Developing Programmatic CDM Activities in Sri Lanka

A report on technical assistance submitted to Sri Lanka Carbon fund

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ENERGY, CLIMATE AND SUSTAINABLE DEVELOPMENT

DEVELOPING PROGRAMMATIC CDM ACTIVITIES IN SRI LANKA

(A report on technical assistance submitted to Sri Lanka Carbon Fund)

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Abbreviations and Acronyms

CDM	Clean Development Mechanism
CDM EB	The CDM Executive Board
CER	Certified Emission Reductions
C/ME	Coordinating/Managing Entity
CMP	Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol
CPA	Programme Activities
CPA DD	CDM Programme of Activity Design Document
DNA	Designated National Authority
DOE	Designated Operating Entities
GHG	Greenhouse gas
GWh	Giga watt hours
LoA	Letter of Approval
MSW	Municipal Solid Waste
MENR	Ministry of Environment and Natural Resources (Sri Lanka)
MW	Mega watt
P-CDM	Programmatic CDM
PDD	Project Design Document
PIN	Project Information Note
PoA	Programme of Activities
PoA DD	Porgramme of Activity Design Document
tCO_2e	Tonne CO_2 equivalent
tOe	Tonne oil equivalent
UNFCCC	United Nations Framework Convention on Climate Change
URC	UNEP Risoe Centre on Energy, Climate, and Sustainable Development

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1. Introduction

The Clean Development Mechanism (CDM) is one of the three market-based flexible mechanisms under the Kyoto Protocol. It is mainly designed to achieve the twin objectives of promoting sustainable development in developing countries and helping industrialized countries fulfil their binding emission reduction commitments under the Kyoto Protocol in the most cost-effective way. This is because of the significant emission reduction cost differences among various countries. Developing countries, due to their general economic, technological, and social background, are generally less energy efficient and, hence have great potential for low-cost emission reduction opportunities. They also have opportunities for using renewables to meet a part of their fast growing energy requirements.

Since the entry of the Kyoto Protocol into force in February 2005, worldwide CDM implementation has grown quickly. As of end of November 2009, around 4300 CDM projects had been submitted to the UNFCCC and 1909 projects had been registered. It is expected that all these CDM projects could generate 2.9 billion tCO_2e of emission reductions by the end of 2012, making CDM the most successful part of the Kyoto Protocol. The 1909 registered CDM projects are spread over 56 developing countries but the majority of these projects come from a few large developing countries. China, India, Brazil, Mexico, Malaysia, Philippines, Chile, and South Korea together host 84% of these projects.

A Programme of Activities (PoA) can be implemented as a regular CDM project and it is referred to as Programmatic CDM (abbreviated as P-CDM). P-CDM is the result of global efforts to expand the scope of a CDM project from emissions reduction in one or a few locations to sector, region, or country-wide transition to low GHG emissions technologies and practices. It has the advantage of reducing transaction costs, speeding up the process of addition of emissions reduction activities in the projects, and encouraging countries with potential only for small-scale projects and limited expertise to participate in CDM market. However, it should also be noted that P-CDM implementation is still new and until end of November 2009, world-wide only 18 programmes had been submitted for validation, of which 2 had been registered. As a new development in CDM, governmental agencies and private sector need capacity building and technical support on how to apply the P-CDM rules and guidance in their specific circumstances.

Sri Lanka has been active with CDM implementation and had 19 projects in the global CDM pipeline (by November 2009). Of these, 6 projects have been registered by the CDM Board. Sri Lanka however has a much larger CDM potential. To further realize the potential Sri Lankan government plans to promote CDM implementation in the country through P-CDM projects in municipal waste and renewable energy sectors.

The UNEP Risoe Centre on Energy, Climate and Sustainable Development (URC) has implemented CDM capacity building in over 40 developing countries around the world and accumulated a strong base of knowledge and expertise on CDM capacity building, including on Programmatic CDM.

