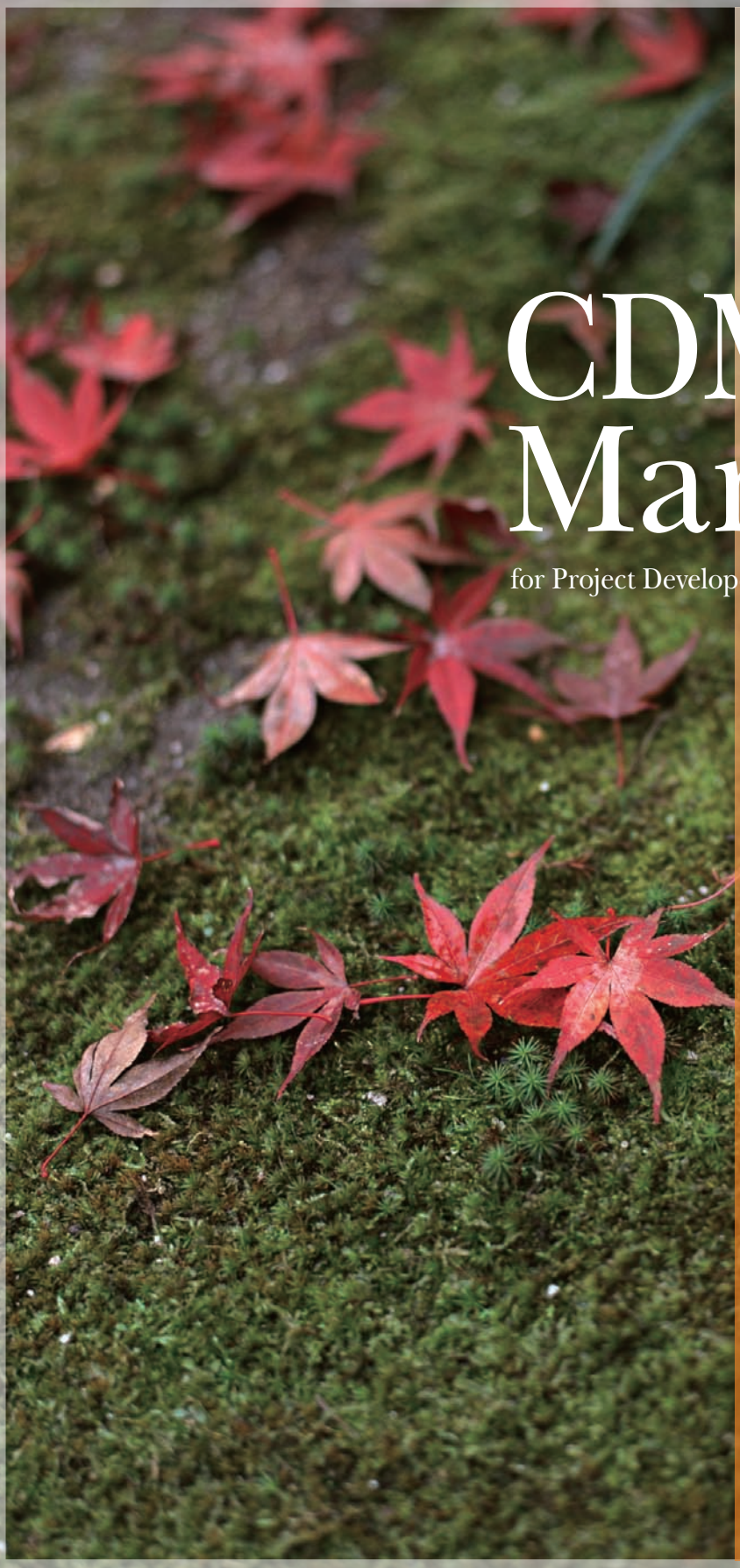

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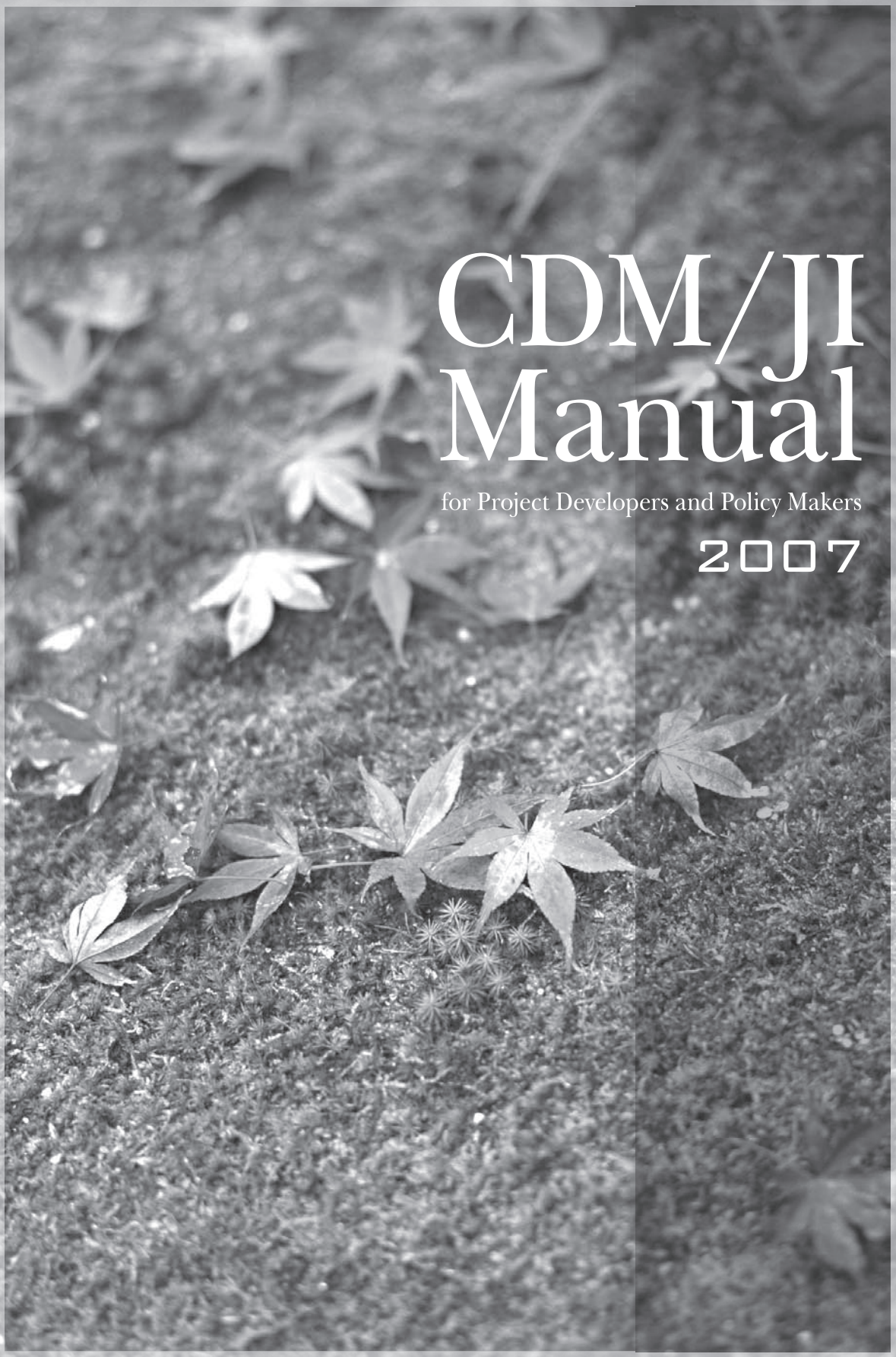

CDM/JI Manual

for Project Developers and Policy Makers

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Preface

The Kyoto Protocol, which was adopted at the third Conference of the Parties (COP3) to the United Nations Framework Convention on Climate Change (UNFCCC) held in December 1997, came into force in February 2005. In order to assist the Parties to achieve their GHG emission reduction targets, the Protocol defines three innovative "flexibility mechanisms" to lower the overall costs to meet the targets. These mechanisms are comprised of the Clean Development Mechanism (CDM), Joint Implementation (JI) and International Emissions Trading (IET). Japan, taking into consideration the use of those mechanisms, plans to advance its emissions reduction activities.

Since 1999, the Ministry of the Environment, Japan (MOE) has been supporting feasibility studies on CDM and JI projects carried out by Japanese private companies and NGOs. Those studies are to accumulate know-how and experience on project findings and related rules both international and domestic, with an aim of finding promising projects. Global Environment Centre Foundation (GEC) has been managing the CDM/JI Feasibility Study Programme as the secretariat.

As the CDM/JI related rules and procedures are rapidly evolving and getting more and more complex, there has been growing demand for a comprehensive guide for the CDM/JI, both in Annex I Parties and non-Annex I Parties. Eyeing the entry into force of the Kyoto Protocol in February 2005, MOE and GEC responded to this demand by releasing the first version of the CDM Manual in December 2004 that aimed at being a comprehensive guide for a wide range of stakeholders to further promote CDM project activities.

The COP/MOP1 officially adopted the Marrakesh Accords, including the CDM Modalities and Procedures and the JI Guidelines, as well as recognised the endeavours that the CDM Executive Board (EB) had undertaken. Moreover, the JI Supervisory Committee (JISC) was officially established, and started to work from its 1st meeting in February 2006. JI-related rules are also rapidly being formulated referencing the EB efforts and CDM related rules, where appropriate. Under these circumstances, we are pleased to release the CDM/JI Manual 2007, with the technical assistance of Pacific Consultants Co., Ltd (Chapter 1-4 and 6), and Det Norske Veritas AS (Chapter 5).

We hope this manual will be of help to many CDM/JI project developers and policy makers and thus would contribute to the implementation of high-quality CDM/JI projects worldwide.

Ministry of the Environment, Japan (MOE)

This CDM/JI Manual 2007 is updated to the results of the EB35 (19 October 2007) and the JISC08 (19 October 2007). For the most recent versions of the references please visit the UNFCCC website: <http://unfccc.int/>

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List of Abbreviations

AAU	Assigned Amount Unit
A/R	Afforestation and Reforestation
A/R WG	Afforestation and Reforestation Working Group
ACM	Approved Consolidated Methodology
AIE	Accredited Independent Entity
AE	Applicant Entity
AM	Approved Methodology
CDM	Clean Development Mechanism
CDM-AP	CDM Accreditation Panel
CDM AR M&P	CDM A/R Modalities and Procedures (Decision 19/CP.9, contained in the document FCCC/CP/2003/6/Add.2)
CDM-AT	CDM Assessment Team
CDM M&P	CDM Modalities and Procedures (Decision 17/CP.7, contained in the document FCCC/CP/2001/13/Add.2)
CER	Certified Emission Reduction
COP	Conference of the Parties to the UNFCCC
COP/MOP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CPA	CDM Programme Activity
DFP	Designated Focal Point
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ERU	Emission Reduction Unit
GHG	Greenhouse Gas
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
IET	International Emissions Trading
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
ITL	International Transaction Log
JI	Joint Implementation
JI-AP	Joint Implementation Accreditation Panel
JISC	Joint Implementation Supervisory Committee
lCER	Long-term CER
LULUCF	Land Use, Land-Use Change and Forestry

Meth Panel	Methodologies Panel
NGO	Non-Governmental Organization
NM	New Methodology
NPV	Net Present Value
OE	Operational Entity
PDD	Project Design Document
PFCs	Perfluorocarbons
PoA	Programme of Activities
RIT	Registration and Issuance Team
RMU	Removal Unit
SSC	Small Scale CDM
SSC WG	Small Scale Working Group
SOP	Share of Proceeds
tCER	Temporary CER
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction to CDM

1.1 What is CDM?

1.1.1 Clean Development Mechanism (CDM)

Clean Development Mechanism (CDM) is a mechanism that is based on the provision of Article 12 of the Kyoto Protocol. It is a scheme for greenhouse gas (GHG) emission reduction through cooperation between developed countries (Annex I Parties to the United Nations Framework Convention on Climate Change (UNFCCC)), which are committed to certain GHG emission reduction targets under the Kyoto Protocol, and developing countries (non-Annex I Parties), which do not have any commitments to reduce GHG emissions. The purpose of CDM is to assist to accomplish the GHG reduction targets of developed countries under the Kyoto Protocol, as well as to contribute to sustainable development of non-Annex I Parties (host countries). Under the CDM, Annex I Parties (investing countries) implement projects (e.g. projects of landfill gas (methane) recovery with power generation) resulting in reduction of greenhouse gas emissions within the territories of non-Annex I Parties. Annex I Parties are able to acquire all or parts of the credits (certified emission reductions (CERs)) which result from the projects. Non-Annex I Parties will benefit from the CDM projects (Figure 1-1).

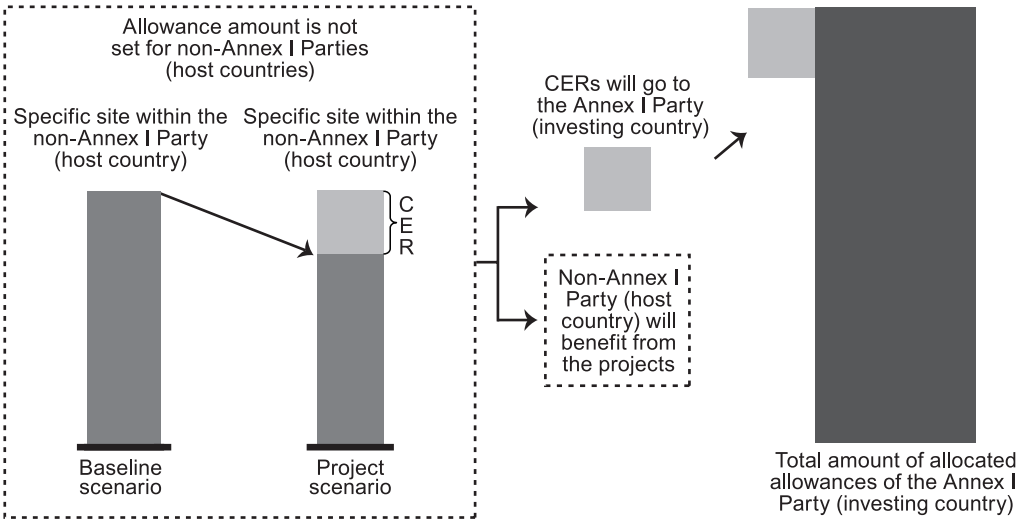


Figure 1-1 Outline of the CDM

Under the CDM, since credits are generated in developing countries that do not have AAUs (Assigned Amount Units[1]), the total amount of permitted emissions in the Annex I Parties increases. The total GHG emissions around the world would increase if CERs would be issued more than actual reductions. Therefore, CDM requires the projects to follow strict procedures set out by the CDM Executive Board (EB) in order to ensure that the amount of CERs is not overestimated. The procedures include a third-party assessment of emission reductions by Designated Operational Entities (DOEs) through processes called validation and verification, and a final approval of project registration and issuance of CERs by the EB. The Kyoto Protocol requires that the DOE shall certify emission reductions on the basis of:

(a) Voluntary participation approved by each Party involved;

(b) Real, measurable, and long-term benefits related to the mitigation of climate change; and

(c) Reductions in emissions that are additional to any that would occur in the absence of the certified project activity.

[Kyoto Protocol, Article 12.5]

1 Credits equivalent to the initial Assigned Amounts of Annex I Parties calculated in a way prescribed in the Kyoto Protocol. AAUs are issued within the national registry of each Annex I Party prior to the First Commitment Period.

CDM is the only Kyoto Protocol mechanism under which credits can be generated starting from year 2000, prior to the Kyoto Protocol First Commitment Period (2008-2012). This is often referred to as "retroactive crediting" (Refer Box 4-3 for details).

1.1.2 Key Concepts of CDM Project

(1) Baseline

Baseline is defined as "the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity" [CDM Modalities and Procedures (CDM M&P)[2], para. 44].

(2) Additionality

The concept of "additionality" is closely related to that of "baseline", and has to be paid particular attention to when setting up a baseline scenario and developing a methodology. It is defined in the CDM M&P that "[A] CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity" [CDM M&P, para. 43].

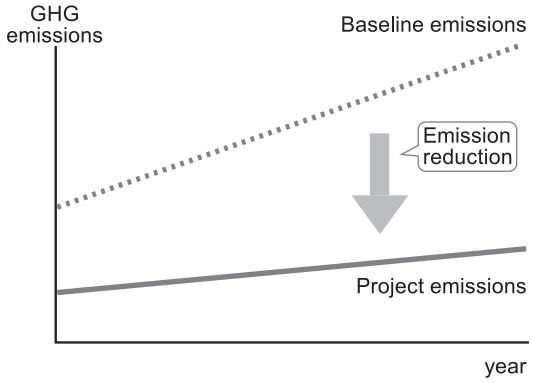


Figure 1-2 Concept of "additionality"

The EB at its 10th meeting provided four options as examples of tools that may be used to demonstrate that a project is additional and therefore not the baseline scenario including, among others:

(a) A flow-chart or series of questions that lead to a narrowing of potential baseline options; and/or
(b) A qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely; and/or
(c) A qualitative or quantitative assessment of one or more barriers facing the proposed project activity (such as those laid out for small scale CDM projects); and/or
(d) An indication that the project type is not common practice (e.g. occurs in less than [<x%] of similar cases) in the proposed area of implementation, and not required by a Party's legislation/regulations.

[EB10, Annex 1]

In addition to this guidance, the EB at its 29th meeting revised the "tool for the demonstration and

2 CDM M&P refers to Decision 3/CMP.1: Modalities and procedures for a clean development mechanism as defined in Article 12 of the Kyoto Protocol, contained in the document FCCC/KP/CMP/2005/8/Add.1, page 6-29.

assessment of additionality" (hereinafter additionality tool) [EB29, Annex 5]. The additionality tool provides a general framework for demonstrating and assessing additionality and is to be applicable to a wide range of project types, though some types may require adjustments. The use of this tool to assess and determine additionality does not replace the need for the baseline methodology to provide for a stepwise approach justifying the selection and determination of the most plausible baseline scenario alternatives. Project participants proposing new baseline methodologies may incorporate this additionality tool, but may also propose other tools for the demonstration of additionality. Project participants can also use the "tool for identification of baseline scenario and demonstration of additionality" (Combined tool) [EB28, Annex 14], which provides a procedure for baseline scenario identification as well as additionality demonstration.

The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its first session (COP/MOP1) confirmed that the use of the additionality tool is not mandatory for project participants, and that in all cases the project participants may propose alternative methods to demonstrate additionality for consideration by the EB, including those cases where the additionality tool is attached to an approved methodologies [Decision 7/CMP.1[3], para. 28].

Detailed descriptions of the additionality tool are found in the Section 4.2.5.

1.2 CDM institutions

The institutions for CDM are depicted in Figure 1-3.

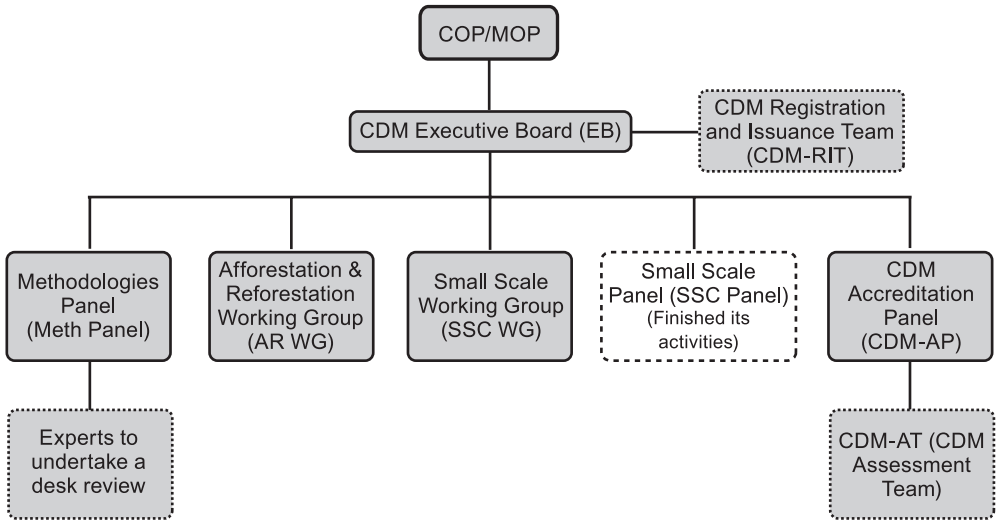


Figure 1-3 CDM institutions

1.2.1 COP/MOP

As the CDM is a mechanism under the Kyoto Protocol, the COP/MOP shall have authority over and provide guidance to the CDM [CDM M&P, para. 2].

3 Decision 7/CMP.1, "Further guidance relating to a clean development mechanism", contained in the document FCCC/KP/CMP/2005/8/Add.1, page 93-99.

1.2.2 Executive Board (EB)

For the actual operation of CDM, the EB is the body that supervises the CDM, under the authority and guidance of the COP/MOP [CDM M&P, para. 5].

The responsibilities of the EB include:

- To approve new methodologies related to, inter alia, baselines, monitoring plans and project boundaries;
- To review provisions with regard to simplified modalities, procedures and the definitions of small scale project activities and make recommendations to the COP/MOP; and
- To be responsible for the accreditation of operational entities, in accordance with accreditation standards, and make recommendations to the COP/MOP for the designation of operational entities. This responsibility includes:
  (i) Decisions on re-accreditation, suspension and withdrawal of accreditation; and
  (ii) Operationalization of accreditation procedures and standards.

The EB is also responsible for:

- Making recommendations to the COP/MOP on further modalities and procedures for the CDM;
- Reviewing the accreditation standards;
- Reporting to the COP/MOP on the regional and subregional distribution of CDM project activities; and
- Developing and maintaining the CDM registry.

The EB comprises of 10 members from Parties to the Kyoto Protocol as follows:

	Member	Alternate
5 United Nations regional groups (1 from each)	5	5
Annex I Parties	2	2
Non-Annex I Parties	2	2
Small island developing States	1	1
Total	10	10

Since the EB held its first meeting in November 2001, it has been holding a meeting every two to three months. Meeting reports, agenda and relevant documents, including webcast of the meetings are available on the CDM website [http://cdm.unfccc.int/EB].

The EB may establish committees, panels or working groups to assist it in the performance of its functions [Decision 3/CMP.1]. The EB shall draw on the expertise necessary to perform its functions, including from the UNFCCC roster of experts. In this context, it shall take fully into account the consideration of regional balance (Rule 32 of the rules of procedures of the EB) [Decision 4/CMP.1]. The EB has thus, so far, established the following panels and working groups:

(1) Methodologies Panel (Meth Panel)

The Methodologies Panel (Meth Panel) was established to develop recommendations to the EB on guidelines for methodologies for baselines and monitoring plans and prepare recommendations on submitted proposals for new baseline and monitoring methodologies. The Meth Panel is composed of 18 members. 2 members of the EB act as Chair and Vice-Chair of the panel, respectively. In

addition to that the panel shall be composed of 15 members [EB30, Annex 3, para. 5]. The EB agreed to increase the membership of the panel to 16 members, by appointing 1 more member [EB33, para. 34].

The Meth Panel:

- Prepares recommendations on submitted proposals for new baseline and monitoring methodologies;
- Prepares draft reformatted versions of proposed new baseline and monitoring methodologies approved by the EB;
- Prepares recommendations on options for expanding the applicability of methodologies and provides tools for project participants to choose among approved methodologies of a similar nature; and
- Maintains a roster of experts and selects experts who are to undertake desk reviews to appraise the validity of the proposed new methodology.

[EB30, Annex 3, para. 2]

Furthermore, the Meth Panel elaborates recommendations for consideration and adoption by the EB on:

- Revisions to the project design document, in particular on sections relevant to baseline and monitoring;
- Draft "decision trees, and other methodological tools, where appropriate, to guide choices in order to ensure that the most appropriate methodologies are selected, taking into account relevant circumstances";
- Guidance on identified modalities and procedures contained in the annex to decision 3/CMP.1 with a view to facilitating the development of project-based methodologies by project participants. Such modalities and procedures shall be identified by the panel and addressed in accordance with guidance provided by the EB;
- Further work on items identified in "Terms of references for establishing guidelines on baselines and monitoring methodologies" [Appendix C of the CDM M&P] as appropriate; and
- Amendments on the annex on indicative simplified methodologies for small scale CDM project activities.

[EB30, Annex 3, para. 3]

Since the Meth Panel held its first meeting in June 2002, it has been holding meetings every two to three months. Meeting reports, agenda and relevant documents are available on the CDM website [http://cdm.unfccc.int/Panels/meth].

A proposed new methodology shall be available to the Meth Panel at least 10 weeks prior to its next meeting [EB32, Annex 13, para. 10]. In case more than 10 proposed new methodologies are submitted by the deadline, the Chair of the Meth Panel can decide to postpone the analysis of some submissions to the subsequent meeting. Submissions received and confirmed to be completed by the secretariat shall be treated on a "first come first served" basis [EB32, Annex 13, para. 11].

(2) Small Scale Panel (SSC Panel)

The small scale panel (SSC Panel) was operational from April 2002 to August 2002 and

recommended draft simplified modalities and procedures for small scale CDM project activities to the EB. The SSC Panel met three times and finished its work with the result of a final recommendation on simplified modalities and procedures for small scale CDM project activities to the EB on its fifth meeting.

(3) Small Scale Working Group (SSC WG)

The small scale working group (SSC WG) was established to prepare recommendations on submitted proposals for new baseline and monitoring methodologies for small scale CDM project activities. The SSC WG is composed of 7 members. 2 members or alternate members of the EB act as Chair and Vice-Chair of the WG, respectively. In addition to that there are 5 members, 2 of whom are members from the panel on baseline and monitoring methodologies [EB23, Annex 20, para. II (3)].

The SSC WG, whose first meeting was held in January 2005, performs the following functions:

- Prepare precise and workable recommendations for consideration and adoption by the EB on submitted proposals for new small scale project activity categories and new simplified baseline and monitoring plans; and
- Prepare, as appropriate, draft revisions for the consideration of the EB of the indicative list of simplified baseline and monitoring methodologies contained in the appendix B of the simplified modalities and procedures for small scale CDM project activities.

[EB23, Annex 20, para. II (1)]

(4) Afforestation and Reforestation Working Group (A/R WG)

The working group on afforestation and reforestation for CDM project activities (A/R WG) was established to prepare recommendations on submitted proposals for new baseline and monitoring methodologies for CDM A/R project activities. The working group is expected to work in cooperation with the Meth Panel. The A/R WG is composed of 10 members. 2 members or alternate members of the EB act as Chair and Vice-Chair of the WG, respectively. In addition to that there are 7 members, 1 of whom is a representative from the Meth Panel [EB23, Annex 14, para. 5]. The EB agreed to further increase the WG by 1 member [EB31, para. 48].

The A/R WG, whose first meeting was held in July 2004, performs the following functions:

- Prepare recommendations on submitted proposals for new baseline and monitoring methodologies for CDM A/R project activities;
- Prepare draft reformatted versions of proposed new baseline and monitoring methodologies for CDM A/R project activities approved by the EB; and
- Prepare recommendations on options for expanding the applicability of methodologies for CDM A/R project activities, if applicable, and develop tools to facilitate the selection of one approved methodology from among those of a similar nature by project participants.

[EB23, Annex 14, para. 2]

(5) CDM Accreditation Panel (CDM-AP)

The CDM Accreditation Panel (CDM-AP) was established to prepare the decision making of the EB in accordance with the procedure [EB34, Annex 1] for accrediting operational entities. The CDM-AP is composed of 9 members. In addition to the designated EB members who act as chair and vice chair, the panel shall be composed of 6 members [EB23, Annex 1, para. 13]. The EB, taking note of the increasing complexities of the methodological and technical aspects of the CDM-AP work, agreed to strengthen the technical capacity of the panel by adding 1 additional

methodological expert to the panel [EB33, para. 16].
The CDM-AP makes recommendations to the EB on accreditation of an Applicant Operational Entity (AOE), suspension of accreditation of a DOE, withdrawal of accreditation of a DOE, and re-accreditation of a DOE [EB23, Annex 1, para. 4]. The CDM-AP also carries out the selection of the members of a CDM accreditation assessment team (CDM-AT) [EB23, Annex 1, para. 5]. A team shall be composed of 1 team leader and at least 2 team members chosen to serve in a team for an assessment at a time [EB09, Annex 1]. The CDM-AT, under the guidance of CDM-AP, undertakes the detailed assessment of the Applicant Entities (AEs) and/or DOEs, identify non-conformities and report to the CDM-AP [EB34, Annex 1, para. 3(d)].

(6) CDM Registration and Issuance Team (CDM-RIT)

The CDM registration and issuance team (CDM-RIT) was established to assist EB by appraising requests for registration of project activities and requests for issuance of CERs. The RIT is composed of not less than 20 members [EB29, Annex 14, para. 7]. The team is chaired by a member of the EB on a rotating basis.
The RIT serves the following purposes:

- To prepare appraisals of requests for registration submitted by DOEs assessing whether the validation requirements are met and/or appropriately dealt with by DOEs;
- To prepare appraisals of requests for issuance of CERs submitted by DOEs assessing whether the verification and certification requirements are met and/or appropriately dealt with by DOEs; and
- Identify general issues related to registration and issuance for consideration by the EB.

[EB29, Annex 14, para. 5]

1.2.3 Designated Operational Entity (DOE)

A designated operational entity (DOE) is either a domestic legal entity or an international organization accredited and designated, on a provisional basis until confirmed by the COP/MOP, by the EB.

A DOE has the following two key functions in the CDM project cycle:

1) Validation: It validates and subsequently requests registration of a proposed CDM project activity which will be considered valid after 8 weeks if no request for review was made; and
2) Verification and Certification: It verifies emission reduction of a registered CDM project activity, certifies as appropriate and requests the EB to issue Certified Emission Reductions (CERs) accordingly. The issuance will be considered final 15 days after the request is made unless a request of review is made.

A DOE can perform either validation or verification and certification on the same CDM project activity. However, upon request, the EB may allow a single DOE to perform all these functions within a single CDM project activity. In case of small scale CDM project activities, the same DOE may undertake validation, and verification and certification.

Sectoral scope(s) of accreditation sets the limits for work which a DOE may perform under the CDM with regard to validation as well as verification and certification related to identified sector(s), and determines the requirements a DOE shall meet in addition to those determined

in Appendix A to the CDM M&P. A list of sectoral scopes, shown in Table 1-1 below, has been prepared based on the list of sectors and sources contained in Annex A of the Kyoto Protocol. The list may be further modified in accordance with the procedural guidelines.

Table 1-1 List of Sectoral Scopes

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

Adapted from: http://cdm.unfccc.int/DOE/scopes.html

As mentioned above, DOEs are designated on a provisional basis by the EB, until the COP/MOP confirms the designation. Table 1-2 shows the DOEs that have been confirmed their designations by the COP/MOP and have been accredited and provisionally designated by the EB before COP/MOP confirmation.

Table 1-2 List of DOEs (as of 12 October 2007)

Ref. Number	Entity Name (short name)	Sectoral scopes for validation	Sectoral scopes for verification and certification
E-0001	Japan Quality Assurance Organization (JQA)	1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13	
E-0002	JACO CDM.,LTD (JACO)	1, 2, 3	1, 2, 3
E-0003	Det Norske Veritas Certification AS (DNV Certification AS)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15	1, 2, 3, 4, 5, 6, 7, 8, 9,10, 11, 12, 13, 15
E-0005	TÜV SÜD Industrie Service GmbH (TÜV-SÜD)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,15	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15
E-0006	Tohmatsu Evaluation and Certification Organization Co., Ltd. (TECO)	1, 2, 3	
E-0007	Japan Consulting Institute (JCI)	1, 2, 13	
E-0009	Bureau Veritas Certification Holding S.A. (BVC Holding S.A.)	1, 2, 3, 4, 5, 6, 7, 10, 11, 12	1, 2, 3
E-0010	SGS United Kingdom Ltd. (SGS)	1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 15	1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 15

Ref. Number	Entity Name (short name)	Sectoral scopes for validation	Sectoral scopes for verification and certification
E-0011	The Korea Energy Management Corporation (KEMCO)	1	
E-0013	TÜV Rheinland Japan Ltd. (TÜV Rheinland)	1, 2, 3, 13	
E-0014	KPMG Sustainability B.V. (KPMG)	1, 2, 3, 13	
E-0018	British Standards Institution (BSI)	1, 2, 3	
E-0021	Spanish Association for Standardisation and Certification (AENOR)	1, 2, 3	1, 2, 3
E-0022	TÜV NORD CERT GmbH (RWTUV)	1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13	1, 2, 3
E-0023	Lloyd's Register Quality Assurance Ltd (LRQA)	1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13	
E-0024	Colombian Institute for Technical Standards and Certification (ICONTEC)		1, 2, 3
E-0025	Korean Foundation for Quality (KFQ)	1, 2, 3	
E-0029	PricewaterhouseCoopers - South Africa (PwC)	1, 2, 3	

Source: http://cdm.unfccc.int/DOE/list

An applicant entity (AE) is an entity which has applied for accreditation by the EB, but has not yet been accredited and designated as a DOE. An AE, in order to be accredited, has to carry out activities witnessed by the CDM-AT related to validation and/or verification and certification. Validation and/or verification and certification activities, witnessed during the accreditation procedure, are considered valid if the AE is successfully accredited by the EB. An AE, for which a CDM-AT has been assigned, may submit proposed new methodologies. An AE must also maintain documentary evidence (e.g. a procedural report) for each new methodology submitted to the EB. The AE once accredited is authorized to function as DOE in the sectoral scope(s) for which the EB agreed to designate. "CDM accreditation procedure" (Version 08) [EB 34, Annex 1] contains the procedure to operationalize the accreditation of operational entities by the EB.

Table 1-3 shows the AEs that have been issued with the indicative letter, excluding the operational entities that have already been confirmed their designations by the COP/MOP and provisionally designated as DOE by the EB, shown in Table 1-2.

Table 1-3 List of AEs issued with Indicative Letter (as of 12 October 2007)

Ref. No.	Entity Name (short name)	Date of issuance
CDM-E-0004	MISUZU Sustainability Certification Co. Ltd (formerly Chuo Aoyama Sustainability Certification Co. Ltd)	23 April 2005
CDM-E-0008	AZSA Sustainability Co., Ltd. (Former ASAHI & Co.)	13 November 2004
CDM-E-0013	TÜV Industrie Service GmbH TÜV Rheinland Group (Former TÜV Anlagentechnik GmbH)	14 June 2004
CDM-E-0020	Conestoga Rovers & Associates Limited (CRA)	25 November 2005
CDM-E-0028	Shin Nihon Environmental and Quality Management Research Institute Co., Ltd (Shin Nihon)	6 September 2006
CDM-E-0030	Nippon Kaiji Kentei Quality Assurance Limited (NKKKQA)	6 September 2006
CDM-E-0031	Perry Johnson Registrars Clean Development Mechanism, Inc. (PJR CDM)	6 September 2006
CDM-E-0032	LGAI Technological Center, S.A. (Applus+ CTC)	15 June 2007

Source: http://cdm.unfccc.int/DOE/ListIL

2. CDM Procedures

2.1 CDM project cycle

The project cycle is common to all CDM project types.

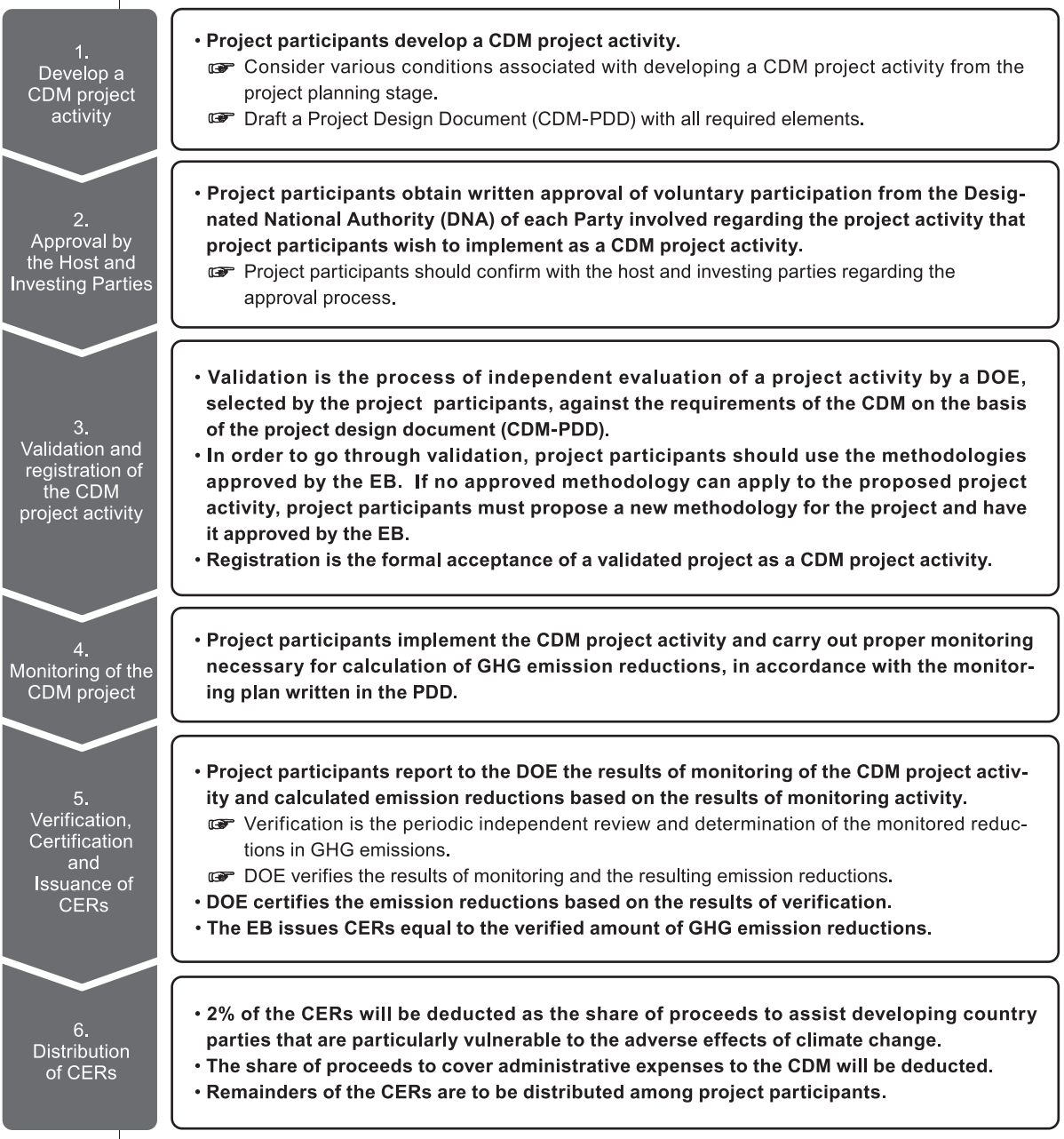


Figure 2-1 CDM project cycle

CDM project activities can be divided into the different types (shown in Table 3-1, Chapter 3) depending on the size and types of activity undertaken. Project participants who wish to develop a CDM project activity should first determine in which of the following categories the project activity would fit, as different modalities and procedures and formats apply to each project type.

Figure 2-2 describes the approval process of an emission reduction project activity and methodologies up to the registration of the project activity as a CDM project activity.

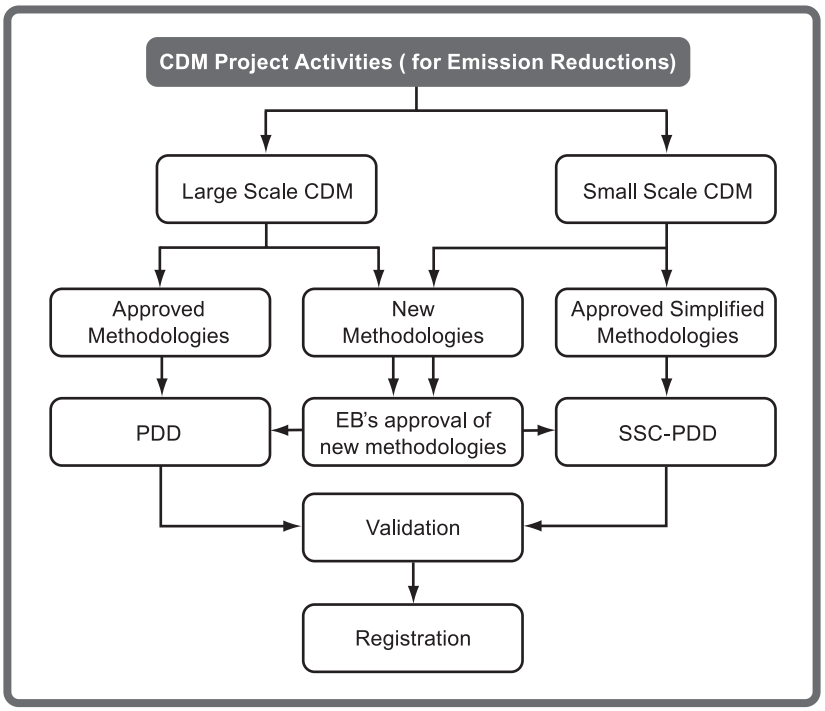


Figure 2-2 Approval process of CDM project activities and methodologies

2.2 CDM project development

2.2.1 Approved Methodologies (AMs)

Once a proposed new methodology (NM) is approved by the EB, it is reformatted and given a number as an approved methodology (e.g. AM0001).

Table 2-1 is the list of approved methodologies. The list of approved methodologies is regularly updated on the CDM website [http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html].

Table 2-1 List of Approved Methodologies (as of 19 October 2007)

Meth. No.	Title and Version Number of Methodology	Scope	Base NMs
AM0001	Incineration of HFC 23 Waste Streams – Version 5.1	11	NM0007-rev
AM0007	Analysis of the least-cost fuel option for seasonally-operating biomass cogeneration plants – Version 1	1, 4	NM0028
AM0009	Recovery and utilization of gas from oil wells that would otherwise be flared – Version 2.1	10	NM0026
AM0013	Avoided methane emissions from organic waste-water treatment – Version 4	13	NM0038-rev NM0085 NM0039
AM0014	Natural gas-based package cogeneration – Version 4	1, 4	NM0018-rev
AM0017	Steam system efficiency improvements by replacing steam traps and returning condensate – Version 2	3	NM0017-rev
AM0018	Steam optimization systems – Version 1.1	3	NM0037-rev
AM0019	Renewable energy project activities replacing part of the electricity production of one single fossil-fuel-fired power plant that stands alone or supplies electricity to a grid, excluding biomass projects – Version 2	1	NM0053

Meth. No.	Title and Version Number of Methodology	Scope	Base NMs
AM0020	Baseline methodology for water pumping efficiency improvements – Version 1	3	NM0042-rev
AM0021	Baseline Methodology for decomposition of N_2O from existing adipic acid production plants – Version 1	5	NM0061
AM0022	Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector – Version 4	13	NM0041-rev2
AM0023	Leak reduction from natural gas pipeline compressor or gate stations – Version 2	10	NM0091
AM0024	Methodology for greenhouse gas reductions through waste heat recovery and utilization for power generation at cement plants – Version 1	1, 4	NM0079-rev
AM0025	Avoided emissions from organic waste through alternative waste treatment processes – Version 9	1, 13	NM0174-rev NM0178 NM0127 NM0090 Replaces: AM0012
AM0026	Methodology for zero-emissions grid-connected electricity generation from renewable sources in Chile or in countries with merit order based dispatch grid – Version 2	1	NM0076-rev
AM0027	Substitution of CO_2 from fossil or mineral origin by CO_2 from renewable sources in the production of inorganic compounds – Version 2.1	5	NM0115
AM0028	Catalytic N_2O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants – Version 4.1	5	NM0111
AM0029	Methodology for Grid Connected Electricity Generation Plants using Natural Gas – Version 1	1	NM0080-rev NM0153
AM0030	PFC emission reductions from anode effect mitigation at primary aluminium smelting facilities – Version 1	9	NM0124-rev
AM0031	Methodology for Bus Rapid Transit Projects – Version 1	7	NM0105-rev
AM0033	Use of non-carbonated calcium sources in the raw mix for cement processing – Version 2	4	NM0123-rev
AM0034	Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants – Version 2	5	NM0143
AM0035	SF_6 Emission Reductions in Electrical Grids – Version 1	1, 11	NM0135
AM0036	Fuel switch from fossil fuels to biomass residues in boilers for heat generation – Version 2	1, 4	NM0140-rev
AM0037	Flare reduction and gas utilization at oil and gas processing facilities – Version 1.1	5, 10	NM0145
AM0038	Methodology for improved electrical energy efficiency of an existing submerged electric arc furnace used for the production of SiMn – Ver. 1	9	NM0146
AM0039	Methane emissions reduction from organic waste water and bioorganic solid waste using co-composting – Version 2	13	NM0147
AM0040	Baseline and monitoring methodology for project activities using alternative raw materials that contain carbonates in clinker manufacturing in cement kilns – Version 1.1	4	NM0163
AM0041	Mitigation of Methane Emissions in the Wood Carbonization Activity for Charcoal Production – Version 1	4	NM0110-rev
AM0042	Grid-connected electricity generation using biomass from newly developed dedicated plantations – Version 1	1, 14	NM0133-rev
AM0043	Leak reduction from a natural gas distribution grid by replacing old cast iron pipes or steel pipes without catholic protection with polyethylene pipes – Version 2	10	NM0151
AM0044	Energy efficiency improvement projects: boiler rehabilitation or replacement in industrial and district heating sectors – Version 1	1	NM0144-rev
AM0045	Grid connection of isolated electricity systems – Version 1.1	1	NM0152-rev
AM0046	Distribution of efficient light bulbs to households – Version 1	3	NM0150-rev
AM0047	Production of biodiesel based on waste oils and/or waste fats from biogenic origin for use as fuel – Version 2	1, 5	NM0180

Meth. No.	Title and Version Number of Methodology	Scope	Base NMs
AM0048	New cogeneration facilities supplying electricity and/or steam to multiple customers and displacing grid/off-grid steam and electricity generation with more carbon-intensive fuels – Version 1	1	NM0141-rev
AM0049	Methodology for gas based energy generation in an industrial facility – Version 1	1, 4	NM0161-rev
AM0050	Feed switch in integrated Ammonia-urea manufacturing industry – Version 1	5	NM0165-rev
AM0051	Secondary catalytic N_2O destruction in nitric acid plants – Version 2	5	NM0176-rev
AM0052	Increased electricity generation from existing hydropower stations through Decision Support System optimization – Version 1	1	NM0186
AM0053	Biogenic methane injection to a natural gas distribution grid – Version 1	1, 5	NM0210
AM0054	Energy efficiency improvement of a boiler by introducing oil/ water emulsion technology – Version 1	1	NM0171
AM0055	Baseline and Monitoring Methodology for the recovery and utilization of waste gas in refinery facilities – Version 1	1, 4	NM0192-rev
AM0056	Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems – Version 1	1	NM0211
AM0057	Avoided emissions from biomass wastes through use as feed stock in pulp and paper production – Version 1	4, 13	NM0220
AM0058	Introduction of a new primary district heating system – Version 1	1	NM0181-rev
AM0059	Reduction in GHGs emission from primary aluminium smelters – Version 1	9	NM0209

Legend for Scope column:

No.	Sectoral Scope	No.	Sectoral Scope	No.	Sectoral Scope
1	Energy industries (renewable-/ non-renewable sources	6	Construction	11	Fugitive emissions from production and consumption of halocarbons and sulphur hexa fluoride
2	Energy Distribution	7	Transport	12	Solvent use
3	Energy demand	8	Mining/ mineral production	13	Waste handling and disposal
4	Manufacturing industries	9	Metal Production	14	Afforestation and reforestation
5	Chemical industries	10	Fugitive emissions from fuels (solid, oil and gas)	15	Agriculture

Note: (i) Number(s) in the Scope column denotes Sectoral Scope Number(s) as indexed in the legend table. (ii) No approved methodology till date for sector numbers: 2, 6, and 12. (iii) A/R CDM is excluded from this classification and categorized separately. (iv) AM0002, AM0003, AM0004, AM0005, AM0006, AM0008, AM0010, AM0011, AM0015, AM0016 and AM0032 have been withdrawn, as they were included into consolidated methodologies. (v) AM0012 is replaced by AM0025 by refining the applicability of AM0012.

