE	MASS FLOW METER	THERMOCOUPLE	BOURDON PRESSURE GAUGE	THERMOCOUPLE	BOURDON PRESSURE GAUGE
SERIAL NUMBER	SN.UVF.XXX	SN.TH.XXX	SN.BPG.XXX	SN.TH.XXX	SN.BPG.XXX
MANUFACTURER MODEL NO.	COMPANY 1	COMPANY 2	COMPANY 3	COMPANY 2	COMPANY 3
SPECIFIC LOCATION	WATER INLET HE-102	WATER INLET HE-102	WATER INLET HE-102	STEAM OUTLET HE-102	STEAM OUTLET HE-102
MEASUREMENT RANGE	5 – 200	0-200	10-5,000	0-200	10-5,000
MEASUREMENT UNIT	M3/S (CUBIC METER PER SECOND)	DEG. CELSIUS	KPA	DEG. CELSIUS	KPA
LAST CALIBRATION DATE	28 MAY 2006	28 MAY 2006	28 MAY 2006	28 MAY 2006	28 MAY 2006
NEXT CALIBRATION DATE	28 JANUARY 2008	28 JANUARY 2008	28 JANUARY 2008	28 JANUARY 2008	28 JANUARY 2008
UNCERTAINTY LEVEL	±2%	±1%	±2%	±1%	±2%
MONITORING & CALCULATION INSTRUCTIONS					
MONITORING FREQUENCY	CONTINUOUS USING DATA RECORDER	CONTINUOUS USING DATA RECORDER	CONTINUOUS USING DATA RECORDER	CONTINUOUS USING DATA RECORDER	CONTINUOUS USING DATA RECORDER
CALCULATION FREQUENCY	MONTHLY	MONTHLY	MONTHLY	MONTHLY	MONTHLY
MAX. REPORTING UNCERTAINTY	2%, REQUEST FOR READJUSTMENT IF TOTAL UNCERTAINTY IS GREATER THAN 2%				

BEFORE READINGS 1. VERIFY INSTRUMENTATION INSTRUMENT ID AND SERIAL NUMBER. 2. CHECK IF ALL INSTRUMENTS ARE CALIBRATED. REQUEST FOR CALIBRATION IF NEXT CALIBRATION DATE IS WITHIN 1 MONTH OF LOG DATE	ABNORMAL SITUATION: 1. ARCHIVE FORM AND RESTART WITH A NEW FORM EVERY EQUIPMENT SHUT-DOWN (MAINTENANCE OR EMERGENCY), OR INSTRUMENT CHANGE OR RECALIBRATION
AFTER READINGS: 1. CUMULATIVE ERROR SHOULD BE BELOW MAX. REPORTING UNCERTAINTY, REQUEST FOR READJUSTMENT IF CUMULATIVE ERROR EXCEEDS THIS LIMIT 2. RETURN FORM TO ARCHIVE	SPECIAL INSTRUCTIONS: 1. TAKE MONTHLY AVERAGE VALUE (FLOWRATE, TEMPERATURE, AND PRESSURE) 2. SUBMIT EQUIVALENT FUEL VALUE (EFV) TO ACCOUNTING TO BE RECONCILIATED WITH FUEL PURCHASE DATA

CALCULATION INSTRUCTIONS:

1. CALCULATE M, THE NUMBER OF MONITORING SECONDS WITHIN THE MONTH
2. USED ATTACHED STEAM TABLE TO FIND SPECIFIC ENTHALPY INLET (H_IN) AND OUTLET(H_OUT) APPLY HIGHEST UNCERTAINTY FACTOR
3. CALCULATE DIFFERENTIAL SPECIFIC ENTHALPY (DELTA_H)=H_OUT-H_IN
4. CALCULATE FTOT, THE MONTHLY FLOWRATE
5. CALCULATE THO, THE MONTHLY THERMAL OUTPUT
6. CALCULATE MONTHLY FUEL USAGE TO BE RECONCILIATED WITH FUEL PURCHASE (INPUT) DATA USING NCV_F(KJ/KG) =27 x 10^6 ± 1%

DATA & CALCULATION LOG

MONITORING PERIOD : JANUARY 2006	START: 00:00 AM, 12 JANUARY 2006	END: 23:59, 31 JANUARY 2006	DURATION (S) M= 1,728,000 S		F_TOT (KG/MONTH) =F_AV*M =[2.5±2%] x 1,728,000 =4,455,000±2% kg/month
INSTRUMENTS	READING UNIT	READING (AVERAGE)	SPECIFIC ENTHALPY (KJ/KG)		
T-101	DEG_C	TIN_AV 92 ± 1%	H_IN	384.5 ± 2%	THO (KJ/MONTH) =DELTA_H x F_TOT =[4,455,000 ±2%] x [2,492 ± 2.3%] =1.11x10^10 ± 3% kJ/month
P-101	KPA	PIN_AV 75 ± 2%			
T-102	DEG_C	TOUT_AV 200 ± 1%	H_OUT	2876.6 ± 2%	
P-102	KPA	POUT_AV 76 ± 2%			
F-105	KG/S	F_AV 2.5 ± 2%	DELTA_H	2492.1 ± 58.1 Or 2,492.1 ± 2.3%	EFV_THO(KG/MONTH): =THO÷ NCV_F =[1.11x10^10 ± 3%] x [27x10^6±1%] =411 ± 3% kg/month
NOTE:	UNCERTAINTY LEVEL ABOVE REPORTING REQUIREMENT, REQUEST FOR RE-ADJUSTMENT IS SUBMITTED.				
MONITORING PERIOD :	START:	END:	DURATION (S) M		F_TOT (KG/MONTH) =F_AV*M
INSTRUMENTS	READING UNIT	READING (AVERAGE)	SPECIFIC ENTHALPY (KJ/KG)		
T-101	DEG_C	TIN_AV	H_IN		THO (KJ/MONTH) =DELTA_H x F_TOT
P-101	KPA	PIN_AV			
T-102	DEG_C	TOUT_AV	H_OUT		
P-102	KPA	POUT_AV			
F-105	KG/S	F_AV	DELTA_H		EFV_THO(KG/MONTH): = THO÷ NCV_F
NOTE:					
CUMULATIVE THERMAL ENERGY			ANNUAL OUTPUT (KJ/YEAR)		
			ANNUAL OUTPUT (MJ/YEAR)		
CUMULATIVE FUEL USAGE			ANNUAL USAGE (KJ/YEAR)		

4.6 PARAMETER MONITORING THOURH DIRECT SAMPLING

Certain parameters require random sampling for measurement. Sampling is typically required for parameters that cannot be measured continuously through on-line instrumentations for reasons such as impracticality or cost. Common examples are the measurement of gas concentration ((CO_2, N_2O, O_2, CH_4) in residual biomass or exhaust gas of a power generation plant, etc.

Inherently, a parameter measured through random sampling involves a certain degree of uncertainty in its results. It is however, necessary to ensure that the possible error (or uncertainty) in the measurement is small in comparison to the result of the measurement in order for the data to be useful. As mentioned earlier, the monitoring plan takes into account this aspect of uncertainty in sampling results by specifying that this type of data may need to be reported within a certain confidence level, typically 95%.

The following example attempts to provide information on how to achieve the required measurement results without providing fundamental knowledge of statistics. Such knowledge can be obtained from various statistical literature and may be relevant for efforts to improve the accuracy of measurement results.

In Form 4 (p. 21), the basic template of Form 1 (p. 21) is used to monitor methane gas concentration in the stack gas of the boiler HE-102, in the process described in Figure 1 (p.13). The concentration measurement will be conducted using a hand-held gas analyzer that has been calibrated to 1% uncertainty level after calibration. The monitoring plan requires the methane gas concentration to be reported with maximum 2% uncertainty and 95% confidence level.

In order to do so, n=5 measurements (d1,…,d5) are taken with 5-minute intervals. The Mean (X_MEAN), Variance (V), Standard Deviation (SIGMA), and Standard Error of the Mean (ALPHA) are calculated from the recorded results using the following formulae:

$$X\_MEAN = \sum_{n=1}^{5} d_n$$

$$V = \frac{\sum_{n=1}^{5} (d_n - X\_MEAN)^2}{n-1}$$

3. $SIGMA = \sqrt[2]{V}$

4. $ALPHA = \frac{SIGMA}{\sqrt{n}}$

For 95% confidence level, the results of the sampling is expressed as X_MEAN±2*ALPHA. However, the final number should also consider the gas analyzer uncertainty (MU) and therefore the total error, E =2*ALPHA+MU. The final methane concentration is thus X_MEAN±E.

It should be noted that the monitoring plan requires the total uncertainty, E, to be below 2%, otherwise the number of samples must be increased.

FORM 4 - EXAMPLE OF RANDOM SAMPLING FORM

GENERAL INFORMATION			
FORM TYPE:	SAM-1	FORM NUMBER:	SAM-06-1000
DATA TO BE MEASURED:	CH4 CONCENTRATION IN STACK GAS EMISSION	CDM ID	CH4_STACK1
DESCRIPTION OF LOCATION: HEAT GENERATION SYSTEM, EXHAUST OF BOILER HE-102		PERSON RESPONSIBLE FOR DATA LOGGING: SURNAME, FIRSTNAME	
INSTRUMENTATION INFORMATION			
INSTRUMENT ID:	GAIR-001	INSTRUMENT TYPE:	INFRARED ABSORPTION GAS ANALYZERS (HAND HELD TYPE)
MANUFACTURER/MODEL:	COMPANY XYZ	SERIAL NUMBER:	SN.007.XYZ..XXX
MEASUREMENT RANGE AND UNIT: UPPER MEASUREMENT LIMIT: 10 %VOLUME LOWER MEASUREMENT LIMIT: 0.1 %VOLUME		INSTRUMENT CALIBRATION INFORMATION: LAST CALIBRATION DATE: 28 MAY 2006 NEXT CALIBRATION DATE: 28 JANUARY 2008 UNCERTAINTY (MU): 1%	
MONITORING INSTRUCTIONS			
SAMPLING FREQUENCY:	QUARTERLY (3-MONTHLY)	MAX REPORTING UNCERTAINTY:	2%, 95% CONFIDENCE
BEFORE SAMPLING: 1. CHECK DEVICE IF IT MEETS SPECIFICATIONS RECORDED ABOVE, REPORT ANY DEVIATION 2. CHECK IF DEVICE HAS BEEN CALIBRATED. SUBMIT REQUEST FOR CALIBRTION IF CALIBRATION DATE IS WITHIN 1 MONTH. AFTER SAMPLING: 1. CUMULATIVE ERROR SHOULD BE BELOW MAX. REPORTING UNCERTAINTY, REQUEST FOR READJUSTMENT IF CUMULATIVE ERROR EXCEEDS THIS LIMIT 2. RETURN FORM TO ARCHIVE ABNORMAL SITUATION 1. DO NOT SAMPLE WITHIN 1 DAY OF TRANSITION PERIOD. WAIT UNTIL STEADY OPERATION BEFORE SAMPLING		SAMPLING INSTRUCTIONS 1. TAKE 5 MEASUREMENTS WITH A 5-MINUTE INTERVAL BETWEEN READINGS 2. USING FORMULA ATTACHED WITH THIS FORM: ▪ CALCULATE MEAN VALUE, X_MEAN ▪ CALCULATE DEVIATION (D) AND D^2 ▪ CALCULATE VARIANCE, V ▪ CALCULATE STANDARD DEVIATION, SIGMA ▪ CALCULATE STANDARD ERROR OF THE MEAN, ALPHA ▪ CALCULATE TOTAL ERROR, E=2*ALPHA+MU ▪ READING RESULTS = X_MEAN ± E 3. IF E IS GREATER THAN MAXIMUM REPORTING UNCERTAINTY, REPEAT PROCEDURE BY INCREASING NUMBER OF DATA SET BY ANOTHER 5 MEASUREMENTS. 4. CALCULATE CONSERVATIVE RESULTS AS XMEAN-E	

DATA SAMPLING				
SAMPLING TIME:	SAMPLE NO. (N)	RESULTS (X)	D^2=(X-XMEAN)^2	STANDARD DEVIATION (SIGMA): =SQRT(V)
	1			
	2			STANDARD ERROR OF THE MEAN (ALPHA) =SIGMA/SQRT(N)
	3			
	4			TOTAL ERROR (E) =2*ALPHA+MU
	5			
CALCULATED VALUES		X_MEAN	VARIANCE(V)	METHANE CONCENTRATION IN STACK GAS = X_MEAN±E

4.7 MECHANISM FOR DATA RECONCILIATION

One of the most important issues to decide while establishing reconciliation procedure is frequency. The monitoring plan generally does not specify the frequency of data reconciliation. It can be three months, or six months, every shut-down, or annually. In general, a shorter time interval for reconciliation period represents lesser risk for project operator to lose any data, a greater prediction in the accuracy for financial reporting (if required), and an opportunity to make a correction should any data seem to deviate from calculation. Additionally, it spreads the workload equally throughout the year.

In the discussion to find the optimum interval for reconciliation, it is crucial to involve the department where the data is going to be collected or supplied. For example, if the field data needs to be collected by the production department and sales receipts need to be collected from the accounting department, both departments must be consulted and should agree and commit to the required frequency of record collection/reconciliation.