A Memorandum of Understanding (MoU) was signed between UNEP Risoe Centre and the Sri Lanka Carbon Fund for URC technical support to the Sri Lankan effort to build capacity in the P-CDM area, including assistance in developing two P-CDM projects PINS and PDDs – one for renewable energy use and the other for management of municipal solid waste. As part of the agreement, two Risoe experts visited Sri Lanka for a week from 27-31 July, 2009. The visit included the following activities;

(a) Discussions with stakeholders in MSW and Renewable Energy sectors on 28 July 2009.

(b) Presentations and other expert inputs for the P-CDM Workshop organised on 29-30 July, 2009 by Sri Lanka Carbon Fund.

(c) Site visits (to MSW and Renewable Energy sites) on 27 July and 31 July to obtain first hand information on the state of these sectors with a view to consider the same in the proposed recommendations for the P-CDM in these two sectors.

A detailed mission and workshop report has been prepared separately for the workshop. This report is a primer for businesses, organisations, and government agencies interested in developing P-CDM projects in Sri Lanka. Section 2 of the report covers the rules and procedures for P-CDM implementation, offers an overview of the 18 P-CDM projects that have been submitted to the UNFCCC as of November 2009, and indicates the benefits that P-CDM could bring to Sri Lanka. Section 3 examines the potential benefits that P-CDM implementation could bring to Sri Lanka. Section 4 analyses the potential and offers some recommendations for P-CDM implementation in municipal solid waste sector in Sri Lanka. Section 5 examines the potential and feasibility for P-CDM implementation to boost renewable energy development in Sri Lanka and gives some recommendations on the issues to be addressed. The report ends with conclusions in Section 6.

2. Programmatic CDM – rules, procedures, and progress as of November 2009

Significant progress has been made in CDM implementation in terms of establishment of rules and projects in the international CDM pipeline. This section 2 focuses on the institutional framework of programmatic CDM and assumes that the readers have general background knowledge about the CDM.

2.1 The Origin and Concept of the P-CDM

The idea about expanding the CDM from single-site projects to multiple-site program of activities originated from the criticism of CDM in its inability to realize its twin targets to the desired levels. The main criticism of the CDM focus is from four aspects: (1) unsatisfactory sustainable development (SD) benefits as more than half of the accumulated 2012 CERs will come from HFCs and N_2O emission reduction projects, with limited SD benefits; (2) failing to benefit least developed countries and poor communities; (3) high transaction costs and complicated rules; and (4) leaving energy efficiency potential in household and, service sector, and renewable use potential for end users and in transportation sector untouched.

Among the different proposals to reform CDM, unlike sectoral or technology-based CDM proposals, which need to be addressed through negotiations for a new international climate regime, P-CDM could fit in the existing Marrakesh Accords. Hence, the clarification at the United Nations Climate Negotiation Conference in 2005 that a P-CDM project could be registered as a single-site CDM project was welcomed enthusiastically. P-CDM is claimed to broaden the scope of the CDM within the existing regulatory framework in the following ways: (1) strengthening the CDM for "under-represented" sectors (e.g. energy efficiency, micro renewables, and fuel switch); (2) reducing transaction costs; (3) reaching the housing sector, transportation sector and small enterprises; (4) responding better to the needs of LDCs and poor communities; and (5) integrating financial instruments and the CDM better.

Definition

The Definition of the P-CDM (Programme of activities CDM) can be found in annex 38 to the report of the CDM EB's 32nd meeting held in June 2007. A programme of activities (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 CDM Programme Activities (CPAs). According to the above definition, P-CDM has a two-level structure: the programme level and the activity level. The programme can be proposed by a government agency or a private company. For example, a government-coordinated programme can be the formulation and implementation of a policy to subsidize the installation and use of biogas digesters among farmers or the replacement of incandescent bulbs among households with CFLs. Examples of programmes coordinated by a private entity can be a retail company's initiative to improve the energy efficiency of all its supermarkets or a solar home system company's decision to promote the sales of its solar home systems by charging lower prices, arranging with banks to provide loans to the solar home system buyers, and setting up after-sale service networks. Examples of CPAs are 500 households installing biogas digesters, 10000 homes in several villages installing solar home systems, a supermarket implementing energy efficiency measures, 1000 families in a town that buy and use the solar home systems etc. Table 1 explains the difference between programmes (PoA) and activities (CPAs).