2.2.2 Approved Consolidated Methodologies (ACMs)

Upon request by the EB, the Meth Panel drafts consolidated methodologies based on proposed new methodologies and approved methodologies with similar applicability. The approved consolidated methodologies are shown in Table 2-2 below. The list of approved consolidated methodologies is regularly updated on the CDM website [http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html].

An approved methodology, which is covered by a consolidated methodology, continues to remain valid in its own right [EB15, para. 8 (a)]. However, the EB decided to withdraw the following AMs and ACM:

- AM0002, AM0003, AM0010, and AM0011 (replaced with ACM0001)
- AM0004 and AM0015 (replaced with ACM0006),

- AM0005 (replaced with ACM0002),
- AM0006 and AM0016 (replaced with ACM0010),
- AM0008 (replaced with ACM0009),
- AM0012 (replaced with AM0025, whose applicability was refined to be applicable to projects previously covered by AM0012), and
- AM0032 and ACM0004 (replaced with ACM0012).

Although an ACM defines to use the "tool for the demonstration and assessment of additionality (additionality tool)", the COP/MOP1 confirmed that the use of the additionality tool is not mandatory for project participants, and that in all cases the project participants may propose alternative methods to demonstrate additionality for consideration by the EB, including those cases where the additionality tool is attached to an approved methodology. Section 4.2.5 explains the additionality tool in detail.

Table 2-2 List of Approved Consolidated Methodologies (as of 19 October 2007)

Meth. No.	Title and Version Number of Meth.	Scope	Consolidated Sources
ACM0001	Consolidated baseline and monitoring methodology for landfill gas project activities – Version 7	13	Replaces: AM0002 AM0003 AM0010 AM0011
ACM0002	Consolidated methodology for grid-connected electricity generation from renewable sources – Version 6	1	NM0001-rev NM0012-rev NM0023 NM0024-rev NM0030-rev NM0036 NM0043 NM0055 Replaces: AM0005
ACM0003	Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement manufacture – Version 6	4	NM0040 NM0048-rev
ACM0005	Consolidated Methodology for Increasing the Blend in Cement Production – Version 3	4	NM0045-rev2 NM0047-rev NM0095 NM0106
ACM0006	Consolidated methodology for electricity generation from biomass residues – Version 6	1	NM0050-rev NM0081 NM0098 Replaces: AM0004, AM0015
ACM0007	Methodology for conversion from single cycle to combined cycle power generation – Version 2	1	NM0070 NM0078-rev
ACM0008	Consolidated baseline methodology for coal bed methane, coal mine methane and ventilation air methane capture and use for power (electrical or motive) and heat and/or destruction by flaring or catalytic oxidation – Version 4	8, 10	NM0066 NM0075 NM0093 NM0094 NM0102
ACM0009	Consolidated methodology for industrial fuel switching from coal or petroleum fuels to natural gas – Version 3	1, 4	NM0131 NM0132 Replaces: AM0008
ACM0010	Consolidated methodology for GHG emission reductions from manure management systems – Version 3	13, 15	AM0006 AM0016
ACM0011	Consolidated baseline methodology for fuel switching from coal and/or petroleum fuels to natural gas in existing power plants for electricity generation – Version 2	1	NM0200-rev NM0213

Meth. No.	Title and Version Number of Meth.	Scope	Consolidated Sources
ACM0012	Consolidated baseline methodology for GHG emission reductions for waste gas or waste heat or waste pressure based energy system – Version 1	1, 4	NM0155-rev NM0179 NM0192-rev Replaces: ACM0004, AM0032
ACM0013	Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology – Version 1	1	NM0215 NM0217

Legend for Scope column:

No.	Sectoral Scope	No.	Sectoral Scope	No.	Sectoral Scope
1	Energy industries (renewable-/ non-renewable sources	6	Construction	11	Fugitive emissions from production and consumption of halocarbons and sulphur hexa fluoride
2	Energy Distribution	7	Transport	12	Solvent use
3	Energy demand	8	Mining/ mineral production	13	Waste handling and disposal
4	Manufacturing industries	9	Metal Production	14	Afforestation and reforestation
5	Chemical industries	10	Fugitive emissions from fuels (solid, oil and gas)	15	Agriculture

Note: (i) Number(s) in the Scope column denotes Sectoral Scope Number(s) as indexed in the legend table. (ii) No approved methodology till date for sector numbers: 2, 6, and 12. (iii) A/R CDM is excluded from this classification and categorized separately. (iv) ACM0004 has been withdrawn, as it is included into ACM0012.

DOEs have to confirm, in the process of validation, that the baseline and monitoring methodologies used in proposed PDDs comply with requirements pertaining to methodologies approved by the EB.

2.2.3 Applicability of approved methodologies

The methodologies (AMs) and consolidated methodologies (ACMs) approved by the EB as of the results of EB35 (19 October 2007) are listed in Table 2-1 and Table 2-2. Project participants who wish to apply an approved methodology to their project activity must check the applicability conditions of AMs and ACMs. Project participants should be aware that the DOE will check the applicability of the selected approved methodology to the proposed project activity during the process of validation.

2.2.4 Proposal of a new baseline and monitoring methodology (NM)

The EB, in its thirty-second meeting, revised the procedures for submission and consideration of a proposed new methodology (NM) [EB32, para. 33]. Figure 2-3 shows the procedures for proposing a new baseline and monitoring methodology. If project participants intend to propose a new baseline and monitoring methodology for consideration and approval by the EB, they should prepare the methodologies forms for baseline and monitoring methodologies (CDM-NM) along with a draft project design document (CDM-PDD) and as a minimum, complete sections A to C, including relevant annexes.

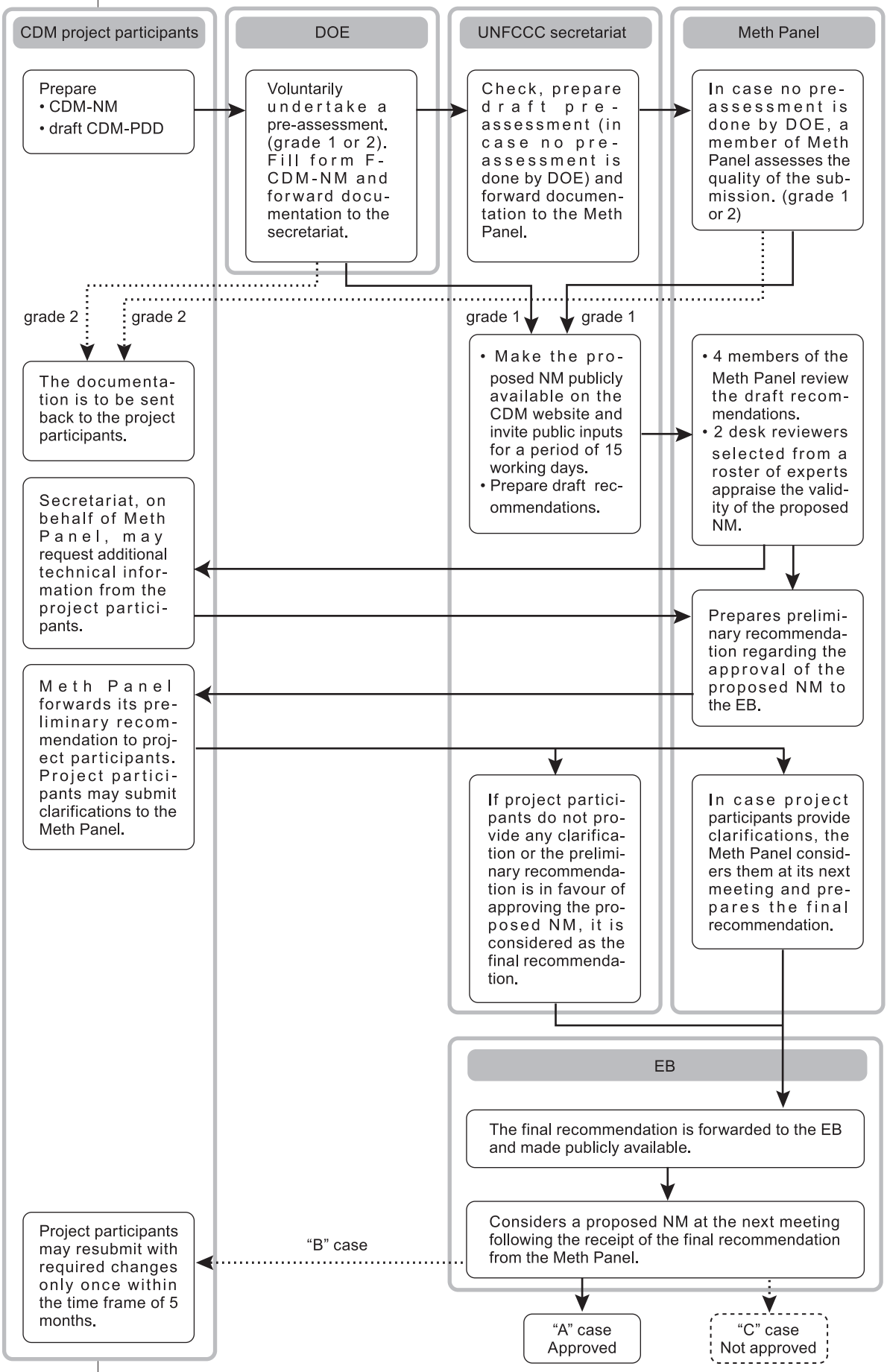


Figure 2-3 Procedures for new methodology submission

A fee of USD 1,000 shall be charged to project participants when submitting a proposed NM for regular project activities (not applicable to methodologies for small scale and afforestation and reforestation project activities). If the proposed NM is approved and the project activity for which it was developed is registered, the registration fee shall be lowered by that amount. [EB32, Annex 13, para. 6]

Project participants should select and contract a DOE/AE for submission of a NM. In case of a DOE, project participants should ensure that the DOE is accredited to perform validation of the sectoral scope of the proposed project activity (refer to Table 1-1 and Table 1-2).

Once project participants submit necessary documentations (CDM-NM and draft CDM-PDD) to the EB through the DOE/AE, a member of the Meth Panel would conduct a pre-assessment of the quality of the submission. Alternatively, the DOE/AE may voluntarily undertake a pre-assessment of a newly proposed methodology before submitting it. In such case, no pre-assessment by the Meth Panel is needed.

If the result of the pre-assessment is satisfactory (grade 1), the proposed NM is made publicly available on the CDM website to invite public inputs for a period of 15 working days. Comments shall be forwarded to the Meth Panel at the moment of receipt and made available to the public at the end of the 15 working days. If the result is unsatisfactory (grade 2), the documentation is sent back to the project participants.

For submissions rated grade 1, after the NM being made publicly available for public inputs, the secretariat shall be responsible for compiling different inputs and prepare draft recommendations for consideration by the Meth Panel. The secretariat may request the project participants to make available additional technical information necessary to further clarify or assist in analyzing the proposed NM with a deadline for responding. 4 members of the Meth Panel shall independently review the draft recommendation prepared by the secretariat.

The Chair and the Vice-Chair of the Meth Panel, with the assistance of the secretariat and in consultation with the 4 selected Meth Panel members, shall, no later than 7 working days after the receipt of the proposed NM, select 2 experts from a roster of experts who are to undertake a desk review to appraise the validity of the proposed NM. The 2 reviewers should provide inputs independently.

The Meth Panel, taking into consideration public comments and the recommendations by the desk reviewers, shall prepare a preliminary recommendation regarding the approval of the proposed NM and forward it to project participants through the secretariat. After the receipt of the preliminary recommendation of the Meth Panel by the project participants, the project participants may submit clarifications to the Meth Panel, through the secretariat, on technical issues concerning the proposed NM raised in the preliminary recommendation by the Meth Panel, within 4 weeks.

If the preliminary recommendation is in favor of approving or not approving the proposed NM, or the project participants do not provide any clarifications, the preliminary recommendation is to be considered as a final recommendation. If project participants provide clarifications, the Meth

Panel shall consider them at its next meeting and prepare its final recommendation to the EB. The Meth Panel, in its recommendation to the EB, rates the proposed new methodology as follows:
(a) To approve the proposed methodology with minor changes ("A" case);
(b) To reconsider the proposed methodology, subject to required changes ("B" case);
(c) Not to approve the proposed methodology ("C" case).

The final recommendation is forwarded to the EB and is made publicly available. The EB shall consider the proposed NM at the next meeting following the receipt of the final recommendation by the Meth Panel.

If the EB considers the case to be re-submitted (so called "B" case), project participants have the opportunity to re-submit the proposal taking into consideration:

- Required changes being made by the project participants, taking into account issues raised by the EB, recommendations made by the Meth Panel, and re-submission of a duly revised proposal. The secretariat shall make the revised proposal publicly available upon receipt;
- Reconsideration of the revised proposal directly by the Meth Panel, without further review by desk reviewers; and
- A recommendation by the Meth Panel being made to the EB.

In the "B" case, a proposed NM may be resubmitted to the EB with required changes only once. If it is not resubmitted within the timeframe of 5 months, it will be considered as withdrawn [EB21, Annex 2].

The EB shall expeditiously, if possible at its next meeting but not later than 4 months after the date of receipt of the proposed NM, review the proposed NM in accordance with the CDM modalities and procedures. Once approved by the EB, it shall make the approved methodology publicly available and the DOE may proceed with the validation of the project activity and submit the CDM-PDD for registration. [EB32, Annex 13, para. 3]

In 2007, the EB modified its process for considering proposed NMs to improve the efficiency of the methodology approval and its consideration by the panels/working groups. The new procedures provide the panels/working groups a more pro-active role in recommending methodologies for approval. The procedures provide for increased dialogue with the project participants to facilitate the methodological approval process. Furthermore, the EB shall only consider the cases put forward by the panels/working groups for approval or non-approval. [EB32, para. 33]

For further details of the submission and approval process, refer "Procedures for the submission and consideration of a proposed new methodology (Version 12)" [EB32, Annex 13] available on the website [http://cdm.unfccc.int/Reference/Procedures/index.html].

2.2.5 Draft of a Project Design Document (CDM-PDD)

Project participants need to draft a project design document (CDM-PDD), which describes the project activity as well as the application of the baseline and monitoring methodology to the

project activity. Project participants should check with the CDM website for the most current version of the CDM-PDD. As of October 2007, CDM-PDD Version 03 is the most recent version. Chapter 4 explains in detail how to fill out the PDD.

2.3 Approval by the Parties involved

The project activities for emission reduction or removal enhancement are required to obtain approvals of the Parties involved before they can be officially registered as CDM project activities. The Parties involved are normally both the host Party and the investing Party(ies), and the CDM project activities need to receive the approval from all Parties involved.

The Party's approval shall be the written approval of voluntary participation which was issued from the designated national authorities (DNAs), including confirmation by the host Party that the project activity assists it in achieving sustainable development [CDM M&P, para. 40 (a)].

The national procedures and process for the Party's approval for CDM projects are decided by each Party. Those procedures could contain the criteria of sustainable development for the Party.

While project participants have to receive written approval by the Parties involved, the timing to receive the approval can be quite flexible: project participants can attach the approval to their PDD on the occasion of the stage of project development, PDD development, or validation. However, the approval shall be attached before the request of the registration of the project activities as CDM. Since some Parties require validation before requesting for approval, project participants should closely check the approval procedures of the Parties involved.

It is possible to register a CDM project activity in which there is no Annex I Party involved. Such project activities are called "unilateral CDM", which means that approval by Annex I Party would not be necessary to register a CDM project activity. Annex I Parties can acquire CERs from a unilateral project activity after submitting a letter of approval regarding the project activity to the EB [EB18, para. 57]. Representatives of holding accounts of entities authorized by non-Annex I Parties to participate in the project activity shall make a request to forward CERs to accounts in national registries in order for an Annex I Party to acquire CERs [EB20, para. 71].

2.4 Validation and registration

2.4.1 Validation

Validation is the process of independent evaluation of a project activity by a DOE against the requirements of the CDM on the basis of the CDM-PDD. Project participants should select and contract a DOE to undertake validation.

The validation and registration process is shown in Figure 2-4.

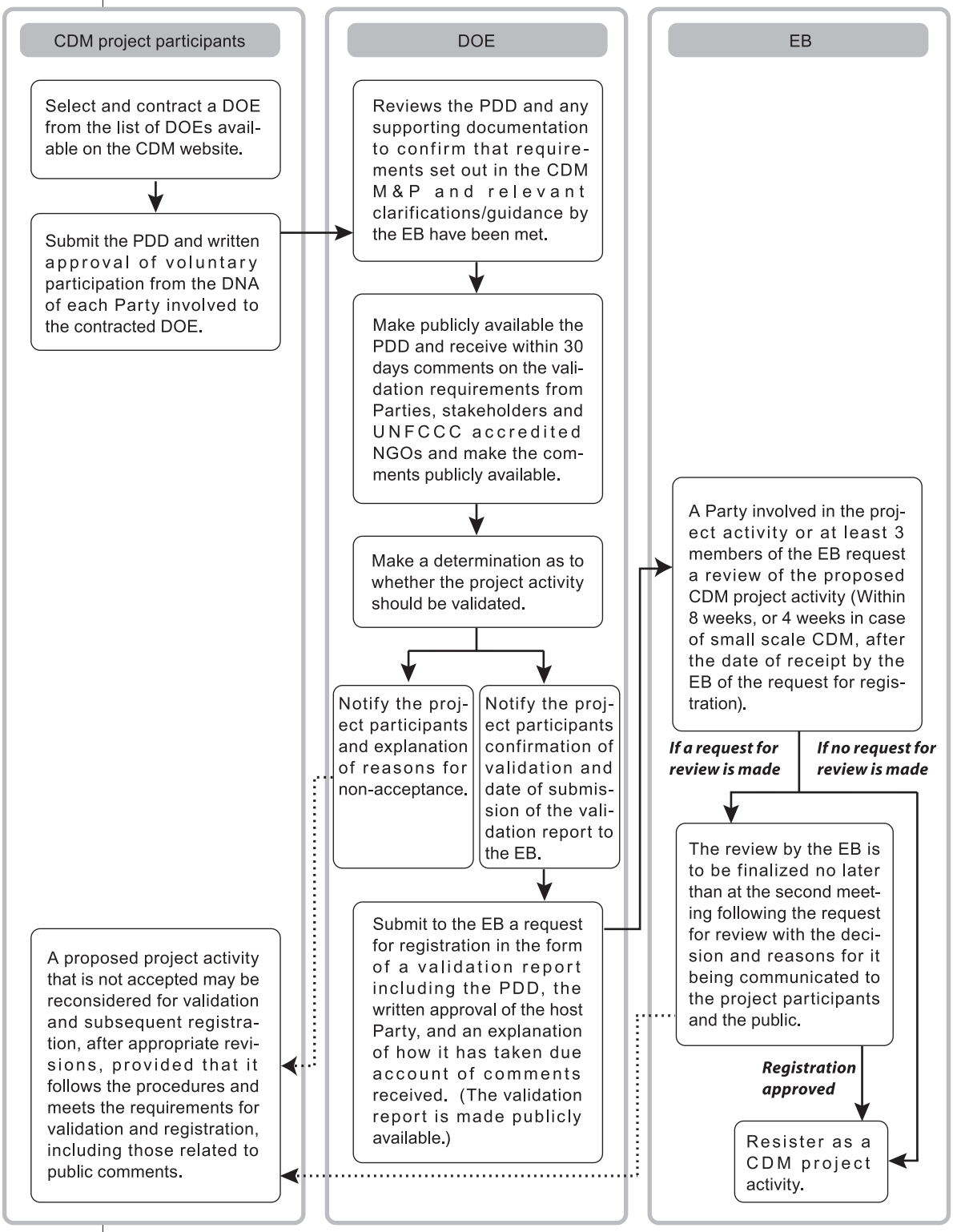


Figure 2-4 Validation and registration procedures

First, project participants submit a CDM-PDD to a DOE, who reviews the CDM-PDD and opens it for public inputs. For the purpose of the local stakeholder review, project participants are requested to describe their project activity in a manner that allows the local stakeholders to understand the project activity. During this review process, DOEs usually draw attention of the project participants to the points in the PDD that need to be clarified and/or improved through Corrective Action Requests (CARs) and Clarifications. In this way, project participants are given

the opportunity to improve the CDM-PDD. After the deadline for receipt of public inputs, the DOE determines whether the proposed project activity should be validated. Once the decision is made, the DOE informs project participants its determination on the validation of the project activity.

The DOE reviews the CDM-PDD and any supporting documentation to confirm that the following validation requirements, as set out in paragraph 37 of the CDM M&P, are met.

(a) The following participation requirements are satisfied;
- Participation in a CDM project activity is voluntary.
- Parties participating in the CDM shall designate a national authority for the CDM.
- A Party not included in Annex I may participate in a CDM project activity if it is a Party to the Kyoto Protocol.

(b) Comments by local stakeholders have been invited, a summary of the comments received has been provided, and a report to the DOE on how due account was taken of any comments has been received;

(c) Project participants have submitted to the DOE documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts and, if those impacts are considered significant by the project participants or the host Party, have undertaken an environmental impact assessment in accordance with procedures as required by the host Party;

(d) The project activity is expected to result in a GHG emission reduction that are additional to any that would occur in the absence of the proposed project activity;

(e) The baseline and monitoring methodologies comply with requirements pertaining to:
  (i) Methodologies previously approved by the EB; or
  (ii) Modalities and procedures for establishing a new methodology;

(f) Provisions for monitoring, verification and reporting are in accordance with decision 17/CP.7, the CDM M&P and relevant decisions of the COP/MOP; and

(g) The project activity conforms to all other requirements for CDM project activities in decision 17/CP.7, the CDM M&P and relevant decisions by the COP/MOP and the EB.

2.4.2 Registration

Registration is the formal acceptance by the EB of a validated project as a CDM project activity. Registration is the prerequisite for the verification, certification and issuance of CERs related to that project activity.

As shown in Figure 2-4, the registration by the EB shall be deemed final 8 weeks, or 4 weeks in case of small scale CDM project activities, after the date of receipt by the EB of the request for registration, unless a Party involved in the project activity or at least 3 members of the EB request a review of the proposed CDM project activity.

The review by the EB shall be made in accordance with the following provisions:

(a) It shall be related to issues associated with the validation requirements;

(b) It shall be finalized no later than at the second meeting following the request for review, with the decision and the reasons for it being communicated to the project participants and the public.

The Registration and Issuance Team (RIT) assists the EB's appraisal process of the project activities requested for registrations. The EB members refer to the RIT's appraisals and made decisions for necessity of reviews.

For detailed procedural instructions for the registration and review of a proposed CDM project activity, refer to the following documents on the "Procedures" page of the CDM website [http://cdm.unfccc.int/Reference/Procedures]:

- Procedures for registration of a proposed CDM project activity (Version 02)
- Procedures for review as referred to in paragraph 41 of the CDM M&P

2.5 Monitoring, verification and certification through issuance of CERs

2.5.1 Implement monitoring activities

As shown in Figure 2-5, the first step that project participants must take to ensure issuance of CERs as planned is to properly implement the monitoring activities according to the monitoring plan stated in the registered PDD, since it is a condition for verification, certification and the issuance of CERs [CDM M&P, para. 57-58].

Project participants then prepare a monitoring report for the period they would like to have verified and CERs issued. The length of such period can vary according to the interests of project participants. For example, the lengths of verified periods of CERs that have already been issues range from two months to four years. A monitoring report covers all the items contained in the monitoring plan, as shown below:

- The collection and archiving of all relevant data necessary for estimating or measuring GHG emission occurring within the project boundary during the crediting period;
- The collection and archiving of all relevant data necessary for determining the baseline of GHG emission within the project boundary during the crediting period;
- The identification of all potential sources of, and the collection and archiving of data on, increased GHG emission outside the project boundary that are significant and reasonably attributable to the project activity during the crediting period;
- The collection and archiving of information relevant to the provisions in paragraph 37 (c) (of the CDM M&P, regarding the analysis of the environmental impacts of the project activity);
- Quality assurance and control procedures for the monitoring process;
- Procedures for the periodic calculation of the GHG emission reductions by the proposed CDM project activity, and for leakage effects; and
- Documentation of all steps involved in the calculations of emission reductions and leakage.

[CDM M&P, para. 53].

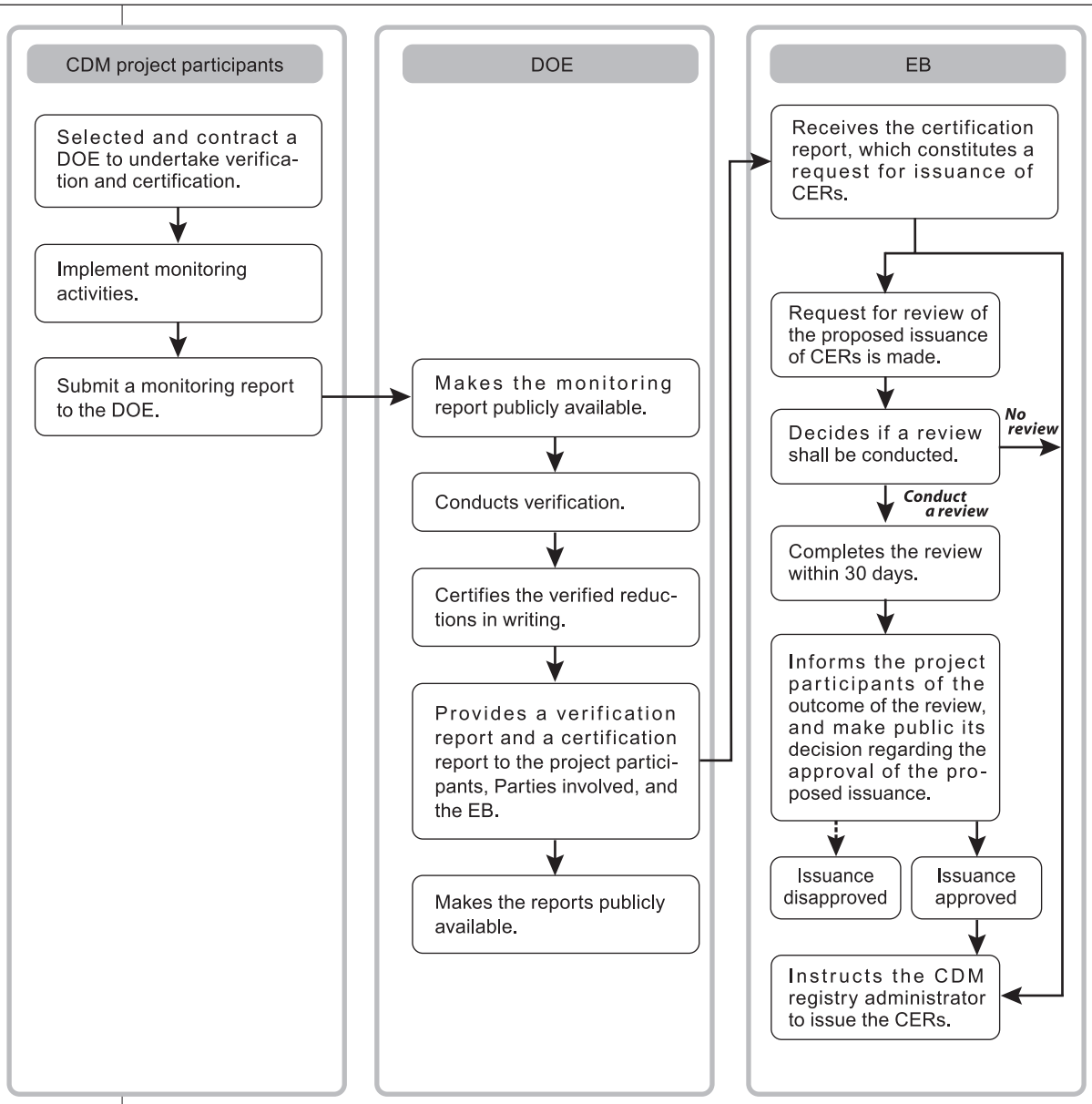


Figure 2-5 Procedures from monitoring through issuance

2.5.2 Provide monitoring report to DOE for verification and certification

A DOE verifies and certifies the emission reductions achieved during the period covered by the monitoring plan. Project participants must select and contract a DOE different from the one that undertook validation of the corresponding project. In case of small scale CDM project activities, the same DOE may undertake validation, and verification and certification.

2.5.3 Verification

The DOE, upon receipt of a monitoring report by the project participants, shall review and determine the monitored GHG emission reductions that have occurred as a result of a registered CDM project activity during the period covered by the monitoring report. During this process of verification, the DOE shall:

- Determine whether the project documentation provided is in accordance with the requirements of the registered project design document and relevant provisions;

- Conduct on-site inspections, as appropriate;
- Use additional data from other sources, if appropriate;
- Review monitoring results and verify that the monitoring methodologies for the estimation of GHG emission reductions have been applied correctly and their documentation is complete and transparent;
- Recommend to the project participants appropriate changes to the monitoring methodology for any future crediting period, if necessary;
- Determine the GHG emission reductions that would not have occurred in the absence of the CDM project activity using calculation procedures consistent with those contained in the registered project design document and in the monitoring plan;
- Identify and inform the project participants of any concerns relating to the conformity of the actual project activity and its operation with the registered project design document. Project participants shall address the concerns and supply relevant additional information; and
- Provide a verification report to the project participants, the Parties involved and the Executive Board. The report shall be made publicly available.

[CDM M&P, para. 62]

Project participants would need to provide clarifications and additional information as requested by the DOE during the verification process. In particular, project participants should be ready to answer questions by the DOE during on-site inspections, which may comprise a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observation of established practices and testing of the accuracy of monitoring equipment.

2.5.4 Certification

Following verification, the DOE will certify in writing that the project activity achieved the GHG emission reductions as verified. It shall inform the project participants, Parties involved and the EB of its certification decision in writing immediately upon completion of the certification process and make the certification report publicly available [CDM M&P, para. 63].

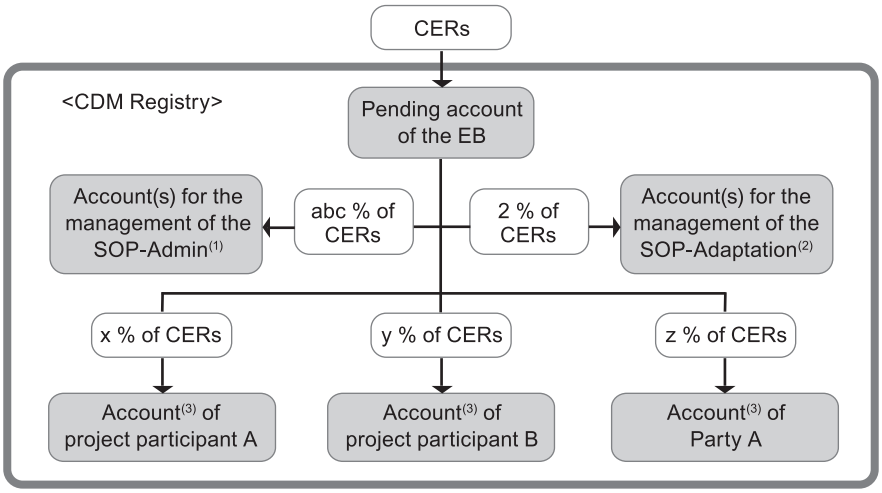
2.5.5 Issuance of CERs

The certification report submitted to the EB by the DOE constitutes a request for issuance of CERs equal to the verified amount of GHG emissions reductions [CDM M&P, para. 64]. The issuance shall be considered final 15 days after the date of receipt of the request for issuance, unless a Party involved in the project activity or at least 3 members of the EB request a review (see Box 2-1) of the proposed issuance of CERs [CDM M&P, para. 65]. When the request for issuance becomes final or the EB decides to approve the issuance as the result of a review, the EB instructs the CDM registry administrator to issue the specified quantity of CERs into the pending account of the EB in the CDM registry [CDM M&P, para. 66].

Upon issuance of CERs, the CDM registry administrator shall promptly forward the CERs to the registry accounts of project participants involved, in accordance with their request, having deducted the quantity of CERs corresponding to the share of proceeds (SOP) to cover administrative expenses for the EB (SOP-Admin) and to assist in meeting costs of adaptation for developing

countries vulnerable to adverse impacts of climate change (SOP-Adaptation), respectively, to the appropriate accounts in the CDM registry for the management of the share of proceeds. From the pending account, the issued CERs are promptly forwarded to the following accounts within the CDM registry. Figure 2-6 shows how CERs are issued and distributed among different accounts within the CDM registry.

Accounts	Amount of CERs to be forwarded
Accounts for the management of the share of proceeds	The share of proceeds to cover administrative expenses for the EB (SOP-Admin): in accordance with the amount of CERs, and to assist in meeting costs of adaptation (SOP-Adaptation): 2 % of issued CERs
Accounts of Parties and project participants involved	In accordance with the request by project participants



(1) SOP-Admin (SOP-Administration) means the share of proceeds to cover administrative expenses for the EB. The amount is determined in accordance to the amount of CERs. (Refer to section 2.6 in details.)
(2) SOP-Adaptation means the share of proceeds to assist in meeting costs of adaptation
(3) It may be a permanent holding account or temporary holding acount. Temporary accounts for Annex I Parties and project participants from such Parties are created for the purposes of receiving CERs forwarded to them from the pending account and for transferring such CERs to accounts in national registries, until national registries for such Parties and entities would be operational. [EB12, para. 35(b)]

Figure 2-6 Issuance of CERs into the CDM registry

The holdings, transfers and acquisitions of Kyoto units[4] will be tracked and recorded through a computerized system of registries that consist of the following:

- Each Party included in Annex I shall establish and maintain a national registry to ensure the accurate accounting of the issuance, holding, transfer, acquisition, cancellation and retirement of Kyoto units. Each Party shall designate an organization as its registry administrator to maintain the national registry of that Party. Any two or more Parties may voluntarily maintain their respective national registries in a consolidated system, provided that each national registry remains distinct. A national registry shall be in the form of a standardized electronic database which contains, inter alia, common data elements relevant to the issuance, holding, transfer, acquisition, cancellation and retirement of Kyoto units. The structure and data formats of national registries shall conform to technical standards to be adopted by the COP/MOP for the purpose of ensuring the accurate, transparent and efficient exchange

4 "Kyoto units" is defined here to include AAUs, RMUs, ERUs, CERs, tCERs and lCERs. Note that it is not a formal UNFCCC term and is used here for the purpose of convenience only.

of data between national registries, the CDM registry and the international transaction log (ITL). [CMP/2005/8/Add.2, Decision 13/CMP.1, Annex, page 28]

- The EB shall establish and maintain a CDM registry to ensure the accurate accounting of the issuance, holding, transfer and acquisition of CERs by Parties not included in Annex I. The EB shall identify a registry administrator to maintain the registry under its authority. The CDM registry shall be in the form of a standardized electronic database which contains, inter alia, common data elements relevant to the issuance, holding, transfer and acquisition of CERs. The structure and data formats of the CDM registry shall conform to technical standards to be adopted by the COP/MOP for the purpose of ensuring the accurate, transparent and efficient exchange of data between national registries, the CDM registry and the international transaction log. The CDM registry shall make non-confidential information publicly available and provide a publicly accessible user interface through the Internet that allows interested persons to query and view it. [CMP/2005/8/Add.1, Decision 3/CMP.1, Annex, Appendix D, page 27-28]
- The secretariat shall establish and maintain an ITL to verify the validity of transactions, including issuance, transfer and acquisition between registries, cancellation and retirement of ERUs, CERs, AAUs and RMUs and the carry-over of ERUs, CERs and AAUs [CMP/2005/8/Add.2, Decision 13/CMP.1, Annex, para. 38, page 31].

For detailed procedural instructions for issuance of CERs, refer to the following documents on the "Procedures" page of the CDM website [http://cdm.unfccc.int/Reference/Procedures]:

- Procedures for making the monitoring report available to the public in accordance with paragraph 62 of CDM M&P (Version 01)
- Procedures for revising monitoring plans in accordance with paragraph 57 of the CDM M&P [EB26, Annex 34]
- Procedures relating to verification report and certification report/ request for issuance of CERs (Version 01)
- Procedures for review referred to in paragraph 65 of the CDM M&P [Decision 4/CMP.1, Annex IV and EB29, Annex 16]

Box 2-1: Review of the issuance of CERs [CDM M&P, para. 65] [Decision 4/CMP.1, Annex IV and EB29, Annex 16]

The issuance of certified emission reductions (CERs) by the EB shall be considered final 15 days after the date of receipt by the EB of the request for issuance, unless a Party involved in the project activity or at least 3 members of the EB request a review of the proposed issuance of CERs. A request for review shall provide reasons for the request for review and any supporting documentation. Such a review shall be limited to issues of fraud, malfeasance or incompetence of the DOE and be conducted as follows:

- Upon receipt of a request for such a review, the EB, at its next meeting, shall decide on its course of action. If it decides that the request has merit, it shall perform a review and decide whether the proposed issuance of CERs should be approved;
- The EB shall complete its review within 30 days following its decision to perform the review; and
- The EB shall inform the project participants of the outcome of the review, and make public its decision regarding the approval of the proposed issuance of CERs and the reasons for it.

If the EB decides not to approve a proposed issuance of CERs and if a DOE is found to be in the situation of fraud, malfeasance or incompetence, the DOE shall reimburse the costs incurred as a result of the review. This provision is subject to review as experience accrues.

2.6 Costs related to CDM project cycle

There are two types of costs associated with preparing and implementing a CDM project activity. The first type is the costs for developing the project activity that are common to any commercial project development, e.g. feasibility assessment, initial costs for construction and equipments, operation and maintenance costs, cost of capital, etc. Since these costs are not particular to CDM project activities, this manual does not discuss them in detail.

The second type of costs is the ones due to specific requirements of the CDM scheme, which is sometimes referred to as "transaction costs", which are incurred at different stages of CDM project cycle.

The following fees are to be paid to the UNFCCC secretariat, which have been determined by the UNFCCC process, i.e. COP, COP/MOP or the EB. Therefore, they can be clearly calculated according to the UNFCCC prescriptions:

- New methodology submission (USD 1,000: Only applicable if project participants submit a new baseline and monitoring methodology)
- Registration fee
- Share of proceeds to cover administrative expenses (SOP-Admin)
- Share of proceeds to assist with the costs of adaptation (SOP-Adaptation)

Box 2-2: Share of proceeds to cover administrative expenses and registration fee

The Kyoto Protocol states that the COP/MOP shall ensure that a share of the proceeds from CDM project activities is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation [Art.12.8]. Concerning the provision, COP/MOP at its first session decided that the share of proceeds to cover administrative expenses (SOP-Admin) shall be:

(a) USD 0.10 per CER issued for the first 15,000 tonnes of CO_2 equivalent for which issuance is requested in a given calendar year;

(b) USD 0.20 per CER issued for any amount in excess of 15,000 tonnes of CO_2 equivalent for which issuance is requested in a given calendar year.

[Further guidance relating to the clean development mechanism (Decision 7/CMP.1)]

The EB at its 23rd meeting clarified the following, regarding the registration fee [EB23, Annex 35]:

- The registration fee shall be the share of proceeds applied to the expected average annual emission reduction for the project activity over its crediting period.
- The maximum registration fee payable based on this calculation shall be USD 350,000.
- No registration fee has to be paid for CDM project activities with expected average annual emission reduction over the crediting period below 15,000 t-CO_2 equivalent.
- The registration fee shall be deducted from the SOP-Admin. In effect, the registration fee is an advance payment of the SOP-Admin for the emission reductions achieved during the first year. If an activity is not registered, any registration fee above USD 30,000 shall be reimbursed.

It may be mentioned here that to enhance a more equitable regional distribution of CDM project activities, the EB recommends CMP3 to decide to abolish the payment of the registration fee and the payment of the share of proceeds at issuance for CDM project activities originated in LDCs and sub-Saharan countries. [EB35, Annex 50, para. 10 (a)]

On the other hand, the following costs that are borne by project participants vary depending on the specific circumstances of the project at hand and the service providers. It is also possible that project participants absorb the costs by carrying out the task in-house, e.g. development of a PDD by its own staff.

Costs for the followings are typically paid to others, e.g. DOEs, consultants, and lawyers:

- Project finding and assessment
- New methodology development and submission
- PDD development
- Validation
- Host country approval
- Contract negotiation and legal costs
- Monitoring
- Verification/Certification

The ranges of CDM transaction costs are illustrated in Figure 2-7. Registration fee, as well as the share of proceeds incurred at the stage of issuance of CERs, is to be paid to the UNFCCC secretariat. For those costs that are not determined by the UNFCCC process, the figures only indicate possible ranges based on the literature about CDM transaction costs. Furthermore, Figures 2-8-1 to 2-8-4 show some examples of the registration fee and the SOP-Admin, which are interrelated.