The interval for reconciliation should be kept sufficiently short if the reconciliation data is derived from sources with a large potential for error. In the previous example, the monitoring plan requires the thermal output parameter (Table 2) to be reconciled with the "fuel purchased record". However, the fuel purchase record may consist of daily receipts from various vendors that may not correspond to actual fuel usage within the same month. Additionally, comparing the thermal input and output values is meaningless without knowing the efficiency factor of the boiler, which in itself is declining over the years. In such a case, the reconciliation between the two values leaves a very large uncertainty gap, and the operator should establish information on what can be regarded as "acceptable" by analyzing the reliability of data sources.

Form 2 (p.22) records electricity output of a power generator, and sets a reconciliation interval equivalent to the form recording period every three months. Under the instruction section of the form, the data miner must submit a copy of the completed form to the accounting department for reconciliation. The accounting department receives this form and compares the recorded output with sales receipts/invoices from the consuming company. Form 5 provides an example of a reconciliation form for this purpose. Often, the date on the invoices may not correspond to the output recorded by the instrument. For this reason, Form 5 uses the total annual consolidated value from the **lower of the two records** as the result.

FORM 5 - EXAMPLE OF RECONCILIATION FORM

GENERAL INFORMATION			
FORM TYPE:	R-ELO-1	FORM NUMBER:	R-ELO-06-1234
DATA MEASURED:	ELECTRICAL OUTPUT EXPORTED TO XXX	CDM ID	EG_{PJY}
DESCRIPTION OF LOCATION:	POWER GENERATOR GAS ENGINE GE-101	TO BE RECONCILED WITH:	SALES RECORD DATA
RECORD SOURCE INFORMATION: PERSONNEL NAME: DEPARTMENT:		DATA RECONCILITION PERSON & DEPARTEMENT: PERSONNEL NAME: DEPARTMENT:	
RECONCILIATION FREQUENCY:	12-WEEKLY	LOG FORM START DATE	30 JUNE 2006

DATA RECONCILIATION INSTRUCTIONS	
BEFORE DATA READING: 1. ATTACH A COPY OF RECEIPT 2. ATTACH A COPY OF REFERRED RECORD 3. SUBMIT TO CDM COORDINATOR ANNUALLY	DURING ABNORMAL SITUATION: 1. DEVIATION GREATER THAN 10% FROM RECORDED OUTPUT SHOULD BE REPORTED TO XXX 2. ANNUAL TOTAL ELECTRICAL OUTPUT FOR CDM PURPOSE SHOULD BE TAKEN AS THE LOWEST NUMBER BETWEEN THE TOTAL ANNUAL OF THE TWO RECORDS

DATA LOG

RECORD REF.	REPORTING PERIOD		RECORDED OUTPUT	SALES RECEIPT DATA	
	START DATE	END DATE	(MWH)	RECEIPT NO	QUANTITY (MWH)
ELO-06-1000	30 JUNE 2006	30 SEP 2006	155.215 ± 2%	DO-2006-XYZ-5678	24.523
				DO-2006-XYZ-5890	89.225
				DO-2006-XYZ-8070	41.467
ELO-06-1001	30 SEP 2006	30 DEC 2006	155.215 ± 2%	DO-2006-XYZ-5678	24.523
				DO-2006-XYZ-5890	89.225
				DO-2006-XYZ-8070	41.467
…					
ANNUAL TOTAL			FROM INSTRUMENT MONITORING		1,205,339 ± 2%
			FROM SALES RECEIPT DATA		1,205,325
			DATA FOR CDM MONITORING REPORT		

4.8 Distribution of Tasks

For a large CDM project, distribution of tasks for data collection and reconciliation is inevitable. In such a case, it is important to be clear on how the data should flow, and who shall carry the responsibility for data collection and reconciliation as well as the supervisory line before the data reaches the CDM coordinator. Figure 2 below provides a graphical representation for the data flow for the hypothetical case described in Figure 1 (p. 13).

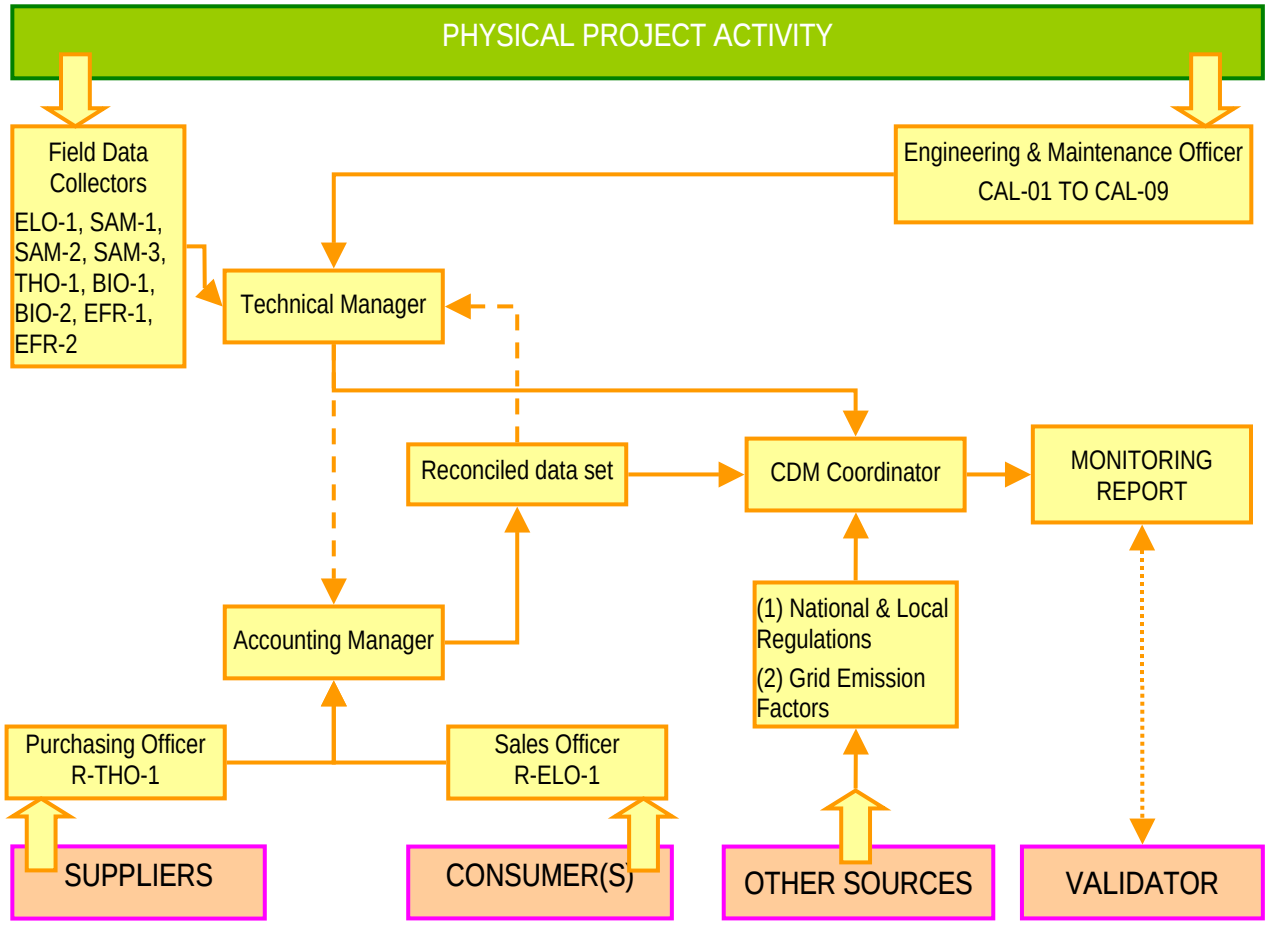

Figure 2 – Example of Data Flow Chart

In the above hypothetical example, the technical manager and the accounting manager become an integral part of the monitoring process and the contact points for data. Procedures maintained and developed by the CDM coordinator is deployed through these leaders that regularly supervise data collection and reconciliation between the two departments. The CDM coordinator him/herself is in charge of the monitoring of data from outside the project boundary such as a regulatory requirement, updating of the grid emission factor as well as procedures for supervision and training as described in Section 3.2.

4.9 (ELECTRONIC) DATA ARCHIVING INFRASTRUCTURE

Many earlier versions of monitoring plan/methodology stated the required method of data archiving as either electronic or hard copy. However the latest Guidelines for Completing CDM-PDD and CDM-NM[3] only requires a qualitative explanation on how this data is going to be archived and no longer specifying archiving procedures for individual parameters. At a minimum, the project developer should keep the data complete for at least 2 years after the crediting period unless specified otherwise. In certain cases, data are mandatory to be kept up to 5 years after the end of crediting period. Whatever the requirements, **a mechanism to ensure the survival of the archive** should exist by creating multiple layers of back-up. This may involve electronic back-up or parallel hard and electronic copies.

In most cases, a combination of electronic and hard copy archiving system is employed. In particular, if the project involves a large volume of field data mining activities, direct data entry into an electronic archive becomes impractical. The schedule of encoding may be selected that allows the hard copy to be transformed into an electronic copy for electronic archiving after the data collection process.

The data archive is the central proof of the generated emission reduction. Good archiving practice increases the credibility of the reported emission reduction, and minimizes the time required for verification process.

4.10 INFORMATION & PROCEDURE DISSEMINATION

It is important that everyone involved in the CDM activities understand their role and their contribution to the overall process. Data miners should be able to follow the instruction provided in the form, and the department head should have a full knowledge about their responsibility to supervise the task. The CDM coordinator should proactively promote this information through provision of standard procedure and regular trainings, in particular during the first few months of monitoring operation.

The Standard Monitoring Procedure should be readily accessible to the CDM team members within the company. The documentation shall describe all of the mechanisms for data collection, data flow, calibration and recording, task delegation, archiving procedure, standard calculation methods, and standard formats of reporting, as well as the routine performed by the CDM coordinator. Such documentation serves as a supporting authentication of the monitoring system during the verification process and it also ensures the **survival of the procedure** during organizational dynamics that may occur throughout the 10- or 21-year crediting period.

[3] Version 05 at the time of writing

Likewise, skills that are required in performing data collection tasks must be identified in the standard monitoring procedure and any sign of inadequacy must be followed with training. Any new member of the team should receive a briefing on their CDM function and contribution to the overall goal. Procedural audit is ideally conducted on a regular basis and followed up with measures to improve compliance of all members of the team.

5 INSTRUMENT & APPARATUS CALIBRATIONS

The measurement of emission reduction is based on the direct data readings from instruments such as electricity meters, weighing apparatus, gas analyzers, flow meter, pressure and temperature sensors, etc. In order to maintain the credibility of the reported emission reduction, the monitoring plan requires that readings must be performed in a manner that ensures accuracy. Guideline on this manner is provided under the mandatory Quality Assurance/Quality Control section of the monitoring plan.

In general, the guideline provided under QA/QC can be classified into two areas; (a) the requirement to reconcile data from multiple sources and (b) the requirement to conduct instrumentation calibration to a specified standard. This section covers the latter part of this requirement.

This section intends only to cover basic and practical knowledge for the project operator to implement the calibration requirement of the monitoring plan, in particular the understanding of the selection of supplier for calibration services. It is not intended to provide knowledge on how to perform calibration and should not replace professional advisory during the design, installation, and calibration of instrumentations. Full knowledge of instrumentation and calibration can be obtained in References R-3 and R-6 listed at the end of this document.

5.1 NECESSITY FOR CALIBRATION

It can be normally assumed that new instruments will initially behave according to the characteristics stated in the specification. During use, however, its behavior will gradually diverge from the stated specification for a variety of reasons. Such reasons include mechanical wear and tear and the effects of dust, fumes, chemical and operating environment. The rate of divergence from standard specification varies according to the type of instrument, the frequency of usage, and the severity of the operating conditions.

However, there will come a time, determined by practical knowledge, when the characteristics of the instrument will have drifted from the standard specification by an unacceptable amount. When this situation is reached, it is necessary to recalibrate the instrument to the standard specifications. Such recalibration is performed by adjusting the instrument at each point in its output range until its output readings are the same as those of a second standard instrument to which the same inputs are applied. This second instrument is one kept solely for calibration purposes the specifications of which are accurately known.

5.2 PRINCIPLE OF CALIBRATION

Calibration consists of comparing the output of the instrument (or sensor) under test against the output of an instrument of known accuracy when the same input (the measured quantity) is applied to both instruments. This procedure is carried out for a range of inputs covering the whole measurement range of the instrument or sensor.

The calibrated instrument will therefore only be valid for the measurement range to which it has been calibrated for. Outside this range, a modification or adjustment method must be employed. Adjustment, however, should be conducted only by a qualified technician (in-house or in a standard laboratory) in consultation with the manufacturer.

The instrument with known accuracy that is being used during calibration is called a standard, and is usually chosen to be of greater inherent accuracy than the process instruments being calibrated.