Table 1. PoA vs CPA

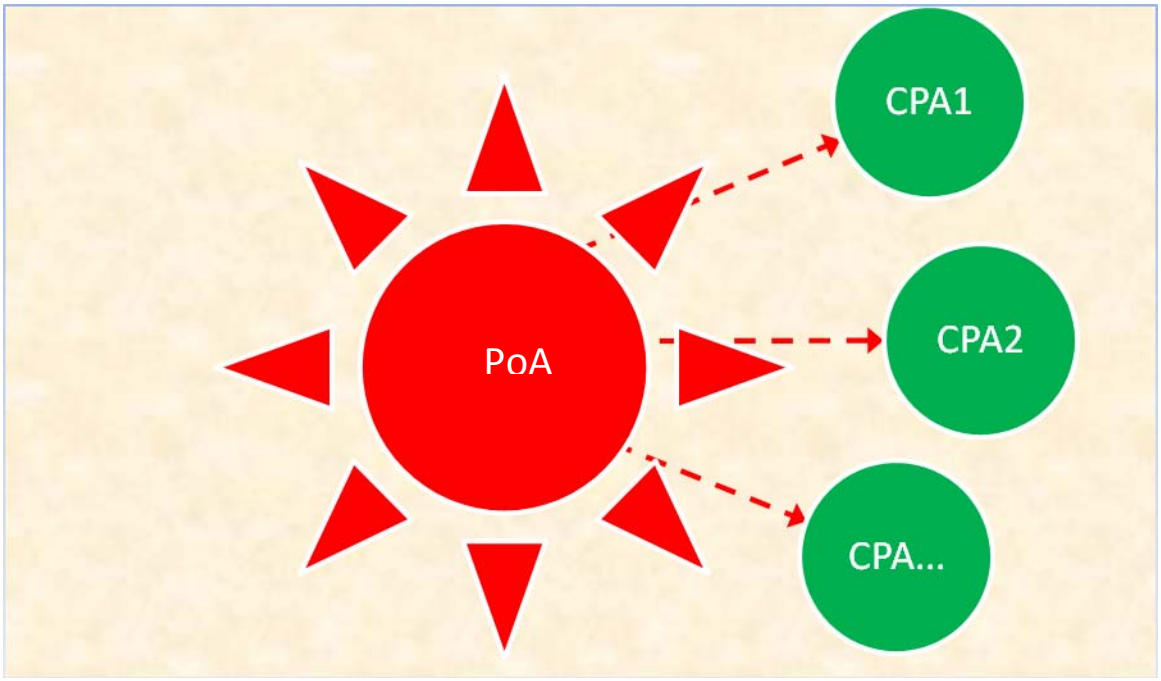
PoA (Programme of Activities)	**CPA (CDM Programme Activity)**

A PoA is:	A CPA is:
• a voluntary action, • coordinated by a private or public entity, • implements a policy/measure or stated goal, for example incentive schemes and voluntary programmes, • which leads to additional GHG emission reductions or increased removals by sinks, • via any number of CPAs.	• a project activity under a PoA • consisting of a single, or a set of interrelated measure(s), • to reduce GHG emissions or result in net removals by sinks, applied within a designated area defined in the baseline methodology. ✓A CPA can be undertaken in a single facility/installation/land or in multiple facilities/installations/land.
A CPA under a PoA is similar to a single CDM project activity	

Source: Adapted based on CDM in Charts, version 8.0, (IGES, 2008)

The traditional structure of the CDM is geared toward stand-alone projects. In most cases, a CDM project proponent is also the investor or developer of the CDM project activity and hence a coordinator or manager is not needed. But a programme achieves emission reductions through a large number of activities, which are often implemented by different individuals, households, or organizations. Hence, a private or public entity is needed to set up the framework arrangement so that the large number of activities can be designed, implemented, monitored, and verified as per requirements.