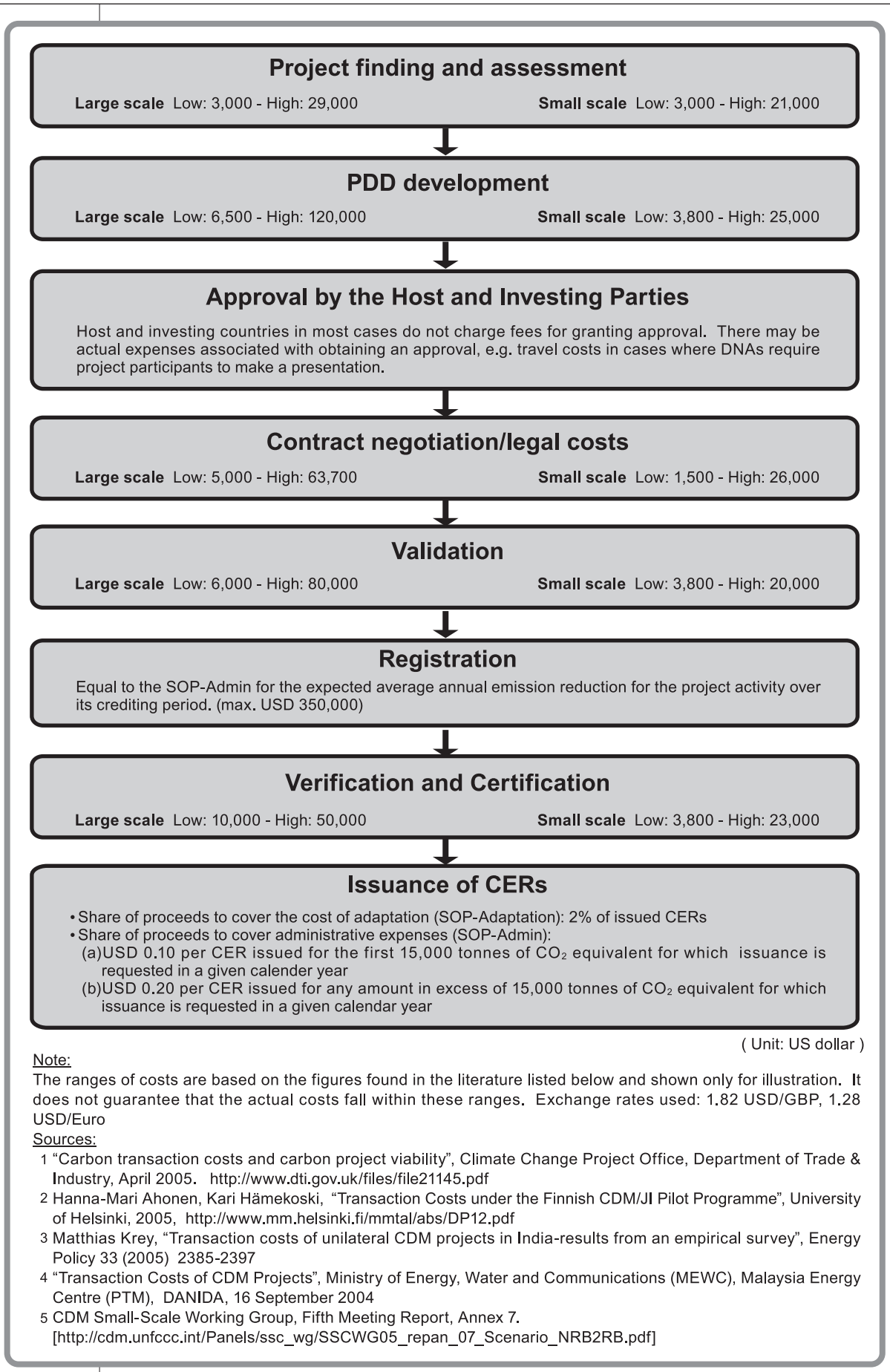


Figure 2-7 CDM transaction costs

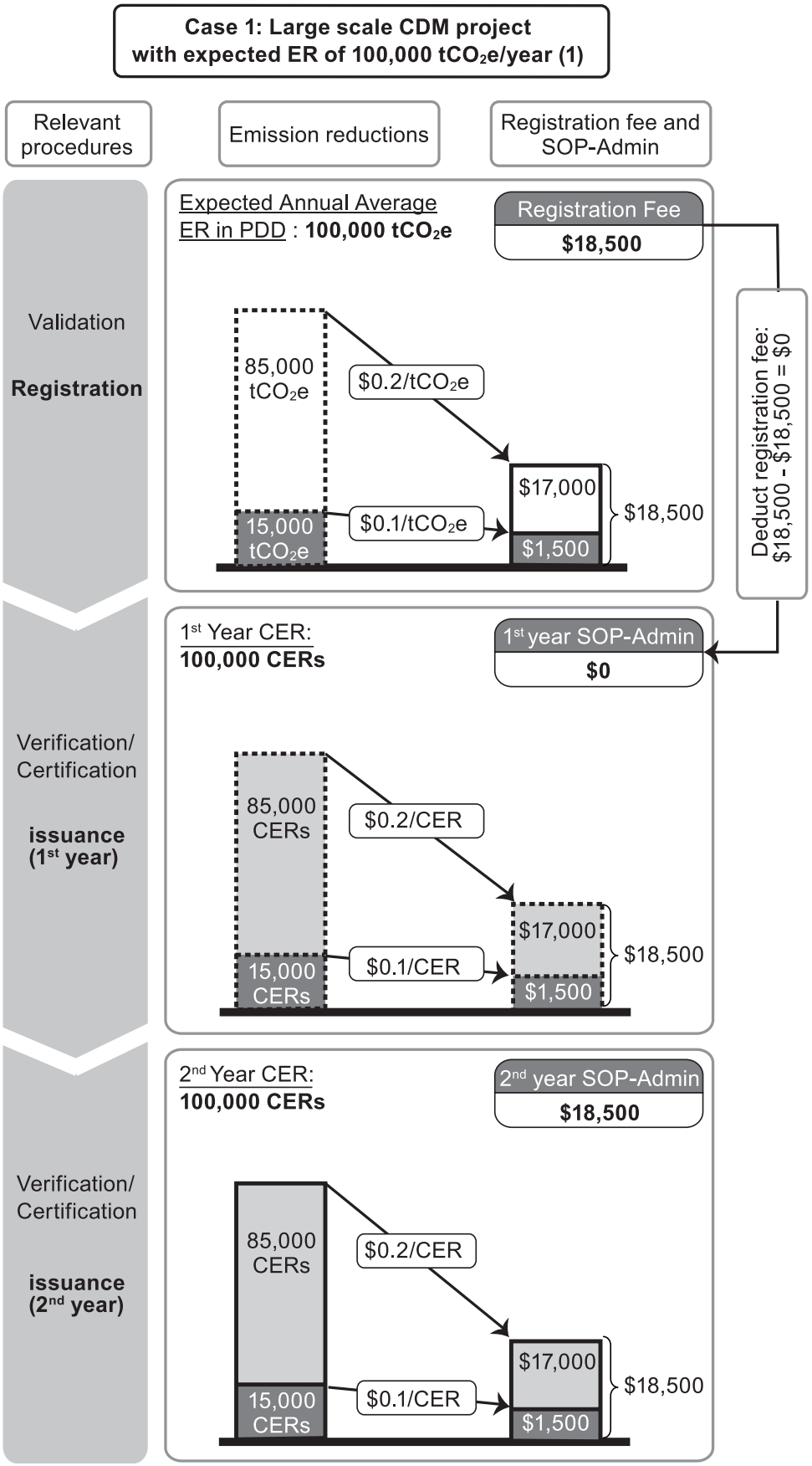


Figure 2-8-1 Costs related to CDM project cycle: Registration fee and SOP-Admin (Case 1)

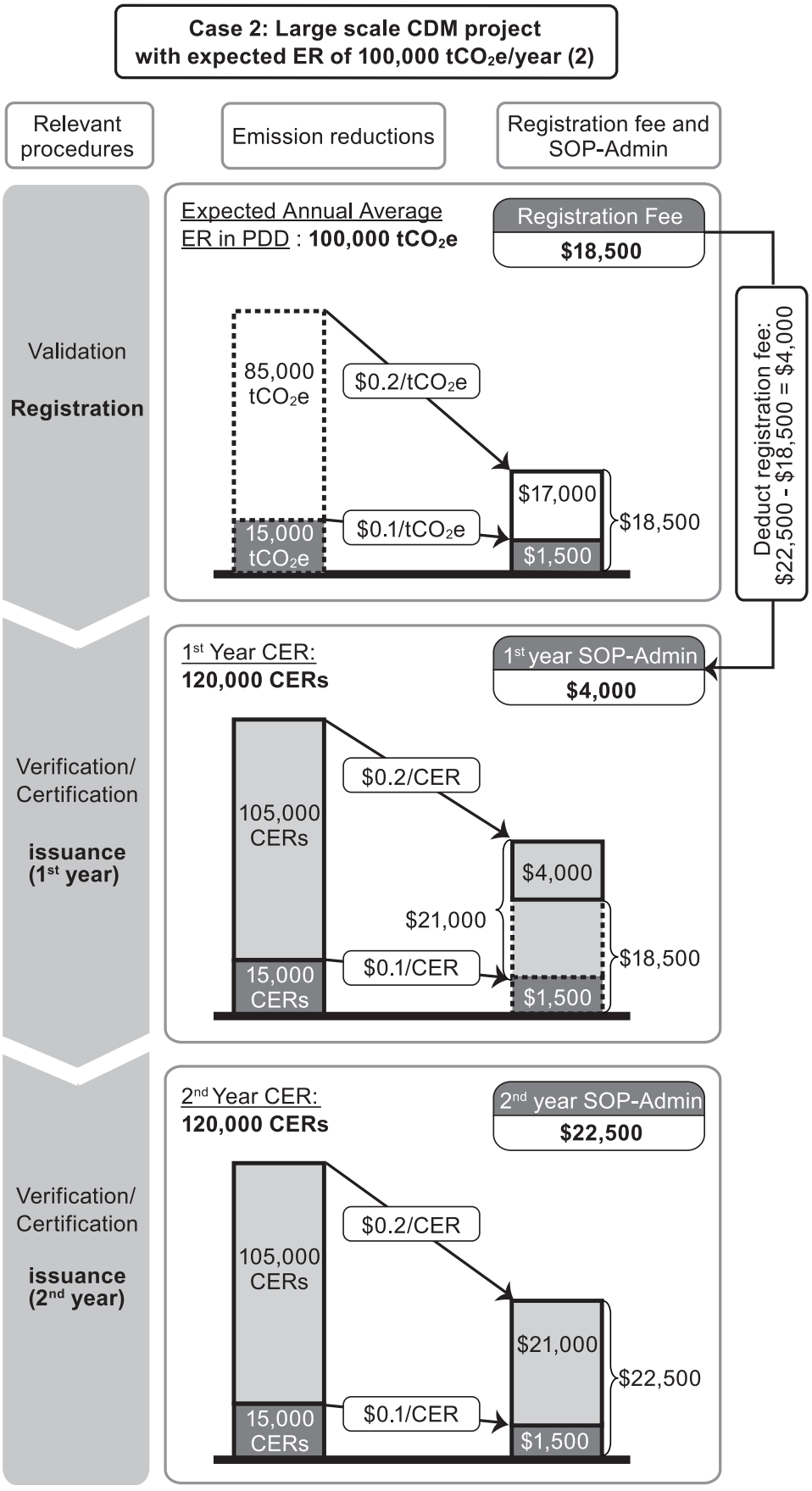


Figure 2-8-2 Costs related to CDM project cycle: Registration fee and SOP-Admin (Case 2)

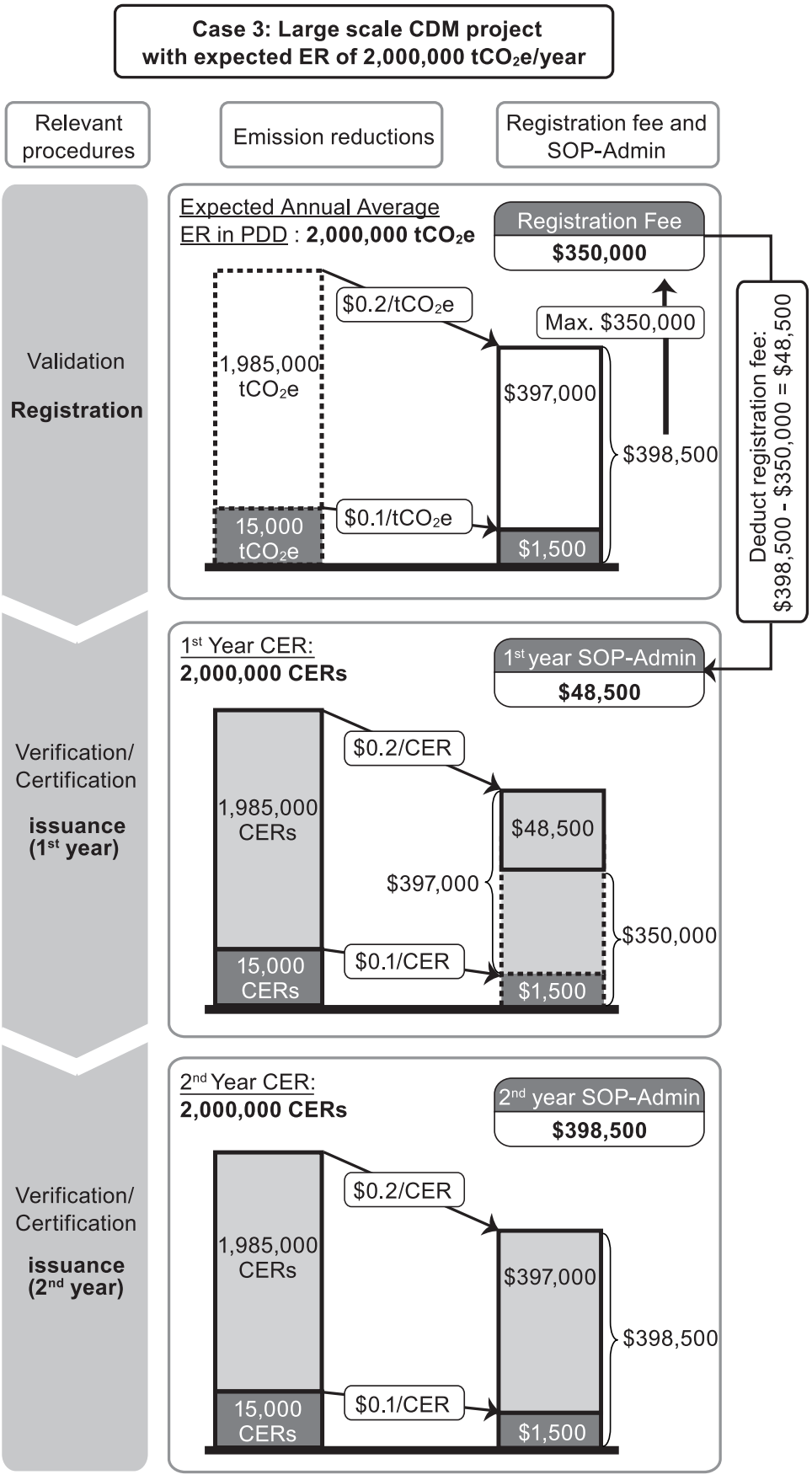


Figure 2-8-3 Costs related to CDM project cycle: Registration fee and SOP-Admin (Case 3)

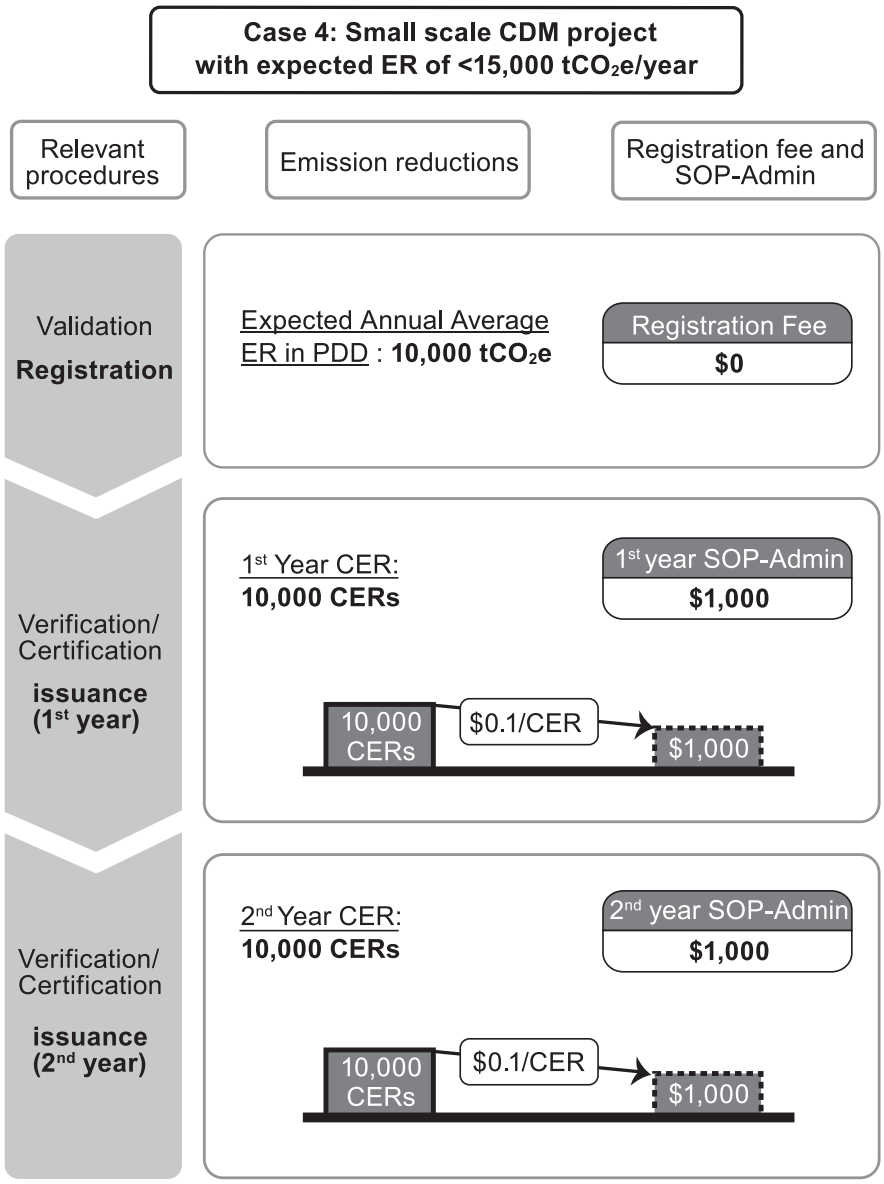


Figure 2-8-4 Costs related to CDM project cycle: Registration fee and SOP-Admin (Case 4)

3. Types of CDM

3.1 CDM typology

CDM project activities can be divided into the following types depending on the size and kinds of activity undertaken. Project participants who wish to develop a CDM project activity should first determine in which of the following categories the project activity would fit, as different modalities and procedures and formats apply to each project type.

Table 3-1 Classification of CDM project activities

Clean Development Mechanism (CDM)		
	1. Emission Reduction Type CDM	
		Emission reduction project activities that are not SSC project activities, i.e. beyond the limits of SSC project activities described above.
		Small Scale CDM (SSC) Type I: Renewable energy project activities with a maximum output capacity of 15 MW (or an appropriate equivalent) Type II: Energy efficiency improvement project activities which reduce energy consumption, on the supply and/or demand side, with a maximum output of 60 GWh per year (or an appropriate equivalent) Type III: Other project activities that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually [CMP/2006/10/Add.1, page 8, para. 28]
	2. Sink or Removal Type CDM / Afforestation and Reforestation (A/R) CDM	
		Sink or removal type CDM project activities through afforestation and reforestation in host countries.
		Small Scale A/R CDM (SSC A/R) Those that are expected to result in net GHG removals by sinks of less than 8,000 tons of CO_2 per year and are developed or implemented by low-income communities and individuals as determined by the host Party.

3.2 CDM project activity

3.2.1 Overview of CDM project activities (large scale)

CDM project activities result in GHG emission reduction in host countries. The types of activities include fossil fuel combustion, fossil fuel consumption, mining, and fugitive emission. Comparing with the GHG emission reduction limits of small scale CDM project activities as mentioned in section 3.3, other project activities are called "large scale" CDM project activities. Project participants wishing to develop such a project activity should prepare a fully completed project design document (CDM-PDD) and submit it for validation and registration. The detail procedure is discussed in chapter 4.

The modalities and procedures, formats and relevant guidelines for CDM project activities are listed as below in Table 3.2.

Table 3-2 List of modalities and procedures, formats and guidelines for CDM project activity

Modalities and Procedures	Modalities and procedures for a CDM as defined in Article 12 of the Kyoto Protocol [decision 3/CMP.1]
Formats	CDM Project Design Document: CDM-PDD, ver 03 CDM proposed new methodology: Baseline and Monitoring: CDM-NM, ver 02 [EB32, Annex 17]
Guidelines	Guidelines for completing CDM-PDD and CDM-NM, ver 06.2

The most recent versions are available on the UNFCCC CDM website: <http://unfccc.int/cdm>

3.2.2 Approved large scale CDM methodologies

This section provides a sectoral scope wise list of approved methodologies (AMs) and approved consolidated methodologies (ACMs). These methodologies are further discussed in Appendix 1.

Table 3-3 Sectoral scope wise list of approved methodologies (as of 19 Oct 2007)

1	AM0058	CO_2							
	AM0025	CH_4	13						
	AM0019	CO_2							
	AM0042	CO_2	14						
	AM0026	CO_2					10	ACM0008	CH_4	8
	AM0035	SF_6	11	AM0001	HFC			AM0043	CH_4	
	AM0029	CO_2						AM0023	CH_4	
	AM0044	CO_2	5	AM0037	CH_4			AM0009	CH_4	
	AM0045	CO_2		AM0051	N_2O					
	AM0048	CO_2		AM0050	CO_2					
	AM0052	CO_2		AM0034	N_2O					
	AM0054	CO_2		AM0028	N_2O					
	AM0056	CO_2		AM0027	CO_2		13	ACM0010	CH_4	15
	AM0047	CO_2		AM0021	N_2O			ACM0001	CH_4	
	AM0053	CH_4						AM0039	CH_4	
	ACM0002	CO_2						AM0022	CH_4	
	ACM0006	CO_2	4	AM0057	CO_2,CH_4			AM0013	CH_4	
	ACM0007	CO_2		AM0033	CO_2					
	ACM0011	CO_2		AM0040	CO_2		3	AM0046	CO_2	
	ACM0013	CO_2		AM0041	CH_4			AM0020	CO_2	
	AM0007	CO_2		ACM0003	CO_2			AM0018	CO_2	
	AM0014	CO_2		ACM0005	CO_2			AM0017	CO_2	
	AM0024	CO_2								
	AM0036	CO_2					7	AM0031	CO_2	
	AM0049	CO_2								
	AM0055	CO_2					9	AM0059	PFC	
	ACM0009	CO_2						AM0038	CO_2	
	ACM0012	CO_2						AM0030	PFC	

Legend for Scope column:

No.	Sectoral Scope	No.	Sectoral Scope	No.	Sectoral Scope
1	Energy industries (renewable-/ non-renewable sources	6	Construction	11	Fugitive emissions from production and consumption of halocarbons and sulphur hexa fluoride
2	Energy Distribution	7	Transport	12	Solvent use
3	Energy demand	8	Mining/ mineral production	13	Waste handling and disposal
4	Manufacturing industries	9	Metal Production	14	Afforestation and reforestation
5	Chemical industries	10	Fugitive emissions from fuels (solid, oil and gas)	15	Agriculture

Note: (i) A/R CDM is excluded from this classification and categorized separately. (ii) No approved methodology till date for sector numbers: 2, 6, and 12. (iii) Shaded boxes denote methodologies that are linked with multiple sectoral scopes. (iv) Each methodology box contains information on Methodology Number (left) and Related GHG for which reduction is to be calculated (right). (v) Numbers 1-15, on the left and/ or right hand side of each methodology box, denote Sectoral Scope Numbers as indexed in the legend table.

3.3 Small scale CDM (SSC) project activity

3.3.1 Overview of small scale CDM (SSC) project activities

The framework of SSC would enable project participants to use a fast-track approach for CDM procedures which could help reduce transaction costs compared to those of large scale CDM. SSC project activities are to meet certain eligibility criteria. Once a project activity is classified as SSC, then it can:

(a) benefit from being able to use the simplified modalities and procedures for SSC project activities,
(b) use a simplified PDD form (SSC-PDD),
(c) apply a shortened review period, and
(d) have the same operational entity undertake validation as well as verification and certification.

To use the simplified modalities and procedures for SSC project activities, a proposed project activity shall:

(a) Meet the eligibility criteria for small scale CDM project activities set out in paragraph 28 of decision-/CMP.2 (types I to III described below);
(b) Conform to one of the project categories in appendix B to Annex II to Decision 21/CP.8 (refer to Table 3-3 for the categories); and
(c) Not be a debundled component of a larger project activity, as determined through appendix C to Annex II to Decision 21/CP.8 (refer to section 3.3.5(2)).

The modalities and procedures, formats and relevant guidelines for SSC project activities are listed as below in Table 3.4.

Table 3-4 List of modalities and procedures, formats and guidelines for SSC project activity

Modalities and Procedures	Simplified modalities and procedures for SSC project activities, and its Appendix B [decision 4/CMP.1, Annex II], Revision of SSC project activities' definition [decision-/CMP.2, para. 28]
Formats	Simplified project design document for SSC project activities: CDM-SSC-PDD, ver 03 Form for submissions on small scale methodologies and procedures: F-CDM-SSC-Subm, ver 03 [EB34, Annex 11] Form for proposed new small scale methodologies: F-CDM-SSC-NM, ver 01 [EB34, Annex 12]
Guidelines	• Guidelines for completing CDM-SSC-PDD and F-CDM-SSC-NM, ver 05 [EB34, Annex 09] • Guidelines for completing F-CDM-SSC-BUNDLE, ver 01 [EB34, Annex 10]

The most recent versions are available on the UNFCCC CDM website: <http://unfccc.int/cdm>

3.3.2 Definition of small scale CDM (SSC) project activities

Three project types are currently recognized as eligible SSC project activity under emission reduction type CDM project activities. Each type of SSC project activity consists of several technologies and measures. The three types of SSC project activities are the following:

(1) Type I: Renewable energy project activities with a maximum output capacity of 15 MW (or an appropriate equivalent) [decision -/CMP.2, para. 28(a)]

Type I covers renewable energy project activities, including solar, wind, hybrid systems, biogas or biomass, water, geothermal, and waste. The total capacity of a plant used for the project activity should not exceed 15 MW in output.

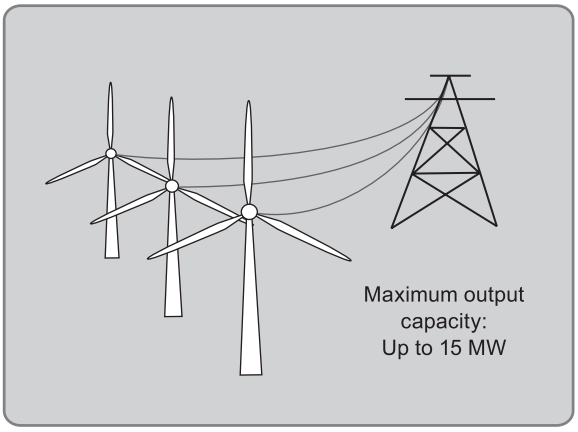


Figure 3-1 Type I - Renewable energy project activities

Maximum "output" is defined as installed/rated capacity, as indicated by the manufacturer of the equipment or plant, disregarding the actual load factor of the plant. "Appropriate equivalent" of 15 MW is defined as "appropriate equivalent" of 15 MW (electric). As MW (electric) is the most common domination, and MW (thermal) only refers to the production of heat which can also be derived from MW (electric), the EB agreed to define MW as MW (electric) and otherwise to apply an appropriate conversion factor [CDM Glos. ver 2, page 27].

(2) Type II: Energy efficiency improvement project activities which reduce energy consumption, on the supply and/or demand side, limited to those with a maximum output of 60 GWh per year [decision -/CMP.2, para. 28(b)]

Type II covers supply side project activities and end-use project activities concerning residential, service, industry, transport, agricultural machineries and cross-cutting technologies, which result in improvement in per unit power for the service provider or in reduction of energy consumption in watt-hours in comparison with the approved baseline.

Energy efficiency improvement is the improvement in the service provided per unit power. It corresponds to project activities which increase unit output of traction, work, electricity, heat, light (or fuel) per MW input are energy efficiency project activities.

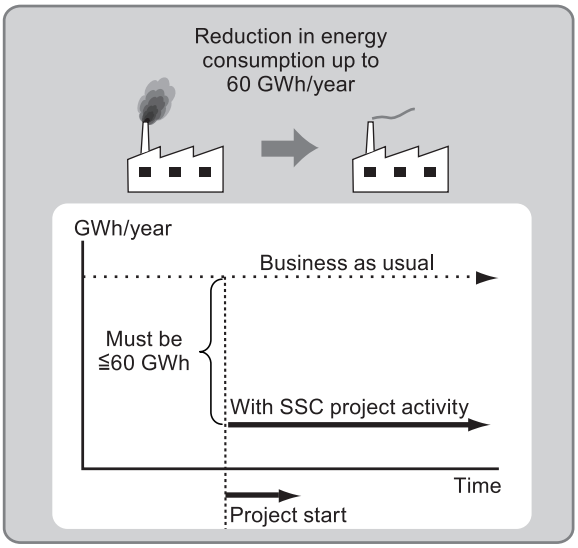


Figure 3-2 Type II - Energy efficiency improvement project activities

Energy consumption is the consumption reduced and measured in watt-hours with reference to an approved baseline. Lower consumption as a result of lower activity shall not be taken into consideration. This means that when energy consumption is reduced due to the reduction in activity level and not due to higher energy efficiency, the resulting emission reduction cannot be

attributed to the CDM project activity.

Demand side, as well as supply side, projects shall be taken into consideration, provided that a project activity results in a reduction of maximum 60 GWh. A total saving of 60 GWh is equivalent to 4000 hours of operation of a 15 MW plant or 60 X 3.6 TJ =216 TJ (terajoules) [CDM Glos. ver 2, page 27].

(3) Type III: Other project activities limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually [decision -/ CMP.2, para. 28(c)]

Type III covers project activities concerning agriculture, fuel switching, industrial processes, and waste management. Possible examples in the agricultural sector include improved manure management, reduction of enteric fermentation, improved fertilizer usage, and improved water management in rice cultivation.

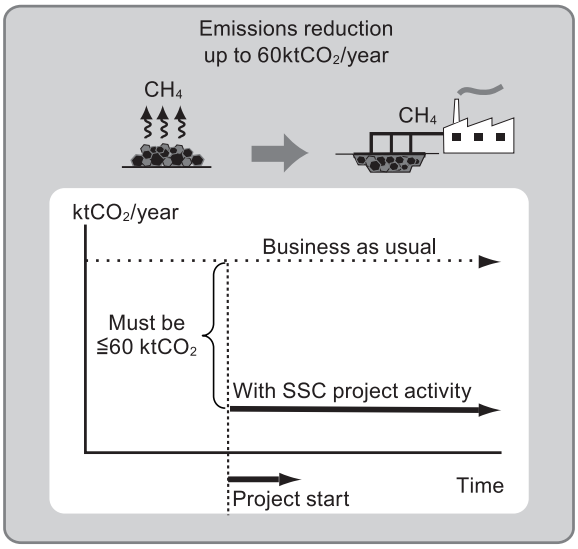


Figure 3-3 Type III - Other project activities

Other project activities that could qualify include CO_2 recycling, carbon electrodes, adipic acid production and the use of HFCs, PFCs and SF_6, making reference to the emission reductions generated by such projects expressed in CO_2 equivalent.

The three types of project activities outlined above are mutually exclusive. In a project activity with more than one component that will benefit from the simplified modalities and procedures for SSC project activities, each component shall meet the threshold criterion of each applicable type, e.g. for a project with both a renewable energy and an energy efficiency component, the renewable energy component shall meet the criterion for "Type I: renewable energy" and the energy efficiency component shall meet that for "Type II: energy efficiency improvement".

3.3.3 Additionality in small scale CDM (SSC)

A simplified baseline and monitoring methodology listed in Appendix B of Annex II to Decision 21/CP.8 (FCCC/CP/2002/7/Add.3) may be used for a SSC project activity if the project participants are able to demonstrate to a DOE that the project activity would otherwise not be implemented due to the existence of one or more of the barriers listed below. Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;

(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new

technology adopted for the project activity and so would have led to higher emissions;

(c) Barrier due to prevailing practice: prevailing practice, existing regulatory, or policy requirements would have led to implementation of a technology with higher emissions;

(d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

It may be mentioned here that the EB has agreed to a compilation of non-binding best practice examples to demonstrate additionality [EB35, Annex 34] to assist the development of PDDs for small scale CDM project activities, which incorporates public inputs and an analysis of additionality in registered SSC project activities. A general guidance to the SSC methodologies is available [EB35, Annex 35].

3.3.4 Approved small scale CDM (SSC) methodologies

Approved methodologies for SSC project activities, which are listed in Table 3-5, are part of the Appendix B of the simplified modalities and procedures for small scale CDM project activities [decision 4/CMP.1, Annex II].

Table 3-5 Category wise approved SSC methodologies (as of 19 Oct 07)

Reference	Ver. No.	Title of the Methodology	Sectoral Scope	GHG
TYPE I – RENEWABLE ENERGY PROJECTS				
AMS-I.A.	12	Electricity generation by the user	Energy industries (renewable-/ non-renewable sources (1)	CO_2
AMS-I.B.	10	Mechanical energy for the user with or without electrical energy		
AMS-I.C.	12	Thermal energy for the user with or without electrical energy		
AMS-I.D.	12	Grid connected renewable electricity generation		
TYPE II – ENERGY EFFICIENCY IMPROVEMENT PROJECTS				
AMS-II.A.	9	Supply side energy efficiency improvements - transmission and distribution	Energy distribution (2)	CO_2
AMS-II.B.	9	Supply side energy efficiency improvements – generation	Energy industries (renewable-/ non-renewable sources (1)	
AMS-II.D.	11	Energy efficiency and fuel switching measures for industrial facilities	Manufacturing industries (4)	
AMS-II.C.	9	Demand-side energy efficiency activities for specific technologies	Energy demand (3)	
AMS-II.E.	10	Energy efficiency and fuel switching measures for buildings		
AMS-II.F.	9	Energy efficiency and fuel switching measures for agricultural facilities and activities		
TYPE III – OTHER PROJECT ACTIVITIES				
AMS-III.A.	7	Agriculture	NA	NA
AMS-III.B.	12	Switching fossil fuels	Energy industries (renewable-/ non-renewable sources (1)	CO_2
AMS-III.C.	11	Emission reductions by low-greenhouse gas emitting vehicles	Transport (7)	
AMS-III.J.	3	Avoidance of fossil fuel combustion for carbon dioxide production to be used as raw material for industrial processes	Chemical industries (5)	
AMS-III.M.	2	Reduction in consumption of electricity by recovering soda from paper manufacturing process		

Reference	Ver. No.	Title of the Methodology	Sectoral Scope	GHG
AMS-III.D.	13	Methane recovery in agricultural and agro industrial activities	Agriculture (15)	CH_4
AMS-III.E.	14	Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/ thermal treatment	Waste handling and disposal (13)	
AMS-III.F.	5	Avoidance of methane production from biomass decay through composting		
AMS-III.G.	5	Landfill methane recovery		
AMS-III.H.	7	Methane recovery in wastewater treatment		
AMS-III.I.	6	Avoidance of methane production in wastewater treatment through replacement of anaerobic lagoons by aerobic systems		
AMS-III.L.	2	Avoidance of methane production from biomass decay through controlled pyrolysis		
AMS-III.K.	3	Avoidance of methane release from charcoal production by shifting from traditional open-ended methods to mechanized charcoaling process	Manufacturing industries (4)	
AMS-III.N.	2	Avoidance of HFC emissions in rigid Poly Urethane Foam (PUF) manufacturing	Manufacturing industries (4)	HFC
AMS-III.O.	1	Hydrogen production using methane extracted from biogas	Chemical industries (5)	CH_4
AMS-III.P.	1	Recovery and utilization of waste gas in refinery facilities	Manufacturing industries (4)	
AMS-III.Q.	1	Waste gas based energy systems	Manufacturing industries (4)	
AMS-III.R.	1	Methane recovery in agricultural activities at household/small farm level	Agriculture (15)	

Note: (i) A/R CDM is excluded from this classification and categorized separately.
(ii) The GHG column denotes the related GHG for which emission reduction is to be calculated.
(iii) The number with parentheses following each Sectoral Scope in the Sectoral Scope column denotes the scope number.

Project participants may propose changes to the simplified baseline and monitoring methodologies or propose additional project categories for consideration by the EB. Project participants willing to submit a new small scale CDM project activity category or revisions to a methodology shall make a request in writing to the EB providing information about the technology/activity and proposals on how a simplified baseline and monitoring methodology would be applied to this category. The EB shall expeditiously, if possible at its next meeting, review the proposed methodology. All new proposed small scale methodologies submissions undergo a desk review prior to consideration by the EB [EB34, para. 26]. Once approved, the EB shall amend the indicative list of simplified baseline and monitoring methodologies contained in Appendix B.

For detailed procedural instructions for the clarifications and revisions of SSC methodologies and for submissions of proposed SSC methodologies, refer to the following documents on the "Procedures" page of the CDM website [http://cdm.unfccc.int/Reference/Procedures]:

- Procedures for clarifications of SSC methodologies (Version 01) [EB34, Annex 6]
- Procedures for revisions of SSC methodologies (Version 01) [EB34, Annex 7]
- Procedures for submissions of proposed SSC methodologies (Version 01) [EB34, Annex 8]

3.3.5 Bundling of small scale CDM (SSC)

(1) Overview of bundling

Bundle is defined as bringing together of several SSC project activities to form a single CDM

project activity or portfolio without the loss of distinctive characteristics of each project activity. Project activities within a bundle can be arranged in one or more sub-bundles, with each project activity retaining its distinctive characteristics. Such characteristics include its technology/ measure, location, and application of simplified baseline methodology. Project activities within a sub-bundle belong to the same type. The sum of the output capacity of projects within a sub-bundle must not be more than the maximum output capacity limit for its type [CDM Glos. ver 2, page 11]. For example, four fuel switching projects of the same type, same category and technology/ measure each of which directly emit 10,000tCO_2, 18,000tCO_2, 9,000tCO_2 and 20,000tCO_2 equivalent per year could be bundled together for the purposes of CDM project registration, as long as separate monitoring plans are submitted for each one and the total capacity is within the maximum allowable limit of 60,000tCO_2 equivalent per year (Figure 3-4).

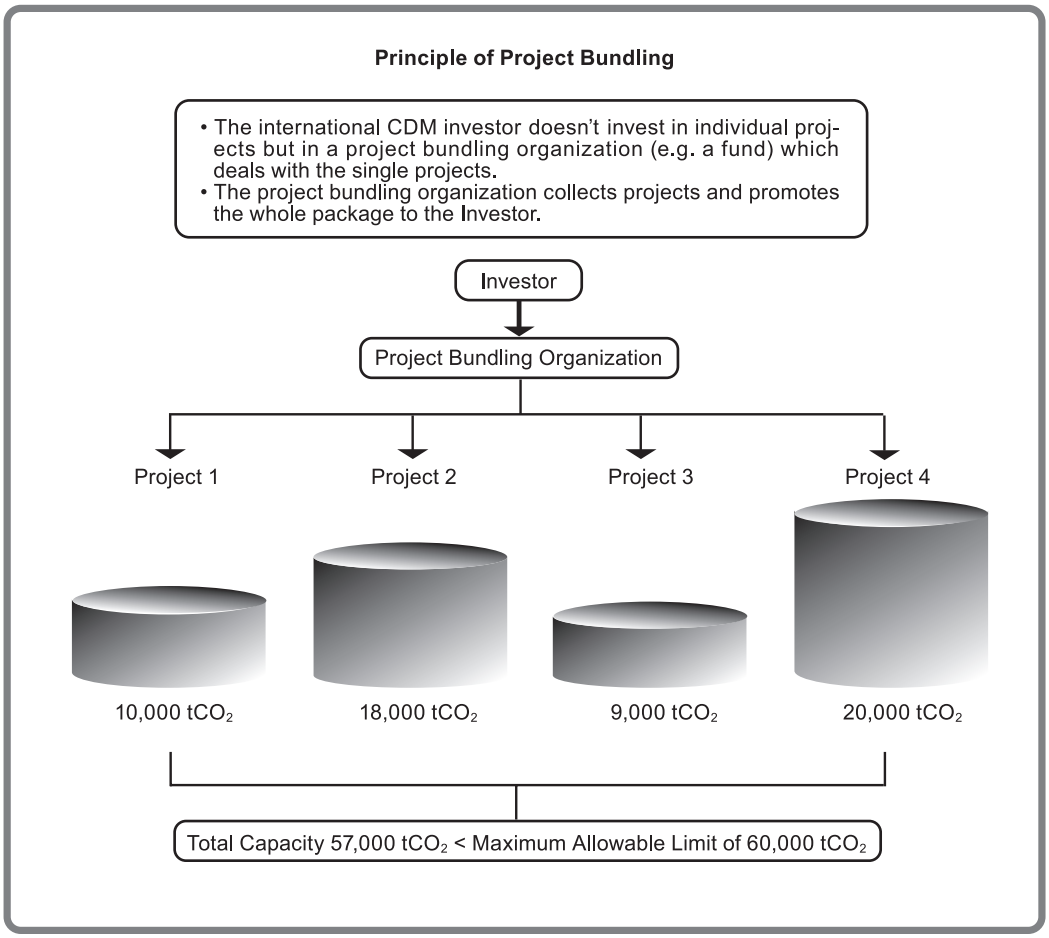


Figure 3-4 Principle of project bundling: Several similar projects are bundled together

Box 3-1: What does "same technology/measure" mean?

"Same technology/measure" is often used in the SSC, especially when considering bundling. At EB26, the term was defined as follows:

(a) Two different project activities will be considered to be applying the same technology if they provide the same kind of output and use the same kind of equipment and conversion process.

(b) Two different project activities will be considered to be using the same measure if they constitute the same course of action and result in the same kind of effect (e.g. two projects using the same management practice such as fuel switch). [EB26, para. 62]

Sub-bundle is defined as an aggregation of project activities within a bundle having the characteristics that all project activities within a sub-bundle belong to the same type [CDM Glos. ver 2, page 25].

The benefits of bundling are as follows:

(a) Reduction of project development costs
(b) Reduction of Engineering, Procurement and Construction (EPC) costs
(c) Reduction of Operation and Maintenance costs (O&M)
(d) Reduction of transaction costs (general and CDM)
(e) Increase of total investment volume

Table 3-6 Information on bundling of SSC project activities

General characteristics
Project activities wishing to be bundled shall indicate this when making the request for registration. Project participants shall at registration provide a written statement along with the submission of the bundle indicating: • That all project participants agreed that their individual project activities are part of the bundle; • One project participant who represents all project participants in order to communicate with the EB in accordance with approved Modalities and Procedures for Communication. Composition of bundles The composition of bundles shall not change over time (i.e. the submission of project activities to be used in a bundle shall be made at the same time). A project activity shall not be taken out of a bundle nor shall a project activity be added to the bundle after registration. Crediting period All project activities in the bundle shall have the same crediting period (i.e. the same length and same starting date of the crediting period). Modalities and procedures Each SSC project in the bundle should comply with the simplified modalities and procedures for SSC project activities and use an approved simplified baseline and monitoring methodology included in Appendix B of the simplified modalities and procedures for SSC project activities. Submission to the EB Bundled project activities shall be submitted in a single submission to the EB and pay only one fee proportional to the amount of expected average annual emission reductions of the total bundle; Request for review If three EB members or a Party involved in a component project activity requests the review of the component project activity, the total bundle remains under review and the implications and recommendations on the review of project activity shall lead to a decision by the EB to register or not register the bundle.
Form
• A form with information related to the bundle must be included in the submission. • The form should cover issues such as the title of the bundle, general description, project participants, locations, types and categories, estimated amount of emission reduction, crediting period and monitoring plans. Formats • Form for submission of bundled small scale project activities: F-CDM-SSC-BUNDLE, ver 02 The most recent versions are available on the UNFCCC CDM website: <http://unfccc.int/cdm> Guidelines • Guidelines for completing F-CDM-SSC-BUNDLE, ver 01 [EB34, Annex 10] • Principles for bundling [EB21, Annex 21] • Clarifications relating to bundling of small scale CDM project activities [EB20, para. 60] The most recent versions are available on the UNFCCC CDM website: <http://unfccc.int/cdm>

Small scale limits

- The sum of the size (capacity for Type I, energy saving for Type II, and direct emissions of project activity for Type III) of the technology or measure utilized in the bundle should not exceed the limits for SSC project activities as set in paragraph 28 of the decision-/CMP.2.
- It should be demonstrated that the bundle will remain under the limit for the type every year during the crediting period. The total emission reduction estimated for the crediting period must be included in the draft SSC-CDM-PDD and further monitored.
- If a bundle goes beyond the limits for the selected SSC project activities type, the emission reduction that can be claimed for this particular year will be capped at the maximum emission reduction level estimated for the bundle by the project participants in the "Bundle" form for that year during the crediting period.

Validation and verification

- One DOE can validate this bundle.
- One verification report is adequate, one issuance will be made at the same time for the same period, and a single serial number will be issued for all the project.
- For projects submitting multiple CDM-SSC-PDDs, all CDM-SSC-PDDs shall be made publicly available for comments at validation stage at the same time. If, for corrective actions the DOE considers that major changes would be required in any of the project activities of the bundle, and that this would require the CDM-SSC-PDD to be made publicly available for comments another time, the whole bundle would need to be made publicly available for public comments. The DOE validating the bundle shall consider the public comments for each of the CDM-SSC-PDDs.

Letter of approval

The letter of approval by the host Party(ies) has to indicate that the Party is aware that the component project activity(ies) taking place in its territory is part of the bundle.

Issuance

If a bundle of project activities is submitted with a single or different CDM-SSC-PDDs it shall have only one identifier for purposes of issuance of CERs.

Use of a single PDD covering all activities

- If all project activities in the bundle belong to the same type, same category and technology/measure, project participants may submit a single CDM-SSC-PDD covering all activities in the bundle. If project participants use the same baseline for all the project activities in the bundle, it should be justified by considering the particular situation of each project activity in the bundle. As an example two project activities using the same technology to produce electricity but connected to different grids must use different baselines. A common monitoring plan can be utilized for the bundle with the submission of one monitoring report, under conditions to be specified. If different baselines are used, the proposed procedure for sampling must consider this situation, including the proportionate representative samples of each baseline used. In this case (a single PDD is used) a single verification and certification report shall be submitted by the DOE.
- In all other cases (if the bundle includes project activities with (a) the same type, same category and different technology/measure; (b) same type, different categories and technologies/measures; and (c) different types): Project participants would have to make the submission of the bundle using a CDM-SSC-PDD for each of the component project activities contained in the bundle. Different monitoring plans will be required for project activities in the bundle and separate monitoring reports must be prepared. In these cases a single verification and certification report can be submitted for the bundle provided that it appraises each of the component project activities of the bundle separately and covers the same verification period.

Overall monitoring plan

- If project activities are bundled, a separate monitoring plan shall apply for each of the constituent project activities, or an overall monitoring plan shall apply for the bundled project, as determined by the DOE at validation.
- Only projects within the same category and technology/measure can use an overall monitoring plan.

[Simplified M&P, para. 34]

(2) Debundling

Debundling is defined as the fragmentation of a large project activity into smaller parts. A SSC project activity that is part of a large scale project activity is not eligible to use the simplified modalities and procedures for SSC project activities. A large scale project activity or any component of a large scale project activity shall follow the regular CDM modalities and procedures. A proposed SSC project activity shall be deemed to be a debundled component of a large project activity if there is a registered SSC project activity or a request for registration by another SSC project activity:

(a) by the same project participants;
(b) in the same project category and technology/measure;
(c) registered within the previous 2 years; and
(d) whose project boundary is within 1 km of the project boundary of the proposed SSC activity at the closest point.

However, if a proposed SSC project activity is deemed to be a debundled component, but total size of such an activity combined with the previously registered SSC project activity does not exceed

Box 3-2: Programme of activities (PoA) and CDM programme activity (CPA)

CDM programme activity (CPA)

CPA is defined as a project activity under a programme of activities (PoA). A CPA is a single, or a set of interrelated measure(s), to reduce GHG emissions or result in net anthropogenic greenhouse gas removals by sinks, applied within a designated area defined in the baseline methodology. The applied approved methodology shall define whether the CPA is undertaken in a single facility/installation/land or undertaken in multiple facilities/installations/land. In the case of CPAs which individually do not exceed the SSC threshold, SSC methodologies may be used once they have first been reviewed and, as needed, revised to account for leakage in the context of a CPA. [EB32, Annex 38, page 1]

Programme of activities (PoA)

A PoA is a voluntary coordinated action by a private or public entity which coordinates and implements any policy/measure or stated goal (i.e. incentive schemes and voluntary programmes), which leads to anthropogenic GHG emission reductions or net anthropogenic greenhouse gas removals by sinks that are additional to any that would occur in the absence of the PoA, via an unlimited number of CPAs. [EB32, Annex 38, page 1]

Boundary

The physical boundary of a PoA may extend to more than one country provided that each participating non-annex I host Party provides confirmation that the PoA, and thereby all CPAs, assists it in achieving sustainable development.