5.3 FREQUENCY OF CALIBRATION

The determination of the frequency at which instruments should be calibrated is dependent upon several factors that require specialized knowledge. These factors include, amongst others, the type of instrument, its frequency of use and prevailing environmental conditions. It is therefore difficult, and almost impossible to determine the required frequency of instrument calibration based on theoretical considerations. In general, the instrument should be calibrated every maintenance shut down (on an annual basis at least) and after any changes in the settings are performed such as after instrument maintenance or repair. Should a different frequency be required the following procedure may be applicable for the determination of the calibration period.

If an instrument is required to measure some quantity with an acceptable inaccuracy level of ± 2%, then a certain amount of performance degradation can be allowed if its inaccuracy immediately after recalibration is ± 1%. What is more important is that the pattern of performance degradation is quantified such that the instrument can be recalibrated before its accuracy is reduced to the limit defined by the application.

Therefore, the determination of the frequency of calibration is based on practical experimentation with the following general steps:

1. Define the maximum permissible measurement error, MPME (± E%)
2. Calculate rate of performance degradation, RPD, for example, ± n% per year
3. Calculate the period of which the instrument will degrade to the maximum permissible measurement error (PD_MPME) in year (PD_MPME=MPME/RPD)

4. The instrument should be calibrated within the period less than PD_MPME.

It is critical to note that the above (PD_MPME) should serve only as an initial estimate, and should be regularly reviewed. It may happen that an instrument starts to go out of calibration more quickly than originally calculated because of the instrument wear and tear, increase in frequency of usage, changes in environmental/operating conditions, etc. A historical record of calibration can also serve as the basis of such a review.

5.4 CHAIN OF CALIBRATION STANDARDS & TRACEABILITY

The next few paragraphs attempt to provide information on the different levels of calibration standards applicable to industry.

5.4.1 Working Standard

A large organization may have a large amount of instruments to be calibrated. In such a case, sometimes it is considered more economical to maintain special equipment for calibration purposes in an in-house calibration laboratory.

In order to eliminate use-related deterioration, these equipment should not be used for day-to-day measurement and must be kept in a controlled environment. By doing so, it can be safely assumed that these instruments maintain their accuracy over a reasonable period of time.

Instruments kept for this purpose are called WORKING STANDARDS and represent the first link in the calibration chain. By maintaining a working standard laboratory, an organization can significantly increase the frequency of calibration without its associated third party calibration cost.

5.4.2 Secondary Reference Standard

Over the longer term, the accuracy of the working standards may also drift, mainly due to the aging effect of the components within them. Therefore, a program must be instituted for the calibrating of the working standard instruments at appropriate intervals of time against instruments of yet higher accuracy. An instrument used for calibrating a working standard instrument is known as a SECONDARY REFERENCE STANDARD.

A Secondary Reference Standard instrument is a very well engineered instrument that gives accuracy and is stabilized against drift in its performance against time, and likely to be an expensive instrument to buy. It is also kept in very controlled environmental conditions with respect to ambient temperature and humidity.

Only an authorized STANDARDS LABORATORY should perform the calibration of a working standard against a secondary reference standard. Such laboratories are accredited and monitored by a National Standards Organization.

After performing the calibration, a standard laboratory will issue a Calibration Certificate. A sample of the calibration certificate is included in APPENDIX I at the end of this document.

5.4.3 Primary Reference Standards

The Primary Reference Standards describe the highest level of accuracy that is achievable in the measurement of any particular physical quantity. All items of equipment used in a Standards Laboratory as secondary reference standards must be calibrated against the primary reference standards at appropriate intervals of time.

The National Standards Organization maintains these primary reference standards, performs the calibration of secondary reference standards against the primary reference standards, and issues a calibration certificate to the Standards Laboratory.

5.4.4 Traceability of Calibration

As described above, calibration has a chain like structure in which every instrument in the chain is calibrated against a more accurate instrument immediately above the chain. All of the elements in the calibration chain must be known so that the calibration of process instrumentation at the bottom of the chain is traceable to the fundamental measurement standards. This knowledge is known as "traceability" and is a mandatory requirement in satisfying the BN EN ISO 9000 standards.

Laboratory Standards Calibration services are available from both instrumentation suppliers such as Yokogawa, Honeywell, Emerson and other independent laboratories. These laboratories must have been accredited by a National/International Standard Organization to provide credible calibration services.

For a smaller organization, it may not be economical to maintain a working standard and the next available option is to calibrate the instrument using a **secondary reference standard** in a Standard Laboratory. In many CDM projects, regular calibration against secondary reference standards is often a minimum requirement. It is important to note that this may involve the cost of sending the instrument to the laboratory site or travel expenses for the instrument technician to the project facility.

For a larger organization with a sizeable number of instruments to be calibrated, it may be cost effective to maintain working standards, and therefore minimize the frequency of costly laboratory standard calibration.

However, the working standard still needs to undergo regular calibration against a secondary reference standard.

5.5 Other Applicable Quality Assurance Standards

A number of methodologies, such as AM00034 mandates compliance with EN14181. This is an international standard intended to improve air pollution level applicable for an Automated Measuring System (AMS) or Continuous Emission Monitoring System (CEMS).

EN14181 covers selection of the measuring system during purchasing (QAL-1), calibration procedure (QAL-2) and procedure to maintain and demonstrate the required quality of measurement results during normal operation (QAL-3). Obviously, successful compliance with EN14181 depends on the selected measuring system. Accordingly, investment in a measuring device (AMS or CEMS) not only involves purchasing decision of an individual equipment but also selection of a supplier that can provide a significant level of support and after-sales service on an on-going basis.

5.6 National and International Standards Organization

Most countries have a national body that is appointed as the accrediting body to the Standards Laboratory and therefore maintain the primary reference standards. These National Standards Organizations are members of the International Standards Organization or ISO. A member body of ISO is the national body "most representative of standardization in its country". Only one such body for each country is accepted for membership of ISO. Member bodies are entitled to participate and exercise full voting rights on any technical committee and policy committee of ISO.

For the Philippines, the designated National Standards Organization is the Bureau of Product Standards (http://www.bps.dti.gov.ph). CDM often requires instruments to be calibrated using a STANDARD Laboratory or a secondary reference standard. As mentioned in Section 5.4, calibration of these secondary reference standards are performed and controlled by the National Standards Organization.

5.7 Calibration Records

An essential element in the maintenance of measurement systems and the operation of calibration procedures is the provision of full documentation. This document should provide a full description of the measurement requirement and the instrument to be used, including a calibration record chronicling any calibration systems and procedures that have been performed for a particular instrument.

The calibration records should register both internal calibration (against a working standard) and formal calibration (against a standard laboratory). A record must be kept for every instrument irrespective of its frequency of usage, whether or not the equipment is an operational or spare unit.

The following example is a calibration record form from Reference R-3 adjusted for CDM purposes.

FORM 6 - CALIBRATION RECORD FORM

GENERAL INFORMATION			
FORM TYPE: CAL-00		FORM NUMBER: CAL-06-1000	
INSTRUMENT ID:		INSTRUMENT TYPE:	
MANUFACTURER/MODEL:		SERIAL NUMBER:	
MEASUREMENT RANGE AND UNIT UPPER LIMIT: LOWER LIMIT:		DESCRIPTION OF LOCATION:	
INSTALLATION DATE (OR FIRST DATE OF USAGE):		EXPECTED LIFETIME:	
MIN CALIBRATION STANDARD BY MONITORING PLAN:		MINIMUM REQUIRED CALIBRATION FREQUENCY:	
SPECIAL INSTRUCTIONS: A. Attach the calibration certificate to this document B. Calibrate every maintenance shut-down		PERSON RESPONSIBLE FOR CALIBRATING THIS INSTRUMENT:	
CALIBRATION RECORDS			
CALIBRATION DATE	CALIBRATION RESULTS	CALIBRATED BY	NEXT CALIBRATION DATE

6 REPORTING EMISSION REDUCTION

At the end of the monitoring period, the project operator has to issue an Emission Reduction Monitoring Report. This document is the central document for the verification process conducted by the DOE. The report has two main objectives: (a) to report the amount of emission reduction that has been delivered by the project activity; (b) to convince the DOE and the public that the emission reduction is credible, as it has been obtained using high standard monitoring practices.

The first part of this section deals with the calculation of emission reduction. The second part covers the presentation of a Monitoring Report to meet the second objective. To carry out these tasks, it is fundamental that that the assigned personnel have a good understanding of the CDM and emission reduction in general. The ensuing section seeks to address this by providing a basic knowledge of emission reduction.

6.1 BASIC KNOWLEDGE OF EMISSION REDUCTION

A CDM project is a project that, because of its activities, reduces the greenhouse gas (GHG) emissions. The quantity of reduction is the difference between the baseline emission and the sum of the project and leakage emission.

Emission Reduction	=	Baseline Emission	-	Project Emission	+	Leakage Emission

EQUATION 5

The *baseline emission* is the emission from the baseline scenario determined during the PDD development. The baseline scenario is the hypothetical situation that is most likely to occur in the absence of the project. The method by which the emission from this situation is calculated has been established during the PDD development. It usually requires a combination of vintage and recent data to calculate the baseline emission.

The *project emission* is the emission generated by the project activity within the project boundary set during the PDD development. The project boundary is typically the project's physical boundary but may sometimes be extended to include systems outside the project's physical boundary. If the project results in emission outside the set boundary, the emission is considered as leakage emission. Similar to the baseline emission, methods and formula to quantify project and leakage emissions are established and provided in the PDD.

The PDD reports a projected emission reduction throughout the chosen crediting period. This projection serves only as *ex-ante* (before the event) information. The actual emission reduction is calculated through the application of the monitoring plan and reported in the periodic monitoring reports.

6.2 EMISSION REDUCTION CALCULATION

The calculation of emission reduction can be conveniently performed using spreadsheet applications such as Microsoft Excel or Lotus 1-2-3. A spreadsheet application eliminates human error from repetitive calculation and speeds up the calculation time, and its advantage cannot be questioned. However, emission reduction calculated in spreadsheet format can sometimes be hard to follow as its formulae/methods are typically concealed within the results. During verification time, the process of detangling information may add additional days spent for clarification.

It is therefore ideal for a project operator to device an efficient, transparent, and reusable spreadsheet template that is easy to understand by all parties. Regardless of the software applications being chosen, the spreadsheet should have the following characteristics embedded in its design:

1. Explain any sources of data being used for calculation. Clearly refers to the data collection form, other archive sources, and full and traceable reference to external sources.

2. Provide the calculation methods and formulae, which must be presented consistently with those in the PDD.

3. Overall approach should be broken down into systematic procedures in consistent units. All unit conversions should be explained.

4. Calculation should be clearly grouped into baseline emission, project emission and leakage emission; within each group, calculation should further be sub-grouped according to its sources. For example, Baseline Emission_CO2 Emission from Electricity Displacement

5. Calculation considers measurement uncertainty and error propagation (Refer to Section 4.2.3 for methods);

6. Provide a summary of calculation as well as the immediate and final results.

7. A good spreadsheet should be easy to use, requires minimum modification or intervention as possible to perform calculation, and features protection against unintended overwriting

6.3 MONITORING REPORT

Once all data of a monitoring period are consolidated, the project operator can issue a monitoring report. In addition to describing the calculated emission reduction discussed earlier, the monitoring report also needs to convince the DOE and ultimately the public, that the reported emission reduction is credible. The standard way to do this is to demonstrate that the data being used as the bases for the calculation of emission reduction were obtained using acceptable methods and has passed Quality Control and Quality Assurance. A good practice however, is to increase the level of credibility by providing documented procedures, access to data archive, and any other proof that supports good monitoring practices such as calibration records, internal audit reports, internal training reports, or compliance to international standards (ISO).

As part of this study, the TÜV-SÜD group presents a Monitoring Report template that provides structure for the presentation of the above information. Please refer to APPENDIX II for the full template. In general the monitoring report should cover the following topics: (1) General project information (2) Key monitoring activities (3) Quality Assurance and Quality Control Measures (4) Calculation of GHG Emissions.

6.3.1 General Project Information

General Information. This section contains brief information about the project including project title, CDM registration number, short description, monitoring/reporting period, applicable methodology, the person responsible for preparation and submission of the monitoring report, the issuance date of the report, and the report version.

Physical Implementation Status. Information on the implementation status compared to the plan as laid out in the PDD should be described in this section. This information is particularly relevant for a CDM project that will be or is implemented in several phases. The project operator should also report if there are any elements of the project that have been only partially implemented or revised, and information on how this has been dealt with in the monitoring and reporting of emissions.

Plan for Modification. The project operator should provide information about any plan to modify the process during the crediting period, be it for maintenance improvement or performance improvement purposes. An assessment should be conducted to identify the impact of these proposed changes to the (1) monitoring plan and to the (2) baseline, project, and leakage emissions. The plan and the results of the assessment should be communicated to the DOE.

Brief Operational Calendar and Plan. This section provides pertinent information about the project operation within the monitoring/reporting period such as the period of maintenance/emergency shut down, operating level (% of capacity), HAZOP trainings, Monitoring Equipment training, etc.

6.3.2 Monitoring Activities

Monitoring Devices. The report should have a list of all instruments being used for CDM monitoring purposes. It should ideally be presented in a table with information such as manufacturer, type, serial number, date of installation, date of last calibration and uncertainty. A CDM instrumentation map such as that provided in Figure 1 may also be included.