Figure 1. Relationship between PoA and CPAs



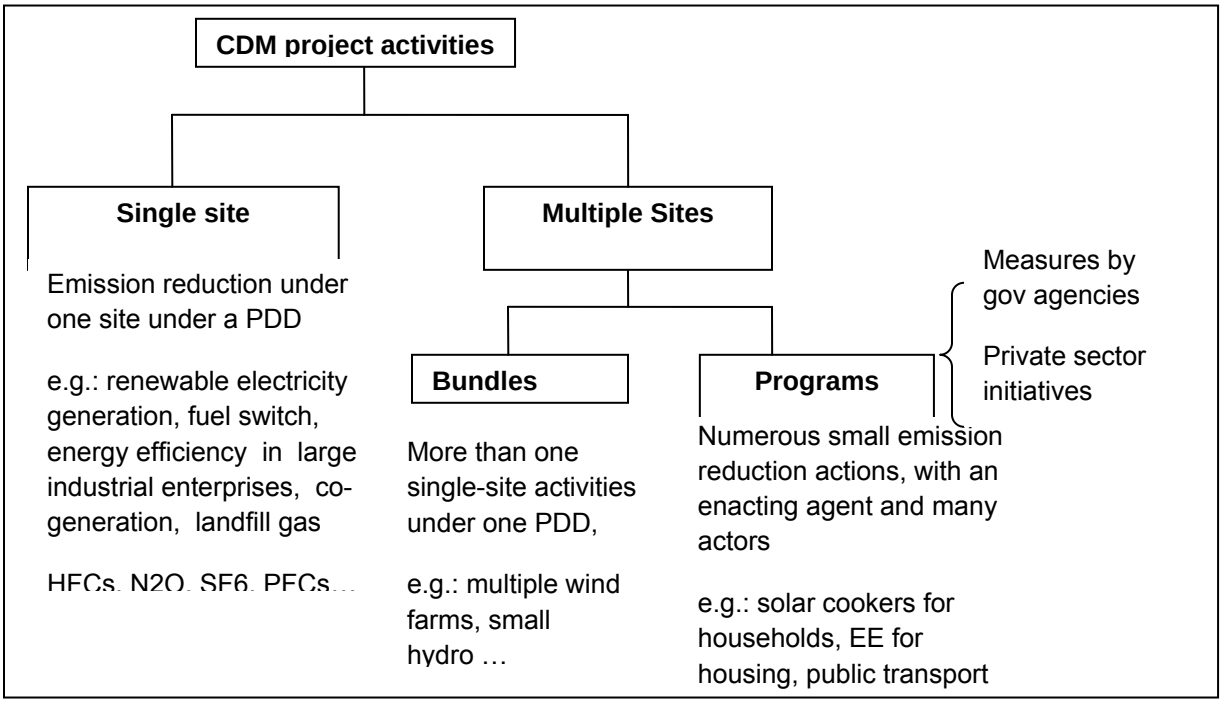
Source: Prepared by the authors

The coordinating/managing entity offers financial, technical, or capacity building support to the activity implementers and facilitates the implementation of the CPAs. As indicated in Figure 1, with the support from the coordinating entity through the Programme (PoA), many small activities that may not be economically viable to be implemented as stand-alone CDM project activities due to a variety of reasons such as high transaction costs, the implementers lacking knowledge of the complicated CDM project cycle and the international carbon market, insufficient access to financial market etc. can be implemented as CPAs.

The Relationship between P-CDM and Other Types of CDM Projects

Based on different criteria, CDM projects can be classified into different groups. Based on their size in terms of annual emissions, they can be divided into large scale and small scale projects. Based on the sectors, they can be regular CDM activities involving reduction of GHG emissions or afforestation/reforestation projects that remove GHGs from the atmosphere as sinks. Based on number of project participants and project organisation, classification can be single-site and single methodology projects, bundles (project covering multiple-site or one-site but multiple methodologies/technologies projects), programmes (multiple sites, many of which may be even unknown at the time of PoA registration) (see Figure 2).