Treatment of local/regional/national policies and regulations

- A PoA shall comply with all current guidance by the EB concerning the treatment of local/regional/national policies and regulations.
- PoAs addressing mandatory local/regional/national policies and regulations are permissible provided it is demonstrated that these policies and regulations are systematically not enforced and that noncompliance with those requirements is widespread in the country/region. If they are enforced, the effect of the PoA is to increase the enforcement beyond the mandatory level required.

Coordinating or managing entity

- A PoA shall be proposed by the coordinating or managing entity which shall be a project participant authorized by all participating host country DNAs involved and identified in the modalities of communication as the entity which communicates with the EB, including on matters relating to the distribution of CERs.
- Project participants of the PoA shall make arrangements with the coordinator or managing entity, relating to communications, distribution of CERs and change of project participants.
- The coordinating entity of the PoA shall identify measures to ensure that all CPAs under its PoA are neither registered as an individual CDM project activity nor included in another registered PoA and that the CPA is subscribed to the PoA. These measures are to be validated and verified by DOE.

Baseline

All CPAs of a PoA shall apply the same approved baseline and monitoring methodology, involving one type of technology or set of interrelated measures in the same type of facility/installation/land.

the limits for SSC project activities as set in paragraph 28 of the decision-/CMP.2, the project activity can qualify to use the simplified modalities and procedures for SSC project activities. [CDM Glos. ver 2, page 15]

The EB further clarified that in cases where a DOE has, in assessing the possibility that a small scale project is a debundled component of a large scale project activity, determined that two or more project activities are taking place within one kilometer of each other and with the same project participants:

(a) The DOE shall ensure that these projects are described in the PDD and that the validation report contains specific details on how it has been determined that the project activities are not a debundled component of a large scale project activity;

(b) The DOE shall consider the project activities to be a debundled component of a large scale project activity even in cases where they are taking place in different project categories, if the project activities are type 1 project activities providing energy to the same user and are registered, or submitted for registration, with 2 years of each other.

[EB30, para. 37]

Duration

- The duration of the PoA, not exceeding 28 years and 60 years for A/R project activities, shall be defined by the entity at the time of request for registration of the PoA.
- Any CPA can be added to the PoA at any time during the duration of the PoA by the coordinating/managing entity. The entity shall inform the EB of the adding of CPA(s) through a DOE using a pre-defined format.

Crediting period

The crediting period of a CPA will be either a maximum of 7 years (20 years for A/R project activities) which may be renewed at most 2 times or a maximum of 10 years (30 years for A/R project activities) with no option of renewal. However, the duration of crediting period of any CPA shall be limited to the end date of the PoA regardless of when the CPA was added.

Monitoring

The emission reductions or net anthropogenic removals by sinks of each CPA shall be monitored as per the registered monitoring plan according to the methodology applied to the registered PoA. The method or approach used to verify emission reductions or removals by sinks (that may include random sampling) shall ensure the accuracy of these emission reductions.

Registration fee

- The registration fee for a PoA is based on the total expected annual emission reductions of the CPA(s) that will be submitted together with the request for registration of the PoA. The calculation of the amount to be paid and the procedures for payment will follow mutatis mutandis the existing rules for the payment of a registration fee [EB23, Annex 35] (refer to box 2-2).
- For each CPA which is included subsequently, no fee is to be paid.
- Fees are to be paid by the coordinating/managing entity to the secretariat.

[EB33, para. 60]

Formats

- Small Scale CDM Programme of Activities Design Document form: SSC-PoA-DD [EB33, Annex 43]
- Small Scale CDM Programme Activity Design Document form: PoA-CPA-SSC-DD [EB33, Annex 44]
- CDM Programme of Activities Design Document form: PoA-DD [EB33, Annex 41]
- CDM Programme Activity Design Document form: PoA-CPA-DD [EB33, Annex 42]

The most recent versions are available on the UNFCCC CDM website: <http://unfccc.int/cdm>

Guidelines

- Guidance on the registration of project activities under a PoA as a single CDM project activity, ver 02 [EB32, Annex 38]

The EB clarified that the "Procedures for registration of a PoA as a single CDM project activity and issuance of CERs for a PoA" shall reflect that a DOE shall perform one of the functions related to a given small scale PoA or small scale A/R PoA: validation or verification and certification in accordance with the Annex to 3/CMP.1 paragraph 27 (e). Hence, the guidance will undergo required changes which shall come into effect on 26 October 2007, 17:00 GMT. [EB35, para. 63]

- Procedures for registration of a PoA as a single CDM project activity and issuance of CERs for a PoA, ver 01 [EB32, Annex 39]
- Guidance for determining the occurrence of debundling under a PoA, ver 01 [EB33, Annex 21]

The most recent versions are available on the UNFCCC CDM website: <http://unfccc.int/cdm>

3.4 Afforestation and reforestation (A/R) CDM project activity

It has been determined in the Marrakech Accords that Land use, Land-use Change and Forestry (so called LULUCF or sink) under the CDM is limited to afforestation and reforestation (A/R) during the first commitment period. Forest management and revegetation are therefore not allowed under the A/R CDM scheme.

A/R CDM and emission reduction CDM project activities have similar aspects, such as provisions for participation requirements, project cycle and procedures. However, the unique characteristic of A/R CDM project activities originating from the issue of temporal storage of GHG removals in forest, which is referred to as "non-permanence", results in a distinctive crediting scheme for A/R CDM project activities.

The modalities and procedures, formats and relevant guidelines for A/R CDM project activities are listed as below in Table 3.7.

Table 3-7 List of modalities and procedures, formats and guidelines for A/R CDM project activity

SSC A/R	Modalities and Procedures	Simplified modalities and procedures for small scale afforestation and reforestation project activities under the CDM in the first commitment period of the Kyoto Protocol and measures to facilitate their implementation [decision 6/CMP.1]
	Formats	Project Design Document Form for small scale A/R project activities: CDM-SSC-AR-PDD, ver 02 [EB35, Annex 22] Form for submission on small scale A/R methodologies and procedures: F-CDM-SSC-AR-Subm, ver 01
	Guidelines	Guidelines for completing CDM-SSC-AR-PDD and F-CDM-SSC-AR-Subm, ver 04 [EB35, Annex 23]
Large scale A/R CDM	Modalities and Procedures	Modalities and procedures for afforestation and reforestation project activities under the CDM in the first commitment period of the Kyoto Protocol [decision 5/CMP.1]
	Formats	CDM Project Design Document for A/R: CDM-AR-PDD, ver 04 [EB35, Annex 20] CDM proposed new methodology for A/R: CDM-AR-NM, ver 03
	Guidelines	Guidelines for completing CDM-AR-PDD, and CDM-AR-NM, ver 08 [EB35, Annex 21]

The most recent versions are available on the UNFCCC CDM website: <http://unfccc.int/cdm>

In this section, a brief overview is provided on what project participants need to know in order to plan an A/R CDM project activity, as well as on SSC A/R project activities. Following the overview of A/R CDM project activities in this section, more technical information is explained with respect to key points covered in a project design document for A/R CDM project activities (CDM-AR-PDD), such as baseline, additionality, monitoring, calculation of GHG removals by sinks, and issue of non-permanence in subsequent section 4.6.

3.4.1 Participation requirements

As mentioned above, all provisions of Section F ("Participation requirements") of the CDM M&P apply to A/R CDM project activities (i.e. Participation in a CDM project activity is voluntary; Parties involved have to be a Party to Kyoto Protocol; Parties need to establish DNA; Annex I

Party has to calculate and record assigned amount as well as maintains national registry, etc.).
In order to host an A/R CDM project activity, a non-Annex I Party needs to determine thresholds for forest definition in addition to the participation requirements mentioned above, and report to the EB through its DNA. The thresholds are:

(a) A single minimum tree crown cover value between 10 and 30 per cent;
(b) A single minimum land area value between 0.05 and 1 hectare; and
(c) A single minimum tree height value between 2 and 5 metres.

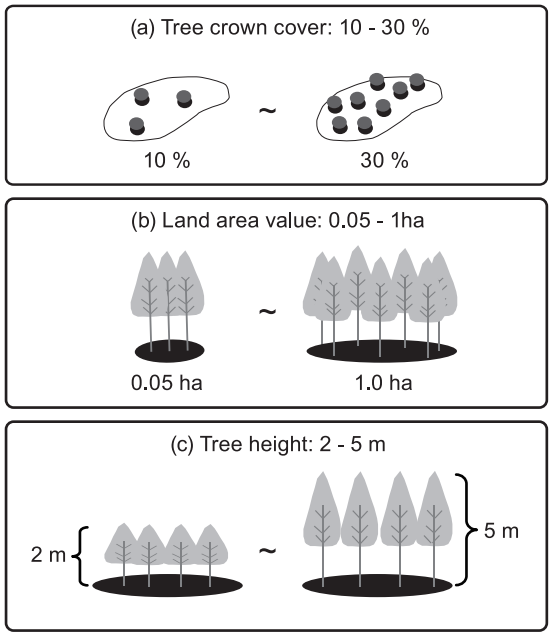


Figure 3-5 Thresholds for forest definition

3.4.2 Definitions of terms used in A/R CDM

(1) Eligibility of A/R CDM project activities (Definitions of Forest, Afforestation and Reforestation)

The EB agreed that eligibility of the A/R CDM project activities shall be demonstrated based on definitions provided in paragraph 1 of the annex to the decision 16/CMP.1 ("Land use, land-use change and forestry"), as requested by decision 5/CMP.1 ("Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol"), until new procedures to demonstrate the eligibility of lands for afforestation and reforestation project activities under the clean development mechanism are approved by the EB [EB28, para. 36].

Forest is a minimum area of land of 0.05–1.0 hectare with tree crown cover (or equivalent stocking level) of more than 10–30 per cent with trees with the potential to reach a minimum height of 2–5 metres at maturity in situ. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10–30 per cent or tree height of 2–5 metres are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest.

The Marrakech Accords decide the eligibility of LULUCF project activities under the CDM is limited to afforestation and reforestation for the first commitment period. The definition of afforestation and reforestation are as follows:

(a) Afforestation is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources;

(b) Reforestation is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989.

(2) Carbon pools

Carbon pools are above-ground biomass, below-ground biomass, litter, dead wood and soil organic carbon.

(3) Project boundary

When project participants start an A/R CDM project activity, a project boundary needs to be clearly defined to calculate GHG removals by sinks per unit of area or in the total area.

The project boundary geographically delineates the afforestation or reforestation project activity under the control of the project participants. The project activity may contain more than one discrete area of land.

In another word, the project boundary is a physical line surrounding piece(s) of land, and one A/R CDM project activity could be composed of different pieces of land.

(4) Baseline net GHG removals by sinks

Baseline net GHG removals by sinks are the sum of the changes in carbon stocks in the carbon pools within the project boundary that would have occurred in the absence of the A/R CDM project activity.

(5) Actual net GHG removals by sinks

Actual net GHG removals by sinks are the sum of the verifiable changes in carbon stocks in the carbon pools within the project boundary, minus the increase in emissions of the GHGs measured in CO_2 equivalents by the sources that are increased as a result of the implementation of the afforestation or reforestation project activity, while avoiding double counting, within the project boundary, attributable to the A/R CDM project activity.

(6) Net anthropogenic GHG removals by sinks

Net anthropogenic GHG removals by sinks are the actual net GHG removals by sinks minus the baseline net GHG removals by sinks minus leakage.

(7) Temporary CER (tCER)

Temporary CER (tCER) is a CER issued for an A/R CDM project activity which expires at the end of the commitment period following the one during which it was issued. For example, if 100 tons of tCERs are issued in the first commitment period, the tCERs will expire at the end of the second commitment period.

(8) Long-term CER (ICER)

Long-term CER (lCER) is a CER issued for an A/R CDM project activity which expires at the end of the crediting period of the A/R CDM project activity for which it was issued.

(9) Starting date of an A/R CDM project activity

An A/R CDM project activity starting after 1 January 2000 can also be validated and registered after 31 December 2005 as long as the first verification of the project activity occurs after the date of registration of this project activity. Given that the crediting period starts at the same date as the starting date of the project activity, the projects starting 2000 onwards can accrue tCERs/lCERs as of the starting date [EB21, para. 64]. In other words, provisions of paragraphs 12 and 13 of Decision 17/CP.7 do not apply to A/R CDM project activities.

(10) Leakage

Leakage is the increase in greenhouse gas emissions by sources which occurs outside the boundary of an afforestation or reforestation project activity under the CDM which is measurable and attributable to the afforestation or reforestation project activity.

3.4.3 Other relevant decisions made by the EB

(1) Pre-project GHG emissions

When the baseline scenario is expected to correspond to approaches of paragraph 22 (a) and (c) of the modalities and procedures for A/R CDM project activities:

(a) A/R CDM project activities, only the increase of pre-project GHG emissions as a consequence of the implementation of the project activity has to be taken into account in the calculation of net anthropogenic GHG removals by sinks.

(b) Pre-project GHG emissions by sources which are displaced outside the project boundary in order to enable an afforestation or reforestation project activity under the CDM shall not be included under leakage if the displacement does not increase these emissions with respect to the pre-project conditions. Otherwise, leakage for the displacement of pre-project activities is equal to the incremental GHG emissions compared with the pre-project conditions.

(2) Renewable biomass

The EB adopted a definition of renewable biomass, as shown below. The EB also agreed that the use of biomass is not necessarily excluded if it does not meet the definition of renewable biomass. In such cases the possible negative impact on carbon stocks of such use, shall be accounted for as leakage in baseline and monitoring methodologies.

Biomass is "renewable" if one of the following five conditions applies in Table 3-8:

Table 3-8 Conditions for renewable/non-renewable biomass [EB23, Annex 18]

1. The biomass is originating from land areas that are forests where:	The land area remains a forest; and
	Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
	Any national or regional forestry and nature conservation regulations are complied with.

2. The biomass is woody biomass and originates from croplands and/ or grasslands where:	The land area remains cropland and/or grasslands or is reverted to forest; and
	Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
	Any national or regional forestry, agriculture and nature conservation regulations are complied with.
3. The biomass is non-woody biomass and originates from croplands and/ or grasslands where:	The land area remains cropland and/or grasslands or is reverted to forest; and
	Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
	Any national or regional forestry, agriculture and nature conservation regulations are complied with.
4. The biomass is a biomass residue and the use of that biomass residue in the project activity does not involve a decrease of carbon pools, in particular dead wood, litter or soil organic carbon, on the land areas where the biomass residues are originating from. For example, if bagasse from sugar production would in the absence of the CDM be dumped or left to decay and is used for energy generation under the CDM, it can be assumed that the use of the bagasse does not affect the sugar cane cultivation practices and hence the carbon pools of the respective soils. In contrast, where a CDM project involves the collection of dead wood from a forest, which would not be collected in the absence of the CDM, the extracted biomass cannot be regarded as renewable, since it would result in a decrease of carbon stocks.	
5. The biomass is the non-fossil fraction of an industrial or municipal waste.	

Note: In case none of these conditions applies, the biomass is considered as "non-renewable".

(3) Guidance of national and/or sectoral policies and circumstances

The EB provided guidance on national and/or sectoral policies and circumstances in the baseline scenario particular for A/R CDM project activities [EB23, Annex 19], as follows:

1. A baseline scenario shall be established taking into account relevant national and/or sectoral policies and circumstances, such as historical land use practices and the economic situation in the project sector.
2. As a general principle, national and/or sectoral policies and circumstances are to be taken into account on the establishment of a baseline scenario, without creating perverse incentives that may impact host Parties' contributions to the ultimate objective of the Convention.
3. National and/or sectoral land-use policies or regulations, which give comparative advantages to afforestation/reforestation activities and that have been implemented since the adoption by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001), need not be taken into account in developing a baseline scenario (i.e. the baseline scenario could refer to a hypothetical situation without the national and/or sectoral policies or regulations being in place).

(4) Procedures to demonstrate the eligibility of lands for A/R CDM project activities

The EB agreed to the "procedures to demonstrate the eligibility of lands for afforestation and reforestation CDM project activities" (Version 01) [EB35, Annex 18], as shown below.

1. Project participants shall provide evidence that the land within the planned project boundary is eligible for an A/R CDM project activity by following the steps outlined below.
   (a) Demonstrate that the land at the moment the project starts does not contain forest by providing transparent information that:
      (i) Vegetation on the land is below the forest thresholds (crown cover or equivalent

stocking level, tree height at maturity in situ, minimum land area) adopted for the definition of forest by the host country under decisions 16/CMP.1 and 5/CMP.1 as communicated by the respective DNA; and

(ii) All young natural stands and all plantations on the land are not expected to reach the minimum crown cover and minimum height chosen by the host country to define forest; and

(iii) The land is not temporarily unstocked, as a result of human intervention such as harvesting or natural causes.

(b) Demonstrate that the activity is a reforestation or afforestation project activity:

(i) For reforestation project activities, demonstrate that the land was not forest by demonstrating that the conditions outlined under (a) above also applied to the land on 31 December 1989.

(ii) For afforestation project activities, demonstrate that for at least 50 years vegetation on the land has been below the thresholds adopted by the host country for definition of forest.

2. In order to demonstrate steps 1 (a) and 1 (b), project participants shall provide information that reliably discriminates between forest and non-forest land according to the particular thresholds adopted by the host country, inter alia:

(a) Aerial photographs or satellite imagery complemented by ground reference data; or

(b) Land use or land cover information from maps or digital spatial datasets; or

(c) Ground based surveys (land use or land cover information from permits, plans, or information from local registers such as cadastre, owners registers, or other land registers).

If options (a), (b), and (c) are not available/applicable, project participants shall submit a written testimony which was produced by following a Participatory Rural Appraisal (PRA) methodology(*1) or a standard Participatory Rural Appraisal (PRA) as practiced in the host country.

(*1) Participatory rural appraisal (PRA) is an approach to the analysis of local problems and the formulation of tentative solutions with local stakeholders. It makes use of a wide range of visualisation methods for group-based analysis to deal with spatial and temporal aspects of social and environmental problems. This methodology is, for example, described in:

- Chambers R (1992): Rural Appraisal: Rapid, Relaxed, and Participatory. Discussion Paper 311, Institute of Development Studies, Sussex.
- Theis J, Grady H (1991): Participatory rapid appraisal for community development. Save the Children Fund, London.

3.4.4 Project cycle of A/R CDM project activities

The project cycle and approval process of A/R CDM project activities is similar to that of emission reduction CDM project activities, as outlined in Figure 2-1 and Figure 2-2, respectively. Project participants need to check whether their A/R CDM project activity is a large scale A/R CDM project activity or a small scale A/R CDM project activity (see section 3.4.6 for definition of small scale A/R CDM project activity), and whether an approved methodology is applicable. Then they need to proceed with drafting of a CDM-AR-PDD, submission of a new methodology if necessary, validation, and registration for issuance of credits (in case of A/R CDM project activities, tCERs and lCERs are issued).

3.4.5 Overview of approval process of A/R CDM project activities and A/R CDM methodologies

As described in Chapter 2 (Figure 2-2), the basic steps of approval process of A/R CDM project activities are the same as emission reduction CDM project activities. In this section, brief explanation of the approval process is given in a step-by-step manner.

Step 1: Determine if your project qualifies as a small scale A/R CDM project activity

Project participants should first consider if their project meets the eligibility criteria of small scale A/R CDM project activities as listed below.

(a) Net anthropogenic GHG removals by sinks of less than 8,000 tons of CO_2 per year; and

(b) Developed or implemented by low-income communities and individuals as determined by the host Party

If your project does not qualify as a small scale A/R CDM project activity, proceed to Step 2 below.

Step 2: Determine if an approved baseline and monitoring methodology is applicable to your project

Project participants need to apply one of the methodologies approved by the EB or propose a new baseline and monitoring methodology for A/R CDM project activities in accordance with the "procedures for the submission and consideration for a proposed new baseline and monitoring methodology for A/R CDM project activities" (Version 06) [EB32, Annex 18]. In case an approved methodology can be used, the DOE may proceed with the validation of the A/R CDM project activity and submit CDM-AR-PDD for registration. If not, project participants must submit a new baseline and monitoring methodology using format CDM-AR-NM, along with the draft CDM-PDD, and have it approved by the EB.

Project participants who wish to apply an approved methodology to their project activity must check the applicability of approved methodologies (AR-AMs). Table 3-9 shows a list of the approved methodologies for A/R CDM project activities.

Table 3-9 List of Approved A/R Methodologies (as of 19 Oct 07)

Reference	Ver. No.	Title of the Methodology	Sectoral Scope
LARGE SCALE			
AR-AM0001	2	Reforestation of degraded land - Version 2	Afforestation and reforestation (14)
AR-AM0002	1	Restoration of degraded lands through afforestation/reforestation	
AR-AM0003	2	Afforestation and reforestation of degraded land through tree planting, assisted natural regeneration and control of animal grazing - Version 2	
AR-AM0004	1	Reforestation or afforestation of land currently under agricultural use	

Reference	Ver. No.	Title of the Methodology	Sectoral Scope
AR-AM0005	1	Afforestation and reforestation project activities implemented for industrial and/or commercial uses	Afforestation and reforestation (14)
AR-AM0006	1	Afforestation/Reforestation with Trees Supported by Shrubs on Degraded Land	
AR-AM0007	1	Afforestation and Reforestation of Land Currently Under Agricultural or Pastoral Use	
AR-AM0008	1	Afforestation or reforestation on degraded land for sustainable wood production - Version 1	
AR-AM0009	1	Afforestation or reforestation on degraded land allowing for silvopastoral activities - Version 1	
AR-AM0010	1	Afforestation and reforestation project activities implemented on unmanaged grassland in reserve/ protected areas - Version 1	
SMALL SCALE			
AR-AMS0001	4	Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands	Afforestation and reforestation (14)

Note: The number with parentheses following each Sectoral Scope in the Sectoral Scope column denotes the scope number.

Step 3: Propose a new baseline and/or monitoring methodology

The procedure for proposing a new baseline and/or monitoring methodology for an A/R CDM project activity is identical to that for emission reduction of CDM project activity. One difference is that the main body to make analysis/recommendation for proposed methodologies is Afforestation and Reforestation Working Group (A/R WG) instead of Methodologies Panel (Meth Panel).

Project participants intending to propose a new A/R baseline and monitoring methodology for consideration and approval by the EB should prepare the A/R methodologies form for baseline and monitoring methodologies (CDM-AR-NM) along with a draft project design document (CDM-AR-PDD) and as a minimum, complete sections A to D, including relevant annexes and submit through a DOE (or an AE).

Having checked that the "CDM: Proposed new A/R methodology form" (F-CDM-AR-PNM) has been duly filled by the DOE and documentation provided by the DOE is complete, the secretariat shall prepare a draft pre-assessment using the latest version of the "CDM: Proposed new A/R methodology assessment form" (F-CDM-AR-NMas) to assess the quality of the submission and forward it along with the documentation submitted by the project participant (CDM-AR-NM & CDM-AR-PDD) to 1 member of the A/R WG for consideration. This member is to assess the quality of the submission, grade it between 1 and 2, and substantiate the appraisal (one paragraph). If the member grades the documentation as being 2, the documentation is to be sent back to the project participants. If the grade is 1, the documentation shall be considered as received by the EB and be forwarded by the secretariat for consideration of the EB and the A/R WG. The A/R WG shall finalize its recommendation to the EB within 2 meetings of the panel.

A DOE/AE may voluntarily undertake a pre-assessment of a newly methodology before submitting it. If a voluntary pre-assessment has been undertaken, no pre-assessment by the A/R WG is needed. Once the secretariat has confirmed that the "CDM: Proposed new A/R methodology form" has been duly filled by the DOE and documentation provided by the DOE is complete, the submitted methodology may be in such case be considered as received.

The secretariat shall make the proposed new A/R methodology publicly available on the UNFCCC CDM website and invite public inputs for a period of 15 working days. Public inputs on a proposed new A/R methodology shall be made using the "Proposed new A/R methodology - public comment form" (F-CDM-AR-NMpu). Comments shall be forwarded to the A/R WG at the moment of receipt and made available to the public at the end of the 15 working day period.

Whenever a proposed new A/R methodology is submitted to the A/R WG, it shall analyze it and, if possible at its next meeting, make a recommendation regarding the approval of the proposed new A/R methodology to the EB. The EB shall consider the proposed new A/R methodology at the next meeting following the receipt of the recommendation regarding the approval ("A" case) or non-approval ("C" case) of the proposed new A/R methodology by the A/R WG.

Reference documents for "Procedures for the Submission and Consideration for a Proposed New Baseline and Monitoring Methodology for Afforestation and Reforestation Project Activities" (Version 06) [EB32, Annex 18] are available on the CDM website (http://cdm.unfccc.int/Reference/Procedures/).

The EB approved the "Technical guidelines for the development of new afforestation/ reforestation baseline and monitoring methodologies" which facilitate the development of new methodologies [EB28, Annex 19].

The EB approved the draft methodological tool for the calculation of the number of sample plots for measurements within A/R CDM project activities [EB31, Annex 15]. The tool facilitates the development of new baseline and monitoring methodologies for A/R CDM project activities by providing two alternative methods by which a minimal number of sample plots for the measurement of biomass can be determined.

Step 4: Draft an A/R Project Design Document (CDM-AR-PDD)

Project participants then need to fill out an A/R PDD (CDM-AR-PDD), which includes information such as general description of the project activity, the baseline methodology and additionality, the monitoring methodology and plan, and calculations of GHG removals by sinks. The information required in the CDM-AR-PDD will be discussed in section 4.6.

Step 5: Validate the A/R CDM project activity

Validation is the process of independent evaluation of a proposed A/R project activity by a DOE against the requirements of the A/R CDM project activities as set out in the modalities and procedures for A/R CDM project activities (CDM A/R M&P) and relevant decisions of the COP/MOP, on the basis of the A/R PDD.

Step 6: Register the CDM project activity

Registration is the formal acceptance by the EB of a validated project as an A/R CDM project activity. Registration is the prerequisite for the verification, certification and issuance of tCERs or lCERs related to the A/R project activity.

3.4.6 Small scale A/R CDM (SSC A/R) project activity

SSC A/R project activities are those that are expected to result in net anthropogenic GHG removals by sinks of less than 8,000 tons of CO_2 per year and are developed or implemented by low-income communities and individuals as determined by the host Party. If a SSC A/R project activity results in net anthropogenic GHGs removals by sinks greater than 8,000 tons of CO_2 per year, the excess removals will not be eligible for the issuance of tCERs or lCERs.

The Project Design Document Form for small scale afforestation and reforestation project activities (CDM-AR-SSC-PDD) and Guidelines for completing CDM-AR-PDD and CDM-AR-NM can be downloaded from:

- CDM-AR-SSC-PDD: http://cdm.unfccc.int/Reference/Documents/cdm_ar_ssc_pdd/
- Guidelines: http://cdm.unfccc.int/Reference/Documents/Guidel_AR_SSC_Pdd/

4. CDM Project Design Document (CDM-PDD)

4.1 Overview of the CDM-PDD version 3

Project participants who wish to develop a CDM project activity must first prepare a fully completed Project Design Document (CDM-PDD) and submit it for validation and registration. The CDM-PDD describes the project activity as well as application of a baseline and monitoring methodology to the project activity. Project participants should check with the CDM web site for the most recent version of the CDM-PDD. As of October 2007, CDM-PDD version 03 is the most recent version[5]. At the same time, project participants are recommended to refer to the most recent version of the "Guidelines for completing CDM-PDD and CDM-NM" for detailed guidance of how to fill out these formats, as well as for explanation of key terms used in the CDM, which is found in the Glossary of CDM terms. Underlined terms in the CDM-PDD and CDM-NM forms can be found in the glossary.

CDM-PDD Format: CDM Project Design Document, version 03
Guidelines: Guidelines for completing CDM-PDD and CDM-NM, version 06.2
Download from the CDM web site: http://cdm.unfccc.int/Reference/Documents

Contents of the CDM-PDD, version 03:

A. General description of project activity
B. Application of a baseline and monitoring methodology
C. Duration of the project activity / crediting period
D. Environmental impacts
E. Stakeholders' comments
Annexes
Annex 1: Contact information on participants in the project activity
Annex 2: Information regarding public funding
Annex 3: Baseline information
Annex 4: Monitoring plan

When completing the CDM-PDD, project participants should be aware of the following general guidelines:

- The CDM-PDD shall be completed and submitted in English language to the EB.
- The CDM-PDD template shall not be altered, that is, shall be completed using the same font without modifying its format, font, headings or logo.
- Tables and their columns shall not be modified or deleted. Rows may be added, as needed.
- The CDM-PDD shall include in section A.1 the version number and the date of the document.
- If sections of the CDM-PDD are not applicable, it shall be explicitly stated that the section is left blank on purpose.

The guidelines explain the CDM-PDD as follows:

1. The CDM-PDD presents information on the essential technical and organizational aspects of the

5 Revisions of the CDM-PDD come into effect once adopted by the EB, bearing in mind the provisions that revisions to the CDM-PDD do not affect project activities, (a) already validated, or already submitted to the OE for validation, prior to the adoption of the revised CDM-PDD, (b) submitted to the OEs within a month following the adoption of the revised CDM-PDD, and (c) the EB will not accept documentation using the previous version of the CDM-PDD six months after the adoption of a new version.

project activity and is a key input into the validation, registration, and verification of the project as required under the Kyoto Protocol to the UNFCCC. The relevant modalities and procedures are detailed in decision 17/CP.7 contained in document FCCC/CP2001/13/Add.2.

2. The CDM-PDD contains information on the project activity, the approved baseline methodology applied to the project activity, and the approved monitoring methodology applied to the project. It discusses and justifies the choice of baseline methodology and the applied monitoring concept, including monitoring data and calculation methods.
3. Project participants should submit the completed version of the CDM-PDD, together with attachments if necessary, to an accredited DOE for validation. The DOE then examines the adequacy of the information provided in the CDM-PDD, especially whether it satisfies the relevant modalities and procedures concerning CDM project activities. Based on this examination, the DOE makes a decision regarding validation of the project.
4. Bearing in mind paragraph 6 of CDM M&P[6], project participants shall submit documentation that contains confidential /proprietary information in two versions:
   - One marked up version where all confidential/proprietary parts shall be made illegible by the project participants (e.g. by covering those parts with black ink) so that this can be made publicly available.
   - A second version containing all information which shall be treated as strictly confidential by all handling this documentation (DOEs/AEs, EB members and alternates, panel/committee and working group members, external experts requested to consider such documents in support of work for the EB, and the secretariat).
5. In accordance with paragraph 6 of CDM M&P information used to determine additionality, to describe the baseline methodology and its application, and to support an environmental impact assessment, shall not be considered proprietary or confidential. Project participants shall therefore, in accordance with paragraph 45 (b) of CDM M&P describe the choice of approaches, assumptions, methodologies, parameters, data sources, key factors and additionality in a transparent and conservative manner. The scope and detail of the description in the PDD should allow interested parties to trace the rationale of the project.

4.2 Application of a baseline methodology

Project participants can find instructions about how to complete the CDM-PDD in the "Guidelines for completing CDM-PDD and CDM-NM", in Part II, Section B: "Specific guidelines for completing the Project Design Document (CDM-PDD)". This manual does not repeat the information contained in the Guidelines, but tries to give supplementary information that may assist project participants in completing the CDM-PDD.

4.2.1 General description of project activity [PDD section A]

In Section A, project participants are expected to provide overview and general information of their project activities. The major items include project title, location, participants, technical description, how the project activity reduces GHG emissions, and the estimated amount of GHG reduction.

6 Paragraph 6 of CDM M&P states: Information obtained from CDM project participants marked as proprietary or confidential shall not be disclosed without the written consent of the provider of the information, except as required by national law. Information used to determine additionality as defined in paragraph 43 below, to describe the baseline methodology and its application, and to support an environmental impact assessment referred to in paragraph 37(c) below, shall not be considered as proprietary or confidential.

4.2.2 Selecting the methodology [PDD section B.1, B.2]

Project participants, when applying an approved methodology, must be careful in assessing the applicability of the methodology to the proposed project activity. Project participants can find the most recent list of approved methodologies and approved consolidated methodologies on the CDM web site[7] in order to check if there is an approved methodology applicable to the project activity. If there is no applicable approved methodology, project participants should propose a new methodology.

Following are the points that project participants should check:

- The proposed project activity meets all the conditions set out in the "Applicability" part of an approved methodology.
- Some approved methodologies state that they are applicable to project activity with a certain baseline scenario. An example is ACM0006 "Consolidated methodology for electricity generation from biomass residues", which provides a list of baseline scenarios to which the methodology can be applied.

Request for deviation

In cases where a project activity does not quite meet the applicability of an approved methodology, but project participants think the difference is not substantial enough to propose a new methodology, it is possible to submit the project for validation using the approved methodology. In such case, in the process of validation, the DOE may find that project participants deviated from an approved methodology when applying it to a proposed project activity. If the DOE does not consider that the deviation implies a revision of the methodology it may seek guidance on the acceptability of the deviation from the EB prior to requesting registration of the proposed project activity. If a DOE finds that the deviation from the approved methodology requires revision of this methodology the procedures provided for revision of approved methodology shall be used [EB24, Annex 30].

Propose a revision to an approved methodology

If project participants intend to propose a revision to an approved baseline or monitoring methodology or tool referred to in a methodology for the EB's consideration and approval, they shall submit to a DOE the following:

(a) a form for submission of requests for revisions of approved methodologies to the Methodologies Panel (F-CDM-AM-Rev);

(b) a draft revised version of the approved methodology or tool referred to in a methodology highlighting proposed changes; and

(c) a draft project design document (CDM-PDD) with sections A to C completed, including relevant annexes.

[EB35, Annex 13, para. 7]

Details of the revision procedure could be found in the document "Procedures for the Revision of an Approved Baseline or Monitoring Methodology by the Executive Board" (Version 09) [EB35, Annex 13]. The most recent version is available on the UNFCCC CDM website: <http://unfccc.int/cdm>.

4.2.3 Project boundary [PDD section B.3]

As defined in the Glossary of CDM terms, project boundary shall "encompass all GHG emissions under the control of the project participants that are significant and reasonably attributable to the

7 http://cdm.unfccc.int/methodologies/approved

CDM project activity".

Project boundary is defined in approved methodologies, usually with regard to the spatial extent and gases to be included. To illustrate the spatial extent included in the project boundary, it is useful to include a schematic of the project site and relevant equipments, delineating the project boundary. As for the gases to be included, use the table format in the CDM-PDD. If the methodology gives an option to include or exclude certain sources and gases from the project boundary, project participants should explain and justify the choice.

4.2.4 Baseline identification [PDD section B.4]

Baseline, a fundamental concept in the CDM, is defined as "the scenario that reasonably represents the GHG emissions that would occur in the absence of the proposed project activity" [CDM M&P, para. 44]. A baseline shall cover emissions from all gases (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6), sectors and source categories listed in Annex A of the Kyoto Protocol within the project boundary. Project participants must identify a baseline scenario for the proposed project activity, according to the methods and steps specified in the baseline methodology that is applied to the project activity.

A baseline shall be deemed to reasonably represent the GHG emissions that would occur in the absence of the proposed project activity if it is derived using an approved baseline methodology or a proposed new baseline methodology that has been approved by the EB. Different scenarios may be elaborated as potential evolutions of the situation existing before the proposed CDM project activity. The continuation of the current activity could be one of them; implementing the proposed project activity may be another; and many others could be envisaged. Baseline methodologies shall require narrative descriptions of all reasonable baseline scenarios. Based on the selected baseline methodology, which could be either a methodology already approved by the EB or a proposed new methodology, project participants must describe how a baseline scenario is identified among possible baseline scenarios in the CDM-PDD. To elaborate the different scenarios, different elements shall be taken into consideration, including related guidance issued by the EB. For instance, the project participants shall take into account national/sectoral policies and circumstances, ongoing technological improvements, investment barriers, etc (Box 4-1).

There are different patterns of baseline identification depending on the approved methodologies.

(1) The methodology presents an already identified baseline scenario. In this case, project participants should demonstrate that the baseline scenario as presented in the methodology is the only relevant and plausible business-as-usual scenario.

Example:

ACM0001

The baseline is the atmospheric release of the gas and the baseline methodology considers that some of the methane generated by the landfill may be captured and destroyed to comply with regulations or contractual requirements, or to address safety and odour concerns.

ACM0002

For project activities that do not modify or retrofit an existing electricity generation facility, the baseline scenario is the following: Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, ….

(2) The methodology presents possible baseline options for various components of the project activity, and project participants are required to identify the most plausible baseline scenario, which is a combination of baseline options.

Example:

ACM0006

Realistic and credible alternatives should be separately determined regarding:

- how power would be generated in the absence of the CDM project activity (P1-P9);
- what would happen to the biomass in the absence of the project activity (B1-B8); and
- in case of cogeneration projects: how the heat would be generated in the absence of the project activity (H1-H8).

20 combinations of baseline options P, B, and H are identified (scenarios 1 through 20) as possible baseline scenarios, to which ACM0006 can be applicable.

(3) The methodology requires a step-wise approach resembling the additionality tool for the identification of a baseline scenario.

Example:

ACM0003

1. Define alternative scenarios for the fuel mix

2. Option 1: Select baseline scenario through financial analysis or Option 2: Select baseline scenario through barriers analysis

Each fuel selection scenario should be processed via the barriers analysis step of the latest version of the "Tool for demonstration assessment and of additionality" agreed by the CDM Executive Board, which is available on the UNFCCC CDM web site. The baseline scenario should take into account relevant national/local and sectoral policies and circumstances, and the proponent should demonstrate that the key factors, assumptions and parameters of the baseline scenario are conservative.

Box 4-1: Treatment of national and/or sectoral policies and regulations [EB22, Annex 3]

The EB, at its 16th meeting agreed on clarifications on the treatment of national and/or sectoral policies and regulations in determining a baseline scenario. The EB acknowledged that there should be differentiated ways to address types of national and/or sectoral policies in determining a baseline scenario and had agreed to a number of definitions. At its 22nd meeting, the EB agreed to revise the clarifications provided at EB16 as outlined below:

- A baseline scenario shall be established taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector.
- As a general principle, national and/or sectoral policies and circumstances are to be taken into account on the establishment of a baseline scenario, without creating perverse incentives that may impact host Parties' contributions to the ultimate objective of the Convention.

(1) Type E+: National and/or sectoral policies or regulations that give comparative advantages to more emissions-intensive technologies or fuels over less emissions intensive technologies or fuels

Only "Type E+" national and/or sectoral policies or regulations that have been implemented before adoption of the Kyoto Protocol by the COP (decision 1/CP.3, 11 December 1997) shall be taken into account when developing a baseline scenario. If "Type E+" national and/or sectoral policies were implemented since the adoption of the Kyoto Protocol, the baseline scenario should refer to a hypothetical situation without the national and/or sectoral policies or regulations being in place.

(2) Type E-: National and/or sectoral policies or regulations that give comparative advantages to less emissions-intensive technologies over more emissions-intensive technologies (e.g. public subsidies to promote the diffusion of renewable energy or to finance energy efficiency programs).

"Type E-" national and/or sectoral policies or regulations that have been implemented since the adoption by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001) need not be taken into account in developing a baseline scenario (i.e. the baseline scenario could refer to a hypothetical situation without the national and/or sectoral policies or regulations being in place).

Project participants proposing new baseline methodologies may use the "tool for identification of baseline scenario and demonstration of additionality" (Combined tool), which provides a procedure for baseline scenario identification as well as additionality demonstration.

Methodologies using this tool are only applicable if all potential alternative scenarios to the proposed project activity are available options to project participants. For example, it applies to project activities that make modifications to an existing installation that is operated by project participants.

Moreover, this applies to the construction of new facilities if all alternative scenarios to the project activity are available options to project participants, i.e. if all alternative scenarios could be implemented by the project participants. For example, it may be applied to a cement manufacturer that plans to construct a new cement plant and has access to all cement production technologies. The EB revised the combined tool to expand its applicability to newly built facilities where the alternative scenarios to the project activity are available options to project participants [EB28, Annex 14].

However, methodologies using this tool are not applicable to project activities where one or more alternative scenarios to the proposed project activity are not available options to the project participant. In these cases, a different procedure than provided here would be required to demonstrate additionality and identify the baseline scenario.

The Meth Panel is considering whether to expanding this tool to cover all cases that would be appropriate. In the meantime, methodologies that typically involve alternatives are not under the control of project participants can continue to use, if desired, the additionality tool (provides benchmark and other tools), and provide their own methods to develop and/or assess baseline scenario.

Since the methodological procedure to identify the baseline scenario and demonstrate additionality by the combined tool and by the "tool for the demonstration and assessment of additionality" (additionality tool) is the same, the step-wise approach is discussed in the following additionality section.

4.2.5 Additionality [PDD section B.5]

Project participants should follow the prescription of the baseline methodology to be applied to the project activity, in order to demonstrate additionality of the project activity. Project participants are asked to explain and justify key assumptions and rationales used in demonstrating additionality, as well as to provide relevant documentation of references.

If the starting date of the project activity is before the date of validation, project participants are asked to provide evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available at, or prior to, the start of the project activity.

Approved methodologies often require the use of the "tool for the demonstration and assessment of additionality[8]" (additionality tool), which was revised by the EB [EB29, Annex 5]. The additionality tool provides a general framework for demonstrating and assessing additionality and is to be applicable to a wide range of project types, though some project types may require adjustments. The use of this tool to assess and determine additionality does not replace the need for the baseline methodology to provide for a stepwise approach justifying the selection and determination of the most plausible baseline scenario alternatives. Project participants proposing new baseline methodologies may incorporate this additionality tool, but may also propose other tools for the demonstration of additionality. The additionality tool provides for a step-wise approach to demonstrate and assess additionality, as shown in Figure 4-1 below.

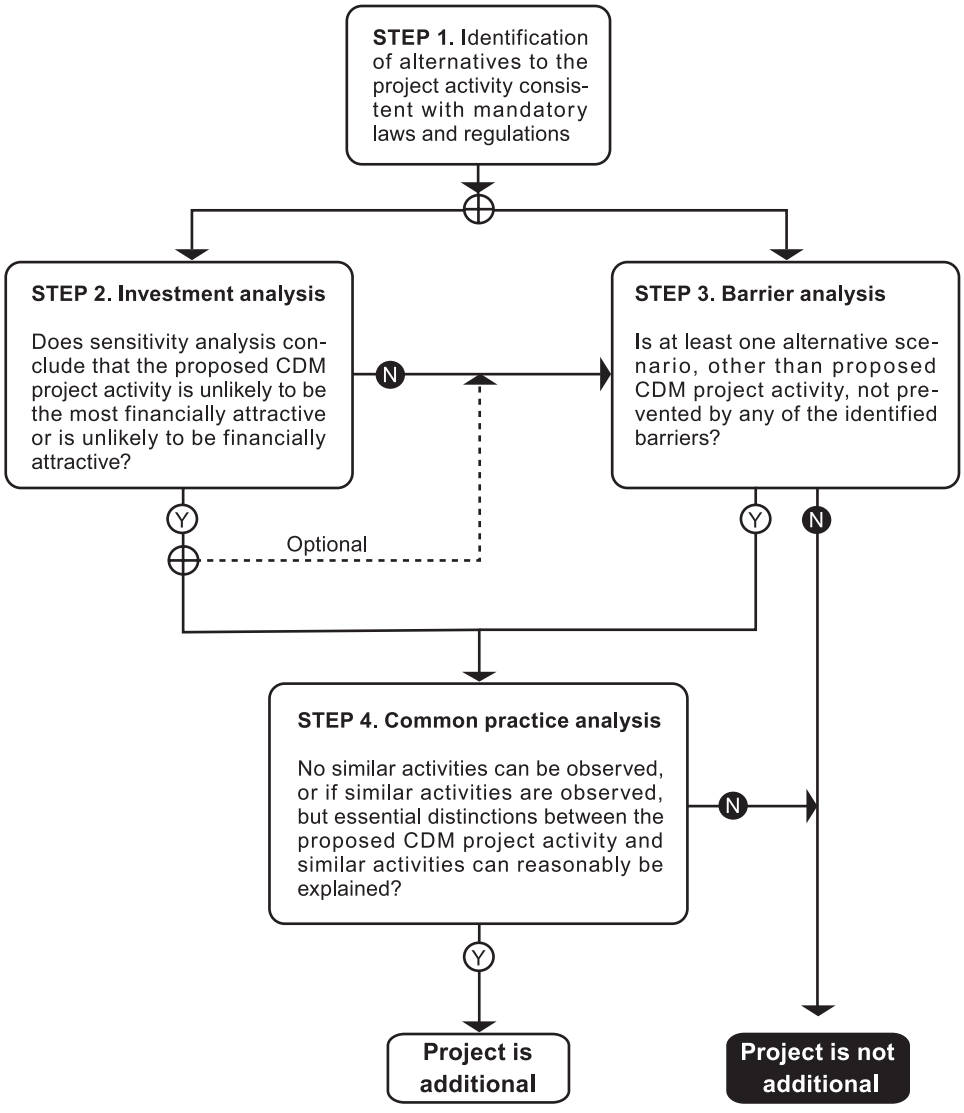


Figure 4-1 Overview of the additionality tool (Source: EB29, Annex 5)

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

- Sub-step 1a. Define alternatives to the project activity. Identify realistic and credible alternative(s) available to the project participants or similar project developers that provide outputs or services comparable with the proposed CDM project activity.