Calibration. Information on the calibration procedure and the standard being applied should be reported, including if a third party conducts this calibration. Any calibration certificates should be provided as supporting documents.

Archiving Method. A description of the adopted archiving system should be included in the report. It should include information such as how the data form is kept including any efforts to ensure data survival.

Data Collection. Records of parameters should be presented in tabular format (Table 3) with pertinent information such as:

1. CDM ID consistent with the PDD
2. Brief information of the data source, for example: "Direct Reading from T-105" or "Estimated from F-105, T-101"
3. Reference to the source of data. For example, Form No. ELO-06-1001 and ELO-06-1002
4. Brief information if the data has been reconciled with other sources. For example, "Reconciled with sales data"
5. Reference to its reconciliation activity. For example, Form R-ELO-06-1001
6. Recorded/Calculated/Estimated value expressed with its uncertainty level and unit.

The data should be grouped accordingly, and an example of presentation is provided in Table 3.

- **List of Fixed Default Values.** This is the collection of index or factors that will be fixed throughout the crediting period and is not required to be monitored.

- **Data Concerning the Project Emission.** Data collection should be presented according to the emission sources. For example, data for the estimation of CO_2 emission from stack gas, which may include stack gas temperature, flowrate, and gas analyzer readings.
- **Data Concerning the Baseline Emissions.** Data collection should be presented according to the emission sources.
- **Data Concerning Leakage Emission.** Data collection should be presented according to the emission sources.
- **Data Concerning Environmental Impact.** Data collection relevant to the Environmental Impact Assessment/Statement should be presented.

TABLE 3[4]

FIXED PARAMETERS						
CDM ID	Brief Description					Value & Unit
GWP_CH4	*Global Warming Potential of Methane*					*21t-CH4/t-CO2*
EF_GRID	*Emission factor of electricity grid*					*0.8t-CO2/MWh*
DATA CONCERNING PROJECT EMISSION						
CDM ID	Brief Description	Data Collection		Reconciliation		Value & Unit
		Source	Ref.	Source	Ref.	
DATA CONCERNING BASELINE EMISSION						
CDM ID	Brief Description	Data Collection		Reconciliation		Value & Unit
		Source	Ref.	Source	Ref.	
EG_{PJY}	*Electricity Output*	*E-101*	*ELO-06-1000*	*Sales Receipts*	*R-ELO-06-1234*	*1,205,325 ± 2% MWh*
DATA CONCERNING LEAKAGE EMISSION						
CDM ID	Brief Description	Data Collection		Reconciliation		Value & Unit
		Source	Ref.	Source	Ref.	

[4] Italic entry is provided as an example

DATA CONCERNING ENVIRONMENTAL IMPACT						
Data	Description					Value & Unit

6.3.3 Quality Assurance/Quality Control Measures

The project operator shall demonstrate that it has fully implemented the monitoring plan using best practices. This section should provide a description of how quality assurance or quality control procedures have been applied to the implementation process, ideally with reference to a documented Standard Monitoring Procedure.

It shall also explain if any, efforts to establish organizational structure, introduce mechanism of data collection and supervisory measures, map the equipment and instrumentation, institute procedural training and personnel empowerment, set up an information framework, embark on an internal audit and initiate compliance with an international or national standard.

6.3.4 Calculation of GHG Emissions

This section reports the approach and results of calculation of GHG emission reduction as per Section 6.2. The emission reduction can be presented in tabular format such as in Table 4.

TABLE 4

BASELINE EMISSION		
SOURCES	FORMULA REFERRING TO CDM ID & VALUE IN TABLE 3	EMISSION IN T-CO_2/YEAR
Fossil based electricity displacement	EG_{PJY}*EF_GRID	964,260±2%
TOTAL BASELINE EMISSION (A)		
PROJECT EMISSION		
SOURCES	FORMULA REFERRING TO CDM ID & VALUE IN TABLE 3	EMISSION IN T-CO_2/YEAR
Fossil fuel usage		
TOTAL PROJECT EMISSION (B)		
LEAKAGE EMISSION		
SOURCES	FORMULA REFERRING TO CDM ID & VALUE IN TABLE 3	EMISSION IN T-CO_2/YEAR

TOTAL LEAKAGE EMISSION (C)		
TOTAL EMISSION REDUCTION	A-(B+C)	

It is important to maintain data ID & unit consistency during data collection, archiving, calculation, and reporting. This consistency ensures that data can be easily tracked during verification.

7 MODIFICATIONS

It is likely that during the crediting period the project operator may need to modify certain parts of the process, be it for maintenance improvement or overall process improvement. If such changes are proposed, the CDM coordinator should assess the impact of these changes to the existing PDD.

The impact assessment should cover the following areas:

- **Monitoring Plan**. If the plan changes the installation of existing monitoring instruments, it shall be re-located to a place that will not reduce the accuracy of the monitoring plan. Decision 17/CP.7 Annex H, paragraph 57 allows monitoring plan modification only if it does not change or improve the accuracy of monitoring, and re-validation process is required. It shall be noted that the change has to be approved by the CDM Executive Board before its implementation; otherwise, the monitoring report may not be accepted.

- **Baseline, Project and Leakage Emissions.** If the project modification will somewhat change either one of the baseline, project, or leakage emissions (for example, by changing the fuel used, or capacity increase, or partial replacement with a newer technology) it is likely that your PDD will need to be revised. At the time of writing, there is no available provision for these changes and the project operator should consult with a DOE or the company's CDM Consultants to find the best available course of action.

8 POTENTIAL PITFALLS DURING IMPLEMENTATION

It is generally agreed that the requirement for monitoring implementation has become stricter in recent months and will continue to be so in the years ahead. The establishment of the Registration and Issuance Team (RIT) has tightened up the requirement to comply with the monitoring plan. Many projects have been put under review by the RIT for reasons such as lack of transparency in data presentations, lack of clarity in presentation of calculations, deviation from the monitoring requirement, etc. The RIT review process may result in delay in the CER issuance process to several months or even years, which has a cash flow implication to the CER seller or a potential failure for the buyer to meet its emission reduction commitment.

Numerous factors may prove to be barriers to a successful implementation of a CDM project, which is narrowly defined as the ability of the project operator to deliver the emission reduction and obtain the CERs in the shortest possible time, thereby satisfying all parties concerned including the project participant, CER compliance buyer, DOE, and the UNFCCC bodies. It should be noted that based on experience, the time of CER delivery is often determined by the time required to consolidate data, which in turn is determined by the monitoring practices of the project operator.

As part of this study, TÜV-SÜD shared their experiences during verification processes. The following information is obtained from the presentation of Mr. Thomas Kleiser, the Head of CDM/JI Division of TÜV-SÜD in the Philippines in September 2006.

No.	Problem Encountered	Possible Solutions
1	Interpretable description of monitoring method.	Build an implementation strategy before entering crediting period. Conduct an initial verification process, and review the strategy with the DOE.
2	Use of accuracy indication given by the equipment manufacturer.	Check if this is in line with the monitoring plan in the PDD. If not, follow exactly the requirement in the monitoring plan and request for revision if you strongly believe that the new approach results in no reduction in the monitoring accuracy.
3	No availability for local support (e.g. accredited laboratory)	Use instrument with minimum calibration requirement to avoid down time due to calibration. Inquire from your instrumentation vendor if provides calibration services can be conducted on site. Request for replacement instrument if external calibration results in extended down time.

4	Consistency in time over reporting period	Choose a reporting period that is consistent with your operational schedule, e.g. the period between annual maintenances. Includes all concerning departments to discuss the optimum data collection/consolidation/reporting frequency that works for everyone.
5	Data transfer between multiple computerized systems.	Integrate a workable archiving practice that streamline data collection and transfer between various parties/departments in the implementation strategy. Ensure that a workable strategy is in place before the data collection activity began.
6	Time demand for data consolidation	Divide consolidation into smaller periods to spread the workload throughout the year. Distribute the workload to relevant departments and request QA/QC to be done at source. Implement a periodic data checking measure such that any deviation can be corrected early. Implement internal audit to ensure compliance to procedure and avoid any data losses.
7	Verifiability of Data Processing	Simplify calculation. Design a standard calculation format/spreadsheet template with full description of methods that can be used repetitively. Discuss with a DOE during initial verification process if your design format/spreadsheet has sufficient clarity. Maintain consistency of variable identification with that in the PDD.
8.	Missing documentations, Private know how of a single employee, Missing description of procedures and processes.	Create a standard monitoring procedure Provide trainings and refresher courses. Perform internal audits to ensure compliance with the standard monitoring procedure
9.	Missing Availability of Proof, such as calibration certificate	Integrate QA/QC procedure with the data collection process. Provide clear instruction of what is required from a task in the data collection form. Perform internal audits to ensure compliance with the standard monitoring procedure
10.	Missing investigation on the representativity	Integrate sampling procedures into the data

	of samples.	collection mechanism Personnel empowerment

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R-1. Marrakesh Accords. UNFCCC

R-2. The Republic of Philippines DNA website, *http://www.cdmdna.emb.gov.ph/*,*Japan International Cooperation Agency*

R-3. Measurement & Instrumentation Principles, *Alan S. Morris, Elsevier Butterworth Heinemann, 2001*

R-4. The UNFCCC CDM website, *http://cdm.unfccc.int/*

R-5. IPCC website, *http://www.ipcc.ch/*

R-6. The Measurement, Instrumentation, and Sensor Handbook, *John G. Webster, CRC Press, 1999*

<<Section Change>>

APPENDIX I CALIBRATION CERTIFICATE & REPORT

SUPPLEMENTAL REPORT FOR 1-SAMPLE01-1-9

CALIBRATION LAB DATA AS FOUND / AS LEFT

RA Nbr:	1-SAMPLE01-1-9	Mfg:	Transunion
Description:	Pressure Module	Model:	90 Series
Customer:	Quality Company	Serial:	12793405
Calibrated:	Apr 20, 2006	PO Nbr:	PO NBR TEST
Date Due:	Apr 20, 2007	ID Nbr:	OP1-134890-PL-7-OLEFINS
Service Type:	D9	Calibration Proc:	1-AC09808-1

THIS ITEM IS CALIBRATED TO MANUFACTURER SPECIFICATION USING CUSTOMER REQUESTED DATA POINTS.

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Uncertainty (k=2; ≈)	TUR
Pressure Measure								
Pressure Upscale	0.0 psi	±(0.25% FS)	-0.5	0.5	0.1 psi		5.429e-2 psi	9.2 : 1
	20.0 psi	±(0.25% FS)	19.5	20.5	19.9 psi		6.149e-2 psi	8.1 : 1
	40.0 psi	±(0.25% FS)	39.5	40.5	40.0 psi		8.695e-2 psi	5.8 : 1
	60.0 psi	±(0.25% FS)	59.5	60.5	60.0 psi		9.037e-2 psi	5.5 : 1
	80.0 psi	±(0.25% FS)	79.5	80.5	80.0 psi		1.156e-1 psi	4.3 : 1
	100.0 psi	±(0.25% FS)	99.5	100.5	100.0 psi		1.110e-1 psi	4.5 : 1
	120.0 psi	±(0.25% FS)	119.5	120.5	120.0 psi		1.199e-1 psi	4.2 : 1
	140.0 psi	±(0.25% FS)	139.5	140.5	140.0 psi		1.205e-1 psi	4.1 : 1
	160.0 psi	±(0.25% FS)	159.5	160.5	160.0 psi		1.250e-1 psi	4.0 : 1
	180.0 psi	±(0.25% FS)	179.5	180.5	180.1 psi		1.303e-1 psi	3.8 : 1
	200.0 psi	±(0.25% FS)	199.5	200.5	199.9 psi		2.047e-1 psi	2.4 : 1
Downscale	180.0 psi	±(0.25% FS)	179.5	180.5	180.1 psi		1.303e-1 psi	3.8 : 1

When uncertainties are provided, the uncertainty only includes the measurement process and does not include uncertainty contributions of the instrument under test

Field not applicable.

Calibration Lab Data Report - Page 1 of 1

RA Nbr: 1-SAMPLE01-1-9

APPENDIX II MONITORING REPORT TEMPLATE

The following Monitoring Report Template is courtesy information from TÜV-SÜD group, a leading Designated Operational Entity.

CLEAN DEVELOPMENT MECHANISM

CDM MONITORING REPORT FORM - 1ST DRAFT

CONTENTS

Initial remark (referring to Decision 17/CP.7, Annex H, paragraph 54, 56, 58 and 60)

The monitoring plan contained in the registered project design document is to be implemented by the project participants and the monitoring report shall be written in accordance with this registered monitoring plan. The monitoring plan shall be based on a previously approved monitoring methodology or a new methodology. The implementation of the registered monitoring plan and its revision, as applicable, shall be a condition for verification, certification and issuance of CERs.

SECTION A. General project activity information

A.1 Title of the project activity:

A.2. CDM registration number:

A.3. Short description of the project activity:

- Max. ½ page

A.4. Monitoring period:

- The 1st and the last day must be clearly indicated.