Figure 2. CDM project classification in terms of sites covered and component activities



The difference between PoAs and bundles

As P-CDM usually covers activities implemented at many sites/facilities, the difference between a P-CDM activity and a standard-alone CDM project activity is easy to notice. Emission reduction or removal activities at multiple sites/facilities can be implemented through bundling or P-CDM. Hence it is necessary to understand the difference between them. Bundling means

that several activities are covered and registered as a single PDD. All the activities in bundling need to have the same crediting period. Once the project is registered, no more activities can be added to the bundle. The multiple activities of the bundle can be financed and developed by the project proponent who registers the bundle or the participants in bundling can share the CDM costs and benefits through contractual arrangements. There is no provision for a coordinating/managing entity for bundling. In contrast, the P-CDM needs to have a specialized coordinating/managing entity, and the emission reductions can be achieved by adding unlimited number of activities (CPAs) throughout the duration of the programme (PoA). Table 2 offers a summary of the main differences between bundling and P-CDM.

Table 2. The Difference between Bundling and P-CDM

	BUNDLING	**P-CDM**
Definition	Bringing together several small-scale CDM 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 are of 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. (Source: CDM EB Glossary of CDM terms Version 01)	A programme of activities (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 GHG emission reductions or increased net 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. (Source: Annex 1 to Proposed Agenda of EB 32)
Sites	Ex ante identification of exact sites	GHG reductions must be estimated ex ante. Exact sites may not be known, but type and maximum potential volume is known
Project participants	Each single activity is represented by a CDM project participant	Only the entity implementing the project represents the project activity as a CDM project participant
Project activity	Project participants are identical to	The project participant does not necessarily carry out the GHG

	entities achieving reductions	reducing activities but rather promotes others to do so
Project activities	Each activity in the bundle is an individual CDM project activity	The sum of all individual activities under the programme is the CDM project activity

Some bundles are more similar to standard-alone projects in that they only combine a few landfills or wind farms in one PDD, while some other bundles may cover activities that are typically more suitable for implementation under P-CDM, such as renewable energy generation by small end users or energy efficiency improvement by the end users. For example, there are some bundles that involve replacing incandescent bulbs with CFLs among tens of thousands of households, energy efficiency among hotels, governmental measures to subsidize the construction and operation of hundreds of small hydro projects etc. If the same activities were to be implemented as a bundle, the activities have to be identified and the emission reduction of the activities needs to be estimated in the PDD. In the P-CDM, the activities can be added later to reap the benefits based on the experiences of successful CPAs. Hence, it is more suitable if a private or public entity believes that it can design a successful business model to attract large number of participants in the years to come.

An example of "why choose P-CDM instead of bundling"

Under regular CDM, all different parts of a project need to be of the same crediting period. In case of programmes or measures that cover many emission reduction activities for which the activities begin and finish in different years, one crediting period means that the project participants have to choose either an early start of the crediting period but lower CER generation over the crediting period or wait for years till all the activities start operating and get more CERs.. This could mean significant difference in the CER generation compared to a P-CDM covering the entire programme. A typical example is the Micro-hydro Promotion by Alternative Energy Promotion Centre (AEPC) in their existing international CDM pipeline. In this project, the Nepal government will promote 750 micro hydropower plants in regions that have no access to electricity grid and will remain so for at least 5 years in the baseline scenario. The starting date for the project activity is January, 2003. The plants will start operation as soon as the installation is complete. The operational lifetime of the micro hydro plants (MHPs) is 15 years.

Table 3. Construction Schedule and Annual CER expectation of the Nepal Hydropower Project

Project Construction and Putting into Operation			Annual Expected CERs from Bundling in existing PDD (as regular CDM)	
Year	kW installed in the year	Cumulative Total kW	Year (10-year crediting period)	Expected CERs per year
2003	287	287	2006	3,106
2004	121	408	2007	9,262
2005	181	589	2008	20,116
2006	378	967	2009	32,697

2007	2,000	2,967	2010	38,529
2008	3,500	6,467	2011	45,819
2009	4,033	10,500	2012	45,819
2010	2,000	12,500	2013	45,819
2011	2,500	15,000	2014	45,819
			2015	45,819

Source: PDD of the Micro-hydro Promotion by Alternative Energy Promotion Centre (AEPC) Project

As shown in Table 3, implemented in the form a bundle, all the micro hydropower plants need to be of the same crediting period. As the 750 Micro hydropower plants are constructed and put into operation over a period of 9 years, during half of the 10-year crediting period, the annual CERs output (20,742 tCO_2e/year) is much lower than the case when all the small hydropower projects included in the project have been fully built and put into operation(45,819 tCO_2e/year).