8 http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf

These alternatives are to include:

- The proposed project activity not undertaken as a CDM project activity;
- All other plausible and credible alternatives to the project activity that deliver outputs and on services (e.g. electricity, heat or cement) with comparable quality, properties and application areas;
- If applicable, continuation of the current situation (no project activity or other alternatives undertaken).

- Sub-step 1b. Consistency with mandatory laws and regulations:
  - The alternative(s) identified in sub-step 1a. shall be in compliance with all applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution. (This sub-step does not consider national and local policies that do not have legally-binding status.).
  - If an alternative does not comply with all applicable legislation and regulations, then show that, based on an examination of current practice in the country or region in which the law or regulation applies, those applicable legal or regulatory requirements are systematically not enforced and that noncompliance with those requirements is widespread in the country. If this cannot be shown, then eliminate the alternative from further consideration.
  - If the proposed project activity is the only alternative amongst the ones considered by the project participants that is in compliance with mandatory regulations with which there is general compliance, then the proposed CDM project activity is not additional.

The project participant should proceed to Step 2 (Investment analysis) or Step 3 (Barrier analysis). One may also select to complete both Steps 2 and 3.

Step 2: Investment analysis

- Project participants can choose the appropriate analysis method from the following three options:
  - Option I - Simple cost analysis: the CDM project activity generates no financial or economic benefits other than CDM related income.
  - Option II - Investment comparison analysis: the CDM project activity has non-CER financial or economic benefits. Select an appropriate financial indicator and compare the indicator value for the CDM project activity and that for the other alternatives. Conduct a sensitivity analysis.
  - Option III - Benchmark analysis: the CDM project activity has non-CER financial or economic benefits. Select an appropriate financial indicator and compare the indicator value for the CDM project activity and the value of the identified benchmark, e.g. government bond rates. Conduct a sensitivity analysis.

Project participants should present the investment analysis in a transparent manner and provide all the relevant assumptions in the CDM-PDD, so that a reader can trace the analysis and obtain the same results. Clearly present critical techno-economic parameters and assumptions (such as capital costs, fuel prices, lifetimes, and discount rate or cost of capital).

Step 3: Barrier analysis

- Project participants should determine whether the proposed project activity faces barriers that:
  (a) Prevent the implementation of this type of proposed project activity; and
  (b) Do not prevent the implementation of at least one of the alternatives.

- Sub-step 3a. Identify barriers. Project participants should identify that there are realistic and credible barriers that would prevent the implementation of the proposed project activity from being carried out if the project activity was not registered as a CDM activity.
  Such barriers include:
  - Investment barriers, other than the economic/financial barriers in Step 2 above, inter alia:
    - Similar activities have only been implemented with grants or other non-commercial finance terms.
    - No access to domestic or international capital markets due to real or perceived risks associated with investment in the country where the project activity is to be implemented.
  - Technological barriers, inter alia:
    - Skilled and/or properly trained labour to operate and maintain the technology is not available and no education/training institution in the host country provides the needed skill, leading to equipment disrepair and malfunctioning;
    - Lack of infrastructure for implementation of the technology;
    - Risk of technology failure;
    - The particular technology used in the proposed project activity is not available in the relevant region.
  - Barriers due to prevailing practice, inter alia:
    - The project activity is the "first of its kind": No project activity of this type is currently operational in the host country or region.
  - Other barriers, preferably specified in the underlying methodology as examples.
- Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity).
  - The projects participants should explain how the identified barriers are not preventing the implementation of at least one of the alternatives. Any alternative that would be prevented by the barriers identified in Sub-step 3a is not a viable alternative, and shall be eliminated from consideration. At least one viable alternative shall be identified.

Project participants are to provide transparent and documented evidence, and offer conservative interpretations of this documented evidence, as to how it demonstrates the existence and significance of the identified barriers and whether alternatives are prevented by these barriers. Anecdotal evidence can be included, but alone is not sufficient proof of barriers. If both Sub-steps 3a – 3b are satisfied, projects participants are to proceed to Step 4 (Common practice analysis). But if one of the Sub-steps 3a – 3b is not satisfied, the project activity is not additional.

Step 4: Common practice analysis

- Sub-step 4a. Analyze other activities similar to the proposed project activity:
  - Project participants provide an analysis of any other activities implemented previously or currently underway that are similar to the proposed project activity. Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Other CDM project activities are not to be included in this analysis. Documented evidence and, where relevant, quantitative information are to be provided. On the basis of that analysis, the project participants describe whether and to which extent similar activities have already diffused in the relevant region.
- Sub-step 4b. Discuss any similar options that are occurring:
  - If similar activities are identified above, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain why the similar activities enjoyed certain benefits that rendered it financially attractive (e.g. subsidies or other financial flows) or did not face the barriers to which the proposed project activity is subject.
  - Essential distinctions may include a serious change in circumstances under which the proposed CDM project activity will be implemented when compared to circumstances under which similar projects were carried out. For example, new barriers may have arisen, or promotional policies may have ended, leading to a situation in which the proposed CDM project activity would not be implemented without the incentive provided by the CDM. The change must be fundamental and verifiable.

If Sub-steps 4a and 4b are satisfied, i.e. (i) similar activities cannot be observed or (ii) similar activities are observed, but essential distinctions between the project activity and similar activities can reasonably be explained, then the proposed project activity is additional.

4.2.6 Calculating emission reductions [PDD section B.6]

Baseline methodologies specify how emission reductions must be calculated in the PDD. In section B.6.1. "Explanation of methodological choices", project participants are required to state which equations will be used in calculating emission reductions, as well as to explain and justify their choices made among different options presented in the baseline methodology applied to the project activity.

Choice of scenarios/cases

Project participants are to explain and justify which scenario or case applies to the project activity. For example, the applied baseline methodology presents different components for baseline emissions and project emissions. Project participants should choose which components are included in the calculation and why, based on the proposed project activity and baseline scenario

identified in section B.4.

Choice of methodological approach

In case the applied baseline methodology offers different methodological approaches, project participants should explain and justify their choice. For example, in ACM0002, four methods are presented for the calculation of the "operating margin". Project participants should explain their choice and give reasons why that choice is appropriate for the proposed project activity.

Choice of default values

Baseline methodologies sometimes present different default values to be chosen according to the specific circumstances of each project activity. For example, the EB has set default values of flare efficiency as shown in Box 4-2 for the methodologies that involve flaring of methane [EB28, Annex 13]. Project participants are to make a choice, explain the choice and give reasons why that choice has been made.

Some of the default values frequently used in emission reduction calculations are shown below. The EB agreed that the IPCC default values should be used only when country or project specific data are not available or difficult to obtain [EB25, para.59]. At EB26, it was clarified that the '2006 IPCC Guidelines for National Greenhouse Gas Inventories' shall be considered as the latest version [EB26, para. 68].

(1) Oxidation factor of fuel

The default carbon oxidation factor is 1 irrespective of different fuel types. Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3: Energy, p. 1.20, Intergovermental Panel on Climate Change (IPCC), 2006.

(2) Default Carbon Content (CC) of different types of Fuels (kg/GJ)

Fuel Type		CC (kg/GJ)	Fuel Type		CC (kg/GJ)
LIQUID (Crude oil and petroleum products)			**SOLID (Coal and coal products)**		
Crude Oil		20.0	Anthracite		26.8
Orimulsion		21.0	Coking Coal		25.8
Natural Gas Liquids		17.5	Other Bituminous Coal		25.8
Gasoline	Motor Gasoline	18.9	Sub-Bituminous Coal		26.2
	Aviation Gasoline	19.1	Lignite		27.6
	Jet Gasoline	19.1	Oil Shale and Tar sands		29.1
Jet Kerosene		19.5	Brown Coal Briquettes (BKB)		26.6
Other Kerosene		19.6	Patent Fuel		26.6
Shale Oil		20.0	Coke	Coke Oven Coke and Lignite Coke	29.2
Gas/ Diesel Oil		20.2		Gas Coke	29.2
Residual Fuel Oil		21.1		Coal Tar	22.0
Liquefied Petroleum Gases		17.2	Derived Gases	Gas Works Gas	12.1
Ethane		16.8		Coke Oven Gas	12.1
Naphtha		20.0		Blast Furnace Gas	70.8
Bitumen		22.0		Oxygen Steel Furnace Gas	49.6
Lubricants		20.0	**BIOMASS**		
Petroleum Coke		26.6	Solid Biofuels	Wood/ Wood Waste	30.5
Refinery Feedstocks		20.0		Sulphite Lyes (black liquor)	26.0
Other Oil	Refinery Gas	15.7		Other Primary Solid Biomass	27.3
	Paraffin Waxes	20.0		Charcoal	30.5
	White Spirit and SBP	20.0	Liquid Biofuels	Biogasoline	19.3
	Other Petroleum Products	20.0		Biodiesels	19.3
GAS				Other Liquid Biofuels	21.7
Natural Gas		15.3	Gas Biomass	Landfill Gas	14.9
OTHER FOSSIL FUELS				Sludge Gas	14.9
Industrial Wastes		39.0		Other Biogas	14.9
Municipal Wastes (non- biomass fraction)		25.0	Other non- fossil fuels	Municipal Wastes (biomass fraction)	27.3
Waste Oil		20.0	**PEAT**		
			Peat		28.9

Source : Adapted from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3: Energy, Table 1.4, pp. 1.23-1.24, Intergovermental Panel on Climate Change (IPCC), 2006.

(3) Default Net calorific Values (NCV) of different types of Fuels (TJ/Gg)

Fuel Type		NCV (TJ/Gg)	Fuel Type		NCV (TJ/Gg)
LIQUID (Crude oil and petroleum products)			**SOLID (Coal and coal products)**		
Crude Oil		42.3	Anthracite		26.7
Orimulsion		27.5	Coking Coal		28.2
Natural Gas Liquids		44.2	Other Bituminous Coal		25.8
Gasoline	Motor Gasoline	44.3	Sub-Bituminous Coal		18.9
	Aviation Gasoline	44.3	Lignite		11.9
	Jet Gasoline	44.3	Oil Shale and Tar sands		8.9
Jet Kerosene		44.1	Brown Coal Briquettes (BKB)		20.7
Other Kerosene		43.8	Patent Fuel		20.7
Shale Oil		38.1	Coke	Coke Oven Coke and Lignite Coke	28.2
Gas/ Diesel Oil		43.0		Gas Coke	28.2
Residual Fuel Oil		40.4	Coal Tar	28.0	
Liquefied Petroleum Gases		47.3	Derived Gases	Gas Works Gas	38.7
Ethane		46.4		Coke Oven Gas	38.7
Naphtha		44.5		Blast Furnace Gas	2.47
Bitumen		40.2		Oxygen Steel Furnace Gas	7.06
Lubricants		40.2	**BIOMASS**		
Petroleum Coke		32.5	Solid Biofuels	Wood/ Wood Waste	15.6
Refinery Feedstocks		43.0		Sulphite Lyes (black liquor)	11.8
Other Oil	Refinery Gas	49.5		Other Primary Solid Biomass	11.6
	Paraffin Waxes	40.2		Charcoal	29.5
	White Spirit and SBP	40.2	Liquid Biofuels	Biogasoline	27.0
	Other Petroleum Products	40.2		Biodiesels	27.0
GAS				Other Liquid Biofuels	27.4
Natural Gas		48.0	Gas Biomass	Landfill Gas	50.4
OTHER FOSSIL FUELS				Sludge Gas	50.4
Industrial Wastes		NA		Other Biogas	50.4
Municipal Wastes (non- biomass fraction)		10.0	Other non- fossil fuels	Municipal Wastes (biomass fraction)	11.6
Waste Oil		40.2	**PEAT**		
			Peat		9.76

Source : Adapted from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3: Energy, Table 1.2, pp. 1.18-1.19, Intergovermental Panel on Climate Change (IPCC), 2006.

(4) Global Warming Potential (GWP)

Global Warming Potential (GWP) values	
CO_2- Carbon dioxide	1
CH_4 - Methane	21
N_2O - Nitrous Oxide	310
HFCs - Hydrofluorocarbons	140 – 11,700
PFCs - Perfluorocarbons	6,500 – 9,200
SF_6- Sulphur hexafluoride	23,900

Source: GWP for a 100 year time horizon in Table 4, p.22, *Climate Change 1995: The Science of Climate Change*, Intergovernmental Panel on Climate Change (IPCC), 1996.
Note: GWP used by parties should be those provided by the IPCC Second Assessment Report (1996) based on the effects of the GHGs over a 100-year time horizon [FCCC/CP/1997/7/Add.1, Decision 2/CP.3].

In section B.6.2, "Data and parameters that are available at validation", project participants should present information on the data and parameters available at validation using a table form provided in the CDM-PDD format. Detailed information should be included in Annex 3 "Baseline information".

Here, only include data that are:

- Determined only once and remains fixed throughout the crediting period,
- Available at the time of validation, and
- Not monitored throughout the crediting period.

Do not include data:

- Data that is calculated with equations provided in the methodology, or
- Default values specified in the methodology.

In section B.6.3, "Ex-ante calculation of emission reductions", project participants are to document how each equation is applied, in a manner that enables the reader to reproduce the calculation. The results of emission reduction calculation for the crediting period should be summarized in section B.6.4., using the table provided in the CDM-PDD format.

Box 4-2: Flare Efficiency [EB28, Annex 13]

For project activities that involve flaring of collected methane, flare efficiency can be an important factor that affects the resulting emission reductions. The EB has adopted the "Tool to determine project emissions from flaring gases containing Methane" to account for flare efficiency in methodologies that involve flaring of methane [EB28, Annex 13]. For example, ACM0001 version 07 [EB35, Annex 11] refers to use such calculation tool to determine the project emissions from flaring.

The efficiency of combustion in the flare is calculated from the methane content in the exhaust gas of the flare, corrected for the air used in the combustion process, and the methane content in the residual gas.

- In case of open flares, the flare efficiency cannot be measured in a reliable manner (i.e. external air will be mixed and will dilute the remaining methane) and a default value of 50% is to be used provided that it can be demonstrated that the flare is operational (e.g. through a flame detection system reporting electronically on continuous basis)). If the flare is not operational the default value to be adopted for flare efficiency is 0%.
- In case of enclosed flares, the temperature in the exhaust gas of the flare is measured to determine whether the flare is operating or not. For enclosed flares, either of the following two options can be used to determine the flare efficiency:

(a) To use a 90% default value. Continuous monitoring of compliance with manufacturer's specification of flare (temperature, flow rate of residual gas at the inlet of the flare) must be performed. If in a specific hour any of the parameters are out of the limit of manufacturer's specifications, a 50% default value for the flare efficiency should be used for the calculations for this specific hour.

(b) Continuous monitoring of the methane destruction efficiency of the flare (flare efficiency).

In both cases, if there is no record of the temperature of the exhaust gas of the flare or if the recorded temperature is less than 500 °C for any particular hour, it shall be assumed that during that hour the flare efficiency is zero.

4.3 Application of a monitoring methodology

PDD Section B.7 describes the application of the monitoring methodology and the monitoring plan, the results of which are subject to verification by the DOE and used for the calculation of the emission reductions achieved through the project activity. Since the difference between the baseline emissions and actual project emissions is to be claimed as CERs, it is very important to develop a detailed and realistic monitoring plan.

The monitoring methodology specifies which parameters and data are to be monitored. Project participants should provide information about how such parameters and data are collected during monitoring for the project activity. It is important that project participants strictly follow the monitoring procedures set out in the monitoring methodology, including recording frequency and measurement methods, if specified. If project participants are not able to follow all the requirements strictly, the differences should be explained and justified. For each data and parameter, a table should be filled out that includes information such as:

(1) Data unit

(2) Description of the data

(3) Source of data

The source(s) of data that will be actually used for the proposed project activity (e.g. which exact national statistics). Where several sources may be used, explain and justify which data sources should be preferred.

(4) Value of data applied for the calculation of ex-ante emission reduction estimation

(5) Measurement methods and procedures

Where data or parameters are supposed to be measured, specify the measurement methods and procedures, including a specification which accepted industry standards or national or international standards will be applied, which measurement equipment is used, how the measurement is undertaken, which calibration procedures are applied, what is the accuracy of the measurement method, who is the responsible person / entity that should undertake the measurements and what is the measurement interval.

(6) QA/QC procedures

A description of the QA/QC procedures (if any) that should be applied.

Below are examples of QA/QC procedures to be applied from some of the registered CDM project activities.

Parameter (Examples)	QA/QC procedures to be applied (Examples)
Total amount of landfill gas captured	The gas management information and monitoring system will be certified under the ISO 9000 Quality Management System
Quantity of HFC 23 supplied to the destruction process after purity adjustment	A QA/QC organization will be formed and QA/QC procedures that are equivalent to JIS (Japanese Industrial Standard) in terms of equipment and analytical method will be set. Will be measured using two flowmeters in parallel with weekly calibration.
Electricity supplied to the grid by the Project	These data will be directly used for calculation of emission reductions. Sales record and other records are used to ensure the consistency. The electricity meter will be calibrated on a yearly basis by the electricity distributor in order to accurately monitor electricity sales.
Gross electricity produced	Meters will be subject to a regular maintenance and testing regime to ensure accuracy. Their readings will be double-checked by the electricity distribution company.

In addition, many PDDs make general statements about the QA/QC procedures in place. Below are some examples:

- Description of the quality assurance practices such as how monitoring records are taken and kept, how often the site is audited, how the personnel are trained, etc.
- Statement that the project developer has a quality assurance system, e.g. ISO series, in place.

(7) Comments

Any comments should be stated here. Relevant background documentation should be provided in Annex 4.

Project participants should also indicate the operational and management structure to implement the monitoring activities proposed in the PDD. A chart showing the organizational structure, as well as a description of the responsibilities of relevant parties and personnel, would be useful.

4.4 Duration of the project activity/crediting period

Project participants should state the duration of the project activity in section C.1 and their choice of crediting period in section C.2 of the PDD.

In section C.1, the starting date of a CDM project activity and expected operation lifetime of the project activity are to be stated. The starting date of a CDM project activity is defined as the date on which the implementation or construction or real action of a project activity begins. It has always been the EB's view that the start date of a CDM project activity is the earliest of the dates at which the implementation or construction or real action of the project activity begins [EB33, para. 76]. Project participants should also state the expected operational lifetime of the project activity in years and months.

In section C.2, project participants state their choice regarding the crediting period. The crediting period for a CDM project activity is the period for which reductions from the baseline are verified and certified by a DOE for the purpose of issuance of certified emission reductions (CERs).

The project participants may choose between two options for the length of a crediting period:

(i) Fixed crediting period

The length and starting date of the period is determined once for a project activity with no possibility of renewal or extension once the project activity has been registered. The length of the period can be a maximum of ten years for a proposed CDM project activity.

(ii) Renewable crediting period

A single crediting period may be of a maximum of seven years. The crediting period may be renewed at most two times (maximum 21 years), provided that, for each renewal, a DOE determines that the original project baseline is still valid or has been updated taking account of new data, where applicable, and informs the EB accordingly.

Project participants should note the following points regarding crediting period:

- A crediting period shall not extend beyond the operational lifetime of the project activity.

- The starting date of a CDM project activity does not need to correspond to the starting date of the crediting period for this project activity.
- The starting date and length of the first crediting period has to be determined before registration. The crediting period may only start after the date of registration of the proposed activity as a CDM project activity, except when requesting "retroactive crediting" (Box 4-3).
- Be sure to state the dates in "DD/MM/YYYY" format, which means that if the date is "1 June 2006", it should be written as "01/06/2006"

4.5 Environmental impacts and stakeholders' comments

4.5.1 Environmental impacts [PDD section D]

Project participants are requested to attach documentation on the analysis of the environmental impacts, including transboundary impacts. Here, project participants should state the possible environmental impacts of the project activity, as well as relevant legal requirements.

Box 4-3: Retroactive crediting

It was decided in the Marrakech Accords that a project activity starting in the period between 1 January 2000 and 18 November 2004 shall be eligible for validation and registration as a CDM project activity if submitted for registration before 31 December 2005. If registered, the crediting period for such project activities may start prior to the date of its registration but not earlier than 1 January 2000.

At COP/MOP 1, it was decided to postpone the deadline for retroactive crediting as follows:

- Project activities that started in the period between 1 January 2000 and 18 November 2004 and have not yet requested registration but have either submitted a new methodology or have requested validation by a designated operational entity by 31 December 2005 can request retroactive credits if they are registered by the Executive Board by 31 December 2006 at the latest [Decision 7/CMP.1 "Further guidance relating to the clean development mechanism", para. 4].
- It was further decided by the EB at its 23rd meeting [EB23, para. 90], that "Requesting validation" requires that a project design document has been submitted to a designated operational entity by 31 December 2005. It also agreed that 11 January 2006 is the effective deadline for submitting proposed new methodologies. With regard to proposed new methodologies that were submitted before the deadline and which are not approved ("C" cases) and submitted again, the EB agreed that:

(i) If the project activity is not changed and is registered before 31 December 2006 using an approved methodology which was submitted based on the non-approved proposed methodology, it would qualify for retroactive crediting in accordance with the relevant decision of COP/MOP 1.

(ii) The resubmitted methodology would not be granted any type of special considerations on resubmission.

The EB provided the following further clarifications [EB26, para. 86]:

In order to operationalize paragraph 4 of Decision 7/CMP.1 the Board clarified that project activities that started in the period between 1 January 2000 and 18 November 2004 that have either submitted a new methodology by 11 January 2006 or have requested validation by a designated operational entity by 31 December 2005 can request retroactive credits if:

(a) The request for registration of the project activity is submitted by the DOE through the electronic interface 31 December 2006, midnight Greenwich mean time;

(b) Any required registration fee is received by the secretariat before 31 January 2007; and

(c) The request is complete and, hence published on the UNFCCC CDM website, by 15 February 2007.

The environmental impact section of PDDs of some of the registered project activities contain information on:

- Name and description of relevant national laws and regulations on the environmental impact (Environmental Impact Assessment / standards) required by the national or local authority and applicability of these to CDM project activity,
- Description of environmental impacts study on environment and local community,
- Analysis of environmental impacts (positive or negative) of before and after project implementation,
- Results of impacts in each category such as air and water quality, noise level, natural resources, human settlement etc.,
- Result of monitoring of EIA required on CDM activity,
- Conclusion of whether the project activity leads to any significant negative impact or not,
- Summary of the EIA (including the scopes of EIA, the magnitude and frequency of impacts, the result of EIA and actions to mitigate impacts).

4.5.2 Stakeholders' comments [PDD section E]

In this section, project participants should clearly describe the procedures taken for compiling the stakeholders' comments, as well as relevant legal requirements in the host country.
Below are examples from the stakeholders' comments section of PDDs of some of the registered project activities.

Brief description how comments by local stakeholders have been invited and compiled.

- Identification of stakeholders at different stages of the project (the local governments, relevant committees, local people, consultants, project participants etc.)
- Process of invitation and announcement of the stakeholders' meeting/consultation
- Description of the meeting/consultation (presentation of the CDM project, the objectives, exchange of comments)
- Description and result of survey given to each stakeholder regarding the project activity

Summary of the comments received.

- Summary and/or list of comments received by each party of stakeholders such as suggestions, concerns, complaints etc.)
- Analysis of the comments (whether stakeholders agree with the project activity or not)

Report on how due account was taken of any comments received.

- Description of how relevant comments and important mentions were considered in the preparation of CDM-PDD
- Description of consultation with stakeholders and efforts to respond to their expectations
- Description of measures taken or will be taken by the project entity to answer the comments of stakeholders

4.6 CDM-AR-PDD : Technical aspects

4.6.1 Overview of CDM-AR-PDD

This section discusses technical aspects of A/R CDM project activities and key items to be covered in the CDM-AR-PDD format. First, this section overlooks the structure of the CDM-AR-PDD, followed by more detailed explanations on Sections of the PDD. The explanations focus on key issues that are specific to A/R CDM project activities rather than covering every item.

PDD Format: CDM-AR-PDD, version 03
Guidelines: Guidelines for completing CDM-AR-PDD, CDM-AR-NM, version 08 [EB35, Annex 21]
Download from the CDM web site: http://cdm.unfccc.int/Reference/Documents

The basic structure of the CDM-AR-PDD is shown below:

Contents of CDM-AR-PDD, version 03:

A. General description of the proposed A/R CDM project activity
B. Duration of the project activity/crediting period
C. Application of an approved baseline and monitoring methodology
D. Estimation of ex ante net anthropogenic GHG removals by sinks and estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period
E. Monitoring plan
F. Environmental impacts of the proposed A/R CDM project activity
G. Socio-economic impacts of the proposed A/R CDM project activity
H. Stakeholders' comments

Annexes

Annex 1: Contact information on participants in the proposed A/R CDM project activity
Annex 2: Information regarding public funding
Annex 3: Baseline information
Annex 4: Monitoring plan

4.6.2 Sections of CDM-AR-PDD

(1) Section A. General description of the proposed A/R CDM project activity

In Section A, project participants are expected to provide overview and general information of their project activities. The items that are specific to CDM-AR-PDD and not required in the CDM-PDD template will be explained in the followings.

Section A.4.5. Approach for addressing non-permanence (Refer to section 3.4.2 (7)&(8) of Chapter 3)

In accordance with paragraph 38 and section K of the A/R CDM M&P, project participants need to select one of the following approaches to address non-permanence:

- Issuance of tCERs

- Issuance of lCERs

The approach chosen to address non-permanence shall remain fixed for the crediting period including any renewals.

Non-permanence issue is explained in detail below.

Addressing non-permanence

The issue of non-permanence arises from nature of GHG removals in forest. Unlike emission reductions, GHGs removed by forest may be released back into the atmosphere in an occasion of forest fires, die back from pests or even harvesting.

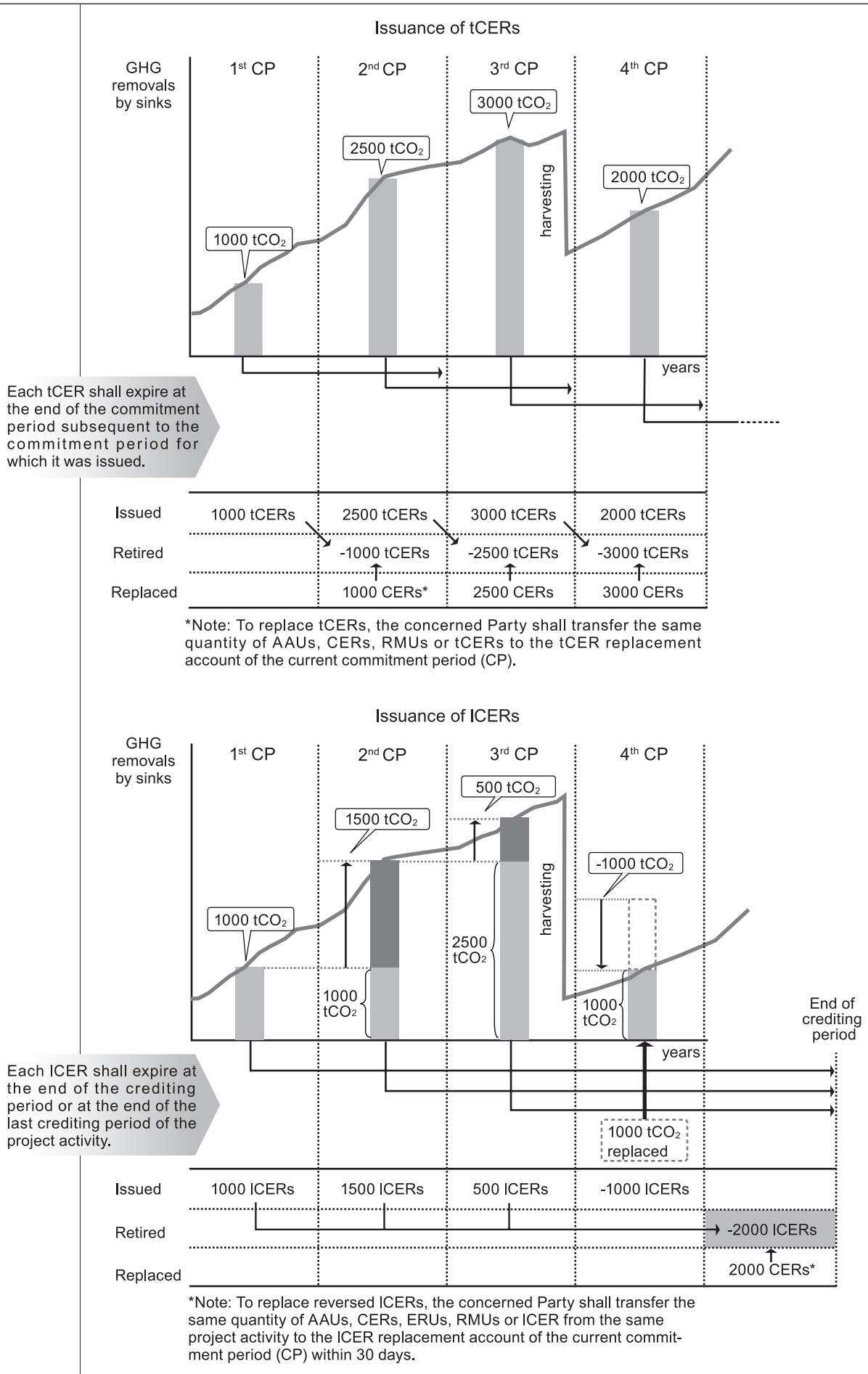


Figure 4-2 Differences between tCER and lCER

The issue of non-permanence should be addressed through two different crediting systems named tCER and lCER. The differences between the two are illustrated with a hypothetical project case shown in Figure 4-2. Each graph has the same changes in net anthropogenic GHG removals while issuance of the credits is different reflecting the differences between tCERs and lCERs. The assumptions made here are:

- Commitment periods would be of 5-year interval after the first commitment period,
- Credits would be used (and retired) for achieving the target of a Party, and
- Replacement of the credits expired would be done by the concerned Party (this situation would vary among countries and the project participants themselves may be held responsible for replacement).

Each lCER shall expire at the end of the crediting period or, where a renewable crediting period is chosen, at the end of the last crediting period of the project activity. Each tCER shall expire at the end of the commitment period subsequent to the commitment period for which it was issued.

Section A.4.6. Estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period:

Project participants need to provide estimation of net anthropogenic GHG removals by sinks as well as annual estimates for the chosen crediting period in the table below:

Summary of results obtained in Sections C.5., D.1. and D.2.				
Years	Estimation of baseline net GHG removals by sinks (tonnes of CO_2e)	Estimation of actual net GHG removals by sinks (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of net anthropogenic GHG removals by sinks (tonnes of CO_2e)
Year A				
Year B				
Year C				
Year …				
Total (tonnes of CO_2e)				

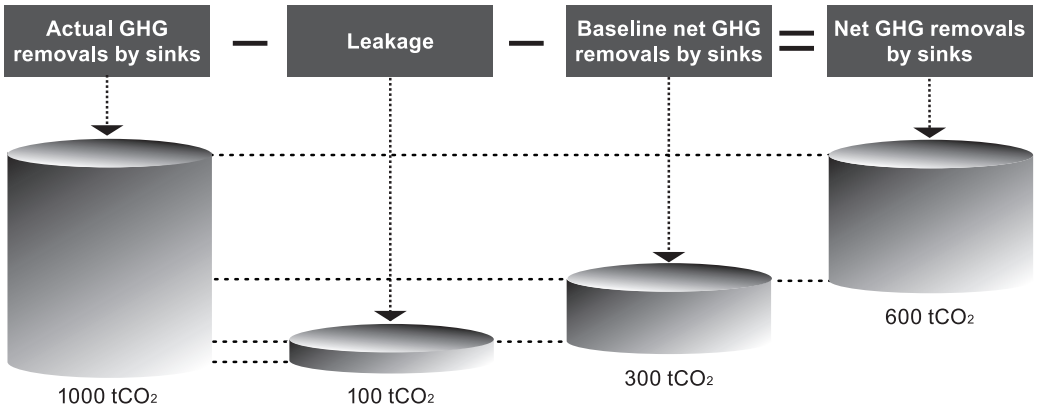


Figure 4-3 Calculation of the net anthropogenic GHG removals by sinks

The EB gave the following clarification on equations for the calculation of net anthropogenic GHG emissions by sinks [EB22, Annex 15].

Equations for the calculation of net anthropogenic GHG emissions by sinks

tCERs reflect the difference of carbon stock in the carbon pools in the project and baseline at the time of verification less cumulative project GHG emissions within the project boundary less cumulative GHG emissions outside the project boundary due to afforestation or reforestation difference in carbon stocks in the carbon pools outside the project boundary (tCO_2), affected by afforestation or reforestation activity, in the baseline and project at the time of verification, i.e,

$$t\text{-}CER(t_v) = C_P(t_v) - C_B(t_v) - \sum_{0}^{t_v} E(t) - \sum_{0}^{t_v} L_E(t) - (L_{P\_B}(t_v) - L_{P\_P}(t_v))$$

lCERs reflect the difference of increment of the carbon stock in the carbon pools, between two verification period, in the project and the baseline less project GHG emissions between two verification period less GHG emissions outside the project boundary less difference of increment in carbon stock in the carbon pools outside the project boundary (tCO_2), affected by afforestation or reforestation project activity, in the baseline and project, i.e,

$$l\text{-}CER(t_v) = [C_P(t_v) - C_P(t_v - K)] - [C_B(t_v) - C_B(t_v - K)] - \sum_{t_v-K}^{t_v} E(t) - \sum_{t_v-K}^{t_v} L_E(t)$$

$$- [(L_{P\_B}(t_v) - L_{P\_B}(t_v - K)) - (L_{P\_P}(t_v) - L_{P\_P}(t_v - K))]$$

where:

$t\text{-}CER(t_v)$	t-CERs emitted at time of verification t_v (tCO_2)
$l\text{-}CER(t_v)$	l-CERs emitted at time of verification t_v (tCO_2)
$C_P(t_v)$	Existing carbon stocks at the time of verification t_v (tCO_2)
$C_B(t_v)$	Estimated carbon stocks of the baseline scenario at time of verification t_v (tCO_2)
$E(t)$	Project emissions in year t (tCO_2)
$L_E(t)$	Leakage: estimated emissions by sources outside the project boundary in year t (tCO_2)
$L_{P\_B}(t_v)$	Leakage: estimated carbon pools outside the project boundaries in the baseline scenario on areas that will be affected due to the implementation of a project activity at time of verification t_v (tCO_2)
$L_{P\_P}(t)$	Leakage: existing carbon pools outside the project boundaries that have be affected by the implementation of a project activity at time of verification t_v (tCO_2)
t_v	Year of verification
K	Time span between two verifications

The EB agreed to the methodological tool for estimation of GHG emissions related to fossil fuel combustion in A/R CDM project activities [EB33, Annex 14]. This tool allows for estimating increase in GHG emissions (both project and leakage emissions) related to fossil fuel combustion (only CO_2 emissions) in A/R CDM project activities. The sources of emissions are: vehicles (mobile sources, such as trucks, tractors, etc.) and mechanical equipments (e.g., portable equipment such

as chain saws and stationary equipment such as, water pumps) required by the A/R CDM project activity.

The EB agreed to the methodological tool for determining when accounting of the soil organic carbon pool may be conservatively neglected in CDM A/R project activities [EB33, Annex 15].

The EB agreed to the tool for estimation of direct nitrous oxide emission from nitrogen fertilization [EB33, Annex 16]. This tool facilitates the development and revision of baseline and monitoring methodologies for A/R CDM project activities by providing a straightforward approach for estimation of direct nitrous oxide emission from nitrogen fertilizers applied in A/R activities. According to the EB decision [EB26, para. 50]:

(a) Only direct (e.g. volatilization), and not indirect (e.g. run-off), emissions of N_2O from application of fertilizers within the project boundary shall be accounted for in A/R project activities.

(b) If the only source of N_2O emissions, which is located outside the project boundary is due to the application of fertilizer in nurseries supplying seedlings to the A/R project activity, then these N_2O emissions (either direct or indirect), may be considered as negligible.

(2) Section B. Duration of the project activity/crediting period

Section B.3 Choice of crediting period and related information

Project participants need to state whether the proposed A/R CDM project activity will use a renewable or a fixed crediting period (They must choose only one crediting period).

- Renewable crediting period: A maximum of 20 years which may be renewed at most two times (maximum 60 years)
- Fixed crediting period: A maximum of 30 years

Project participants who choose a renewable crediting period should be aware that, 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.

(3) Section C. Application of an approved baseline and monitoring methodology

As mentioned earlier, project participants need to refer to the CDM website for approved methodologies applicable to their project activities. In case an applicable methodology for the project activity does not exist, project participants need to propose a new baseline and/or monitoring methodology.

In any case, the following sections need to be filled out with information taken from the methodology (either approved or proposed new ones) applied to the project activity.

Section C.1. Assessment of the eligibility of land

The EB agreed to the "Procedures to demonstrate the eligibility of lands for afforestation and reforestation CDM project activities" (Version 01) [EB35, Annex 18] which is explained in section 3.4.3 (4).

Section C.5. Identification of the baseline scenario

- C.5.1: Description of the application of the procedure to identify the most plausible baseline scenario (separately for each stratum defined in C.4., if procedures differ among strata):

- C.5.2: Description of the identified baseline scenario (separately for each stratum defined in Section C.4.)

The detailed information regarding baseline is given as follows:

Baseline

The baseline for a proposed A/R CDM project activity is the scenario that reasonably represents the sum of the changes in carbon stocks in the carbon pools within the project boundary that would have occurred in the absence of the proposed project activity. A baseline shall be deemed to reasonably represent the sum of the changes in carbon stocks in the carbon pools within the project boundary that would occur in the absence of the proposed A/R CDM project activity if it is derived using a baseline methodology referred to in paragraphs 12 and 13 of the CDM A/R M&P.

Establishment of Baseline net GHG removals

The baseline net GHG removals by sinks for a proposed A/R CDM project shall be established:

- By project participants in accordance with provisions for the use of approved and new baseline methodologies (contained in decision 19/CP.9, the CDM A/R M&P and relevant decisions of the COP/MOP);
- In a transparent and conservative manner regarding the choice of approaches, assumptions, methodologies, parameters, data sources, key factors and additionality, and taking into account uncertainty;
- On a project-specific basis;
- In the case of small scale A/R CDM project activities, in accordance with simplified modalities and procedures developed for such activities;
- Taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends.

Carbon pools and baseline net GHG removals

In calculating the baseline net GHG removals by sinks and/or actual net GHG removals by sinks, project participants may choose not to account for one or more carbon pools, and/or emissions of the GHGs measured in CO_2 equivalents, while avoiding double counting. This is subject to the provision of transparent and verifiable information that the choice will not increase the expected net anthropogenic GHG removals by sinks. Project participants shall otherwise account for all significant changes in carbon pools and/or emissions of the GHGs measured in CO_2 equivalents by the sources that are increased as a result of the implementation of the A/R project activity, while avoiding double counting.

Baseline approaches

In choosing a baseline methodology for an A/R CDM project activity, project participants shall select from among the following approaches the one deemed most appropriate for the project activity, taking into account any guidance by the EB, and justify the appropriateness of their choice:

(a) Existing or historical, as applicable, changes in carbon stocks in the carbon pools within the project boundary;

(b) Changes in carbon stocks in the carbon pools within the project boundary from a land use

that represents an economically attractive course of action, taking into account barriers to investment;

(c) Changes in carbon stocks in the pools within the project boundary from the most likely land use at the time the project starts.

Section C.6. Assessment and demonstration of additionality

The concept of additionality in A/R CDM project activities is basically the same as that of the emission reduction CDM. The concept of additionality in A/R CDM is defined in A/R CDM M&P as follows:

"The proposed A/R CDM project activity is additional if the actual net GHG removals by sinks are increased above the sum of the changes in carbon stocks in the carbon pools within the project boundary that would have occurred in the absence of the registered A/R CDM project activities."

The "Tool for the demonstration and assessment of additionality in A/R CDM project activities" (Version 02) [EB35, Annex 17] provides for a step-wise approach to demonstrate additionality in A/R CDM projects. It has the basic structure similar to that of the emission reduction CDM projects. The main difference is that the additionality tool for A/R CDM project activities has an extra step "STEP 0. Preliminary screening based on the starting date of the A/R project activity." For details on its scope, applicability and parameters refer to Table A-2 in Appendix 2.

Section C.7. Estimation of the ex ante baseline net GHG removals by sinks

Project participants are asked to present final results of their calculations using the following tabular format.

Year	Annual estimation of baseline net anthropogenic GHG removals by sinks in tonnes of CO_2e
Year A	
Year B	
Year C	
Year …	
Total estimated baseline net GHG removals by sinks (tonnes of CO_2e)	
Total number of crediting years	
Annual average over the crediting period of estimated baseline net GHG removals by sinks (tonnes of CO_2e)	

The EB agreed to the "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" (CT-AR) (Version 01) [EB35, Annex 19]. The CT-AR provides a general framework and a step-wise approach to identify the baseline scenario and simultaneously demonstrates additionality in A/R CDM project activities. It applies the same approach used in the combined tool to identify the baseline scenario and demonstrate additionality for non-A/R project activities, while including specific guidance for use in the A/R CDM project activities. The CT-AR is consistent with the revised tool for the demonstration and assessment of additionality in A/R CDM project activities and facilitates development of new baseline and monitoring methodologies by providing a stepwise procedure to identify the baseline scenario and demonstrate additionality.

(4) Section D. Estimation of ex ante actual net GHG removals by sinks, leakage and estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period

Project participants should calculate the ex ante actual net GHG removals by sinks and leakage for the chosen crediting period using the approach provided in the selected approved baseline and monitoring methodology (annually, for each gas, pool, source, in units of CO_2 equivalent). Use a stepwise approach and name components being calculated. List numerical values and sources of all data used in the above calculation. Refer to, but do not copy, pieces of the selected approved methodology, unless necessary.

The actual net GHG removals by sinks is the sum of verifiable changes in carbon stocks, minus the increase in emissions of the GHGs measured in units of CO_2 equivalent by the sources that are increased as an attributable result of the implementation of the proposed A/R CDM project activity within the project boundary.

Leakage is defined as the increase of anthropogenic emissions by sources of GHG which occurs outside the project boundary, and that is measurable and attributable to the proposed A/R CDM project activity.

The EB considered and approved the draft tool for testing the significance of GHG emissions in A/R CDM project activities [EB31, para. 47/ Annex 16]. The draft tool assists project participants to transparently demonstrate, which GHG emission sources, possible decreases in carbon pools and leakage emissions are insignificant for a particular CDM A/R project activity and therefore can be neglected. Or when required by the applicability conditions of approved methodologies, whether increases in GHG emissions by sources for a particular CDM A/R project activity are significant. The EB also clarified that this tool supersedes the guidance provided by the Board in paragraph 3 (b) of the annex 15 to the report from its twenty-second meeting (as follows) concerning ignoring leakage emissions from extraction of non-renewable fuel wood.

The EB has provided guidance regarding leakage [EB22, Annex 15].
The accounting of decreases of carbon pools outside the project boundary is to be considered as leakage and that, in particular:

(a) In the case of deforestation as land clearance outside the project boundary due to activity shifting, effects on all carbon pools shall be considered;
(b) In the case of fuelwood collection or similar activities outside the project boundary, only the gathered volume of wood that is non-renewable shall be considered as an emission by sources if forests are not significantly degraded due to this activity. The equation (Eq. 3.2.8) for fuelwood gathering as outlined in IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC-GPG) (2003) could be applied in combination with household surveys or Participatory Rural Appraisal (PRA). In the case that forests are significantly degraded, accounting rule 1 applies. “Not significantly degraded” means that the extracted volume results in emissions which are between 2% and 5% of net actual GHG removals by sinks. If the extracted wood volume results in emissions which are below 2% of the net actual GHG removals by sinks, this type of leakage can be ignored.

The EB approved the draft tool for testing the significance of GHG emissions in A/R CDM project

activities [EB31, Annex 16]. The draft tool assists project participants to transparently demonstrate, which GHG emission sources, possible decreases in carbon pools and leakage emissions are insignificant for a particular CDM A/R project activity and therefore can be neglected. Or when required by the applicability conditions of approved methodologies, whether increases in GHG emissions by sources for a particular CDM A/R project activity are significant. The EB also clarified that this tool supersedes the guidance provided by the EB in the EB 22 Annex 15 para. 3(b), concerning ignoring leakage emissions from extraction of non-renewable fuel wood. [EB31, para. 47]

(5) Section E. Monitoring plan

In the section E of monitoring, project participants describe, according to the monitoring methodology they selected, methods to collect and archive data necessary for estimating net GHG removals by sinks. The results of monitoring will be used to calculate the difference between GHG removals in baseline scenario and in project scenario.

The monitoring plan needs to provide detailed information related to the collection and archiving of all relevant data needed to estimate or measure verifiable changes in carbon stocks in the carbon pools and the emissions of GHG occurring within the project boundary, to determine the baseline, and to identify increased emissions outside the project boundary.

Section E.2. Sampling design and stratification

Project participants need to describe the sampling design that will be used in the project for the ex-post calculation of actual net GHG removals by sinks and, in case the baseline is monitored, the baseline net GHG removals by sinks. The sampling design should describe stratification, determination of number of plots & plot distribution, etc.

Section E.4.1. Data to be collected or used in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed A/R CDM project activity

Project participants need to archive monitored data for 2 years following the end of the (last) crediting period.

When archiving data, header of tables and titles of columns should not be modified and columns should not be deleted. If necessary, rows are added at the bottom of the table.

(6) Section F. Environmental impacts of the proposed A/R CDM project activity:

Section F.1. Documentation on the analysis of the environmental impacts, including impacts on biodiversity and natural ecosystems, and impacts outside the project boundary of the proposed A/R CDM project activity:

This analysis should include, where applicable, information on:

- hydrology,
- soils,
- risk of fires, and
- pests and diseases.

(Project participants need to attach the relevant documentation with the CDM-AR-PDD)

(7) Section G. Socio-economic impacts of the proposed A/R CDM project activity:

Section G.1. Documentation on the analysis of the major socio-economic impacts, including impacts outside the project boundary of the proposed A/R CDM project activity:

This analysis should include, where applicable, information on:

- local communities,
- indigenous peoples,
- land tenure,
- local employment,
- food production,
- cultural and religious sites, and
- access to fuelwood and other forest products.