A.5. Methodology applied to the project activity (incl. version number):

A.5.1. Baseline methodology:

A.5.2. Monitoring methodology:

A.6. Status of implementation including time table for major project parts:

- To include: Complete schedule, commission date, major revisions and changes, etc.

A.7. Intended deviations or revisions to the registered PDD:

A.8. Intended deviations or revisions to the registered monitoring plan (Decision 17/CP.7, Annex H, paragraph 57 to be considered):

A.9. Changes since last verification:

A.10. Person(s) responsible for the preparation and submission of the monitoring report:

SECTION B. Key monitoring activities according to the monitoring plan for the monitoring period stated in A.4 (referring to Decision 17/CP.7, Annex H, paragraph 53 (a) – (d) on data collection and archiving)

B.1. Monitoring equipment:

B.1.2. Table providing information on the equipment used (incl. manufacturer, type, serial number, date of installation, date of last calibration, information to specific uncertainty, need for changes and replacements):

B.1.3. Calibration procedures:

B.1.4. Involvement of Third Parties:

B.2. Data collection (accumulated data for the whole monitoring period):

B.2.1. List of fixed default values:

B.2.2. List of variables:

B.2.3. Data concerning GHG emissions by sources of the project activity (referring to paragraph 53(a)):

B.2.4. Data concerning GHG emissions by sources of the baseline (referring to paragraph 53(b)):

B.2.5. Data concerning leakage (referring to paragraph 53(c)):

B.2.6. Data concerning environmental impacts (referring to paragraph 53(d)):

B.3. Data processing and archiving (incl. software used):

B.4. Special event log:

- Any special events that occurred should be listed here with date and details.

SECTION C. Quality assurance and quality control measures

C.1. Documented procedures and management plan:

C.1.1. Roles and responsibilities:

C.1.2. Trainings:

C.2. Involvement of Third Parties:

C.3. Internal audits and control measures:

C.4. Troubleshooting procedures:

SECTION D. Calculation of GHG emission reductions (referring to Decision 17/CP.7, Annex H, paragraph 53 (f) and 59)

D.1. Table providing the formulae used:

D.2. Description and consideration of measurement uncertainties and error propagation:

D.3. GHG emission reductions (referring to B.2. of this document):

D.3.1. Project emissions:

D.3.2. Baseline emissions:

D.3.3. Leakage:

D.3.4. Summary of the emissions reductions during the monitoring period:

添付 7：温室効果ガス排出削減量購入協定：売り手の視点から

Emission Reduction Purchase Agreements: A seller's perspective

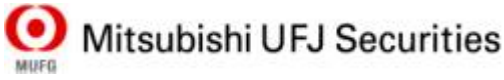
Produced by Mitsubishi UFJ Securities
Clean Energy Finance Committee

In association with:

Department of Environment and Natural Resources,
Republic of the Philippines

and

Japan International Cooperation Agency



Emission Reduction Purchase Agreements: A seller's perspective

Preface

The Emission Reduction Purchase Agreement is a vital document for the developer of a CDM project. This is the document that will ensure that all of the hard work on finding financing, achieving CDM registration, constructing the project, operating the project and monitoring, all of these elements actually result in receiving a revenue from the CERs generated. However, there have been many instances of project developers signing very unfavourable ERPAs, and in doing so, taking on unnecessary risks, and not receiving a sufficiently high level of reward.

This can be because of advantages that the buyer has:

- the buyer is very experienced, having negotiated numerous ERPAs
- often, the buyer insists on using its standard agreement
- the buyer has much greater knowledge about the market
- the buyer is more familiar with the language used

Or because of disadvantages on the seller side:

- often too optimistic about the likely results of the project
- may be too busy for detailed ERPA negotiations
- may not be confident dealing in a new area of business

The manual was produced in collaboration with a variety of stakeholders, including the staff at DENR, project developers in the Philippines who had experience of ERPA negotiations, and project developers with no such experience. An initial feedback session was held at DENR in September, with a more formal workshop held in October, where the author presented the findings which form the backbone of this manual. We should also mention the assistance that JICA has provided for this manual's preparation.

This manual aims to help the seller overcome some of the difficulties outlined above, and we very much hope that it is useful.

Matthew Setterfield
Mitsubishi UFJ Securities

Overview

To help the project developer, the Seller, to overcome some of the difficulties outlined in the Preface, this manual aims to bring more transparency to the ERPA negotiation process, by highlighting some of the risks to the Seller, and offering some advice on how to approach an ERPA negotiation.

The first key is to be able to actually understand the text of a typical ERPA, and analyse its strengths and weaknesses - from your point of view. Therefore a significant part of this report is taken up by a walk-through of the IETA's 2006 model ERPA, (Chapter 2), a detailed analysis of issues surrounding termination clauses and penalties (Chapter 4) and comments on some clauses from other ERPAs (also Chapter 4).

At the same time the Seller needs to be able to understand the pricing options available (Chapter 3) and to be able to analyse the risks being taken on by each party to the Agreement (Chapter 5). The Buyer will certainly be making such a risk analysis when setting their price, so it is useful for the Seller to be able to do so too.

The manual ends with some more general guidance for the Seller and some advice on how to approach the negotiations (Chapters 6 & 7).

The appendixes contain a copy of the IETA 2006 model ERPA, and listings to give the reader access to some further resources.

Glossary

Buyer – the primary buyer of the CERs – the counterparty on the ERPA
CDM – Clean Development Mechanism
CER – Certified Emission Reduction (= 1 tonne CO_2 equivalent)
EB – Executive Board (of the CDM)
ERPA – Emission Reduction Purchase Agreement
EU ETS – European Union Emissions Trading System
EUA – European Union Allowance (= 1tonne CO_2 equivalent)

IETA – International Emissions Trading Association
Seller – sometimes referred to as the project developer, or Project Entity.

Disclaimer:
This Manual is intended as a learning tool for project developers, financiers or government bodies in the Philippines who are involved in structuring CDM projects and negotiating sale of CERs. It analyses some of the key legal and risk issues involved in an ERPA negotiation. However, the Manual should in no way be relied upon as legal advice for project stakeholders, as the appropriate means to structure a CDM Project and sell CERs from that project will very much depend on the particular project and the nature and interests of the Project Participants. Independent legal advice should always be sought when undertaking a CDM Project or entering into the types of contracts described herein. The example contractual provisions provided are examples only. They should be carefully considered and modified to suit the particular circumstances of an individual CDM Project and should not be considered as legal advice.

1. Introduction to ERPAs

1.1 Key elements

The key elements in any ERPA will cover the following areas:

- Quantity of CERs to be delivered
- Price per unit
- Delivery schedule
- Consequences of non-delivery
- Other default events

ERPAs are usually long-term agreements and need to cover a range of potential scenarios, so they will generally be more complex than this, often extending to 30 – 40 pages.

1.2 Key issues for the Project Developer

Overall, assessing and negotiating an ERPA can be seen as an exercise in finding an appropriate balance between risk and reward. Therefore the key issues for a Project Developer to consider when negotiating an ERPA include:

i. the rewards they wish to receive, which can differ, e.g. : maximizing future revenue from CERs; using an ERPA as collateral to obtain further finance; upfront funding for project costs; etc.
ii. the overall risks associated with the project: what barriers does the project face before CERs are to be delivered, and how great is the possibility of failure. It is helpful here if the Seller can assess how the Buyer will perceive these risks too.
iii. How does the ERPA deal with the project's risks: who will be taking responsibility for these risks, and are these risks manageable for the Seller.
iv. Finally, to assess whether the rewards on offer with a particular ERPA are balanced with the risks the Seller is taking on.

This suggests that the Seller needs expertise in 3 key areas in order to assess whether an ERPA meets their requirements:
1: A knowledge of the CER market, to know what rewards can be reasonable expected – what is the benchmark for a reasonable buy offer?

2: An ability to assess the risks associated with the project, and to work to minimise these risks.
3: An understanding of the language used in ERPAs, and the ability to predict how the ERPA would be used in the event of, e.g. a massive fall in CER prices, or the failure of the Project to deliver the required quantity of CERs, or a change in ownership of the project developer.

This manual aims to bring some transparent guidance for the second and third areas above in particular. There is also some information related to market prices, but the market can change rapidly, so it will be essential for each project developer to find their own ways of assessing what price and conditions they can obtain.

2. Walk through IETA 2006 model ERPA

The International Emissions Trading Association is an independent, non-profit organisation dedicated to the establishment of effective systems for trading in greenhouse gas emissions by businesses. It has carried out lengthy consulting work among potential buyers of CERs, lawyers and participants in the emission trading market to develop template ERPAs, which can be used as a standard for all market participants. However, while the IETA ERPA professes to be a neutral document, in practice most of the people involved with drafting the IETA ERPA were close to the buyer side, and many of its clauses tend to favour the buyer, rather than the seller. Nonetheless, most buyers will have a template agreement similar to this, so it is important for potential CER sellers to be aware of how these types of agreement work, so that they can negotiate for clauses and wordings that are more favourable to them.

First it is important to gain familiarity with the overall architecture of the IETA 2006 ERPA, as it can be confusing at first glance. Most of the key terms of the Agreement are described in detail in the Code of CDM Terms, which is an attachment to the Agreement. The Agreement itself is relatively brief, and mostly refers to the Code of CDM Terms for the contractual conditions, and to separate Schedules for the commercial terms.

Therefore, when reviewing draft agreements from a Buyer under this format, it is essential to read the Code of CDM Terms first. The main body of the Agreement cannot be clearly assessed without first gaining a firm understanding of the definitions and terms in this Code.

The rest of this section will describe the terms of the IETA 2006 ERPA in plainer language, and provide commentary on some of the key issues for the seller to consider.

2.1 Emission Reduction Purchase Agreement v3.0

This largely refers to items described in more detail in the Code of CDM Terms. Where options are available under the Code of Terms, the Agreement may specify which option is to be used in this Agreement, but in many cases, the Agreement refers to Schedule 1, which again refers back to the Code of CDM Terms. Nonetheless, the main Agreement should be studied carefully, with reference to the other sections, in order to ensure that the overall arrangements are in line with the Seller's understanding.

2.2 Schedule 1: Incorporate Provisions from the Code of CDM Terms

This section has 2 main purposes:

1. To clarify in detail which options are to be exercised from the Code of CDM Terms
2. To specify some items which are not dealt with in the Code, e.g. the minimum credit rating of a Credit Support Party, the language and place of arbitration.

It may appear that selecting the options from the Code is the key to negotiating a favourable ERPA. However, if none of the options seems appropriate for your project, then the wording of the options themselves are of course open for negotiation.

2.3 Schedule 2: Commercial Terms

The information to be added here is based on the commercial negotiations. The issues of pricing and sales structures are addressed in Chapter 3 of the

Manual.

2.4 Code of CDM Terms v1.0

The Code contains 8 Articles.

Article 1: Definitions

This is the first, and longest Article. Many of the Definitions are simply common sense – definition of a "US Dollar" or of a "Banking Day". However, some are more complex, and include several alternatives.

Comments:

The reader should note that these Definitions are just as negotiable as any other part of the Agreement. Sometimes a definition may be disadvantageous to the one or other Party, and clearly they will want to negotiate a different wording. For some of the key definitions, for instance "Buyer's Market Damages" there are options given in the Code. However, if a party feels that all of the options are unfavourable, there is nothing to stop them from proposing new alternatives.

Article 2: Conditions Precedent

Before the Agreement comes into effect, certain conditions have to be met, mainly by Seller, e.g.

- project approval from the Host Country government
- the Seller, and sometimes perhaps the buyer, furnishing each other with Letters of Credit to the Buyer

Comments:

The items listed under Conditions Precedent in this version of the Agreement are quite small in number. However, the Seller also takes on a number of obligations under Article 3, and in other parts of the Agreement, which can be quite onerous. Clearly the Seller will want to avoid as many

Conditions and Obligations as possible apart from the key obligation, which is to actually deliver the CERs.

In IETA 2006 ERPA, a Letter of Credit will be required when the Buyer is providing upfront cash to help fund the Project. The provider of this letter is like a guarantor for the cash received by the project developer, and is usually a bank with a strong financial rating. Provision of such a guarantee can greatly reduce the Buyer's risk and may enable the Seller to push for a higher unit price, even when receiving upfront payment. Seller will have to pay to obtain such a Letter, and will clearly want to try to recoup this cost in some way. It is noted that when the Project is particularly attractive to the Buyer in terms of quality and pricing, it can obtain an upfront payment without a guarantee.

Article 3: Obligations of the Seller

This sets out the seller's obligations to, among others:

- provide an Initial Verification Report to the Buyer – this is separate from the CDM's verification requirements. Based on this Report, the Buyer may request the Seller to take action to improve the Project's performance, or even terminate the Agreement.
- Complete Validation and obtain Registration for the Project.
- Develop and implement a Monitoring Plan
- Carry out Verification and Certification, to ensure issuance of the CERs.
- Operate the Project in a competent and prudent manner (as an RPO – Reasonable and Prudent Operator).
- Deliver the CERs to the Buyer
- Arrange for additional Buyers to be added as Project Participants, if the Buyer resells the CERs to a third party before delivery.