(Project participants need to attach relevant documentation with the CDM-AR-PDD)

5. Monitoring and Verification

5.1 Introduction

This section is designed to help project participants navigate the pitfalls of preparing a Monitoring Report and be better prepared to face the verification process for the CDM project activities. It may be mentioned here that the CDM EB validation and verification manual, aimed to promote quality and consistency in verification and validation reports, is expected to lead to the issuance of the first version in early 2008 [EB35, para. 5].

Verification by a Designated Operational Entity (DOE) is the review and confirmation of the CDM project activity or operational performance as described in the monitoring plans or reporting protocols. This includes the confirmation by examination and provision of objective evidence that real, measurable and long-term emission reductions have been achieved, in accordance with pre-determined criteria.

The purpose of the Monitoring Report is to prepare information about the CDM project activity relevant to the collection and archiving of all relevant data necessary for determining:

(a) GHG emissions occurring within the project boundary during the monitoring (crediting) period;

(b) Baseline of GHG emissions within the project boundary during the monitoring (crediting) period;

(c) Increased GHG emissions outside the project boundary that are significant and reasonably attributable to the CDM project activity during the monitoring (crediting) period.

The Monitoring Report should also address the quality assurance and control (QA/QC) procedures adopted during the monitoring period together with the documentation on the calculations of the GHG emissions.

The Monitoring Report, together with the verification report forms the basis for the issuance of CER's by the UNFCCC. Experience has shown that the information needed to judge the suitability of a CDM project activity for the issuance of CER is vast and can take months to assemble. Also, the time required to assemble relevant information increases with the number and diversity of monitoring parameters involved and the complexity of the information itself. The advice given and the pitfalls described in this section are based on day-to-day, hands-on experience and real instances of mistakes made in submissions.

5.2 Verification process

Verification is the periodic independent review and ex post determination by the DOE/ Independent Entity of the monitored reductions in GHG emissions during the defined verification period. The three objectives of verification are:

(a) to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan

(b) to evaluate the GHG emission reduction data and express a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission reduction data is "free" of material misstatements and the reported GHG emission reduction data is sufficiently supported by evidence, i.e. monitoring records.

(c) to evaluate the relevance and reliability of reported GHG emissions (and calculated reductions), related to: accuracy, completeness and consistency of the information

Thus, the verification activity essentially involves the review and confirmation of the project

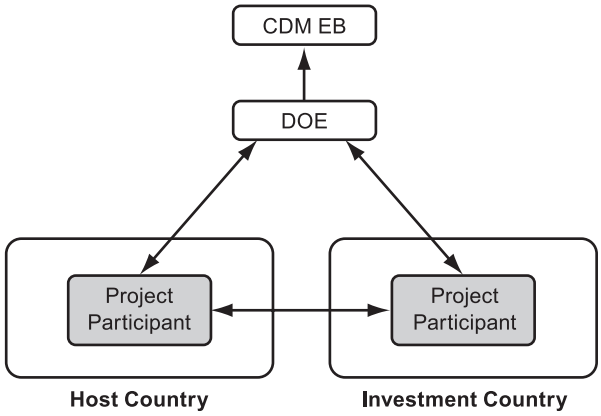
performance as described in the monitoring plans. In other words, it is the confirmation by examination and provision of objective evidence that real, measurable and long-term GHG emission reductions have been achieved, in accordance with pre-determined criteria.

The verification methodology developed by most DOE's differentiates between initial and periodic verification:

- Initial verification: The objective of an initial verification is to verify that the CDM project activity is implemented as planned, to confirm that the monitoring system is in place and fully functional and to assure that the CDM project activity will generate verifiable GHG emission reductions.
- Periodic verification: The objective of subsequent periodic verifications is the review and ex post determination of the monitored GHG emission reductions that have occurred during a specified verification period

The project participant can, based on a cost-benefit analysis, choose whether the initial verification is carried out a) as a separate activity prior to the CDM project activity commencing its regular operations or b) as an integrated part of the first periodic verification. To reduce verification costs, most project participants choose to have the initial verification performed as part of the first periodic verification.

The key verification actors in a verification activity are the project participants, the DOE (the verifier) and the EB (Figure 5-1).



Note: Contractual relationships among project participants and DOE differ case by case.

Figure 5-1 Relationship between the verification actors

Most DOEs follow a risk based approach in their task of verification. The registered PDD, the final validation report, the monitoring report, the monitoring plan and monitoring records, together with the GHG emission reduction data typically form the input for commencing the verification activity. From the inputs provided and based on an understanding of the CDM project activity the key reporting risks are identified and it is assessed to which extend the project participant's operation control systems are adequate for mitigating these key reporting risks. Key reporting risks that are not sufficiently addressed by the project participant's operation control system represent residual risk areas where detailed audit testing is necessary.

5.2.1 Initial verification process

After the selection of a DOE has been finalized and a contract established between the DOE and

the project participant, DOE selects a verification team that is competent and whose qualifications and experience will match the requirements of the CDM project activity and the project participant. A schedule for verification activities will be drawn up with detailed dates and reporting deadlines. Periodic verification audits are expected to be carried out on an annual basis or at any other interval determined by the project participant in consultation with the DOE. It is expected that audit intervals will depend on audit outcomes, the complexity of the monitoring methodology and experience with the project's performance and compliance with the monitoring plan. The process is illustrated in Figure 5-2.

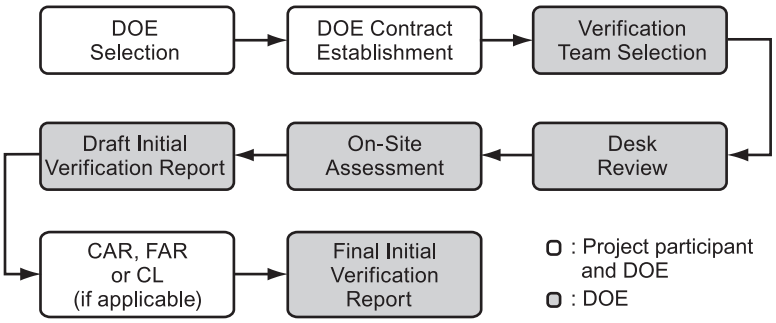


Figure 5-2 The initial verification process

(1) Desk review

The DOE will familiarise themselves with the validation report, the baseline and monitoring methodologies of the CDM project activity. An audit trail will be defined to verify reliable monitoring and reporting of the project emission reductions. Emphasis will be put on the GHG information management systems and their reliability, monitoring equipment and its accuracy, and the control of data from sources that are outside of the project operator's control, e.g. data sources and factors used for baseline emissions. In order to ensure transparency, an initial verification checklist is also customized for the project activity by the DOE.

(2) On-site assessment

Having prepared for the initial verification through a desk review of the validation report, baseline study and monitoring plan of the project, the assigned DOE team will follow up the identified key issues through a on-site assessment. The initial verification checklist can also be submitted to the client for review and necessary preparations for the on-site assessment.

(3) Draft initial verification report and CAR, FAR and/or CL

After the initial verification audit the DOE will develop a draft initial verification report. Dependent on the nature of findings, if any, these will be presented in the form of either Corrective Action Requests (CAR) or Forward Action Requests (FAR). Corrective action requests (CAR) are issued, where:

i) there is a clear deviation concerning the implementation of the project as defined in the PDD;
ii) requirements set by the monitoring plan or qualifications in a validation opinion have not been met; or
iii) there is a risk that the project would not be able to deliver (high quality) CERs.

Forward action requests (FAR) are issued, where:

iv) the actual status requires a special focus on this item for the next consecutive verification, or

v) an adjustment of the MP is recommended.

The verification team may also use the term clarification request (CL), which would generally be in the form of additional information that is needed to fully clarify an issue.

After the presentation of the draft initial verification report, the project participant will be given sufficient time to respond to the CAR's and FAR's, so that these can be resolved as much as possible before the final initial verification report and statement is issued.

(4) Final initial verification report

After the above mentioned process, an final initial verification report and statement will be provided. It will give an overview of the verification approach applied and will reflect the results from the dialogue and any adjustments made to the project after the draft initial verification report was submitted. It will hence give the final conclusions regarding the projects readiness to start operation and generation of emission reductions. Before awarding a positive (unqualified) initial verification statement all findings indicated as a CAR in the draft initial verification report must be resolved. FARs will need to be addressed during the period up to the first periodic verification.

5.2.2 Periodic verification audits

The aim of the periodic verification of GHG emission reductions is to verify that GHG emission reductions quantified and reported from the CDM project activity are free from material misstatement and represent an accurate and conservative number, considering associated monitoring uncertainties. Hence, the DOE will seek to verify that methods used for quantification are in line with the applied approved CDM methodologies and that the GHG emission reductions are reported in accordance with the validated monitoring plan.

During the verification, the DOE will identify, collect and verify all information that sustains the GHG emission reductions claim in order to ensure that the provided data is complete, accurate and verifiable. It should also be verified that data gathered for baseline GHG emission quantification are complete, accurate and correctly applied. The verification results will be documented in a verification report.

5.2.3 Audit preparations

The DOE will review the monitoring records and GHG emission reductions calculations submitted by the project participant and will determine whether the provided monitoring records are in accordance with the monitoring plan. In line with the CDM modalities and procedures, the DOE should also make the monitoring report publicly available on the UNFCCC climate change website.

It is expected that the key records from CDM project activities will be made available to the DOE prior to the site visit in order to prepare well for the audit. However, it is also expected that the underlying detailed information will be available on-site only.

A periodic verification checklist will be prepared according to the Validation and Verification Manual[9]. This checklist will mirror a complete project audit trail and the project monitoring plan and will be used to identify the key risk areas where material misstatement of GHG emission

9 IETA/WB(PCF) Validation and Verification Manual, http://www.ieta.org/ieta/www/pages/index.php?IdSitePage=392

reductions may occur. Initially, material misstatements can be caused by at least the following key sources:

- Incorrect transfer of data between reporting forms,
- Use of monitoring equipment that is not calibrated,
- Incorrect application of emission factors for estimation of GHG emission reductions.

Other factors may be identified through a more detailed risk assessment carried out as part of the audit preparations.

5.2.4 On-site audit

The DOE will conduct on-site audits to confirm the project's operational performance. The on-site audit will comprise a review of on-site performance records not submitted prior to the visit, interviews with project participants and local stakeholders, collection of measurements, observation of established practices and testing of the accuracy of monitoring equipment. This will also include a review of the monitoring results and the verification that the monitoring methodologies for the estimation of the GHG emission reductions have been applied correctly and their documentation is complete and transparent. Any concerns related to the conformity of the actual CDM project activity and its operation with the monitoring plan will be identified and communicated to the project participant.

5.2.5 Draft verification report and resolution of outstanding issues

A draft verification report, which will include any verification findings, will be issued to the project participant for review. The draft verification report will also include potential issues that need to be resolved before the verification of GHG emission reductions can be finalised. Any outstanding issues that may impact the final verification statement will hence be fully disclosed. In dialogue with the project participant these issues will be handled according to established certification practices in order to complete the verification of GHG emission reductions. Findings that should be resolved before the next periodic verification will also be included and elaborated in this report.

Findings established during the verification may be that:

(a) The verification has not been able to obtain sufficient evidence for the reported GHG emission reductions or part of the reported GHG emission reductions. In this case these emission reductions will not be verified and certified; or

(b) The verification has identified material misstatements in the reported GHG emission reductions. In this case GHG emission reductions with material misstatements will be discounted based on the ex-post determination of the achieved GHG emission reductions.

5.2.6 Final verification report and certification

Eventually, a final verification report and verification statement will be submitted to the project participant. The final verification report will briefly document the verification process, methodology and results, including the completed verification checklist. The verification statement will clearly specify the DOE's ex post determination of the monitored GHG emission reductions that have occurred during a specified verification period and will serve as a basis for requesting the EB to issue an equivalent amount of CERs.

5.2.7 Certification and issuance process

In accordance with paragraph 64 of the CDM M&P, the certification report shall constitute a request for issuance to the EB of CERs equal to the verified amount of reductions of GHG emissions. A DOE shall submit its verification report and certification report/request for issuance of CERs to the UNFCCC. The date of receipt of a request for issuance is the date when the secretariat has determined that the request is complete. Unless there is a request for review, a request for issuance shall be considered final 15 days after its receipt. After this period, or upon conclusion of the review process, the EB shall instruct the CDM Registry administrator to issue the specified amount of CERs for the specified time period.

In case the project participant disagrees with a DOE's final verification findings, the procedure for handling of disputes in accordance with the CDM M&P will be applied.

5.3 Principles of verification

In order to reach a reasonable level of assurance through the verification, it must be recognised that several facts and factors for the determination of emission reductions need be seen as fixed factors and not as variables. This comprises validated baseline emission factors fixed ex-ante (e.g. baseline grid emission factors), validated publicly accessible and recognised factors such as national or IPCC emission factors and coefficients and other factors that are available in the public domain and are used for calculation input. These should be accepted despite their inherent uncertainties and not to be pursued for further verification. The level of assurance through verification should be reached by rigorously testing the uncertainties related to the remaining variable factors such as fuel consumption, activity levels etc. in the quantification of GHG emission reductions.

GHG emissions have a decreasing level of accuracy, dependent on whether these are monitored, calculated, estimated or projected. For emissions factors it is the same, the more specific an emissions factor is, the higher level of assurance it provides. It is expected that a DOE discounts verified GHG emission reductions or requests a discount of these by using conservative assumptions for uncertainties in GHG emission estimates that cannot be fully quantified or that cannot give a desired level of assurance.

As addressed earlier, the objective of verification is to evaluate the GHG emissions and express a conclusion with a high level of assurance. The audit conclusion is based on the interaction of four key verification principles[10] (Figure 5-3):

1. Compliance with monitoring plan
2. Materiality
3. Accuracy
4. Quality of evidence

10 IETA/WB(PCF) Validation and Verification Manual

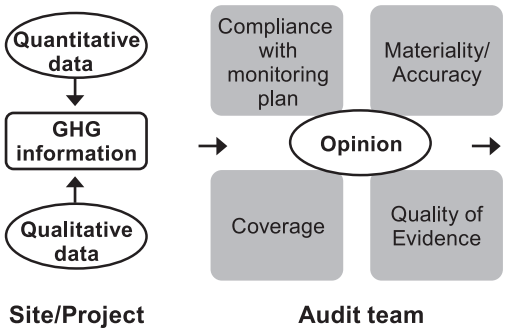


Figure 5-3 Verification principles

5.3.1 Compliance with monitoring plan

The DOE shall determine whether:

- The monitoring plan is properly implemented and followed by relevant personnel;
- All indicators stated in the monitoring plan are sufficiently monitored and updated as applicable, i.e.:
  - project emission indicators,
  - baseline emission indicators,
  - leakage indicators,
  - sustainable development indicators fro CDM projects;
- The responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan.

In addition, the DOE shall also assess whether:

- The proposed monitoring frequency is sufficient to show the full range of variations,
- The accuracy of equipment used for monitoring is sufficient and regularly controlled and calibrated, and
- Monitoring results are consistently recorded, reviewed and approved.

The DOE shall also determine whether the monitoring plan is still applicable or whether the monitoring plan shall be revised to allow for any changes that may have occurred since validation and that have impact on the CDM project activity. Revision to the monitoring plan may be necessary if:

- External sources of data is no longer available or is published in a different format,
- Operations of the CDM project activity have changed.

As decided in 26th EB meeting, in conducting verification, when it is discovered that activity levels or non-activity parameters have not been monitored by the project participants in accordance with the registered monitoring plan, the DOE shall make the most conservative assumption theoretically possible in finalising the verification report.

5.3.2 Materiality

Materiality is a test used to assess to which extent GHG emission reduction data may be misstated. Data can be checked for errors by checking:

- Spreadsheet formulas and connections,
- That factors are used consistently with recommended methods or guidelines,
- For manual transposition errors between data sets,
- Uncertainty of technology (e.g. metering), and
- Appropriateness of default data where specific source data is lacking.

GHG emission reductions with material misstatements shall be discounted based on the DOE's ex-post determination of the achieved GHG emission reductions. In CDM, the DOE is liable for the GHG emission reductions verified and certified. If a review by the EB reveals that excess CERs were issued, the DOE, who has falsely verified and certified excess CERs, shall acquire an amount of CERs equal to the excess CERs and transfer this amount to a cancellation account.

For CDM there are no definitions of materiality. Definition by ISO 14064 as follows will be a reference: "Materiality is the professional judgement of the validator or verifier whether an individual or aggregation of omissions, misrepresentations or errors that effects management's GHG assertion will reasonably influence the intended user's decisions." A guiding example was given by UNEP in 2001: "Example: Material (or significant) uncertainty can be defined as, e.g., 1% of total CO_2e for regular projects and 5% for small scale project."

5.3.3 Accuracy

Reported GHG emission reductions might include uncertainties due to:

- Technological limitations, i.e. inherent uncertainties associated with the methods used to measure emission indicators;
- Lack of source data, i.e. use of default data which has been derived based on certain assumptions/conditions and which will therefore have varying applicability in different situations.

The project participant or DOE may choose to discount GHG emission reductions for technical uncertainties, if appropriate, in the ex-post determination of the achieved GHG emission reductions. Uncertainty should be explored with the site personnel, based on their knowledge and experience. High risk parameters or source data (i.e. those with a significant influence on the reported data, such as monitoring equipment) should be reviewed for uncertainties. The CDM M&P do not include any guidance on treatment of uncertainties. However, project participants may base their conclusion on other relevant guidance such as the guidelines for the monitoring and reporting of GHG emissions in the EU emission trading scheme, which addresses uncertainty matters, i.e.:

- General treatment of uncertainty
- Uncertainty and calculation
- Uncertainty and measurement

Misstatements can be the result of errors:

- Calculation errors (e.g. inappropriate factors, assumptions)
- Lack of clarity within the methods/guidelines for determining GHG emissions or baselines
- Data management weaknesses e.g. manual transposition errors

5.3.4 Quality of evidence

When verifying GHG information the DOE shall verify that there is a clear audit trail for the reported GHG emission reductions. The DOE shall also obtain sufficient and appropriate audit evidence. Evidence includes a complete audit trail including source documents the basis for assumptions, and other information underlying the GHG data. Operational records to sustain claimed emission may include, but are not limited to:

- Fuel purchase records,
- Fuel consumption records,
- Invoices for sold heat,
- Invoices for sold electricity,
- Laboratory analysis.

Issues to address when assessing audit evidence include:

- Whether the evidence is of sufficient quantity and appropriate quality;
- Professional judgement on the reliability of the evidence;
- The source and nature of the evidence (external/internal, oral, documented).

5.4 Monitoring report

The monitoring report forms the basic document for the verification process. While performing a CDM verification process, it entails the use of documents like the registered PDD, registered validation report, the baseline and emission reduction calculation work sheets, the basic document on which the initial and the periodic verification is based is the monitoring report.

The monitoring report should ideally address the following and must be in line with the monitoring plan of the registered PDD:

- Project performance data
- Project and baseline emission factors
- Documentation of GHG emission reduction calculations
- Leakage

The monitoring report should be backed up by operational records to sustain claimed GHG emission reductions, such as

- Fuel purchase records
- Fuel consumption records
- Invoices for sold heat
- Invoices for sold electricity
- Leakage estimation records
- Laboratory analysis

The monitoring report is prepared by the project participant or hired consultants. Since the Kyoto Protocol does not specify the frequency at which a verification process is to be carried out for a registered CDM project activity, the choice of the frequency and duration of the verification lies with the project participant and the monitoring report should clearly state the period for which the GHG emission reductions are proposed to be claimed.

The UNFCCC guidelines do not specify any specific format in which the monitoring report is to be prepared. It is left to the project participant to formulate their own format. The following guidelines are based on best practices, and desirable to ensure a complete and concise monitoring report.

1. ***The cover page.*** It is desirable that the cover page of the monitoring report contain the following project related information.
   a) Title of the CDM project activity.
   b) UNFCCC reference number.
   c) Project participants name and address/contact address and signature (optional) of the responsible person (preferably as stated in the modalities of communications).
   d) The period for which the GHG emission reductions are being claimed for (i.e. the start date of verification period and the end date).
   e) The GHG emission reductions being claimed.
   f) Whether this is the initial verification or a periodic verification, in which case the number of the periodic verification should be specified.
   g) The version of the monitoring report and the date of its release.

2. ***A contents page*** is desirable if the monitoring report is lengthy with many sections. However it is always desirable to keep the monitoring report short but containing all the relevant details as stated below.

3. ***Introduction:*** An introduction of the CDM project activity. This should describe the type of project (whether large or small scale), sectoral scope, approved methodology applied, the involved non-Annex I Party, details of other project participants from Annex I Parties, and the period for which the monitoring report pertains to.

4. ***A list of the references*** of the CDM project activity like:
   a) The approved baseline methodology used and its version.
   b) Registered PDD of version and date.
   c) Validation report, version and date.
   d) The approved monitoring methodology used and its version.
   e) Date when the CDM project activity was registered.
   f) Any other references of importance in the verification process.

5. ***A brief description of the CDM project activity*** with respect to
   a) What was envisaged in the registered PDD?
   b) Has the CDM project activity been implemented as envisaged and what are the deviations?
   c) When was the CDM project activity commissioned?
   d) Whether any additions have been done on the CDM project activity for further improvements?
   e) Performance of the CDM project activity during the period of verification.
   f) Number of days of operation / downtime, and
   g) Legal compliance of the CDM project activity during the period.

6. ***Monitoring parameters:*** The list of the parameters to be monitored along with the specified frequency as indicated in the registered PDD. Justification is also to be provided if any of the parameters could not be monitored or the frequency could not be maintained.

7. ***The step by step calculation*** involved in arriving at the CERs as provided in the registered PDD. The ex-ante fixed variables should be clearly specified and the source of the constants (whether IPCC or local value) should also be provided for easy reference. Any deviations from the calculation due to either non availability of data or non-applicability of the formulae which could not be foreseen during the validation, or the need to apply a correction factor is also to be clearly stated. A comparison of the GHG emission reductions being claimed for the period as against the estimated GHG emission reductions (in the registered PDD) for the same period and the justification for variations on either side (plus or minus) is also to be provided.

8. Incase the baseline methodology specifies a ***check against the baseline requirements;*** this should also be clearly stated.

9. A brief on the ***quality control and quality assurance (QA/QC) procedures*** being followed for data monitoring, calculations and archiving.

10. ***Calibration / maintenance of measurement and analytical instruments.*** A list of the instruments that require calibration as per the methodology and their compliance is to be stated.

11. ***Environmental Impacts:*** a brief write-up on the environmental impacts of the CDM project activity on the immediate surroundings, the compliance of the CDM project activity or the unit as a whole to the local regulations/standards of air and water quality and if applicable, the monitoring results of environmental parameters stated either in the environmental impact assessment or in the approved methodology environmental impact assessment.

12. Though not a part of the monitoring report ***an excel worksheet*** comprising of the following is also to be provided to the verifying DOE for conducting the verification:
    a) All parameters monitored with the frequency and all values
    b) Calculations of the GHG emission reductions
    c) Variations from the estimated GHG emission reductions stated in the registered PDD with reasons/justifications.

Any change in the monitoring report after the original version has been uploaded on the UNFCCC website is to be indicated by a change in the version number and date on the front page for easy reference and tracking.

5.5 Pitfalls

5.5.1 Pitfall descriptions

Seven pitfalls are explained in detail based on experience with verification of monitoring reports.

Good practice and examples are presented as appropriate.

Pitfall 1: What is indicated in the registered PDD is ideal and hence not reflected in practice.

In most instances, the monitoring plan is a direct copy of what has been stipulated in the approved methodology. Again, this is primarily reflected against the parameters that are required to be monitored, the frequency of measurements and / or the data variable being measured, calculated or estimated.

Examples:

- Annual quantity of HSD utilized by the CDM project activity is indicated as a measured value in the monitoring plan, while the monitoring report and records indicate that these are estimated values.
- Net calorific value of the waste gas is committed to be a measured value in the monitoring plan but in practice it is gross calorific value per the records evidenced. Alternately, against the requirement of a measured value, IPCC default values are observed to be used.
- The steam production parameter to be measured as per monitoring plan while in practice is estimated.
- Fuel quantities committed to be recorded on a daily basis through direct flow measurement is actually demonstrated on a monthly basis, based on fuel receipts.
- Leakage needs to be monitored (as required by methodology) and the validated PDD every year till the entire crediting period; however this is not evident.
- The steam enthalpy used to calculate energy is a constant value of 0.682. As per the registered PDD, the monthly actual enthalpy based on steam parameters is to be used.
- The baseline steam requirement for power generation was estimated to be 6.3 tonnes/MWh by XYZ Corporation during the validation. The project participant is requested to use the same value while calculating the GHG emission reductions.

Good practice:

It must be ensured that what is committed in the monitoring plan of the registered PDD is actually adhered-to and demonstrated through appropriate evidences. It is advisable to do the following:

- Ensure that the commitments are practicable for implementation by the project participant and initiate appropriate steps to facilitate implementation of the same. The DOE at the time of validation should also ensure to verify that systems are in place for such implementation.
- An initial verification of the CDM project activity also ensures to dissolve all such discrepancies.
- The process also requires that periodic internal audits be done by the project participant and corrective actions effected.

The monitoring report summarizes the GHG emission reductions due to the CDM project activity. All the parameters as required by the final monitoring plan of the CDM project activity needs to be presented in the final monitoring report. Any deviation from the monitoring plan in the PDD should be justified adequately. The monitoring report shall necessarily report parameters in the same frequency as required by the monitoring plan.

Pitfall 2: Systems are not in place.

Based on experience, the most common lack of system relates to the calibration procedures and evidences thereof.

Examples:

- Procedures for project management covering measurement, monitoring, reporting,

calibration, maintenance and emergency preparedness are by and large available as part of the company's integrated management system. However system procedures covering authority and responsibility, documentation/record keeping, corrective actions, internal audits and performance reviews have not been formally linked to the CDM project activity.

- Calibration records of measuring instruments not available at site as required by the registered PDD.

Good practice:

It must be ensured that all relevant procedures – for calibration, maintenance, internal audits, emergency preparedness, corrective actions and performance reviews must be in place either at the time of validation stage or during the initial verification. The procedures must clearly address roles, responsibilities and authorities of all personnel involved. Companies who already have management systems in place, by way of certification towards ISO 9001 and ISO 14001 systems must also ensure that the CDM project activity is adequately covered in their existing procedures.

The project participant is requested to provide the DOE with relevant calibration records for all appropriate instrumentation, whose readings will have a bearing on the CER estimates. Examples include energy meters, flow meters, temperature transducers etc. For newly installed meters the calibration certificates provided during procurement may be presented.

The project participant is requested to provide the accreditation certificate for the lab wherein the calorific value of coal used in power generation has been analyzed.

Pitfall 3: Vast difference in the estimates of the PDD and actual monitoring report, leading to a higher claim on the CER's than the estimates in the PDD.

Typically the following discrepancies are observed:

- Differences between the estimates in the registered PDD and the final monitoring plan
- Differences between the estimates in the initial monitoring plan that is uploaded and the final monitoring report submitted along with the request for issuance.

The estimates in the PDD and in the monitoring reports vary by and large only if the CDM project activity involves an ex-post monitoring of the baseline emissions. While this is considered acceptable, a variation otherwise is not.

Examples:

The differences in the estimates between the PDD and the monitoring report can be further attributed to the following instances:

- Increased production levels realized beyond the rated capacities. If the gross electricity generation by a hydro power project for were 10.7% and 8.7% higher than the rated installed capacity in certain two months, they lead to higher CER estimate.
- Transportation emissions are either not being accounted OR being demonstrated to be lower than what was estimated.
- The accounting periods indicated in the registered PDD and the period considered in the monitoring period could be different.
- Leakage emissions considered in the monitoring report have been incorrectly estimated. Maybe the project emissions do not account for the usage of coal in the project for the monitoring period.

Good practice:

A critical analysis of the gap between ex ante estimated CERs detailed in the PDD, and the actual CERs claimed in the monitoring report, should be provided in the monitoring report by the project

participants. Such analysis should also be provided in the verification report by the DOE. In case, higher CERs are being claimed due to increased production levels beyond rated capacities, then this shall also be justified together with technical specifications that support increased loads beyond the rated capacities.

A justification is also advisable, both in the monitoring report as well as the verification report, should the CERs claimed for in the monitoring period be far below the estimates in the PDD.

Pitfall 4: Ex-post monitoring not evident

While the registered PDD and the validation report stipulate an ex-post monitoring of the baseline emissions, it is sometime seen that the monitoring report adopts a baseline value that has been determined ex-ante.

Good practice:

It is advisable that the PDD, the validation report and the applied approved methodology are reviewed and understood before embarking on the preparation of the monitoring report. This will become also evident if the project participant chooses to do an internal audit and/or an initial verification of the project activity by the DOE.

Pitfall 5: Detailed excel sheet calculations not available

Typically, many monitoring reports present all relevant data in the form of tables. This does not therefore guarantee that the GHG data recorded and reported are accurate and devoid of errors such as calculation errors (through the use of inappropriate factors, assumptions etc) and transposition errors.

Examples:

The monitoring report does only contain the aggregated data and does not show in a transparent manner the actual calculations and formula used to arrive at specific result.

Good practice:

The monitoring report should ideally be accompanied by a spreadsheet that clearly demonstrates - where each number comes from (could be a measured value or from a reliable source); that the number is applied correctly; that the applied formula is correct (e.g. no double counting?); that correct conversions are applied and the aggregated number is correct.

Pitfall 6: Current environmental permits and legal obligations not fulfilled.

Many projects, at the time of validation are able to demonstrate that all current environmental obligations and permits have been fulfilled because of the project activity. However, at the time of each verification, it must also be demonstrated that the project activity is in full compliance with all the statutory obligations.

Example:

Environmental Monitoring Plan associated with project activity viz., stack emissions and performance evaluation of bag filters and ambient & fugitive emissions have not been formalized. Consents as per the Environmental law of the region has not been renewed on a yearly basis.

Good Practice:

Established management procedures must ensure requirements towards complying with all identified and applicable obligations, together with the responsibilities for adherence and maintenance of relevant records/evidences towards the same.

Pitfall 7: Other common issues normally encountered are:

- For a power generation CDM project activity using biomass, quantity of biomass used through non-renewable sources is not included separately in the monitoring report, as per conclusion of the registered validation report. This shall be reported and equivalent CERs deducted, should there be no justification that the biomass used is renewable. Each type of biomass shall be monitored separately, and presented as a part of spread sheet submitted for verification; also project emissions due to usage of non-renewable biomass shall be accounted and deducted from GHG emission reductions. IPCC default values for the carbon emission factor for non-renewable solid biomass may also be adopted.
- The estimation of the transportation emissions are not clearly presented in the monitoring report. Ideally supplier wise consignment details shall be recorded, together with the details such as quantities transported, distances travelled and fuel consumption particulars in kilo liters.
- Some of the CDM project activities are operational since the start of the crediting period and some of them commissioned after the start of the crediting period. The project participant is requested to clearly identify the project implementation dates in the monitoring report and present documentary evidence regarding the project implementation dates to the DOE during the final verification.
- Maintenance of history cards for all electrical drives which are a part of the CDM project activity are not always presented. This is needed in order to verify the annual running hours of the equipment, in order to facilitate correct estimations of the emissions.
- The auxiliary electricity consumption is monitored with errors. The auxiliary electricity consumption directly influences the Project Emissions. The auxiliary electricity consumption is usually 10%-20% of the gross electricity generation. Sometimes such auxiliary electricity consumption for a year are reported to be of the order of about 2 -3%. This may be the result of failure of the auxiliary electricity consumption meter/s together with the failure of the responsible for the monitoring that should use maximum auxiliary power values in such cases.

5.5.2 Other good practices

- Monitoring of data pertaining to GHG emissions due to consumption of diesel for DG set operations in case of emergency need to be made part of monitoring plan
- Defined procedures shall ensure the methodology and criteria for training of personnel working on GHG emission reductions. The mechanism of evaluation of effectiveness for the training imparted shall also be clear from the procedures defined
- It shall always be ensured that for a grid connected CDM project activity, it is not the gross energy generated that will be used for the calculation of CER's but only the net energy exported to the grid.
- The procedure for calculation of boiler efficiency shall also be reported including the quantification of the values obtained
- Leakage emissions for transportation should ideally consider round trips and variation in the size of trucks.
- All the parameters mentioned in the monitoring plan are to be reported in international units in the monitoring report.
- Data pertaining to import of electricity from the grid for the project when plant is not operational, shall also be included in the monitoring report.

6. Joint Implementation (JI)

6.1 What is JI?

The Joint Implementation (JI)[11] is one of the Kyoto mechanisms, along with the CDM and Emissions Trading, which allows Annex I Parties to transfer to or acquire from other Annex I Parties emission reduction units (ERUs) resulting from GHG emission reduction or sink projects, as shown in Figure 6-1 [Kyoto Protocol, Article 6].

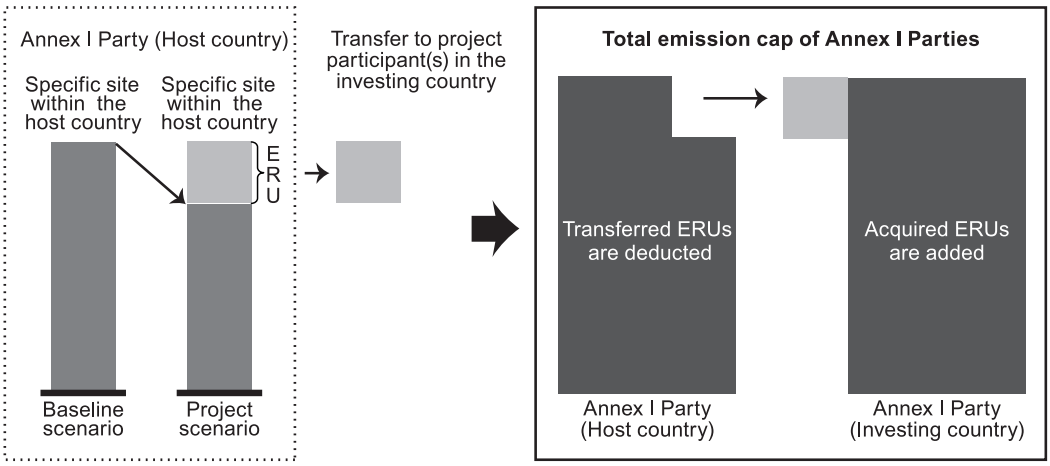


Figure 6-1 Outline of the JI

Whereas the CDM is a mechanism for project activities undertaken in non-Annex I countries that do not have a commitment inscribed in Annex B of the Kyoto Protocol, JI project activities take place in Annex I countries with a commitment inscribed in Annex B. Therefore, undertaking JI projects and transferring ERUs do not increase the total allowable emissions from Annex I countries.

Article 6 of the Kyoto Protocol sets out the following conditions for JI projects:

- Any such project has the approval of the Parties involved;
- Any such project provides a reduction in emissions, or an enhancement of removals, that is additional to any that would otherwise occur;
- It does not acquire any emission reduction units if it is not in compliance with its obligations under Articles 5 and 7 (of the Kyoto Protocol); and
- The acquisition of emission reduction units shall be supplemental to domestic actions for the purposes of meeting commitments under Article 3 (of the Kyoto Protocol).

Eligibility Requirements

The procedures for the issuance of ERUs differ depending on if the host Annex I Party satisfies the eligibility requirements as set out in paragraph 21 of the "Guidelines for the implementation of Article 6 of the Kyoto Protocol" (hereinafter referred to as "JI guidelines") [Annex to Decision 9/CMP.1].

Eligibility requirements[12] for an Annex I Party to transfer and/or acquire ERUs are as follows [JI guidelines, para. 21]:

11 Joint Implementation is a term that refers to the mechanism referred to in Article 6 of the Kyoto Protocol.
12 Refer to paragraph 21 of Decision 9/CMP.1 [CMP/2005/8/Add.2, p.6] for the exact wording.

(a) It is a Party to the Kyoto Protocol
(b) Its assigned amount has been calculated and recorded
(c) It has in place a national system for the estimation of GHG emissions and removals
(d) It has in place a national registry
(e) It has submitted annually the most recent required inventory, including the national inventory report and the common reporting format. For the first commitment period, the quality assessment needed for the purpose of determining eligibility to use the mechanisms shall be limited to the parts of the inventory pertaining to emissions of greenhouse gases from sources/sector categories from Annex A to the Kyoto Protocol and the submission of the annual inventory on sinks
(f) It submits the supplementary information on assigned amount and makes any additions to, and subtractions from, assigned amount

Verification Procedures

Different verification procedures are commonly referred to as "Track 1" and "Track 2".

Track 1 (Party-verified) Procedure

If a host Party meets all the eligibility requirements, the host Party may verify reductions in GHG emissions or enhancements removals from a JI project as being additional to any that would otherwise occur. Upon such verification, the host Party may issue the appropriate quantity of ERUs. [JI guidelines, para. 23]

Track 2 (Independently Verified) Procedure

If a host Party does not meet the eligibility requirements, the verification of reductions from a JI project shall occur through the verification procedure under the JI Supervisory Committee (JISC). However, the host Party may only issue and transfer ERUs upon meeting the eligibility requirements of (a), (b), and (d) above. [JI guidelines, para. 24]

Hence, where a host Party does not meet all of the eligibility requirements, "Track 2" has to be applied. Otherwise it has the choice between "Track 1" and "Track 2", i.e. it "may at any time elect to use the verification procedure under the JISC" [JI guidelines, para. 25].

Parties Involved in JI Projects

The parties involved in JI projects are: Austria, Belarus, Belgium, Bulgaria, Canada, Czech Republic, Denmark, European Community, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Liechtenstein, Lithuania, Luxembourg, Netherlands, New Zealand, Poland, Portugal, Romania, Russian Federation, Slovenia, Spain, Sweden, Switzerland, Ukraine, and United Kingdom of Great Britain and Northern Ireland (in alphabetic order) [Source: http://ji.unfccc.int/JI_Parties, as accessed on 1 October 2007].

6.2 JI institutions and procedures

6.2.1 JI institutions[13]

The institutions for the JI consist of the following:

COP/MOP

The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP/MOP) shall provide guidance regarding the implementation of Article 6 and exercise authority over the JI Supervisory Committee [JI guidelines, para. 2].

Designated Focal Point (DFP)

A Party involved in a JI project shall inform the secretariat of its designated focal point for approving JI projects. In addition, a Party involved in a JI project shall inform the secretariat of its national guidelines and procedures for approving JI projects, including the consideration of stakeholders' comments, as well as monitoring and verification. [JI guidelines, para. 20]

JI Supervisory Committee (JISC)

The JI Supervisory Committee (JISC) shall comprise 10 members from Parties to the Kyoto Protocol, as follows [JI guidelines, para. 4]:

	Members	Alternates
Annex I Parties that are undergoing the process of transition to a market economy	3	3
Annex I Parties that are not undergoing the process of transition to a market economy	3	3
Non-Annex I Parties	3	3
Small island developing States	1	1
Total	10	10

The JISC shall supervise, inter alia, the verification of ERUs generated by JI project activities, and be responsible for [JI guidelines, para. 3]:

- Reporting on its activities to each session of the COP/MOP;
- The accreditation of independent entities in accordance with standards and procedures contained in appendix A of the JI guidelines;
- The review of standards and procedures for the accreditation of independent entities in appendix A of the JI guidelines, giving consideration to relevant work of the CDM EB and, as appropriate, making recommendations to the COP/MOP on revisions to these standards and procedures;
- The review and revision of reporting guidelines and criteria for baseline and monitoring in appendix B of the JI guidelines, for consideration by the COP/MOP, giving consideration to relevant work of the CDM EB, as appropriate;
- The elaboration of the JI-PDD, for consideration by the COP/MOP, taking into consideration appendix B of the annex on CDM M&P and giving consideration to relevant work of the CDM EB, as appropriate;
- The review procedures set out in paragraph 35 and 39 of the JI guidelines;
- The elaboration of any rules of procedure additional to those contained in the JI guidelines,

13 The JISC, AIE, JI-AP and JI-ATs are only relevant for JI Track 2.

for consideration by the COP/MOP.

In addition, the COP/MOP, at its second session [Decision 2/CMP.2, paras. 1-4]:

- Adopts the rules of procedure of the JISC;
- Encourages the JISC to keep its rules of procedure under review and, if necessary, make recommendations on any amendments or additions aimed at safeguarding its efficient, cost-effective and transparent functioning;
- Adopts the JI-PDD forms;
- Authorizes the JISC, taking into account experience gained, to make any amendments or additions to the PDD forms, as appropriate, and to elaborate in its annual report to the COP/MOP, for information, on any such amendments or additions.

Accredited Independent Entity (AIE)

An accredited independent entity (AIE) is an entity accredited by the JISC in accordance with standards and procedures contained in appendix A of the JI guidelines. An AIE is responsible for the determination of whether a project and the ensuing GHG emission reductions or enhancements of removals meet the relevant requirements of Article 6 of the Kyoto Protocol and the JI guidelines. In short, the AIE under the JI scheme has similar functions with the DOE under the CDM, but is more responsible for its determination. Under the CDM, the DOE is responsible to validate the PDD, and to check the applicability of the approved methodology to the proposed project. Under the JI, the AIE has to assess the concepts of baseline setting and monitoring in accordance with the criteria for baseline setting and monitoring set out in appendix B of JI guidelines because there are no approved methodologies. In the case the project participants select to use the CDM approved methodology to the proposed JI project, the AIE shall assess whether all explanations, descriptions and analyses refer to the selected CDM methodology.

The procedure for accrediting independent entities by the JISC (Version 02) [JISC 06, Annex 3] was adopted at JISC sixth meeting. The scheme for the JI accreditation procedure is shown in Figure 6-2.

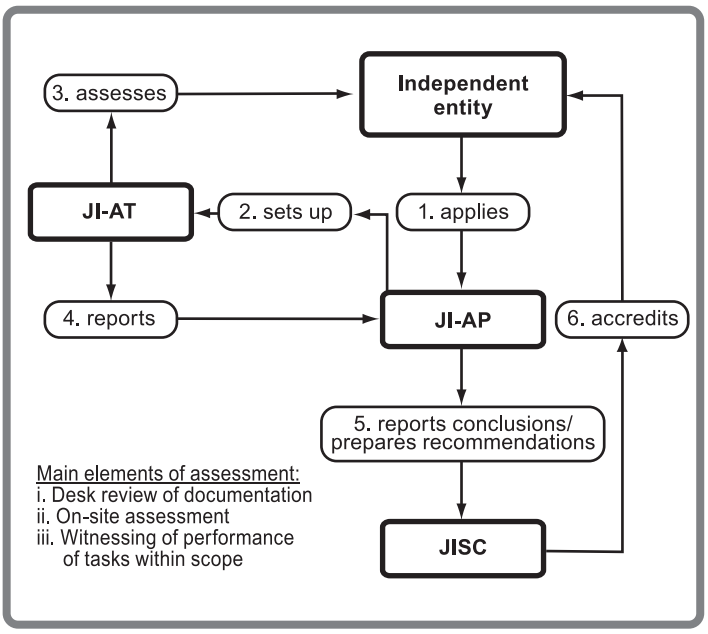


Figure 6-2 JI Accreditation Procedure
(Source: JISC06, Annex 3, Figure 1, page 4)

The assessment of an applicant IE under the JI accreditation process consists of three main elements: desk review, on-site assessment, and witnessing [JISC06, Annex 3, para. 4]. Those elements are the same as CDM accreditation process. The scope of accreditation of an AIE refers to both its functions (determination regarding PDDs or determination of GHG emission reductions or enhancements of removals) and its sectoral scope [JISC06, Annex 3, para. 6]. The list of sectoral scopes was adopted at JISC fourth meeting, as shown in Table 6-1. The listing of scopes is the same as the one for the accreditation under the CDM except for the scope 14, reflecting the difference in the relevant provisions in the Marrakesh Accords.

Table 6-1 List of Sectoral Scopes (Version 01)

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

Source: "List of sectoral scopes (version 01)" [JISC04, Annex 2]

Applicant IE may choose to apply for one or more sectoral scopes [JISC06, Annex 3, paras. 9 and 10]. A list of independent entities that have applied for accreditation by the JISC is available electronically on the UNFCCC JI website under the section "Accredited Independent Entities" <http://ji.unfccc.int/AIEs/CallForInputs> and an updated list of AIEs is provided on the UNFCCC JI website under the same section <http://ji.unfccc.int/AIEs/List>.

The COP/MOP, at its first session, decided that DOEs under the CDM may act provisionally as AIEs under JI, until the JISC has approved its procedures for accreditation, and that those DOEs that apply for accreditation under the approved JI accreditation procedure may continue to act provisionally as AIEs until a final accreditation decision is taken [Decision 10/CMP.1, paras. 3 (a) and (b)].

The JISC, at its fourth meeting, decided to start the JI accreditation process on 15 November 2006, in order to avoid a potential time vacuum derived from paragraphs 3 (a)-(c) of decision 10/CMP.1. The JISC understands that its procedures for accreditation will be effective as of that day, to allow sufficient time for DOEs acting provisionally as AIEs to prepare their applications for the JI accreditation process, so that the DOEs can continue to act provisionally as AIEs in the meantime. Moreover, the JISC clarified that DOEs may act provisionally as AIEs within

the corresponding sectoral scope(s) and function(s) for which they had been designated under the CDM (including provisional designation by the CDM EB) before 15 November 2006 and for which they have applied for JI accreditation. Again, DOEs that did not apply for accreditation by the JISC before 15 November 2006 may resume their status as provisional AIEs from the date they apply for JI accreditation [JISC07, Annex 2, paras. 4 and 5]. DOEs designated for the sectoral scope of afforestation and reforestation may act as AIEs for the sectoral scope of land use, land-use change and forestry for the designated function(s) [JISC04, para. 7].

JI Accreditation Panel (JI-AP)

The JI-AP is responsible for:

(a) Preparing recommendations to the JISC regarding the accreditation of an applicant IE;
(b) Preparing recommendations regarding unscheduled surveillance, suspension and withdrawal of accreditation, re-accreditation and accreditation for additional sectoral scope(s);
(c) Providing guidance to and approves the work plan of each JI-AT

[JISC06, Annex 3, para 3.2].

The JI-AP shall operate under the guidance of the JISC, in accordance with the general guidelines for panels and working groups under the JISC. The JI-AP shall be established as a standing panel of the JI accreditation process, and its mandate may be revised or terminated by the JISC, if necessary.

JI Assessment Team (JI-AT)

A JI-AT, operating under the guidance of the JI-AP, shall be an ad-hoc team chosen by the JI-AP relevant to the scope(s) of an assignment and taking into consideration the issues of consistency of the assessment [JISC08, Annex 1, paras. 6 and 7]. The JISC, at its eighth meeting, adopted the document "Terms of reference for JI-ATs" (Version 02) [JISC08, Annex 1]. These terms of reference provide details on the following:

(a) Areas of work of JI-ATs,
(b) Modalities of work, and
(c) Membership in the teams including competence requirements.

[JISC08, Annex 1, para. 2]

In accordance with the JI accreditation procedure, a JI-AT shall:

(a) Undertake an assessment of an applicant IE and/or AIE; and
(b) Prepare an assessment report to the JI-AP.

[JISC08, Annex 1, para. 3]

6.2.2 JI procedures

Figure 6-3 describes the verification procedure under the JISC, or Track 2 procedure. The procedure involves two kinds of determinations by the AIE(s). The first determination is according to paragraph 33 of the JI guidelines (often referred to as "determination" or "determination of PDD"), which corresponds to validation under the CDM. The other is according to paragraph 37 of the JI guidelines (often referred to as "verification" or "determination of ERUs"), which corresponds to verification under the CDM.

The JISC will undertake appraisals of the first determinations with inputs from experts, as appropriate.

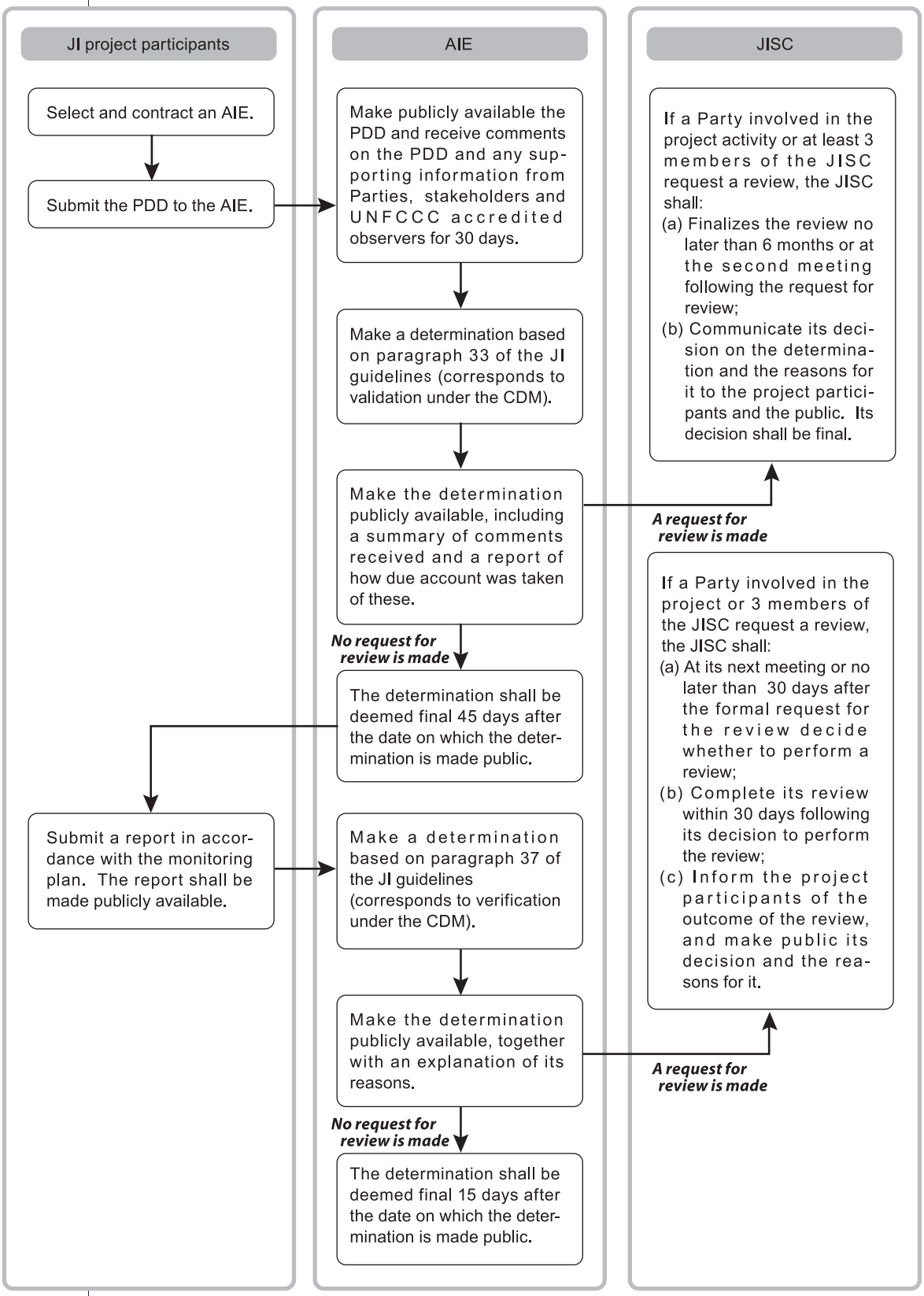


Figure 6-3 Verification procedure under the JISC (Track 2 procedure)

Fees to cover administrative costs

The fee structure [JISC04, Annex 16] adopted by the JISC at its fourth meeting as endorsed by decision 3/CMP.2, para. 16 is described below. The fees to cover administrative costs relating to

the activities of the JISC are in line with the share of proceeds to cover administrative expenses (SOP-Admin) under the CDM (refer to section 2.6).

1. Fees for accreditation:

(a) Application fee: USD 15,000 per application (one-off payment, non-reimbursable);

(b) Cost of the work by assessment teams: direct payment from applicant or accredited independent entities.

2. Fee for processing of verification report:

(a) USD 0.10 per tonne of CO_2 equivalent of emission reductions or enhancements of removals for the first 15,000 tonnes of CO_2 equivalent generated by the project in question in a given calendar year;

(b) USD 0.20 per tonne of CO_2 equivalent of emission reductions or enhancements of removals for any amount in excess of 15,000 tonnes of CO_2 equivalent generated by the project in question in a given calendar year.

3. Advance payment (similar to registration fee under the CDM)

- A fee equivalent to the expected average annual generation of emission reductions or enhancements of removals for the project over its crediting period as described in 1(b) above shall be paid as an advance payment when a determination report regarding the PDD is submitted to the secretariat in accordance with paragraph 34 of the JI guidelines.
- The advance payment shall be deducted from the fee for processing the first verification report on the same project submitted to the secretariat in accordance with paragraph 38 of the JI guidelines.
- If a verification report is not submitted, the advance payment above USD 30,000 shall be reimbursed.
- No advance payment shall be paid for projects with an expected average annual generation of emission reductions or enhancements of removals over the crediting period below 15,000 tonnes of CO_2 equivalent.
- Maximum fee payable as advance payment shall be USD 350,000.

To incorporate preferential treatment of JI small scale projects regarding advanced payments on the fee for the processing of verification reports, the JISC revised the fee structure at its eight meeting and agreed to submit the revised fee structure [JISC08, Annex 9] to the CMP3 for endorsement, after which time it would enter into force [JISC08, para. 32].

6.3 JI-PDD and guidelines

6.3.1 JI-PDD format

The JISC has agreed on the draft JI-PDD form version 01 (in effect as of 15 June 2006) [JISC03, Annex 1], similar to version 02 of the CDM-PDD form[14], and the guidelines for users of the JI-PDD form [JISC03, Annex 2]. Later on, the COP/MOP2 adopts the JI-PDD form in accordance with the JI guidelines [Decision 2/CMP.2, Para 3]. As shown in Table 6-2, the contents of JI-PDD version 01 and CDM-PDD version 02 are quite similar.

The JI-PDD form and the guidelines for users of the JI-PDD form are available on: http://ji.unfccc.int/Ref/Docs.html.

14 When the draft JI-PDD form was approved by the JISC, the most recent version of CDM-PDD form was version 02.

Projects with written approvals from Parties of the JI guidelines dated before 15 June 2006 shall use either the JI-PDD form or the CDM-PDD forms. In the latter case, the AIE selected by the project participants to perform the determination shall confirm that the PDD submitted provides all the information covered by the JI-PDD form and related JISC guidance [JISC03, para. 8].

Table 6-2 Comparison of JI-PDD version 01 and CDM-PDD version 02

JI-PDD version 01	CDM-PDD version 02
A. General description of the project	A. General description of project activity
B. Baseline	B. Application of a baseline methodology
C. Duration of the project / crediting period	C. Duration of the project activity / Crediting period
D. Monitoring plan	D. Application of a monitoring methodology and plan
E. Estimation of greenhouse gas emission reductions	E. Estimation of GHG emissions by sources
F. Environmental impacts	F. Environmental impacts
G. Stakeholders' comments	G. Stakeholders' comments
Annexes	
Annex 1: Contact information on project participants	Annex 1: Contact information on participants in the project activity
	Annex 2: Information regarding public funding
Annex 2: Baseline information	Annex 3: Baseline information
Annex 3: Monitoring plan	Annex 4: Monitoring plan

Main differences of JI-PDD version 01 from CDM-PDD version 02

(1) A.4.2. "Category(ies) of project activity" of the CDM-PDD is not included in the JI-PDD.

(2) Annex 2 "Information regarding public funding" of the CDM-PDD is not included in the JI-PDD since the constraints regarding public funding is not applicable to JI.

(3) In A.5. "Project approval by the Parties involved", written approvals by the Parties involved should be attached to the JI-PDD. The approval should be unconditional and in writing and shall be attached to the JI-PDD at the latest before the final determination report is made publicly available. Such written approval constitutes the authorization by a designated focal point of a specific legal entity to participate in the specific JI project.

(4) In section B "Baseline", a baseline has to be set in accordance with appendix B of the JI guidelines and further guidance on criteria for baseline setting and monitoring developed by the JISC. As appropriate, project participants may, but are not obliged to, apply approved CDM baseline and monitoring methodologies. If an approved CDM baseline and monitoring methodology is used, all explanations, descriptions and analyses shall refer to the selected methodology. In particular, the following steps should be adhered to:

1. Referencing of the approved baseline and monitoring methodology applied to the project,
2. Justification of the choice of the methodology and why it is applicable to the project, and
3. Description of how the methodology is applied in the context of the project.

(5) In section G "Stakeholders' comments", provide

- A list of stakeholders from whom comments on the project have been received;
- Nature of the comments; and
- Whether and how the comments have been addressed.

6.3.2 Criteria for baseline setting and monitoring[15]

The JISC is responsible for "the review and revision of reporting guidelines and criteria for baselines and monitoring in Appendix B [of the JI guidelines] for consideration by the COP/MOP, giving consideration to relevant work of the Executive Board of the CDM, as appropriate" [JI guidelines, para. 3(d)]. Project participants should follow Appendix B of the JI guidelines regarding criteria for baseline setting and monitoring, as well as guidance on criteria for baseline setting and monitoring provided by the JISC , both of which are described below.

Note that it has been decided by the COP/MOP that methodologies for baselines and monitoring, including methodologies for small scale project activities, approved by the CDM EB, may be applied by project participants under JI, as appropriate [Decision 10/CMP.1, para. 4(a)] .

Criteria for baseline setting

Criteria for baseline setting [JI guidelines, Appendix B]

1. The baseline for a JI project is the scenario that reasonably represents the GHG emissions or removals that would occur in the absence of the proposed project. A baseline shall cover emissions from all gases, sectors and source categories listed in Annex A, and removals by sinks, within the project boundary.

2. A baseline shall be established:
   (a) On a project-specific basis and/or using a multi-project emission factor;
   (b) In a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors;
   (c) Taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector;
   (d) In such a way that emission reduction units (ERUs) cannot be earned for decreases in activity levels outside the project activity or due to force majeure;
   (e) Taking account of uncertainties and using conservative assumptions.

3. Project participants shall justify their choice of baseline.

Regarding the criteria for baseline setting shown above, the JISC has given the following guidance [JISC04, Annex 6].

Project boundary

In the case of a JI project aimed at reducing GHG emissions, the project boundary shall:

(a) Encompass all GHG emissions which are:
   (i) Under the control of the project participants;
   (ii) Reasonably attributable to the project; and
   (iii) Significant, i.e., as a rule of thumb, would by each source account on average per year over the crediting period for more than 1 per cent of the annual average GHG emissions, or exceed an amount of 2,000 tonnes of CO_2 equivalent, whichever is lower; and

(b) Be defined on the basis of a case-by-case assessment with regard to the criteria referred to in (a) above. If an approved CDM baseline and monitoring methodology is used the project

15 This term corresponds to "baseline and monitoring methodologies" in the CDM.

boundary shall be defined in line with the approved methodology.

Refer to section 6.5 for project boundary in the case of JI project aimed at enhancing GHG removals (JI LULUCF project).

Leakage

- Leakage is the net change of GHG emissions and/or removals which occurs outside the project boundary, and that can be measured and is directly attributable to the JI project.
- Project participants must undertake an assessment of the potential leakage of the proposed JI project and explain which sources of leakage are to be calculated, and which can be neglected. Leakage to be included shall be quantified and a procedure provided for an ex ante estimate.

Basic features of a baseline

- The baseline for a JI project:
  (a) Is the scenario that reasonably represents the GHG emissions or removals that would occur in the absence of the project;
  (b) Shall cover emissions from all gases, sectors and source categories listed in Annex A of the Kyoto Protocol, and/or removals within the project boundary.

Basic options for the establishment of a baseline

- A baseline shall be established on a project-specific basis and/or using a multi-project emission factor, taking into account the project boundary.
- A multi-project emission factor may be used and its application shall be justified. Sector-wide baselines may e.g. be used if:
  (a) The physical characteristics of the sector justify the application of a standard emission factor across the sector (e.g. in the case of an integrated electricity network with no major transmission constraints, the physical characteristics of the system may imply that the impact of a project on emissions can be assessed irrespective of its location); and/or
  (b) The emissions intensity does not vary significantly across the sector (e.g. in the case of diesel power generation in off-grid electricity systems, the emission factor for electricity generation may be based on standard factors with a reasonable degree of accuracy).
- The following two options are applicable if a baseline is established on a project-specific basis:
  (a) Project participants may apply methodologies for baselines and monitoring approved by the CDM EB, including methodologies for small scale project activities, as appropriate. If an approved CDM baseline and monitoring methodology is used, all explanations, descriptions and analyses shall be made in accordance with the selected methodology;
  (b) Alternatively, the project participants may establish a baseline that is in accordance with appendix B of the JI guidelines. In doing so, selected elements or combinations of approved CDM baseline and monitoring methodologies or approved CDM methodological tools may be used, as appropriate.

Identification of a baseline

- Taking into account the options for the establishment of a baseline referred above, a baseline can be identified, inter alia:
  (a) By using an approved CDM baseline and monitoring methodology. In this case all

explanations, descriptions and analyses, inter alia with regard to the identification of a baseline, shall be made in accordance with the methodology chosen;

(b) By identifying and listing plausible future scenarios on the basis of conservative assumptions and identifying the most plausible one.

- A baseline shall be established taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector. Key factors that affect a baseline shall be taken into account, e.g.:
  (a) Sectoral reform policies and legislation;
  (b) Economic situation/growth and socio-demographic factors in the relevant sector as well as resulting predicted demand. Suppressed and/or increasing demand that will be met by the project can be considered in the baseline as appropriate (e.g. by assuming that the same level of service as in the project scenario would be offered in the baseline scenario);
  (c) Availability of capital (including investment barriers);
  (d) Local availability of technologies, skills and know-how and availability of best available technologies in the future;
  (e) Fuel prices and availability;
  (f) National and/or subnational expansion plans for the energy sector, as appropriate; and
  (g) National and/or subnational forestry or agricultural policies, as appropriate.
- Furthermore, each baseline shall be established:
  (a) In a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors;
  (b) Taking account of uncertainties and using conservative assumptions; and
  (c) In such a way that ERUs cannot be earned for decreases in activity levels outside the project activity or due to force majeure.
- In establishing a baseline the project participants shall draw on the list of standard variables contained in appendix B to the guidance on criteria for baseline setting and monitoring, as appropriate.
- The project participants shall justify their choice of baseline taking into account Annex 1 to the guidance on criteria for baseline setting and monitoring, which explains about additionality. If the baseline approach chosen differs from approaches already taken in comparable cases (same GHG mitigation measure, same country, similar technology, similar scale) that an AIE has positively determined, the differences shall be explained and justified.
- In any case:
  (a) The project participants shall set a baseline in accordance with appendix B of the JI guidelines;
  (b) The host Party/Parties (as well as the other Parties involved) has/have to approve the project; and
  (c) The AIE has to determine whether the project has an appropriate baseline in accordance with the criteria set out in appendix B of the JI guidelines.

Monitoring

II. Monitoring [JI guidelines, Appendix B]

1. Project participants shall include, as part of the project design document, a monitoring plan that provides for:
   (a) The collection and archiving of all relevant data necessary for estimating or measuring GHG emissions and/or removals occurring within the project boundary during the crediting period;
   (b) The collection and archiving of all relevant data necessary for determining the baseline of GHG emissions and/or removals within the project boundary during the crediting period;
   (c) The identification of all potential sources of, and the collection and archiving of data on increased GHG emissions and/or reduced removals outside the project boundary that are significant and reasonably attributable to the project during the crediting period. The project boundary shall encompass all GHG emissions and/or removals under the control of the project participants that are significant and reasonably attributable to the JI project activity;
   (d) The collection and archiving of information on environmental impacts, in accordance with procedures as required by the host Party, where applicable;
   (e) Quality assurance and control procedures for the monitoring process;
   (f) Procedures for the periodic calculation of the GHG emission reductions and/or enhancements of removals by the proposed JI project, and for leakage effects, if any. Leakage is defined as the net change of GHG emissions and/or removals which occurs outside the project boundary, and that is measurable and attributable to the JI project;
   (g) Documentation of all steps involved in the calculations referred to in subparagraphs (b) and (f) above.

2. Revisions, if any, to the monitoring plan to improve its accuracy and/or completeness of information shall be justified by project participants and shall be submitted for the determination referred to in paragraph 37 of the annex on JI guidelines by the accredited independent entity.

3. The implementation of the monitoring plan and its revisions, as applicable, shall be a condition for verification.

Regarding the above criteria for monitoring, the JISC has given the following guidance [JISC04, Annex 6].

- As part of the PDD of the project a monitoring plan has to be established by the project participants in accordance with appendix B of the JI guidelines (shown above):
  (a) Project participants may apply methodologies for baselines and monitoring approved by the CDM EB, including methodologies for small-scale project activities, as appropriate. If an approved CDM baseline and monitoring methodology is used, all explanations, descriptions and analyses shall be made in accordance with the selected methodology;

(b) In other cases, a monitoring plan established in accordance with appendix B of the JI guidelines may, inter alia, use selected elements or combinations of approved CDM baseline and monitoring methodologies, if deemed appropriate.

- The monitoring plan shall, inter alia:
  (a) Describe all relevant factors and key characteristics that will be monitored, and the period in which they will be monitored, in particular also all decisive factors for the control and reporting of project performance;
  (b) Specify the indicators, constants and variables used;
  (c) Draw on the list of standard variables contained in appendix B to the guidance on criteria for baseline setting and monitoring, as appropriate;
  (d) Describe the methods employed for data monitoring (including its frequency) and recording;
  (e) Present the quality assurance and control procedures for the monitoring process. This includes, as appropriate, information on calibration and on how records on data and/or method validity and accuracy are kept and made available on request;
  (f) Clearly identify the responsibilities and the authority regarding the monitoring activities;
  (g) On the whole, reflect good monitoring practices appropriate to the project type. In the case of JI LULUCF projects, this includes applying the good practice guidance, as developed by the IPCC; and
  (h) Provide a complete compilation of the data that needs to be collected for its application. This includes data that is measured or sampled and data that is collected from other sources (e.g. official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature etc.). Data that is calculated with equations should not be included in the compilation. The information in the monitoring plan shall be provided in tabular form.
- The indicators, constants, variables and/or models used shall be reliable (i.e. provide consistent and accurate values) and valid (i.e. be clearly connected with the effect to be measured), and shall provide a transparent picture of the emission reductions or enhancements of removals (to be) monitored. In particular, it is recommended with regard to:
  (a) Project-specific indicators to use, to the extent possible, indicators that are already used in normal business practice and/or have to be reported e.g. to local authorities. Such indicators might also be used to cross-check project operations (e.g. changes in the ratio of fuel input and energy output could indicate that the project equipment is not working properly and leakage effects have occurred);
  (b) Leakage indicators to use data from suppliers/utilities and/or available public statistics and/or to conduct surveys, as business-linked indicators might not be available and leakage effects can be controlled less effectively by the project participants.
- Default values may be used as appropriate. In the selection of default values, accuracy and reasonableness shall be carefully balanced. The default values chosen should originate from recognized sources, be supported by statistical analyses providing reasonable confidence levels and be presented in a transparent manner.
- Emission reductions or enhancements of removals shall be estimated/calculated in accordance with annex 2 of the guidance on criteria for baseline setting and monitoring, which is described further down.
- If a national or international monitoring standard has to be and/or is applied to monitor certain aspects of the project, this standard shall be identified and a reference as to where a detailed

description of the standard can be found shall be provided. Whenever possible, internationally recognized standards/methods with regard to monitoring (as well as calibration, as appropriate) should be applied.

- In any case:
  (a) The project participants shall set a monitoring plan in accordance with appendix B of the JI guidelines;
  (b) The host Party/Parties (as well as the other Parties involved) has/have to approve the project; and
  (c) The AIE has to determine whether the project has an appropriate monitoring plan in accordance with the criteria set out in appendix B of the JI guidelines.
- Project participants shall ensure that monitoring occurs in accordance with the monitoring plan.
- If statistical techniques are used for monitoring, these shall be documented and used in a conservative manner.
- In accordance with paragraph 36 of the JI guidelines, project participants shall submit to an AIE a monitoring report on GHG emission reductions or enhancements of removals that have already occurred. This report will be made publicly available.
- The project participants are encouraged to improve the monitoring process and its results. Revisions, if any, to the monitoring plan to improve its accuracy and/or completeness of information shall be justified by project participants and shall be submitted for the determination referred to in paragraph 37 of the JI guidelines by the AIE. In this case the AIE shall determine whether the proposed revisions improve the accuracy and/or completeness of information of the original monitoring plan without changing conformity with the relevant rules and regulations for the establishment of monitoring plans and, in case of a positive determination, shall proceed with the determination referred to in paragraph 37 of the JI guidelines.
- Data monitored and required for determination according to paragraph 37 of the JI guidelines are to be kept for two years after the last transfer of ERUs for the project.

Additionality [Annex 1 to the Guidance of criteria for baseline setting and monitoring (JISC04, Annex 6)]

- In accordance with Article 6 of the Kyoto Protocol a JI project has to provide a GHG emission reductions , or an enhancements of removals, that is additional to any that would otherwise occur.
- Having identified a baseline, additionality can be demonstrated, inter alia, by using one of the following approaches:
  (a) In case an approved CDM baseline and monitoring methodology is used, all explanations, descriptions and analyses, inter alia with regard to additionality, shall be made in accordance with the selected methodology;
  (b) In all other cases, inter alia, one of the following options may be applied:
    (i) Application of the most recent version of the "Tool for the demonstration and assessment of additionality" approved by the CDM EB;
    (ii) Application of any other method for proving additionality approved by the CDM EB;
    (iii) Provision of traceable and transparent information showing that the baseline was identified on the basis of conservative assumptions, that the project scenario is not part of the identified baseline scenario and that the project will lead to GHG emission

reductions or enhancements of removals;

(iv) Provision of traceable and transparent information that an accredited independent entity has already positively determined that a comparable project (to be) implemented under comparable circumstances (same GHG mitigation measure, same country, similar technology, similar scale) would result in a GHG emission reduction or an enhancement of removals that is additional to any that would otherwise occur and a justification why this determination is relevant for the project at hand.

- The approach chosen, including its appropriateness, shall be justified as a basis for the determination referred to in paragraph 33 of the JI guidelines.

Calculation of emission reductions or enhancements of net removals [Annex 2 to the Guidance of criteria for baseline setting and monitoring (JISC04, Annex 6)]

- The GHG emission reductions or enhancements of removals generated by the project have to be estimated ex ante in the PDD of the project and calculated ex post according to the monitoring plan included in the PDD:
  (a) On a periodic basis;
  (b) At least from the beginning until the end of the crediting period;
  (c) On a source-by-source/sink-by-sink basis;
  (d) In tonnes of CO_2 equivalent, using global warming potentials defined by decision 2/CP.3 or as subsequently revised in accordance with Article 5 of the Kyoto Protocol.
- Reductions of emissions or enhancements of removals of GHGs generated by JI projects are estimated/calculated by comparing the quantified GHG emissions or removals within the project boundary in the baseline scenario with those in the project scenario and adjusting for leakage. In practice, this estimation/calculation can be conducted, as appropriate, in one of the following two ways:
  (a) Assessment of GHG emissions or removals in the baseline scenario and in the project scenario:
    (i) Estimation/calculation of GHG emissions or removals within the project boundary in the baseline scenario;
    (ii) Estimation/calculation of GHG emissions or removals within the project boundary in the project scenario;
    (iii) Difference of the results of the estimations/calculations referred to in subparagraphs (i) and (ii) above;
    (iv) Adjustment of the result of subparagraph (iii) above for leakage;
  (b) Direct assessment of emission reductions:
    (i) Direct estimation/calculation of the difference between the GHG emissions within the project boundary in the baseline scenario and in the project scenario (e.g. in the case of landfill gas projects, the emission reductions can be calculated by multiplying the methane captured with an appropriate factor based on the global warming potential of methane);
    (ii) Adjustment of the result of subparagraph (i) above for leakage.
- The project boundary chosen affects the identification of sources/sinks for which emissions or removals have to be assessed when estimating/calculating GHG emission reductions or enhancements of removals .

Crediting period

- The period for which GHG emission reductions or enhancements of removals may be determined by an AIE.
- Projects starting as of 2000 may be eligible as JI projects if they meet the requirements of the JI guidelines. ERUs shall only be issued for a crediting period starting after the beginning of 2008.
- The project participants shall choose the starting date of the crediting period to be on or after the date the first GHG emission reductions are generated by the JI project. The crediting period shall not extend beyond the operational lifetime of the project.
- The end of the crediting period can be after 2012, subject to the approval by the host Party. The status of GHG emission reductions generated by JI projects after the end of the first commitment period may be determined by any relevant agreement under the UNFCCC.

6.4 JI small scale projects[16]

6.4.1 JI Small scale thresholds

In accordance with the revised thresholds for SSC project activities under the CDM as defined in the paragraph 28 of decision 1/CMP.2, the threshold for JI SSC projects are:

(a) Renewable energy projects with a maximum output capacity of up to 15 megawatts (MW) (or an appropriate equivalent) (type I JI SSC projects);

(b) Energy efficiency improvement projects which reduce energy consumption, on the supply and/or demand side, by up to 60 gigawatt hours (GWh) per year (or an appropriate equivalent) (type II JI SSC projects);

(c) Other projects that result in emission reductions of less than or equal to 60 kilotonnes (kt) of carbon dioxide (CO_2) equivalent annually (type III JI SSC projects).

6.4.2 Project categories

JI SSC projects have to conform to one of the project categories for the small scale CDM project activities (Refer to section 3.3.4). Additional project categories under JI may be approved by the JISC either on its own initiative or based on submissions by project participants. Project participants may make a substantiated request in writing to the JISC providing information about the project/technology and a definition of the new project category proposed.

6.4.3 Bundling and debundling

JI SSC projects can be bundled at the following stages in the project cycle under the verification procedure under the JISC:

(a) Project design document;

(b) Determination referred to in paragraph 33 of the JI guidelines (so-called determination);

(c) Monitoring;

(d) Determination referred to in paragraph 37 of the JI guidelines (so-called verification).

16 This section is based on the "Provisions for Joint Implementation Small Scale Projects" (Version 02) [JISC06, Annex 1].

The provisions for bundling and debundling are similar to those for the small scale CDM project activities, including the following:

- Bundled JI SSC projects may, but do not necessarily, pertain to the same project category.
- All projects in the bundle shall:
  (a) Have the same crediting period; and
  (b) Comply with the provisions for JI SSC projects defined in the document "Provisions for Joint Implementation Small Scale Projects", in particular the thresholds referred above; and
  (c) Retain their distinctive characteristics (i.e. location, technology/measure etc.).
- The composition of a bundle shall not change over time.
- A single SSC PDD may be used for the whole bundle provided that all the projects pertain to the same JI SSC project category, apply the same technology or measure and are located in the territory of the same host Party. Otherwise, separate SSC PDDs have to be submitted for each project in the bundle. All SSC PDDs pertaining to a particular bundle shall be published at the same time, whenever the publication of PDDs is required under the verification procedure under the JISC.
- A debundled component of a large project is not eligible to benefit from the specific provisions for JI SSC projects.

However, one major difference of JI SSC from small scale CDM is that no limit for a whole bundle is set if each project composed of a bundle meet the threshold of JI SSC abovementioned. In addition, other benefit from the JI SSC provisions is the requirements of monitoring section in PDD[17] are reduced. In the different context from the JI SSC provisions, it is decided that no advance payment upon submitting the determination report shall be paid for projects with an expected average annual generation of emission reductions or enhancements of removals over the crediting period below 15,000 tonnes of CO_2 equivalent [Decision 3/CMP.2, para. 16(b)(iv)].

6.4.4 Baseline setting and monitoring

- In baseline setting and monitoring appendix B of the JI guidelines and guidance of the JISC shall be taken into account. In particular, project participants may, but are not obliged to, use the most recent versions of the simplified baseline and monitoring methodologies for SSC project activities approved by the CDM EB, as appropriate. In this case, all explanations, descriptions and analyses shall be made in accordance with the selected methodology.
- Leakage only has to be considered within the boundaries of non-Annex I Parties, if applicable.
- If projects in a bundle use the same baseline, this has to be justified by considering the particular situation of each project in the bundle.
- If projects are bundled, a separate monitoring plan shall apply for each of the constituent projects or an overall monitoring plan, which, inter alia, may also propose to monitor performance of the constituent projects on a sample basis, shall apply for the bundled projects. In the latter case the projects have to be located in the territory of the same host Party, have to pertain to the same project category and have to apply the same technology or measure, and the AIE shall determine that the overall monitoring plan reflects good monitoring practice appropriate to the bundled projects and provides for collection and archiving of the data needed to calculate the GHG emission reductions achieved by the bundled projects.

17 The JI SSC PDD form and the guidelines for users of the JI SSC PDD form are available on: http://ji.unfccc.int/Ref/Docs.html. Projects with written approvals from Parties in accordance with the JI guidelines dated before 1 October 2006 shall use either the most recent version of the JI SSC PDD form or the SSC-CDM-PDD [JISC06, Annex 1, para. 25].

6.5 JI land use, land-use change and forestry (LULUCF) projects

Under the CDM, among different activities related to land use, land-use change and forestry (LULUCF), only afforestation and reforestation are eligible as CDM project activities. On the other hand, all kinds of projects based on LULUCF activities that aim at enhancing net anthropogenic removals by sinks can be considered as LULUCF projects under the JI [JISC04, Annex 15, p.9].

LULUCF activities include the following activities referred to in Article 3, paragraphs 3 and 4 of the Kyoto Protocol (see Box 6-1): afforestation, reforestation, deforestation, revegetation, forest management, cropland management and grazing land management. Project participants wishing to undertake JI LULUCF projects other than afforestation or reforestation projects are recommended to check which of the other activities the host Party has chosen to account for in the first commitment period [Decision 16/CMP.1, Annex, para. 6].

Definition of LULUCF activities: [Decision 16/CMP.1, Annex, para. 1]

Afforestation	The direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.
Reforestation	The direct human-induced conversion of non-forested land to forested land through planting, seeding ad/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989.
Deforestation	The direct human-induced conversion of forested land to non-forested land.
Revegetation	A direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation.
Forest management	A system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner.
Cropland management	The system of practices on land on which agricultural crops are grown and on land that is set aside or temporarily not being used for crop production.
Grazing land management	The system of practices on land used for livestock production aimed at manipulating the amount and type of vegetation and livestock produced.

Definition of Forest

Definition of forest is the same as the one under the CDM (see section 3.4.1).

(a) A single minimum tree crown cover value between 10 and 30 per cent;

(b) A single minimum land area value between 0.05 and 1 hectare; and

(c) A single minimum tree height value between 2 and 5 metres.

Baseline

A baseline has to be set in accordance with appendix B of the JI guidelines and further guidance on criteria for baseline setting and monitoring developed by the JISC. As appropriate, project participants may, but are not obliged to, apply approved CDM baseline and monitoring methodologies.

Box 6-1: Kyoto Protocol Article 3, paragraphs 3 and 4

Paragraph 3:
The net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990, measured as verifiable changes in carbon stocks in each commitment period, shall be used to meet the commitments under this Article of each Party included in Annex I. The greenhouse gas emissions by sources and removals by sinks associated with those activities shall be reported in a transparent and verifiable manner and reviewed in accordance with Articles 7 and 8.

Paragraph 4:
Prior to the first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol, each Party included in Annex I shall provide, for consideration by the Subsidiary Body for Scientific and Technological Advice, data to establish its level of carbon stocks in 1990 and to enable an estimate to be made of its changes in carbon stocks in subsequent years. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session or as soon as practicable thereafter, decide upon modalities, rules and guidelines as to how, and which, additional human-induced activities related to changes in greenhouse gas emissions by sources and removals by sinks in the agricultural soils and the land-use change and forestry categories shall be added to, or subtracted from, the assigned amounts for Parties included in Annex I, taking into account uncertainties, transparency in reporting, verifiability, the methodological work of the Intergovernmental Panel on Climate Change, the advice provided by the Subsidiary Body for Scientific and Technological Advice in accordance with Article 5 and the decisions of the Conference of the Parties. Such a decision shall apply in the second and subsequent commitment periods. A Party may choose to apply such a decision on these additional human-induced activities for its first commitment period, provided that these activities have taken place since 1990.

Carbon pools

Carbon pools for JI LULUCF projects, which are the same as those for A/R CDM projects, are above-ground biomass, below-ground biomass, litter, dead wood, and soil organic carbon. Project participants may choose not to account for one or more carbon pools if they provide transparent and verifiable information that indicates that the pool is not a source.

Use of IPCC good practice guidance

According to the JI guidelines, JI projects aimed at enhancing removals shall conform to definitions, accounting rules, modalities and guidelines under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Decision 16/CMP.1, paragraph 2, states that good practice guidance, and methods to estimate, measure, monitor and report changes in carbon stocks and GHG emissions and removals resulting from LULUCF activities, as developed by the Intergovernmental Panel on Climate Change (IPCC), shall be applied by Parties, if decided in accordance with relevant decisions of the COP/MOP. According to decision 17/CMP.1, paragraph 1, Parties included in Annex I to the Convention that have ratified the Kyoto Protocol shall apply for the first commitment period the good practice guidance for LULUCF, as developed by the IPCC [JISC04, Annex 15, p.9].

Project boundary

In the case of a JI LULUCF project, the project boundary shall:

(a) Geographically delineate the JI LULUCF project under the control of the project participants. A JI LULUCF project may contain more than one discrete area of land. In this case:
   (i) Each discrete area of land should have a unique geographical identification;
   (ii) The boundary should be defined for each discrete area and should not include the areas in between these discrete areas of land;

(b) Encompass all GHG emissions and removals which are:
  (i) Under the control of the project participants;
  (ii) Reasonably attributable to the project; and
  (iii) Significant;

(c) Account for all changes in the following carbon pools: above-ground biomass, below-ground biomass, litter, dead wood, and soil organic carbon. Project participants may choose not to account for one or more carbon pools if they provide transparent and verifiable information that indicates that the pool is not a source;

(d) Be defined on the basis of a case-by-case assessment with regard to the criteria referred to in subparagraph (b) above. If an approved CDM baseline and monitoring methodology is used the project boundary shall be defined in line with the approved methodology [JISC04, Annex 6, para. 12].

Leakage

Leakage is the net change of GHG emissions and/or removals which occurs outside the project boundary, and that can be measured and is directly attributable to the JI project. In the case of JI LULUCF projects, only the increased GHG emissions and/or reduced removals outside the project boundary shall be taken into account [JISC04, Annex 6, para. 14].

Permanence

Whereas tCERs and lCERs have been created to cope with non-permanence under the CDM, the credits issued from JI LULUCF projects are called ERUs, same as credits from GHG emission reduction JI projects. However, there are following differences from ERUs generated from GHG emission reduction JI projects:

- ERUs are issued by each Party by converting assigned amount units (AAUs)[18] or removal units (RMUs) [19] previously issued by that Party and held in its national registry [Decision 13/CMP.1, Annex, para. 29]. Since an AAU or RMU shall be converted into an ERU by adding a project identifier to the serial number and changing the type indicator in the serial number to indicate an ERU, it can be supposed that ERUs from JI LULUCF projects would be converted from RMUs. It has been decided that ERUs that have been converted from RMUs cannot be carried over to subsequent commitment periods [Decision 13/CMP.1, Annex, para. 15(a)]. Consequently, it would not be possible to carry over ERUs originating from JI LULUCF projects to subsequent commitment periods.
- In case of net GHG emissions resulting from its activities under Article 3, paragraph 3, and its elected activities under Article 3, paragraph 4, each Party included in Annex I shall cancel CERs, ERUs, AAUs and/or RMUs equivalent to such net emissions [Decision 13/CMP.1, Annex, para. 32]. This indicates that in case of reversal, the host Party is primarily responsible for replacing that amount in the formal UNFCCC procedures.

JI LULUCF PDD

The draft JI LULUCF PDD form was agreed by JISC at its fourth meeting [JISC04, Annex 14], and shall be applied provisionally until the COP/MOP adopts has adopted it in accordance with the JI guidelines [JISC04, para. 29]. It was developed based on the draft JI-PDD form (see section 6.3.1 for detailed information on the draft JI PDD form) agreed on by the JISC at its third meeting [JISC04, para. 27]. Later on, the COP/MOP2 adopts the JI-PDD form in accordance with the JI guidelines [Decision 2/CMP.2, Para. 3]. The structure of the JI LULUCF PDD is almost the same

18 Total amount of AAUs of an Annex I Party is calculated from its base year emissions and emission reduction target
19 Total amount of RMUs of an Annex I Party is calculated from net removal of GHGs by afforestation and reforestation (A/R) activities and additional activities related to GHG removals by sinks

as that of JI-PDD, with some modifications, insertions, and deletion along with adjustments to keep the conformity to LULUCF activities. The JI LULUCF PDD form and the guidelines for users of the JI LULUCF PDD form are available on: http://ji.unfccc.int/Ref/Docs.html. Table 6-3 shows the comparison of contents of JI LULUCF PDD, JI-PDD, and CDM-AR-PDD.

Table 6-3 Comparison of JI LULUCF PDD version 01, JI-PDD version 01, and CDM-AR-PDD version 03

JI-PDD version 01	JI LULUCF PDD version 01	CDM-AR-PDD version 03
A. General description of the project	A. General description of the LULUCF project	A. General description of the proposed A/R CDM project activity
B. Baseline	B. Baseline	B. Duration of the project activity / crediting period
C. Duration of the project / crediting period	C. Duration of the LULUCF project / crediting period	C. Application of an approved baseline and monitoring methodology
D. Monitoring plan	D. Monitoring plan	D. Estimation of ex ante net anthropogenic GHG removals by sinks and estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period
E. Estimation of greenhouse gas emission reductions	E. Estimation of enhancements of net anthropogenic removals by sinks	E. Monitoring plan
F. Environmental impacts	F. Environmental impacts	F. Environmental impacts of the proposed A/R CDM project activity
G. Stakeholders' comments	G. Stakeholders' comments	G. Socio-economic impacts of the proposed A/R CDM project activity
		H. Stakeholders' comments
Annexes		
Annex 1: Contact information on project participants	Annex 1: Contact information on project participants	Annex 1: Contact information on participants in the proposed A/R CDM project activity
		Annex 2: Information regarding public funding
Annex 2: Baseline information	Annex 2: Baseline information	Annex 3: Baseline information
Annex 3: Monitoring plan	Annex 3: Monitoring plan	Annex 4: Monitoring plan

Main features of JI LULUCF PDD version 01 compared to CDM-AR-PDD version 03

(1) In A.2. "Description of the LULUCF project" of JI LULUCF PDD, it is not necessary to include the following items:
- Explain how the proposed project activity is undertaken (e.g. what exact measures are undertaken, what is their impact within and beyond the project boundary, list plant species used and state if they belong to the categories of Invasive Alien Species (IAS) or Genetically Modified Organisms (GMO), etc.);
- The view of the project participants on the contribution of the proposed A/R CDM project activity to sustainable development (max. one page).

(2) In A.4.1.4 "Detailed delineation of the project boundary including information allowing the unique identification of the LULUCF project", project participants shall provide information which ensures that areas of land are identifiable.

(3) In A.4.2 "Conformity with the definition of LULUCF activities", project participants should specify how the project conforms to the definitions of LULUCF activities included in paragraph 1 of the annex to decision 16/CMP.1, applying the good practice guidance for LULUCF as decided by the COP/MOP, as appropriate. In the case of afforestation, reforestation and/or forest management projects, project participants shall apply the definition of "forest" selected by the host Party, which specifies:

- A single minimum tree crown cover value between 10 and 30 per cent; and
- A single minimum land area value between 0.05 and 1 hectare; and
- A single minimum tree height value between 2 and 5 metres.

(4) In A.4.4. "Brief explanation of how the net anthropogenic removals by sinks are to be enhanced by the proposed JI LULUCF project, including why these enhancements would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances", explain briefly how the removals are to be enhanced (details to be provided in section B.) and provide the estimate(s) of anticipated total enhancements of removals in tonnes of CO_2 equivalent as determined in section E. (Max. length: one page.)

(5) Section B. "Baseline" shall contain all key elements of the baseline. Annex 2 "baseline information" to JI LULUCF PDD that should be prepared in parallel to completing the remainder of the section B of JI LULUCF PDD shall contain a summary of the key elements in tabular form as well as additional supporting documentation/information.

(6) In B.1. "Description and justification of the baseline chosen", explain how the baseline chosen takes into account the good practice guidance for land use, land-use change and forestry, developed by the IPCC, and how it ensures conformity with the definitions, accounting rules, modalities and guidelines under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

(7) In B.2. "Carbon pools selected", in calculating the removals occurring within the project boundary in the project and in the baseline scenario, project participants may choose not to account for one or more carbon pools, if transparent and verifiable information is provided that these unaccounted pools are not a source. The assessment should be based on conservative assumptions. The same carbon pools shall be considered in the estimation and/or calculation of the removals, occurring within the project boundary in the project and in the baseline scenario. The selected carbon pools should be presented in a table shown below, with short explanations and justifications for the choice.

Carbon Pools	Selected (yes/no)	Justification / Explanation (If needed, please use the space at the bottom of the table)
Above-ground biomass		
Below-ground biomass		
Dead wood		
Litter		
Soil organic carbon		
Further justification/explanation		

(8) In B.3. "Specification of the GHG sources whose emissions will be part of the JI LULUCF

project", project participants should use the table below to identify the sources of GHG emissions within the project boundary of the LULUCF project, e.g. soil preparation, machinery and fertilisation. CO_2 emissions or removals resulting from changes in carbon stocks should not be included in this table. Project participants should explain whether any emission sources are excluded and if yes, justify their exclusion.

Source	Gas	Included / excluded	Justification / Explanation (If needed, please use the space at the bottom of the table)
Use of fertilisers	CO_2		
	CH_4		
	N_2O		
Combustion of fossil fuels used in on-site vehicles	CO_2		
	CH_4		
	N_2O		
Further justification/explanation			

(9) In B.4. "Description of how the net anthropogenic removals by sinks are enhanced above those that would have occurred in the absence of the JI LULUCF project", project participants should explain how and why the JI LULUCF project is additional, including

- A description of the baseline scenario,
- A description of the project scenario, and
- An analysis showing why the net removals in the baseline scenario would likely lie below the net removals in the project scenario.

If an approved CDM baseline and monitoring methodology is used, all explanations, descriptions and analyses shall refer to the selected methodology.

(10) Section D. "Monitoring Plan" has to be established in accordance with appendix B of the JI guidelines and further guidance on criteria for baseline setting and monitoring developed by the JISC. As appropriate, project participants may, but are not obliged to, apply approved CDM baseline and monitoring methodologies. If an approved CDM methodology used, any guidance contained in the methodology shall be taken into consideration.

- The monitoring plan needs to provide detailed information on the collection and archiving of all relevant data necessary for determining:
  - Project emissions and removals,
  - Baseline emissions and removals, and
  - Leakage effects.
- The monitoring plan should reflect good monitoring practice appropriate to the project type.
- If a national or international monitoring standard has to be applied to monitor certain aspects of the project, project participants should identify this standard and provide a reference as to where a detailed description of the standard can be found. Project participants shall implement the determined monitoring plan and provide data in accordance with the plan through their monitoring reports. Data monitored and required for determination shall be

kept for two years after the last transfer of ERUs for the project.

(11) In D.1. "Description of monitoring plan chosen", project participants should explain how the monitoring plan chosen takes into account the good practice guidance for LULUCF, developed by the IPCC, and how it ensures conformity with the definitions, accounting rules, modalities and guidelines under Article 3, paragraph 3 and 4, of the Kyoto Protocol.

(12) In D.1.1. "Sampling design and stratification", project participants should describe the sampling design that will be used for the calculation of the removals occurring within the project boundary in the project scenario and, in case the baseline is monitored, in the baseline scenario. The sampling design shall describe, inter alia, stratification, determination of number of plots and plot distribution, etc.