Comments:

Some of these items are things that the Seller should aim to carry out regardless of any contractual obligations: they are simply good practice. For example,

operating the project prudently, obtaining registration, carrying out monitoring, and so on. The Seller, however, is advised to make sure that the wording for these when they are included as contractual obligations does not create unreasonable responsibility. It will be helpful to remember that any increase in contractual obligations should generally be seen as a disadvantage, as it increases the opportunity for one of the parties to find a reason to terminate the Agreement.

Further, where the Seller is obliged to carry out additional activities which are primarily for the benefit of the Buyer, as in the case of Initial Verification, the Seller should clearly understand what they entail and make sure that they are useful in reaching a satisfactory ERPA.

In addition, the Initial Verification can, depending on the wording, give the Buyer an opportunity to exit from the Project. If the Seller is prepared to accept this condition, they should be careful to ensure that the criterion by which the Project is to be judged will be objective. Vague wording here can allow the Buyer to pull out simply because, for example, "*in the Buyer's judgement* the Project will not be able to deliver the Delivery Amount". This gives the Buyer an easy opportunity to withdraw from the Project if later market conditions make the Agreement look unfavourable. From the Seller's perspective, it is better if the Buyer cannot withdraw from the Agreement unless the Seller actually fails to deliver CERs. If an Initial Verification is carried out, it is more desirable if the report is used as an opportunity for Buyer and Seller to have a dialogue and agree on ways to improve project performance, but without giving Buyer the right to force changes in the project design – this may result in additional costs which the Seller is not able to cover. Ultimately, the ERPA must be based on the assumption that both Buyer and Seller will work diligently to implement the Project successfully.

Article 4: Obligations of the Buyer

The Buyer's main obligations are to:

- ensure that they have an account ready to receive delivery of the CERs
- pay for the CERs

- communicate with the CDM Executive Board (EB) as the Focal Point

Comments:

The last item in the list above warrants particular attention. The ERPA Party that is nominated as the Focal Point for communication with the EB is in a strong position. When a project is registered, the Project Participants, as listed in the PDD, must send a jointly signed letter to the CDM Secretariat instructing the Secretariat as to who will be responsible for communication with the CDM EB. The Participant who takes this responsibility becomes the Focal Point. When CERs are issued, it is up to the Focal Point to instruct the CDM EB whose account the CERs should be issued into. Therefore the Focal Point has a strong position in terms of access to the CERs, and other Project Participants must rely on the Focal Point to instruct the EB correctly. However, it is possible for two or more Project Participants to be joint Focal Points, whereby they will jointly sign any necessary instructions to the CDM EB, and will both receive copies of any communication directly from the EB. Given the importance of the role of the Focal Point, Project Participants should think very carefully before signing over their right to share in these communications. In particular, if a Buyer does not have the automatic right to receive 100% of the CERs, then the Buyer does not have strong grounds to ask for this right. As the minimum, it is recommended to stipulate that the Buyer performs the function of the Focal Point in accordance with the terms of the ERPA.

Article 5: Representations, Warranties and Undertakings

Both Buyer and Seller make a set of promises, both about the current state of their business, and about their future actions. In this version, most of these promises are reciprocal, but there are a few obligations on the Seller which are not reciprocal, such as the warranties that Seller will:

- construct and operate the Project in line with the CDM rules
- will not allow any 3rd party to gain an interest in the Contract Quantity

Comments

In general, these warranties seem reasonable, but as with the comments above for Article 3, the Seller may wish to check carefully so that the ERPA's wording does not unduly favour the Buyer.

Article 6: Termination

This is a long and complex Article, and needs careful review. A separate section (Section 4.1) will examine issues related to delivery failure, and potential penalties. It covers various issues related to situations that can lead to termination, and penalties in the event of termination, including:

- Events of default, such as:
  - Non-payment
  - Representation or warranty (where one of the Parties, or a Credit Support provider has given false or misleading information)
  - Material obligation, with only 5 days to rectify any problem (this would include the duty to report certain events)
  - Insolvency (particularly if either party becomes bankrupt or goes into administration proceedings)
  - Credit support – if Credit Support is withdrawn or weakened
  - Cross default
  - Material Adverse Change – especially if the Credit Support Provider suffers a fall in its financial strength rating, or if a Party's ability to perform its obligations under the Agreement is materially impaired, or if a Party's net worth (as measured by audited accounts)
  - Withdrawal of one Party's government from the Kyoto Protocol
- Delivery failure – what happens when the Seller fails to deliver the Contract Quantity, and what requests can the Buyer make, or penalties will the Seller have to pay
- Force Majeure – penalty payments may be due even if the Agreement is terminated due to an FM event
- Termination Rights – the technicalities of securing a Termination
- Consequences of Termination – this reiterate the penalties that may

become payable by the Parties following any Termination

Comments:
This is a crucial part of the Agreement, and can include major risks for the Seller. In an extreme case, the Seller may be required to pay Buyer's Market Damages even if the Agreement is Terminated due to an instance of Force Majeure. When the value of the ERPA represents a major revenue stream to the project developer, then penalties payable under the Termination clause could be enough to send the developer into bankruptcy. Clearly there is a need for balance between the level of risk the Buyer is accepting and the level of guarantee the Seller has to provide. This issue will be looked at more closely in a section 4.1.

Article 7: Dispute Resolution

In this Agreement, Parties have to agree to submit to either formal legal dispute resolution or to arbitration under international rules. However, there is also an option to use Expert Determination as a cheaper and swifter alternative to these formal procedures. Expert Determination is used as a first stop measure, and Parties can take the issue to formal arbitration / legal action if they are unhappy with the Expert's judgement. Appointment of the Expert will be a vital concern: in the current wording, in event of dispute over who to appoint, the President of IETA may appoint the Expert.

Comments:

The potential role of the IETA's President may be of concern to the Seller, as the IETA is an organisation dominated by Annex I CER traders and buyers.
However, in general, the Seller may welcome a procedure such as Expert Determination, as it can enable cheaper resolution of disputes: some Sellers may not have the funds to compete in international arbitration or legal procedures, especially when these take place outside of the Seller's domicile.
For any Arbitration or legal procedures, Seller will aim to have these in their own country. If the Seller's country does not offer international arbitration, then aim for a neutral neighbouring country which does.. Most Buyers will have the ability to compromise on this issue.

Article 8: Miscellaneous

Some important issues are buried in the Miscellaneous section, including:

- Confidentiality
- Transfer and Assignment – can Buyer or Seller transfer their rights under the ERPA to a third party, e.g. to a secondary buyer, or to a creditor, and do they have to receive the other party's permission to do so. Permission may be withheld if the new Party to the ERPA is a weaker organisation than the original signatory.
- Share of proceeds – will these be paid by one or other Party, or shared.
- Taxes – which portions of tax are the respective Parties liable to pay

Comments

Ability to freely assign the right to receive payment for the CERs to a third party can be important to the Seller, especially when looking for finance. If the Seller is unable to assign this right, then potential lenders may not be able to consider the CER revenue as collateral, and its value in leveraging further finance will be greatly reduced. Similarly for the Buyer, ability to give a secondary buyer the right to take direct delivery of the CERs will be important. The Buyer will also wish to ensure that the Seller cooperates in adding any secondary buyer as an additional Project Participant (see Article 3.8).

Further, if Buyer is able to assign its rights under the ERPA to a financially weaker organisation, this would represent a significant fall in the value of the ERPA. A lender providing money to the Project will place great importance on the financial strength of the Buyer, as this assures the lender of the Buyer's ability to meet their obligations over the long term. It would be wise for the Seller to insist that any replacement counterparty has a financial strength equal to or greater than the original Buyer, according to some objective measure – e.g. financial strength ratings from Standard & Poor's, AM Best or other international ratings agency.

The split of the Share of Proceeds is important as if can affect income by 2 –4% (2% for the Share of Proceeds for adaptation, plus 1-2% in cash fees for the

administrative share of proceeds).

3. CER pricing & terms of sale

This section will examine the main pricing options available, and how these options will affect the Parties' assessment of risk and the unit price. The 2006 ERPA does not include some of the agreement types below, but other sample ERPAs, including IETA 2004 and the World Bank's ERPA do.

3.1 Types of Agreement

The key agreement types seen are spot agreements, future delivery agreements and options. To date, the most common ERPAs seen have been future delivery agreements. The IETA 2006 ERPA was designed for this type of agreement. However, often ERPAs have some option element for CERs produced above the Contract Amount. Spot agreements will become more common as more CDM projects reach maturity.

Type 1: Spot Agreement

Status of CERs:	Issued, ready for delivery
Payment:	Immediate, on delivery
Risk to Buyer:	Negligible
Risk to Seller:	Negligible
Price:	Fixed

The spot agreement is for CERs which have already been issued. Therefore from the Buyer's and Seller's perspective, the risks of non-delivery or non-payment are very low. Prices are fixed.

Type 2: Future Delivery Agreement

Status of CERs:	Non-issued, to be delivered in the future
Payment:	Future, on delivery
OR	Advanced, as project progresses

Risk to Buyer:	Small → large, depending on amount of upfront payment
Risk to Seller:	Small → very large, depending on level of guarantee for delivery
Price:	Various options, including: - fixed - floating - guaranteed floor, with floating element

In this case CERs have not yet been issued. CERs will be issued at some point in the future. Clearly there are risks on both sides, but when payment will be only made on delivery, and the Seller gives no guarantees, the risk to each side is fairly low. There is a risk to both parties that the market will change, the other party will start to see the ERPA as unattractive, and try to renegotiate or terminate the agreement. There is a risk to the Buyer that money is set aside to purchase the CERs and will not be available for productive use for a number of years. In addition, should there be a delivery failure, the Buyer would be obliged to purchase the same volume of CERs from other sources to comply with their reduction target. This may have to be done at a much higher price than in the ERPA in view of the need to buy CERs in a rush and possibly due to a rise in CER prices in the future.

More significant risks are seen if the Buyer provides payment upfront, against future delivery: they risk losing that money if the project fails to perform as planned. However, this risk is mitigated if the Seller gets a bank guarantee before any upfront payment is released. The risk is further mitigated if the Seller is able to show that any upfront payment will be used to complement other financing arrangements to ensure that the Project reaches financial closure.

If the Seller gives strong guarantees for delivery, then this can create a major liability: in the case of failure to deliver, Seller may have to pay penalties to the Buyer, or carry out expensive measures to replace the CERs which it failed to deliver.

Type 3: Options

(a) Call option

Buyer has the right but no obligation to buy CERs at a certain point in the future for a fixed price ("strike price").

Status of CERs:	Non-issued, to be delivered in the future
Payment:	Buyer pays for the CERs on delivery Standalone call option: buyer pays an upfront amount called the "premium" for the option.
Risk to Buyer:	If market price falls below the strike price, then Buyer's premium has been wasted
Risk to Seller:	Need to keep the CERs for the Buyer when there is no assurance that the Buyer will exercise the option and purchase the CERs. Buyer may ask for strong delivery guarantees
Price:	High strike price → low premium paid by Buyer

Clearly this is a highly attractive arrangement for the Buyer. If market prices rise above the strike price, then they will be able to buy below the market price, whereas if market prices fall below the strike price, they can cancel the option and buy from the market instead. In most commodities markets, the Buyer would pay a premium for this kind of option, but in many ERPAs it appears that an option to purchase additional credits (above the minimum delivery amount) is being given away for free, or else is built into the overall CER unit price. Where the Seller provides this option, they should negotiate for a premium payment or as a minimum for a higher unit price for the main delivery quantity of CERs.

It should be noted that sources of project finance (i.e. lenders) cannot consider such call options from buyers as good collateral, because it is entirely the choice of the Buyer whether they wish to exercise the option or not.

(b) Put option

Seller has the right but no obligation to sell at a certain point in the future for a fixed price ("strike price").

Status of CERs:	Non-issued, to be delivered in the future
Payment:	Buyer pays for the CERs on delivery Standalone put option: Seller pays an upfront premium for the option.
Risk to Buyer:	Forced to buy CERs at a price higher than the market
Risk to Seller:	Buyer unable to pay for CERs when the option is exercised
Price:	High strike price → high premium paid by Seller

This is the opposite of the Call Option described above, and is very beneficial for the Seller. Again, in the case of most ERPAs, there will be no specific "Premium" paid for an option of this sort. Rather, the unit price of the main Contract Amount of CERs will be adjusted down to reflect the benefits to Seller of any of these options for additional CERs produced.

(c) Collar option

This is where buyer and seller agree on mutual put and call options. However, such options have not been seen in ERPAs to date, in part because they are seen as complex and difficult to negotiate. In fact, they can be mutually beneficial, because they allow the buyer to put a definite ceiling on future compliance costs; while the seller puts a definite floor on value of the CERs. If the market price at the time of issuance is somewhere between the two strike prices, then both Parties are free to go to the open market to Buy/Sell. A further attraction is that a well-balanced collar option will not require any money to change hands between buyer and seller.

3.2 Types of pricing.

As noted under the future delivery agreement above, the unit price for CERs is usually fixed, floating, or a combination of these.