(13) In D.1.5. "Where applicable, in accordance with procedures as required by the host Party, information on the collection and archiving of information on the environmental impacts of the LULUCF project", project participants should provide information on the collection and archiving of information on the environmental impacts of the project, as well as reference to the relevant host Party regulation(s). State if not applicable.

(14) The following sections of CDM-AR-PDD are not found in JI LULUCF PDD:
- A.4.5. "Approach for addressing non-permanence"
- A.4.7. "Public funding of the proposed A/R project activity"
- C.1. "Assessment of the eligibility of land"
- Section G. "Socio-economic impacts of the proposed A/R project activity"

Appendix

Appendix 1 Large Scale CDM Methodologies

Table A-1 List of Large Scale CDM Methodologies (as of 19 Oct 07)

Meth. No.	Scope	Main Keywords	Place of Application	Title and Version Number of Meth.
AM0001	11	Fugitive emissions, HFC 23 (CHF_3) destruction	HCFC-22 production facility	Incineration of HFC 23 Waste Streams – Version 5.1
AM0007	1, 4	Biomass (excl. non-renewables), Bagasse power	Grid connected biomass cogeneration plant	Analysis of the least-cost fuel option for seasonally-operating biomass cogeneration plants – Version 1
AM0009	10	Fugitive emissions from fuels, CH_4 recovery, Utilization in dry gas, LPG and condensate production	Oil wells	Recovery and utilization of gas from oil wells that would otherwise be flared – Version 2.1
AM0013	13	Waste, Biogas (CH_4) extraction, Flaring, Electricity/heat generation	Organic wastewater treatment plant	Avoided methane emissions from organic waste-water treatment – Version 4
AM0014	1, 4	EE supply side	Power plants producing electricity/ district heat	Natural gas-based package cogeneration – Version 4
AM0017	3	Demand side EE, EE industry (end-use savings)	Industry, Fossil fuel fired boiler	Steam system efficiency improvements by replacing steam traps and returning condensate – Version 2
AM0018	3	Demand side EE, EE industry (end-use savings)	Industry, Steam generator	Steam optimization systems – Version 1.1
AM0019	1	Renewables (excl. biomass)	Wind, geothermal, solar, hydro, wave and/or tidal electric power plant	Renewable energy project activities replacing part of the electricity production of one single fossil-fuel-fired power plant that stands alone or supplies electricity to a grid, excluding biomass projects – Version 2
AM0020	3	Demand side EE, EE service	Buildings & appliances in public & private service, water pump	Baseline methodology for water pumping efficiency improvements – Version 1
AM0021	5	N_2O reduction	Adipic acid production plant	Baseline Methodology for decomposition of N_2O from existing adipic acid production plants – Version 1
AM0022	13	Waste, Biogas (CH_4) extraction, Flaring, Electricity/heat generation	Industrial organic waste water treatment facility	Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector – Version 4
AM0023	10	Supply side EE, Energy distribution, Leak reduction	Natural gas transmission/ distribution system	Leak reduction from natural gas pipeline compressor or gate stations – Version 2
AM0024	1, 4	Supply side EE, EE own generation (of electricity)	Electricity production in cement plant using waste heat/gas	Methodology for greenhouse gas reductions through waste heat recovery and utilization for power generation at cement plants – Version 1
AM0025	1, 13	Waste, Composting, Gasification, Mechanical/ Thermal treatment, Incineration, Anaerobic digestion, Flaring, Power generation	MSW treatment facility	Avoided emissions from organic waste through alternative waste treatment processes – Version 9
AM0026	1	Renewables	Hydro, wind, solar, geothermal, wave and tidal electric power plant	Methodology for zero-emissions grid-connected electricity generation from renewable sources in Chile or in countries with merit order based dispatch grid – Version 2
AM0027	5	Biomass (excl. non-renewables) processing for use in production	Chemical plant	Substitution of CO_2 from fossil or mineral origin by CO_2 from renewable sources in the production of inorganic compounds – Version 2.1

Meth. No.	Scope	Main Keywords	Place of Application	Title and Version Number of Meth.
AM0028	5	N_2O reduction	Nitric acid & caprolactam production plants	Catalytic N_2O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants – Version 4.1
AM0029	1	Fossil fuel switch	Natural gas fired grid-connected electricity generation plant	Methodology for Grid Connected Electricity Generation Plants using Natural Gas – Version 1
AM0030	9	PFCs reduction, Metal production	Aluminium smelting facility	PFC emission reductions from anode effect mitigation at primary aluminium smelting facilities – Version 1
AM0031	7	Transport	Urban public transport system	Methodology for Bus Rapid Transit Projects – Version 1
AM0033	4	Cement, Lime replacement by other materials	Cement plant	Use of non-carbonated calcium sources in the raw mix for cement processing – Version 2
AM0034	5	N_2O reduction	Nitric acid production plants	Catalytic reduction of N_2O inside the ammonia burner of nitric acid plants – Version 2
AM0035	1, 11	Fugitive emissions, SF_6 emission reduction, SF_6 recycle, SF_6 leak reduction	Electric grid of the electric utility	SF_6 Emission Reductions in Electrical Grids – Version 1
AM0036	1, 4	Biomass (excl. non-renewables) utilization, Fossil fuel switch	Biomass boiler	Fuel switch from fossil fuels to biomass residues in boilers for heat generation – Version 2
AM0037	5, 10	Fugitive emissions from fuels, Tail gas recovery, Use in production	Oil and natural gas processing facility	Flare reduction and gas utilization at oil and gas processing facilities – Version 1.1
AM0038	9	Demand side EE, EE industry (end-use saving), Metal production	Silicomanganese production	Methodology for improved electrical energy efficiency of an existing submerged electric arc furnace used for the production of SiMn – Version 1
AM0039	13	Waste, Co-composting	Organic wastewater treatment facility, Landfill	Methane emissions reduction from organic waste water and bioorganic solid waste using co-composting – Version 2
AM0040	4	Cement, Lime replacement by other materials	Cement plant	Baseline and monitoring methodology for project activities using alternative raw materials that contain carbonates in clinker manufacturing in cement kilns – Version 1.1
AM0041	4	Kiln replacement, CH_4 avoidance	Charcoal production	Mitigation of Methane Emissions in the Wood Carbonization Activity for Charcoal Production – Version 1
AM0042	1, 14	Biomass excl. non-renewables, Co-firing, Plantation	Biomass fired grid-connected power plant	Grid-connected electricity generation using biomass from newly developed dedicated plantations – Version 1
AM0043	10	Supply side EE, Pipe replacement, Energy distribution, Lossreduction	Natural gas transmission/ distribution grid	Leak reduction from a natural gas distribution grid by replacing old cast iron pipes or steel pipes without catholic protection with polyethylene pipes – Version 2

Legend for Scope column:

No.	Sectoral Scope	No.	Sectoral Scope
1	Energy industries (renewable-/ non-renewable sources)	9	Metal Production
3	Energy demand	10	Fugitive emissions from fuels (solid, oil and gas)
4	Manufacturing industries	11	Fugitive emissions from production and consumption of halocarbons and sulphur hexa fluoride
5	Chemical industries	13	Waste handling and disposal
7	Transport	14	Afforestation and reforestation
8	Mining/ mineral production	15	Agriculture

Note: (i) Color gradation denotes the frequency of application of each methodology for registered project activities: 0 ☐, 1 to 5 ▭ and over 5 ▬. (ii) Number(s) in the Scope column denotes Sectoral Scope Number(s) as indexed in the legend table. (iii) No approved methodology till date for sector numbers: 2, 6, and 12. (iv) A/R CDM is excluded from this list and categorized separately.

Meth. No.	Scope	Main Keywords	Place of Application	Title and Version Number of Meth.
AM0044	1	Demand side EE, EE industry (end-use savings)	Industrial boiler	Energy efficiency improvement projects: boiler rehabilitation or replacement in industrial and district heating sectors – Version 1
AM0045	1	Supply side EE, Energy distribution, Loss reduction	Transmission/ distribution of electricity/district heat	Grid connection of isolated electricity systems – Version 1.1
AM0046	3	Demand side EE, EE household	Domestic houses and appliances	Distribution of efficient light bulbs to households – Version 1
AM0047	1, 5	Biofuels, Biodiesel	Chemical plant producing waste oil/ fat	Production of biodiesel based on waste oils and/ or waste fats from biogenic origin for use as fuel – Version 2
AM0048	1	EE supply side	Power plants producing electricity/ district heat	New cogeneration facilities supplying electricity and/or steam to multiple customers and displacing grid/off-grid steam and electricity generation with more carbon-intensive fuels – Version 1
AM0049	1, 4	EE supply side	Power plants producing electricity/ district heat, Industry	Methodology for gas based energy generation in an industrial facility – Version 1
AM0050	5	Fossil fuel switch, Naphtha, Natural Gas	Integrated ammonia-urea manufacturing facility	Feed switch in integrated Ammonia-urea manufacturing industry – Version 1
AM0051	5	N_2O reduction	Nitric acid production plants	Secondary catalytic N_2O destruction in nitric acid plants – Version 2
AM0052	1	EE supply side, Decision Support System (DDS)	Hydropower plant producing electricity	Increased electricity generation from existing hydropower stations through Decision Support System optimization – Version 1
AM0053	1, 5	Waste, Organic matter, Landfills, Liquid waste treatment, animal waste management systems	Biogas processing system and distribution grid	Biogenic methane injection to a natural gas distribution grid – Version 1
AM0054	1	Demand side EE, EE industry (end-use savings)	Industry, Residual fuel oil fired boiler	Energy efficiency improvement of a boiler by introducing oil/water emulsion technology – Version 1
AM0055	1, 4	Supply side EE, EE own generation (of electricity)	Refinery generating heat using waste gas that is flared currently	Baseline and Monitoring Methodology for the recovery and utilization of waste gas in refinery facilities – Version 1
AM0056	1	Demand side EE, EE industry (end-use savings)	Industry, Fossil fuel fired steam boiler(s)	Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems – Version 1
AM0057	4, 13	Agricultural waste, Biomass, On-site power generation	Pulp and paper industry	Avoided emissions from biomass wastes through use as feed stock in pulp and paper production – Version 1
AM0058	1	Supply heat to residential and commercial consumers	District heating system, Power Plant, Cogeneration (CHP) plant, Heat only boilers (HOB)	Introduction of a new primary district heating system – Version 1
AM0059	9	PFCs reduction, Metal production, Electrical energy use efficiency	Aluminium smelting facility	Reduction in GHGs emission from primary aluminium smelters – Version 1
ACM0001	13	Landfill gas capture, Flaring, Power generation, Injection to natural gas distribution grid, Waste	Landfill site	Consolidated baseline and monitoring methodology for landfill gas project activities – Version 7
ACM0002	1	Renewables	Hydro, wind, geothermal, solar, wave and tidal electric power plant	Consolidated methodology for grid-connected electricity generation from renewable sources– Version 6

Meth. No.	Scope	Main Keywords	Place of Application	Title and Version Number of Meth.
ACM0003	4	Biomass(excl. non-renewables),Alt fuel, Less C intensive fossil fuel	Cement plant	Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement manufacture– Version 6
ACM0005	4	Clinker reduction, Additives	Cement plant	Consolidated Methodology for Increasing the Blend in Cement Production– Version 3
ACM0006	1	Biomass (excl. non-renewables)	Biomass residue fired power plants, Cogeneration plants	Consolidated methodology for electricity generation from biomass residues– Version 6
ACM0007	1	EE supply side, Waste heat utilization	Power plants producing electricity/ district heat	Methodology for conversion from single cycle to combined cycle power generation– Version 2
ACM0008	8, 10	Fugitive emissions from fuels, CH_4 recovery, Mining, Power, Flaring	Coal bed/ mine	Consolidated baseline methodology for coal bed methane, coal mine methane and ventilation air methane capture and use for power (electrical or motive) and heat and/or destruction by flaring or catalytic oxidation – Version 4
ACM0009	1, 4	Fossil fuel switch, Coal/ Petroleum fuel, Natural gas	Industry, Boiler	Consolidated methodology for industrial fuel switching from coal or petroleum fuels to natural gas– Version 3
ACM0010	13, 15	Animal waste	Livestock farm	Consolidated methodology for GHG emission reductions from manure management systems– Version 3
ACM0011	1	Fossil fuel switch, Coal/ Petroleum fuel, Natural gas	Power plant producing electricity	Consolidated baseline methodology for fuel switching from coal and/or petroleum fuels to natural gas in existing power plants for electricity generation– Version 2
ACM0012	1, 4	Supply side EE, EE own generation (of electricity)	Electricity/heat production/use in industry using waste heat/gas	Consolidated baseline methodology for GHG emission reductions for waste gas or waste heat or waste pressure based energy system– Version 1
ACM0013	1	EE supply side, Supercritical coal fired power plant	Fossil fuel fired power plants producing electricity/district heat	Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology– Version 1

Legend for Scope column:

No.	Sectoral Scope	No.	Sectoral Scope
1	Energy industries (renewable-/ non-renewable sources)	9	Metal Production
3	Energy demand	10	Fugitive emissions from fuels (solid, oil and gas)
4	Manufacturing industries	11	Fugitive emissions from production and consumption of halocarbons and sulphur hexa fluoride
5	Chemical industries	13	Waste handling and disposal
7	Transport	14	Afforestation and reforestation
8	Mining/ mineral production	15	Agriculture

Note: (i) Color gradation denotes the frequency of application of each methodology for registered project activities: 0 ☐, 1 to 5 ▭ and over 5 ▬. (ii) Number(s) in the Scope column denotes Sectoral Scope Number(s) as indexed in the legend table. (iii) No approved methodology till date for sector numbers: 2, 6, and 12. (iv) A/R CDM is excluded from this list and categorized separately.

Appendix 2 Methodological Tools

Table A-2 List of Methodological Tools (as of 19 Oct 07)

Title and Version Number	Scope, Applicability and Parameters	
I. METHODOLOGY RELATED TOOLS		
1. Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site – Version 2 [EB35, Annex 10]	Scope and applicability	This tool calculates baseline emissions of methane from waste that would in the absence of the project activity be disposed at solid waste disposal sites (SWDS). Emission reductions are calculated with a first order decay (FOD) model. The tool is applicable in cases where the SWDS where the waste would be dumped can be clearly identified. The tool is not applicable to hazardous wastes.
	Parameter(s) to be determined	Methane emissions avoided during the year y from preventing waste disposal at the SWDS during the period from the start of the project activity to the end of the year y (tCO_2e) [$BE_{CH4,SWDS,y}$].
2. Tool for the demonstration and assessment of additionality – Version 3 [EB29, Annex 5]	Scope and applicability	The document provides a general framework for demonstrating and assessing additionality and is to be applicable to a wide range of project types. Particular project types may require adjustments to this framework. The steps include: • Identification of alternatives to the project activity; • Investment analysis to determine that the proposed project activity is not the most economically or financially attractive; • Barriers analysis; and • Common practice analysis.
3. Tool to determine project emissions from flaring gases containing methane [EB28, Annex 13]	Scope and applicability	This tool provides procedures to calculate project emissions from flaring of a residual gas stream (RG) containing methane. This tool is applicable under the following conditions: • The RG to be flared contains no other combustible gases than methane, carbon monoxide and hydrogen; • The RG to be flared shall be obtained from decomposition of organic material (through landfills, bio-digesters or anaerobic lagoons, among others) or from gases vented in coal mines (coal mine methane and coal bed methane).
	Parameter(s) to be determined	• Project emissions from flaring of the residual gas stream in year y (tCO_2e) [$PE_{flare,y}$] • Flare efficiency in hour h based on measurements or default values [$\eta_{flare,h}$]
4. Combined tool to identify the baseline scenario and demonstrate additionality – Version 2 [EB28, Annex 14]	Scope and applicability	This tool provides for a step-wise approach to identify the baseline scenario and simultaneously demonstrate additionality. Project participants proposing new baseline methodologies may incorporate this combined tool in their proposal. Project participants may also propose other tools for the identification of the baseline scenario and demonstrate additionality to the EB for its consideration. Methodologies using this tool are only applicable if all potential alternative scenarios to the proposed project activity are available options to project participants. This applies, for example, to project activities that make modifications to an existing installation that is operated by project participants, such as, for example: • energy efficiency improvements at existing installations operated by project participants; • fuel switch at existing installations operated by project participants; • changes in waste management practices at existing solid waste disposal sites operated by project participants; • reduction of N_2O, HFC-23 or PFC emissions at existing installations operated by project participants. The methodological procedure involves following four steps: • Identification of alternative scenarios • Barrier analysis • Investment analysis (if applicable) • Common practice analysis
5.Estimation of project or leakage emissions from fossil fuel combustion – Version 1 [EB32, Annex 9]	Scope and applicability	This tool provides procedures to calculate project and/or leakage CO_2 emissions from the combustion of fossil fuels. It can be used in cases where CO_2 emissions from fossil fuel combustion is calculated based on the quantity of fuel combusted and its properties. Methodologies using this tool should specify for which combustion processes j this tool is being applied.
	Parameter(s) to be determined	CO_2 emissions from fossil fuel combustion in process j during the year y (tCO_2/yr) [$PE_{FC,j,y}$]

Title and Version Number	Scope, Applicability and Parameters	
6. Estimation of project emissions from electricity consumption – Version 1 [EB32, Annex 10]	Scope and applicability	This tool provides procedures to estimate the project emissions associated with the consumption of electricity by the proposed CDM project activity. For example, the operation of plants (e.g. waste treatment plants, biofuel generation plants, etc) may involve the consumption of auxiliary electricity. This tool is not applicable in cases where captive renewable power generation technologies installed at the project site supply the electricity consumed by the project activity. This tool also refers to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
	Parameter(s) to be determined	Project emissions from electricity consumption by the project activity during the year y (tCO_2/yr) [$PE_{EC,y}$]
7. Tool to calculate the emission factor for an electricity system – Version 1 [EB35, Annex 12]	Scope and applicability	This methodological tool determines the CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the "operating margin" (OM) and "build margin" (BM) as well as the "combined margin" (CM). The OM refers to a cohort of power plants that reflect the existing power plants whose electricity generation would be affected by the proposed CDM project activity. The BM refers to a cohort of power units that reflect the type of power units whose construction would be affected by the proposed CDM project activity. This tool may be referred to in order to estimate the OM, BM and/or CM for the purpose of calculating baseline emissions for a project activity substitutes electricity from the grid, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). Note that this tool is also referred to in the "Tool to calculate project emissions from electricity consumption" for the purpose of calculating project and leakage emissions in case where a project activity consumes electricity from the grid or results in increase of consumption of electricity from the grid outside the project boundary.
	Parameter(s) to be determined	• Combined margin CO_2 emission factor for grid connected power generation in year y (tCO_2/MWh) [$EF_{grid,CM,y}$] • Build margin CO_2 emission factor for grid connected power generation in year y (tCO_2/MWh) [$EF_{grid,BM,y}$] • Operating margin CO_2 emission factor for grid connected power generation in year y (tCO_2/MWh) [$EF_{grid,OM,y}$]
II. AFFORESTATION AND REFORESTATION (A/R) RELATED TOOLS		
1. Tool for the demonstration and assessment of additionality in A/R CDM project activities – Version 2 [EB35, Annex 17]	Scope	• This tool provides for a step-wise approach to demonstrate additionality in A/R CDM projects. • Project participants proposing new baseline methodologies may incorporate this tool in their proposal. Project participants may also propose other approaches for the demonstration of additionality to the EB for its consideration. • In validating the application of this tool to a proposed project activity, DOEs should assess credibility of all data, rationales, assumptions, justifications and documentation provided by project participants to support the selection of the baseline and demonstration of additionality. Procedure: Project participants shall apply the following 5 steps: • STEP 0. Preliminary screening based on the starting date of the A/R project activity; • STEP 1. Identification of alternative land use scenarios to the A/R project activity; • STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or • STEP 3. Barriers analysis; and • STEP 4. Common practice analysis.
	Applicability	• Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced; • The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project participants proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity; and • This tool is not applicable to small scale afforestation and reforestation project activities.

Title and Version Number	Scope, Applicability and Parameters	
	Parameter(s) to be determined	This procedure does not use its own parameters.
2. Calculation of the number of sample plots for measurements within A/R CDM project activities – Version 1 [EB31, Annex 15]	Scope	This tool is applicable if sample plots are used for monitoring purposes. The tool estimates the number of permanent sample plots needed for monitoring changes in carbon pools at a desired precision level. Permanent sample plots are preferred when: • Measurements are to be made at specific time intervals; • High covariance is expected between observations at successive sampling events.
	Applicability	This tool is applicable under the following condition: • Variables under consideration are normally distributed or may be transformed into a normal distribution. Normal distribution can be assumed when: • Many small (independent) effects contribute to each observation in an additive fashion.
	Parameter(s) to be determined	• Sample size (total number of permanent sample plots required) in the project area [n] • Sample size for stratum i [n_i]
3. Tool for testing significance of GHG emissions in A/R CDM project activities– Version 1 [EB31, Annex 16]	Scope	This tool facilitates the determination of which GHG emissions by sources, possible decreases in carbon pools, and leakage emissions are insignificant for a particular CDM A/R project activity. The sum of decreases in carbon pools and increases in emissions that may be neglected shall be less than 5% of the total decreases in carbon pools and increases in emissions, or less than 5% of net anthropogenic removals by sinks, whichever is lower.
	Applicability	The tool shall be used in the application of an A/R CDM approved methodology to an A/R CDM project activity: • To determine which decreases in carbon pools, and increases in GHG emissions measured in CO_2 equivalents that result from the implementation of the A/R project activity, are insignificant and can be neglected. • To ensure that it is valid to neglect decreases in carbon pools and increases in GHG emissions by sources stated as being insignificant in the applicability conditions of an A/R CDM methodology.
	Parameter(s) to be determined	This procedure does not use its own parameters.
4. Estimation of GHG emissions related to fossil fuel combustion in A/R CDM project activities – Version 1 [EB33, Annex 14]	Scope and applicability	This tool allows for estimating increase in GHG emissions (both project and leakage emissions) related to fossil fuel combustion in A/R CDM project activities. The sources of emissions are: vehicles (mobile sources, such as trucks, tractors, etc.) and mechanical equipments (e.g., portable equipment such as chain saws and stationary equipment such as, water pumps) required by the A/R CDM project activity.
	Parameter(s) to be determined	CO_2 emissions from fossil fuel combustion during the year y (tCO_2) [$ET_{FC,y}$]
5. Procedure to determine when accounting of the soil organic carbon pool may be conservatively neglected in CDM A/R project activities – Version 1 [EB33, Annex 15]	Scope	This tool provides guidelines to determine when accounting of the soil organic carbon pool may be conservatively neglected in CDM A/R projects. The guidelines have been developed from a review of recent scientific peer-reviewed literature, and with reference to IPCC literature as appropriate. Where available evidence on change in the soil organic carbon pool under land use or land-use change remains limited, a conservative approach has been adopted.
	Applicability	The tool is applicable to those land areas within the project boundary that meet the following conditions: • The areas shall not include organic soils (e.g., peat-lands), or wetlands. • The rate of loss of carbon stocks in mineral soils due to erosion within the project boundary shall not be permanently increased above baseline rates by the CDM A/R project activity. • Fine litter (woody twigs less than 2 mm diameter, bark and leaves) shall remain on site.
	Parameter(s) to be determined	This procedure does not use its own parameters.
6. Estimation of direct nitrous oxide emission from nitrogen fertilization – Version 1 [EB33, Annex 16]	Scope	This tool allows for estimating direct nitrous oxide emission from applying nitrogenous fertilizer within project boundary of an A/R CDM project activity, for both ex ante and ex post estimation.

Title and Version Number	Scope, Applicability and Parameters	
	Applicability	This tool is not applicable when: • A/R CDM project activities are implemented on wetlands; • Flooding irrigation or any flood has occurred within period of 3 months from date of fertilization.
	Parameter(s) to be determined	Direct N_2O emission as a result of nitrogen application within the project boundary in year t (tCO_2e) [$N_2O_{direct\text{-}N,t}$]
7. Procedures to demonstrate the eligibility of lands for A/R CDM project activities – Version 1 [EB35, Annex 18]	Procedure	Project participants shall provide evidence that the land within the planned project boundary is eligible for an A/R CDM project activity by following the steps outlined below. • Demonstrate that the land at the moment the project starts does not contain forest by providing transparent information: - Vegetation on the land is below the forest thresholds adopted for the definition of forest by the host country under decisions 16/CMP.1 and 5/CMP.1 as communicated by the respective DNA; and - All young natural stands and all plantations on the land are not expected to reach the minimum crown cover and minimum height chosen by the host country to define forest; and - The land is not temporarily unstocked, as a result of human intervention such as harvesting or natural causes. • Demonstrate that the activity is a reforestation or afforestation project activity: - For reforestation project activities, demonstrate that the land was not forest by demonstrating that the conditions outlined above also applied to the land on 31 December 1989. - For afforestation project activities, demonstrate that for at least 50 years vegetation on the land has been below the thresholds adopted by the host country for definition of forest.
8. Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (CT-AR) – Version 1 [EB35, Annex 19]	Scope	• This tool provides a general framework and a step-wise approach to identify the baseline scenario and simultaneously demonstrates additionality in A/R CDM project activities. • Application of this tool allows for transparent identification of baseline scenario which further allows for conservative establishing of baseline net greenhouse gas removals by sinks for a proposed afforestation or reforestation project under the CDM. • Project participants proposing new baseline methodologies may incorporate this tool in their proposal. Project participants may also propose other approaches for identification of the baseline scenario and the demonstration of additionality to the EB for its consideration. • In validating the application of this tool, DOEs should assess credibility of all data, rationales, assumptions, justifications and documentation provided by project participants to support the selection of the baseline and demonstration of additionality. Procedure: Project participants shall apply the following 5 steps: • STEP 0. Preliminary screening based on the starting date of the A/R project activity; • STEP 1. Identification of alternative scenarios; • STEP 2. Barrier analysis; • STEP 3. Investment analysis (if needed); • STEP 4. Common practice analysis.
	Applicability	• Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced. • This tool is not applicable to small scale afforestation and reforestation project activities.
	Parameter(s) to be determined	This procedure does not use its own parameters.

Note: The most recent versions are available on the UNFCCC CDM website: <http://unfccc.int/cdm>

Appendix 3: Application of baseline methodology: ACM0001 version 07

ACM0001 "Consolidated baseline and monitoring methodology for landfill gas project activities" (Version 07) is widely applied for landfill gas capture and utilization projects. Here, it is illustrated that how ACM0001 is being applied in the PDD, based on examples from the PDDs of some registered CDM project activities[20].

Applicability

This methodology is applicable to landfill gas capture project activities where the baseline scenario is the partial or total atmospheric release of the gas. The project activities include situations such as:

(a) The captured gas is flared; and/or

(b) The captured gas is used to produce energy (e.g. electricity/thermal energy);

(c) The captured gas is used to supply consumers through natural gas distribution network. If emission reductions are claimed for displacing natural gas, project activities may use AM0053.

For the purpose of illustration, 4 registered CDM project activities have been selected as examples of how ACM0001 is applied. Table A-3 summarizes the characteristics of those projects.

Table A-3 Examples of ACM0001 application

1. Meizhou Landfill Gas Recovery Utilization as Energy (Document Version 05, 2005/11/01)	
Project activity	Landfill gas collection and utilization activities of the eight landfills in the Meizhou City, Guangdong province, the People's Republic of China.
Landfill status	Total Municipal Solid Waste collection: 1,160 t/d (2004 average). 9% Increase per annum.
Energy production	Electricity generation for export to the grid or landfill local site use. Emission reductions due to displaced grid electricity will not be claimed for the first seven years.
2. Landfill Gas Extraction and Utilization at the Matuail landfill site Dhaka, Bangladesh	
Project activity	Landfill gas extraction and utilization with electricity generation at the Matuail landfill site near Dhaka, the Peoples Republic of Bangladesh
Landfill status	Total waste in t/y: 429,900 (1994) – 635,500 (2005) – 431,100 (2008 onwards)
Energy production	Electricity generation for export to the grid.
3. Bandeirantes Landfill Gas to Energy Project (BLFGE) (Version 2B, dated December 04, 2005)	
Project activity	Landfill gas extraction and utilization with electricity generation at the Bandeirantes landfill, near Sao Paulo, Brazil.
Landfill status	Older parts have already been closed and newer parts are still accepting wastes. Waste disposal in the newer parts: 1.8-1.9 million tonnes/years (1996-2006)
Energy production	Electricity generation for export to the grid: 22MW installed capacity
4. Hiriya Landfill Project (Version 3, 11 November 2005)	
Project activity	Landfill gas collection and flaring at the Hiriya landfill, Dan Region, Israel.
Landfill status	Closed in 1998.
Energy production	Collected gas may be used for burning in boilers, but no CERs are claimed.

Note: Above information is based on the publicly available CDM-PDDs of the registered projects. The project activities have been selected considering regional distribution.

20 The registered CDM project activities may be applying earlier versions of ACM0001.

Baseline

The baseline is the atmospheric release of the gas. The baseline methodology considers that some of the methane generated by the landfill may be captured and destroyed to comply with regulations or contractual requirements, or to address safety and odour concerns.

The baseline is usually described in the PDDs as the continuation of the current practice, often called the busine ss as usual (BAU) scenario. This corresponds to a situation where landfill gas is neither collected, flared nor utilized, except for partial collection and flaring.

Examples of baseline description:

- The landfill operator could continue the current business as usual practice of not collecting and utilizing or flaring landfill gas from his waste operations. Uncontrolled LFG emissions are expected occur from the landfills until the organic component of the MSW is completely decomposed anaerobically. This is expected to continue for about 30 years after the site is closed. In this case, no power would be generated at the sites. (BAU scenario)
- Continuation of the current practice (landfill gas recovery does not take place and no electricity generation will occur)
- The baseline scenario is the atmospheric release of the methane generated, with some gas being destroyed to comply with regulations or contractual requirements. In fact, prior to GLFGE operation, some landfill gas was burned inefficiently at some well's heads. This amount has been estimated to be around 20% of the gas captured by the passive venting system in place.

Procedure for the selection of the most plausible baseline scenario

Step 1: Identification of alternative scenarios

Project participants should use step 1 of the latest version of the "Tool for the demonstration and assessment of additionality" (additionality tool), to identify all realistic and credible baseline alternatives. In doing so, relevant policies and regulations related to the management of landfill sites should be taken into account. In addition, the assessment of alternative scenarios should take into account local economic and technological circumstances. National and/or sectoral policies and circumstances must be taken into account in the following ways:

(a) In Sub-step 1b of the additionality tool, the project developer must show that the project activity is not the only alternative that is in compliance with all regulations (e.g. because it is required by law);

(b) Via the adjustment factor AF in the baseline emissions project participants must take into account that some of the methane generated in the baseline may be captured and destroyed to comply with regulations or contractual requirements;

(c) The project participants must monitor all relevant policies and circumstances at the beginning of each crediting period and adjust the baseline accordingly.

Alternatives for the disposal/treatment of the waste in the absence of the project activity, i.e. the scenario relevant for estimating baseline methane emissions, to be analysed should include, inter alia:

(a) LFG1: The project activity (i.e. capture of landfill gas and its flaring and/or its use) undertaken without being registered as a CDM project activity;

(b) LFG2: Atmospheric release of the landfill gas or partial capture of landfill gas and destruction to comply with regulations or contractual requirements, or to address safety and odour concerns.

If LFG is used for generation of electric or heat energy for export to a grid and/or to a nearby industry, or used on-site realistic and credible alternatives should also be separately determined for:

(a) Power generation in the absence of the project activity (P1-P6);
(b) Heat generation in the absence of the project activity (H1-H7).

From the list of alternatives, all the 4 example PDDs narrow down the list of plausible alternatives to the BAU and project scenarios.

Step 2: Identify the fuel for the baseline choice of energy source taking into account the national and/or sectoral policies as applicable

The project participants should demonstrate that the identified baseline fuel is available in abundance in the host country and there is no supply constraint. In case of partial supply constraints (seasonal supply), the project participants may consider an alternative fuel that result in lowest baseline emissions during the period of partial supply. Detailed justification shall be provided for the selected baseline fuel. As a conservative approach, the lowest carbon intensive fuel such as natural gas through out the period may be used.

Step 2 is applied in all 4 example cases, as this type of projects usually brings considerable financial benefits. In one case, the simple cost analysis is chosen as the appropriate analysis method in Step 2a, whereas the other 3 cases opt for the benchmark analysis. The simple cost analysis can be applied when the only financial benefit of the project activity is the CER revenue. In other words, project activities that only collect and flare landfill gas can apply the simple costs analysis method. Project activities that involve electricity generation or sale of produced landfill gas should apply either the benchmark analysis or the investment comparison analysis. In the 3 cases that apply the benchmark analysis, government bond rates or interest rates provided by local banks are used as the benchmark value.

Step 3: Step 2 and/or step 3 of the latest approved version of the additionality tool

Step 2 and/or step 3 of the latest approved version of the additionality tool shall be used to assess which of these alternatives should be excluded from further consideration (e.g. alternatives facing prohibitive barriers or those clearly economically unattractive).

2 of the example PDDs apply Step 3 as well, considering technical barriers, mechanism barriers, policy barriers and organization and implementation barriers. Availability of securing necessary financial resources is also listed as one of the barriers.

Step 4: Common practice analysis

Where more than 1 credible and plausible alternative remains, project participants shall, as a conservative assumption, use the alternative baseline scenario that results in the lowest baseline emissions as the most likely baseline scenario. The least emission alternative will be identified for each component of the baseline scenario. In assessing these scenarios, any regulatory or

contractual requirements should be taken into consideration.

In all 4 cases, the PDDs simply make a statement that there are no or limited occurrences of similar activities in the host country. Only 1 PDD provides a list of landfills in the host country with an indication if those landfills have gas collection system in place or not.

Baseline emissions

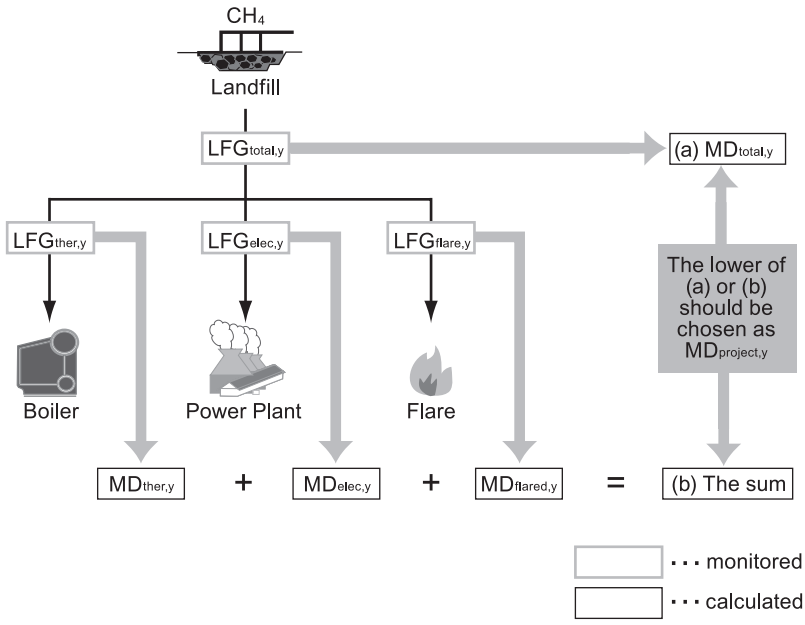
BE_y, baseline emissions in year y (tCO_2e), is estimated as follows:

$$BE_y = (MD_{project,y} - MD_{reg,y}) \bullet GWP_{CH_4} + EL_{LFG,y} \bullet CEF_{elec,BL,y} + ET_{LFG,y} \bullet CEF_{ther,BL,y}$$

(1) (2) (3) (4) (5) (6) (7)

(1) $MD_{project,y}$ The amount of methane that would have been destroyed/combusted during the year (tCH_4) in project scenario

Figure A-1 shows how $MD_{project,y}$ is to be determined ex post by metering the actual quantity of methane captured and destroyed once the project activity is operational.



Here, $MD_{total,y}$, $MD_{flared,y}$, $MD_{elec,y}$ and $MD_{ther,y}$ are calculated based on monitored flow of landfill gas at different points, i.e. $LFG_{total,y}$, $LFG_{flare,y}$, $LFG_{electricirty,y}$ and $LFG_{thermal,y}$, using the following formula:

$MD_{total,y} = LFG_{total,y} \bullet w_{CH4,y} \bullet D_{CH4}$

$MD_{elec,y} = LFG_{elec,y} \bullet w_{CH4,y} \bullet D_{CH4}$

$MD_{ther,y} = LFG_{ther,y} \bullet w_{CH4,y} \bullet D_{CH4}$

$MD_{flared,y} = (LFG_{flare,y} \bullet w_{CH4,y} \bullet D_{CH4}) - (PE_{flare,y}/GWP_{CH4})$

$w_{CH4,y}$: Average methane fraction of the landfill gas as measured during the year (in m^3CH_4 / m^3LFG)

D_{CH4}: Methane density (tCH_4/m^3CH_4)

Figure A-1 Flow diagram of $MD_{project,y}$ calculation

$MD_{project,y}$ should be chosen as the lower value of $MD_{total,y}$ or the sum of $MD_{flared,y}$, $MD_{elec,y}$, and $MD_{ther,y}$. When the sum of $MD_{flared,y}$, $MD_{elec,y}$, and $MD_{ther,y}$ is lower, then the hours where the energy plant and the boiler are working should be monitored and no emission reduction could be claimed for methane destruction in the energy plant or the boiler when they are not working.

Calculation of $PE_{flared,y}$ using a tool

$PE_{flared,y}$, the project emissions from flaring of residual gas stream in year y (tCO_2e), can be determined by following the procedure described in the "Tool to determine project emissions from flaring gases containing Methane" [EB28, Annex 13].

(2) $MD_{reg,y}$ The amount of methane that would have been destroyed/combusted during the year in the absence of the project (tCH_4) due to regulatory and/or contractual requirement

(a) In the case where the $MD_{reg,y}$ is given/defined in the regulation and/or contract as a quantity that quantity will be used.
(b) In cases where regulatory or contractual requirements do not specify $MD_{reg,y}$ an "Adjustment Factor" (AF) shall be used and justified, taking into account the project context.

$$MD_{reg,y} = MD_{project,y} \bullet AF$$

The following examples provide guidance on how to estimate AF:
(a) In cases where a specific system for collection and destruction of methane is mandated by regulatory or contractual requirements, the ratio of the destruction efficiency of the system to the destruction efficiency of the system used in the project activity shall be used.
(b) In cases where a specific percentage of the "generated" amount of methane to be collected and destroyed is specified in the contract or mandated by regulations, this percentage divided by an assumed efficiency for the collection and destruction system used in the project activity shall be used.

In situations where the landfill gas is captured and destroyed previous to implementation of the project activity because of reasons other than regulatory or contractual, the estimation of amount of gas destroyed in the baseline along with the value of AF that shall be used in estimating $MED_{reg,y}$ should be presented in the CDM-PDD and validated by the DOE.

Table A-4 summarizes some examples of application of Adjustment Factor (AF).

Table A-4 Examples of application of Adjustment Factor (AF)

Case	AF	Justification
1	0%	Meizhou landfills do not have any contractual requirements to do the landfill gas collection. All the eight landfill sites in this Project emit all gas produced in the waste dumps to the atmosphere. An AF of 0% will be used to account for any self burning that may occur at Meizhou, or at similar landfills in China that are not CDM projects. In the monitoring plan, it is stipulated if the situation changes for similar landfills, the AF will be increased to take the changed situation into consideration.
2	0%	In the Matuail landfill situation currently no measures are in place to capture or destroy methane produced. In Bangladesh no policies or regulations or contractual requirements what so ever are in place that oblige landfill operators to capture or destroy methane. AF will be evaluated at the beginning of each crediting period.
3	20%	Prior to BLFGE operation, some landfill gas was burned inefficiently at some well's heads. This amount has been estimated to be around 20% of the gas captured by the passive venting system in place. Considering there is no regulatory or contractual requirement determining MD_{reg}, an EAF of 20% is used in BLFGE's case.

Case	AF	Justification
4	0%	This value is justified based on local regulations, which do not require flaring of any landfill gas in closed landfills. Although there is a recommendation to keep methane concentration in the surface of the landfill below 5%, this is not mandatory and does not require flaring (i.e. solutions such as venting could be adopted).

(3) GWP_{CH4} Global Warming Potential value for methane for the first commitment period is 21 (tCO_2e/tCH_4)

(4) $EL_{LFG,y}$ Net quantity of electricity produced using LFG, which in the absence of the project activity would have been produced by power plants connected to the grid or by an on-site/off-site fossil fuel based captive power generation, during year y (MWh)

(5) $CEF_{elec,BL,y}$ CO_2 emissions intensity of the baseline source of electricity displaced, estimated as per ACM0001 (tCO_2e/MWh)

(6) $ET_{LFG,y}$ The quantity of thermal energy produced utilizing the landfill gas, which in the absence of the project activity would have been produced from onsite/offsite fossil fuel fired boiler, during the year y (TJ)

(7) $CEF_{ther,BL,y}$ CO_2 emissions intensity of the fuel used by boiler to generate thermal energy which is displaced by LFG based thermal energy generation, estimated as per ACM0001 (tCO_2e/TJ)

Methods for the ex ante estimation of $MD_{project,y}$

Project proponents should provide an ex ante estimate of emissions reductions, by projecting the future GHG emissions of the landfill in the CDM-PDD. ACM0001 specifies a tool to estimate this. The ex ante estimation of $MD_{project,y}$, the amount of methane that would have been destroyed/combusted during the year (tCH_4), will be done with the "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site" (Version 02) [EB35, Annex 10], considering the following additional equation:

$$MD_{project,y} = BE_{CH4,SWDS,y}/GWP_{CH4}$$

The quantity of methane projected to be formed during a given year is estimated using a first order decay (FOD) model based on the discrete time estimate method proposed in the IPCC Guidelines[21]. All of the example PDDs adopted the FOD model for ex ante estimation of methane generation potential. $BE_{CH4,SWDS,y}$, the amount of methane generated from the landfill in the absence of the project activity at year y (tCO_2e), is calculated as follows:

$$BE_{CH4,SWDS,y} = \varphi \cdot (1-f) \cdot GWP_{CH4} \cdot (1-OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^{y} \sum_{j} W_{j,x} \cdot DOC_j \cdot e^{-k_j \cdot (y-x)} \cdot (1-e^{-k_j})$$

where:

φ Model correction factor to account for model uncertainties (Value 0.9)

f Fraction of methane captured at the landfill site and flared, combusted or used in another manner

21 IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 5: Waste (IPCC, 2006)

F	Fraction of methane in the landfill gas (volume fraction) (Default value 0.5)
DOC_j	Fraction of degradable organic carbon (DOC) (by weight) in the waste type j (Refer to Table A-5 for values)
DOC_f	Fraction of degradable organic carbon (DOC) that can decompose (Default value 0.5)
MCF	Methane correction factor (Refer to Table A-6 for values)
GWP_{CH4}	Global warming potential of methane (Value 21, for the first commitment period of the Kyoto Protocol)
OX	Oxidation factor (0.1 for managed landfills and 0 for other types of landfills)
$W_{j,x}$	Amount of organic waste type j prevented from landfilled in the year x (tonnes)
k_j	Decay rate for the waste stream type j (Refer to Table A-7 for values)
j	Waste type category
x	Year during the crediting period: x runs from the first year of the first crediting period (x=1) to the year for which avoided emissions are calculated (x=y)
y	Year for which methane emissions are calculated

Table A-5 DOC_j values for the different waste types j

Waste type j	DOC_j (% wet waste)	DOC_j (% dry waste)
Wood and wood products	43	50
Pulp, paper and cardboard (other than sludge)	40	44
Food, food waste, beverages and tobacco (other than sludge)	15	38
Textiles	24	30
Garden, yard and park waste	20	49
Glass, plastic, metal, other inert waste	0	0

Source: Adapted from IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 5: Waste, Tables 2.4 and 2.5 (IPCC 2006).

Table A-6 MCF values for different landfill sites

Landfill site type	MCF
Anaerobic managed	1.0
Semi-aerobic managed	0.5
Unmanaged – deep (≥ 5m) and/or with high water table	0.8
Unmanaged – shallow (< 5m)	0.4

Source: Adapted from IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 5: Waste (IPCC 2006).

Table A-7 Decay rate (k_j) for different waste types j

Waste type j		Boreal and Temperate (MAT ≤ 20°C)		Tropical (MAT > 20°C)	
		Dry (MAP/PET < 1)	Wet (MAP/PET >1)	Dry (MAP < 1000mm)	Wet (MAP > 1000mm)
Slowly degrading	Pulp, paper, cardboard (other than sludge), textiles	0.04	0.06	0.045	0.07
	Wood, wood products and straw	0.02	0.03	0.025	0.035

Waste type j		Boreal and Temperate (MAT ≤ 20°C)		Tropical (MAT > 20°C)	
		Dry (MAP/PET < 1)	Wet (MAP/PET >1)	Dry (MAP < 1000mm)	Wet (MAP > 1000mm)
Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05	0.10	0.065	0.17
Rapidly degrading	Food, food waste, beverages and tobacco (other than sludge)	0.06	0.185	0.085	0.40

Note: MAT – mean annual temperature, MAP – Mean annual precipitation, PET – potential evapotranspiration. MAP/PET is the ratio between the mean annual precipitation and the potential evapotranspiration.
Source: Adapted from IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 5: Waste (IPCC 2006).

Project Boundary

The spatial extent of the project boundary is defined in ACM0001 as the site of the project activity where the gas is captured and destroyed/ used.

The following GHG sources are to be accounted as project emissions:

- If the electricity for project activity is sourced from grid or electricity generated by the landfill gas captured would have been generated by power generation sources connected to the grid, the project boundary shall include all the power generation sources connected to the grid to which the project activity is connected.
- If the electricity for project activity is from a captive generation source or electricity generated by the captured landfill gas would have been generated by a captive power plant, the captive power plant shall be included in the project boundary.