For the Seller, any assessment of which of these is preferable will depend on the Seller's view of the likely direction of price movements in the market in the future, when compared with the level of the price offer. Therefore it is essential for the Seller to obtain good market information before entering into

negotiations. Potential sources of such market information are given in the Resources section (Annex 2).

An equally important factor in the Seller's choice of the pricing type is their priority. This is essentially whether certainty or upside potential is more important for the CERs in terms of the Seller's overall plans for the Project.

(a) Fixed price

This gives both Buyer and Seller confidence in the value of the CERs to be delivered. Thanks to this certainty about pricing, a fixed-price contract will allow the Seller to incorporate prospective CER revenues more easily into their decision on the Project.

A fixed-price arrangement can also make the ERPA more valuable when the Seller wishes to use the CER revenue to leverage further project finance: a banker may not have a clear understanding of carbon pricing, but if a Buyer has made a clear commitment to a firm price, then the banker can clearly see how much revenue the ERPA represents. However, clearly Buyer can start to see the fixed-price agreement as unattractive if the market collapses, making it possible for them to procure the same volume of CERs at a much lower price than is agreed on in the ERPA. In this case it will be particular important to have a tightly worded ERPA, because it is highly likely that the Buyer will have a big financial incentive to try to renegotiate or terminate the Agreement. If articles or clauses are loosely worded, this makes it easier to escape from the terms of the Agreement. The Seller has more obligations that the Buyer, so it is generally easier for the Buyer to find a loophole.

(b) Floating price

This gives neither Buyer nor Seller a great amount of confidence as to the exact value/cost of the CERs. However, it does give the Buyer the confidence that the risk of the Seller reneging is small even when the market soars. A floating price reassures the Seller that they have a buyer for their CERs, while allowing them to retain upside potential in a bull market.

A floating-price arrangement is no different from a fixed-price contract as regards the risk that CERs will not be delivered due to the failure of the Project

itself or its CDM process. Thus the floating price will usually be discounted from the market indicator, for instance EU ETS prices in the year of delivery. Depending on the assessment of non-delivery risks, prices of 50% - 80% of the indicator are typical. For a floating price, it is extremely important to have a very clear definition of the indicator that will be used: whose EU ETS price will be used, on what date, and for which EUA vintage.

(c) Combination of fixed and floating

This can enable the Seller to secure a minimum price, but also share in any rises in the market value of CERs. In general, a low floor price will enable the Seller to take a greater share in any additional value, whilst with a high floor price, the Buyer will not be willing to give much of a share.

Examples here might be:

Fixed floor price of Eu5 / unit. If EU ETS price is above Eu5, Seller receives 50% of the excess.

Or:

Fixed floor price Eu10/unit. If EU ETS goes above 10, Seller receives 30% of the excess.

4. Some key concerns for the Project Developer

4.1 Termination Clauses

In Section 2.4, the Termination Clause (Article 6) from IETA 2006 was examined briefly. Here we look at this clause in more detail.

(a) Events leading to termination

First it is necessary to consider what events can lead to termination. Some of the events of default in Article 6.1 of IETA 2006 are non-controversial, for example non-payment, making misleading warranties, insolvency of one of the Parties, or loss of Credit Support. Another event of default, failing to perform a material obligation, appears straightforward, but greatly depends on the

definition of “material obligation”. If material obligations include a host of conditions regarding reporting, or the running and operation of the Project, as in IETA 2006, then it can be easy for the Buyer to find a reason to claim that one of these obligations has been broken.

One of the clauses under this section, 6.1.7 contains some extremely vague language. For instance clause 6.1.7(c) states that “If in the reasonable and good faith opinion of the Requesting Party, the ability of the Party or the Party’s Credit Support Provider ... to perform its obligations ... is materially impaired”, then the other Party may claim that a default event has occurred. Essentially one Party to the Agreement could decide, on very subjective grounds, that the other Party is not going to honour the agreement, and then move to Termination. Clause 6.1.7 contains further detailed items related to a fall in the Party’s net worth, and the Party’s earnings to debt ratio. Such items can place constraints on the management of the Seller, and can potentially impose costs if financial reporting and auditing are required above the Seller’s normal standards. The Seller should therefore be careful to consider the implications of such clauses.

Article 6.2 deals with Delivery Failure. The first part of this article differentiates between Delivery Failure which occurred through no fault of the Seller - for example where a law changed making participation in CDM illegal, or an event of Force Majeure.

Article 6.4 deals with Force Majeure (FM): getting the right definition of FM can be difficult. On the one hand a broad definition of FM events can reassure the Seller that they will not be held responsible if the Project fails due to events beyond their control. However, this may leave the Buyer in a position to terminate the Agreement even though the Seller is still in a position to deliver the CERs. Therefore the FM clauses need to remove responsibility from the Seller when it has become impossible for them to meet their obligations, but not allow the Buyer to use adverse conditions as an excuse to terminate the Agreement.

The definitions of default are just as important as the consequences, which are outlined below.

(b) Consequences of Termination

In IETA 2006 there are a number of potential consequences, including (in order from least to most severe):

- Seller and Buyer agree a new delivery schedule.
- The Agreement is terminated without any penalty payments.
- The Agreement is terminated, but the Seller pays partial Buyer's Market Damages.
- The Seller find replacement CERs to make up for any delivery failure.
- The Agreement is terminated, and the Seller pays full Buyer's Market Damages.

In IETA 2006, depending on the options selected, it is possible that full Buyer's Market Damages may have to be paid, even if the Agreement is terminated due to an incident of Force Majeure. This would be a highly unusual condition to impose in most commercial agreements.

Buyer's Market Damages represents the amount that the Buyer would have to pay to replace the CERs which the Seller fails to deliver. This can include not only the current year's delivery quantity, but also the full amount of CERs to be delivered under the ERPA in later years.

Other ERPAs also include similar potential penalties for the Seller in case of delivery failure, sometimes known as "Restitution costs". IETA 2004 allowed the Seller to choose between delivering replacement credits, or paying for the Buyer to purchase replacement credits, but clearly both of these options are highly unattractive to the Seller.

In IETA 2006, these consequences are mainly dealt with in Article 6.6, but also in Article 6.2.2/3. Options available to the Buyer include:

- [6.2.2(a)] to receive Replacement CERs from the Seller to make up a shortfall, or to use "reasonable endeavours" [6.2.3] to renegotiate a new delivery schedule. If such reasonable endeavours fail, then Buyer may ask for Market Damages, or terminate the Agreement.

- [6.6.1-7] depending on the nature of termination, damages / penalties may or may not be payable.

The consequences of termination, and wording for describing the potential penalties payable by the Seller can differ greatly from one ERPA to another. It is essential for the Seller to gain a clear understanding of whether penalties will be payable if:

1. Seller commits gross negligence or willful misconduct
2. The project is poorly implemented and fails to deliver the expected level of CERs
3. The project is correctly implemented but still fails to deliver the expected level of CERs, due to, e.g. low rainfall or wind levels (hydro/wind projects), lack of availability of other project inputs (natural gas, biomass projects).
4. The project fails to deliver the CERs due to an occurrence of force majeure, e.g. natural catastrophe, coup d'etat.

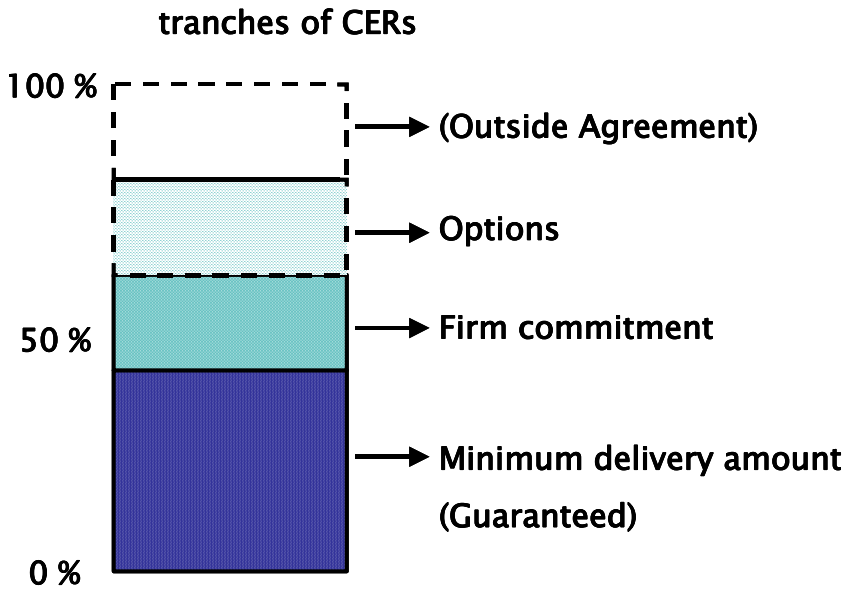
A well-organised project developer may wish to give guarantees for 1. and 2, but only in order to get a higher price for the CERs. Point 3. above can be solved by only guaranteeing a relatively small portion of the CERs (see (c) below). It is highly unusual for guarantees to be enforceable even in the event of an occurrence of force majeure.

(c) Avoiding penalty payments

Of course, the best way of avoiding penalty payments is to negotiate an ERPA which removes penalties for non-delivery. However, this may not be possible. For instance, if market conditions favour the Buyer, the Seller may be willing to accept harsher conditions to obtain a favourable price; or even in a Seller's market, the Seller may determine that a higher price can be obtained for the CERs if a delivery guarantee is provided. Alternatively, when the Buyer is going to pay for some of the CERs upfront to cover project investment costs, there may be strong grounds for the Buyer to ask for a guarantee on that portion of the CERs. If a guarantee of any level is given, the Seller should ensure they have a cushion, that the number of CERs for guaranteed delivery is significantly less than the estimated amount of CERs to be produced. One option may be to agree a delivery amount, but to have a Minimum Amount which is less than this – for example to have a Contract Quantity at 75% or more of the Project's

estimated CERs, but only guarantee delivery for 30% in the first year, possibly 50% or more from the second year (project performance is usually more unpredictable in the first year).

The table below shows how the tranches of CERs from a project may be sold with different levels of commitment.



It may be helpful for the Project Developer to make a clear diagrammatic representation of all commitments made with the CERs, and to make different diagrams for different scenarios – what will happen if the project only produces 90% of the estimated CERs, or 75% or even 40%? Or what if the Project produces more CERs than expected? There may also be other payments and obligations that reduce the net amount of CERs available for delivery– for example the Share of Proceeds for Adaptation, or fees for a consultant or broker.

4.2 Clauses from other ERPAs

EU ETS penalties

"The Project Entity shall indemnify the Buyer for any additional liabilities incurred as a result of a Production Failure or Transfer Failure."

If there is a delivery failure, it is possible that the Buyer will subsequently have to pay further penalties to a 3rd party – e.g. the Eu40 (Phase I) or Eu100 (Phase II) fine per tonne for failure to comply with the EU ETS target. The above clause makes it possible for the Buyer to pass these costs on to the Seller. This

would clearly be a massive cost for the Seller.

Assignment

"The Buyer may assign all or a part of its rights ... under this Agreement at any time to any one or more parties." At the same time, 15.05(a) insists that the Seller cannot assign any of its rights to another party without the Buyer's consent.

This is very unbalanced: when the Seller is selecting a Buyer, an important factor will be the financial standing of the Buyer, because the ERPA is a long term commitment. Such a clause will make the ERPA much less attractive to potential lenders. If Buyer wants to have the right to assign the agreement without the Seller's permission, then this should only be possible when the new Buyer has a financial strength equal to or greater than the original Buyer's (see also Section 2.4, Article 8.

Advanced payment:

"The advanced payment shall be credited against the first payment(s) to be made by Buyer in consideration for the Emission Reductions delivered until the total amount of the advance payment has been taken into account"

Where the Buyer has made an advanced payment, they will want to receive theCERs as soon as possible. However, the Seller should be aware that it will not get any further income from CERs until the project has been operating for several years. This repayment of the advanced payment may also include any "Additional Emission Reductions" which would not otherwise be delivered to the Buyer.

Reporting:

"Seller shall notify to Buyer any incident that may delay, endanger or render impossible the implementation of the Project and any circumstances leading to a change of the Project."

The language here is very vague, making it easy for the Buyer to claim a breach of the Agreement.

"Seller shall at all times keep Buyer informed of any support such as furtherances applied for or granted with regard to the Project."

This is a more specific reporting requirement and clearly related to the original

requirement of the Buyer to have financial closure as a Condition Precedent, so may be more acceptable.

Costs to be deducted from Buyer's payments to the Seller

The Buyer will deduct from its payments to the Seller costs related to:

(i) *[Begin quote]* the initial Project assessment including the environmental, social, financial and legal due diligence costs, and Project review and appraisal costs;

(ii) the preparation or review of the Project Documents and the CDM Operations Plan;

(iii) Validation of the Project Activity; and

(iv) preparation and execution of the ERPA; *[end quote]*

First, be wary of costs which are outside of your control. The Seller should ensure that there are clear limits on any costs accepted, particularly when payment is simply to be deducted from money paid. But a broader point is, what costs should the Seller be prepared to accept? Point (i) above is the Buyer's due diligence cost incurred when deciding whether or not to take part in the Project. Similarly (iv) is the Buyer's costs for negotiating the ERPA. It would be highly unusual in most areas of business for such costs to be passed on directly to the Seller. With respect to costs associated to preparation of a PDD and Validation,the Seller would be well-advised to clearly differentiate between the Buyer absorbing them and the Buyer advancing them. The latter entitles the Buyer to deduct the costs from their payment to the Seller while the former does not. If the Seller's understanding is absorption, it is important to make sure that the ERPA is not worded as the Buyer merely advancing the costs.

5. Balancing risk, price and contractual terms

5.1 Country risks

Often Buyers have a very high perception of country risk. The Seller's perception of this risk may be lower, as the host country is their everyday operating environment. While country risks are more relevant for upfront payment deals, they are also evaluated carefully by the buyer even when payment for CERs will only be made on delivery. This is because country risks are an important element to affect the prospects of delivery failure.

Country risks can include:

- Changes in laws.

  Reversal of liberalization policies in the power industry could have a negative effect on renewable projects. Changes in waste management legislation may affect the additionality of LFG projects. The imposition of taxes on CERs may reduce the number of CERs available for delivery, necessitating a change to the delivery schedule. Any of these will of course have a negative impact on the project developer, as well as a prospective Buyer.

- Failure to receive DNA approval

  Some countries have a well-established process for assessing and approving projects, but others either have not yet established a DNA or the DNA is not functioning in a transparent manner. There are many potential CDM projects in Thailand, and one EU country has invested significantly in Thai projects, but Thailand still has no official process for giving DNA approval. Other countries have rigid standards which, while good for ensuring the sustainability and environmental integrity of projects, can be seen as a risk factor by outside investors.

- Currency fluctuation

  Most ERPA transactions seen to date have been denominated either in US Dollars or in Euros. Some Yen denominated transactions are starting to be seen, involving the Japanese government. Generally this means that the Seller is taking on a currency risk, as any payment received will ultimately have to be converted into the Seller's currency. In some cases, where the Seller's currency has a history of depreciation, this may be a positive risk, increasing the value of the payments, but in a rapidly growing economy, with a strengthening currency the opposite will be the case.

How can these country risks be mitigated?

- Political risk insurance is possible, although it can be expensive. This type

of insurance is usually easier for the Buyer to obtain. Political risk insurance from private insurers will almost certainly add a significant cost to the deal, which will inevitably be passed on to the Seller. However, in some cases government-backed insurance is available, through export credit agencies, for example. In this case the cost to the Buyer should be far less.

- In general, failure to obtain DNA approval is an insurmountable barrier to a CDM project. Some early ERPAs allowed the project developer to deliver Verified Emission Reductions, in case of failure for the Kyoto Protocol to come into force. However, now that the CDM system is up and running, this option is not being included in most ERPAs, and most Buyers will want the Seller to accept this risk. A good knowledge of the workings of the Host country DNA is therefore essential for the Seller to ensure timely approval for their Project.
- As discussed above, the currency risk will usually be taken on by the Seller. For most sellers, this is not a problem as their base currency tends to depreciate against international currencies. For those sellers with appreciating base currency, it may be possible to purchase currency options or use other financial tools to reduce the risk from this source. However, without proper knowledge of the functioning of these tools, their use can lead to increased, rather than reduced risk.

5.2 General project risks

These are the type of risk that will affect any project, but often in the case of CDM projects, risk in this area is heightened by the use of new technology, or at least the use of technology with which the project developer is not familiar.

Some of the key risks under this category include:

- "Acts of God" – natural catastrophes such as earthquake and typhoon risk, accidental fire or explosion.
- Project under-performance. This could be due to technical failure, poor operational procedures or external factors such as low rainfall for a hydro project, lower than average winds for a wind project.
- Market risks. The cost of key inputs to the project could increase, for instance a coal to natural gas fuel switch project would be severely affected

by an increase in gas prices. A waste heat boiler project would be affected if the main product of the plant falls in price, leading to production cuts and a smaller amount of waste heat available for the boiler.

- Cost overruns can also be a significant issue when installing new technology, particularly when maintenance engineers and spare parts have to be brought in from overseas.

There are ways to mitigate most of these risks, at least to some extent.

- The more predictable accidental risks like fire can be insured quite readily. Often an ERPA will stipulate that the Seller must have insurance in place in line with standard industry practices. Insurance cover is available against natural perils, although it may be costly in hurricane zones or areas with high levels of seismic activity.
- The project developer's internal risk management systems will be the first line of defence against project under-performance. Gaining certification in recognised international standards, for instance ISO, will give the project developer greater credibility, and reassure the Buyer that mechanisms can be put in place to ensure adequate project performance.
- In terms of performance of new technology, if the Seller gives any CER delivery guarantees to the Buyer, then Seller should ensure that the provider of the technology gives performance guarantees. If the technology provider cannot provide such guarantees, then Seller should be wary of guaranteeing CER delivery. Often the technology provider will be able to obtain insurance to cover the risk of equipment failure, or to cover potential penalties for delays in installation or business interruption.
- The risk of increasing price of inputs can be hedged to some extent by buying options on the futures market for any key inputs to a project. However, as with currency hedges, this will probably not be attempted unless the project developer has some expertise in this area.

5.3 CDM Risks

Now that the CDM process is firmly established, many market participants are in a stronger position to judge the risks associated with issues such as project registration and CER issuance volumes. However, there are still risks specific

to CDM projects, for example:

- What will happen after 2012? Does the ERPA cover this?
- Failure to register the project may conflict with a Condition Precedent.
- Monitoring difficulties can lead to delays in the issuance of CERs, and to a reduction in the number of CERs received. Many project developers are distracted by the need to move quickly to CDM Registration, and overlook the importance of having a robust monitoring plan in place. Once a project is registered it becomes difficult to amend the monitoring plan. Some registered projects have been issued with much smaller quantities of CERs than was anticipated due to difficulties complying with the monitoring plan – this is particularly the case with some methane extraction projects in Latin America.
- Legal disputes of the CERs can delay projects, and interfere with the warranties made in the ERPA by the Seller. Many Buyers will want to exit from the Project if there is a possibility of being caught up in legal action between different claimants to the CERs. This can be particularly problematic when there are a number of parties involved in projects. The example often quoted is of the landfill gas recovery projects where there were landowners, leaseholders, site operators, LFG project developers and a municipal authority who all potentially had a legal claim to the CERs. Most legal systems are not well-equipped to deal with the issue of legal title of carbon assets, so resolving such problems could be time-consuming and expensive.

Reduction of these risks will be essential to successfully benefiting from the CDM. In particular the risk of monitoring failure can be greatly reduced by taking appropriate preparatory measures. A separate Monitoring Manual, produced for DENR as part of this JICA project is also available from DENR. However, a key consideration when negotiating an ERPA is that the delivery schedule should have a built-in cushion, both in the delivery date, and the delivery volumes, to give the Seller some breathing space if there are any teething troubles with monitoring, or if the Registration process takes longer than expected.

Clearly also, any warranties made by the Seller regarding ownership, should be

tightly adhered to. First, there may be 3rd parties who potentially have a claim on the CERs, but do not yet know about CDM: as CDM becomes better known, these people will hear about the Project, and will come forward to claim their share of the income. Second, the Seller may have promised small shares of the CERs to other parties in return for some service. In both of these cases, the Buyer can use this situation as a reason for canceling the agreement, on the grounds that the Seller has broken one of the central warranties. Any such issues should be settled before signing an ERPA, or highlighted to the Buyer, so that the ERPA can take account of them.

5.4 Project Entity Risks

Credit risk will be a major disincentive when Buyers consider paying upfront cash for CERs, or making a direct investment into a CDM project. However, the nature of project entity risk can be broken down further:

- Motivation: if a project developer receives a large upfront payment for CERs from the Project, they may feel that there is little incentive to complete the project as planned. At the very least, the urgency in setting up effective monitoring systems and assuring issuance of the CERs may become lower.
- Credibility (non-financial aspects): investors operating in an unfamiliar environment may have difficulty in distinguishing reliable operators, or small companies with good potential, from less reliable counterparties.
- Lack of know-how, technologies, skills and resources
- Operation risk
- Financial risk (credibility)

In order to keep their transaction costs low, many buyers will prefer to take a default negotiating position that Project Entity Risk factors are high, and price their buy offers accordingly. Alternatively, in order to enable advance payment for credits, the Buyer may ask the Seller to provide a bank guarantee. This means that it will be the bank who does a detailed analysis of the Project Entity's counterparty risk, rather than the Buyer. Such a guarantee will usually have to be from an established bank, with a high credit rating and a branch in the EU.

Further mitigation strategies can include:

- Having transparent information available to show the size and experience of your organisation can reduce Buyer's perception of risk.
- Reaching financial closure for your project before entering negotiations will be a boost to your credibility, and put you in a much stronger negotiating position.
- As with general project risks above, gaining certification in internationally recognised standards can help to demonstrate your organisation's competence.

5.5 Division of the risks and benefits

In order to maximise the overall benefits to both parties from the Agreement, it is a general principle that the various risks should be shouldered by the Party which has the most control over the outcome of those risks. For example, the Seller has most control over the Project's monitoring, so the Seller may take on the risk in event of a monitoring failure. However, for some events neither Party has any significant influence: for example if the government of the Host country is overthrown and a new government renationalizes the power industry. In this case, one party may have better access than the other to risk mitigation tools. For example, the Annex 1 Buyer may be able to obtain political risk insurance from an Export Credit Agency, or some similar government backed insurance scheme. This means that the Buyer may be able to assume the risk from political force majeure events for a relatively low cost. While this cost will be passed on to the Seller (in the form of a lower unit price), this may still be better for the Seller than simply taking on this risk without any mitigation.

Some Buyer countries, like the UK, are eager to boost business with CDM host countries. They produce and make public information dealing with potential government risk mitigation measures. This can help the Seller to decide whether to shoulder political risk for themselves, or to negotiate with the Buyer to take on this risk.

When entering ERPA negotiations, it is essential for the Seller to develop a clear understanding of the various risks involved, to decide which it can and cannot take on, and calculate how the Buyer will factor in any non-covered risks in its offer price. In a sense, once the balance of risks and price have been agreed on,

then the ERPA negotiation simply becomes a matter of ensuring that the wording of the ERPA is an accurate reflection of this agreement.

6. Approaches to negotiating an ERPA

6.1 Whose standard agreement?

In general it is an advantage to have your own standard agreement from which to start any contractual negotiations: generals in the military always prefer to choose their own battlefield. However, in practice most project developers are only working with a small number of projects, and do not have the time or resources to create and become familiar with their own standard ERPA. They usually therefore end up negotiating with the Buyer's standard ERPA. The Buyer can gain an advantage by having a clearer understanding of the workings of their standard ERPA, and the ability to easily figure out what the benefits / drawbacks will be from any small change in the wording. Therefore in the initial stages of contract negotiation, the Seller should try their utmost to have a Standard ERPA with which they are familiar used as the starting point for negotiations. We recommend starting with the IETA ERPA, of which we provide a copy in Annex 1 of this manual, and adapting it to the Seller's needs.

6.2 Simple negotiating principles

The first steps in a contract negotiation are extremely important. It is much easier to ask for wholesale changes to the draft agreement at an early stage of the negotiation. It is also easier to ask for clarifications at the beginning.
When faced with a new Agreement, or with a request for extensive changes from the other party, the first stage should be to read through the entire contract carefully and in detail. It is tempting to skip sections like the Definitions, Confidentiality, Communication, and so on, but small changes to any part of the Agreement can create new liabilities or loopholes which may be regretted later. So, after reading the draft, if there is anything that is not clear, find out what it means. A legal adviser may be able to assist you in reaching a clear understanding of the terms and conditions, but often this is not possible at the early stages of negotiation for two reasons: first, the legal adviser may not be familiar with carbon trading, and will not be able to give appropriate advice;

second, working with a lawyer right through the negotiations may not be possible due to financial constraints. One approach is to ask the Buyer to clarify any terms or clauses which do not make sense. If their explanation does not make sense, or the clause seems superfluous, then insist that it be removed or changed. Of course, it helps if you are able to suggest an alternative wording, which meets with the needs of both yourself and the Buyer.

Ideally, though, if you have a legal adviser, ask for their advice, at minimum, at the start of negotiations, and again when negotiations are close to reaching their conclusion.

7. Conclusions

Whilst the Buyer will often have greater resources when negotiating an ERPA, there are certain actions that a Seller can take to improve the balance, including:

- exercise great caution before signing. Make sure you have a clear understanding of the whole Agreement
- gain knowledge about the market, both for pricing and for terms and conditions.
- find a standard agreement you can familiarise yourself with: study it in detail and adapt it to your needs.
- use conservative CER estimates: if you generate an excess, then great. These can be sold on the spot market for a higher price.
- Closely assess the risks faced by both sides. Do the risks accepted by the Buyer justify any discount against spot market prices?
- Ensure that any liabilities you take on (delivery guarantees, penalties) are balanced by the benefits you gain.
- Do not ignore the possibility that the project will not perform as planned.

... and finally:

- be patient: these negotiations can and often do take time. Don't be pressured into making hasty decision.
- be confident: this is no different from any other kind of business.