In comparison, if implemented as a P-CDM project, then the above problem could be solved simply by registering the programme first, and then including the micro hydropower plants completed each year as CPAs. In this way, the crediting period starting dates of each CPA will be different, enabling the project proponents to claim higher emission reductions from the same emission reduction activities. As indicated in Table 4, with all other things the same, such a change from regular CDM involving bundling to P-CDM will enable the project developers to enjoy both early CER claim (from 2006, without waiting until 2010) and maximum CER generation. The CER increase in this case works out to 125,745 tCO_2e, taking the total CERs from the project to 45,819 tCO_2e per year for 10 years. In contrast, to reach this level, under regular CDM, the project proponents will have to postpone the starting date of the project's crediting period to 2012.

Table 4. Estimated CERs generation from the Nepal Hydro Projects if Implemented as a P-CDM project

	CPA1	CPA2	CPA3	CPA4	CPA5	CPA6	Annual Total
2006	3,016						3,016
2007	3,016	6,156					9,262
2008	3,016	6,156	10,854				20,116
2009	3,016	6,156	10,854	12,581			32,697
2010	3,016	6,156	10,854	12,581	5,832		38,529
2011	3,016	6,156	10,854	12,581	5,832	7,290	45,819
2012	3,016	6,156	10,854	12,581	5,832	7,290	45,819
2013	3,016	6,156	10,854	12,581	5,832	7,290	45,819
2014	3,016	6,156	10,854	12,581	5,832	7,290	45,819

2015	3,016	6,156	10,854	12,581	5,832	7,290	45,819
2016		6,156	10,854	12,581	5,832	7,290	42,803
2017			10,854	12,581	5,832	7,290	36,647
2018				12,581	5,832	7,290	25,793
2019					5,832	7,290	13,212
2020						7,290	7,290

Source: calculated by the author from the PDD of the Nepal Hydro Project

2.2 P-CDM International Rules and Procedures

Since the COP/MOP1[1] decision in December 2005 that a programme of activities can be registered as a single CDM project, the CDM EB has established the rules regarding P-CDM implementation in the past 3 years. These documents can be classified into guidance and clarifications, procedures, as well as forms and tools.

2.2.1 Evolution of P-CDM Rules

Due to high expectations from P-CDM to improve the sustainable development benefits of CDM and enable energy end users and low-income countries and communities to benefit from CDM, in November 2006 the COP/MOP2 requested the CDM EB '*to finalize with utmost priority its guidance relating to the definition of project activities under a PoA and procedures for registration as a single CDM project activity*'. This led to the issuance of several EB decisions on rules, procedures, and methodologies for P-CDM implementation.

CDM EB Rules for P-CDM

Jun 2007, Decision made at 32nd meeting of the EB (EB 32) were included in the two documents; EB 32 Meeting Report: Annex 38 - Guidance on the registration of project activities under a PoA as a single CDM project activity (Vers. 02), and Annex 39 - Procedures for registration of a PoA as a single CDM project activity and issuance of certified emission reductions for a PoA (Vers. 01).

July 2007, EB 33 came out with the PoA-DD and CPA-DD templates for full-scale non-LULUCF P-CDM project activities and small scale non-LULUCF P-CDM project activities and also revised many existing small-scale methodologies for application under P-CDM. Also the criteria for determining de-bundling under P-CDM were established.

Nov 2007: The CDM EB at its 33rd meeting in July 2007 decided the PoA-DD and CPA-DD templates for preparing documents for large scale forestry P-CDM projects, and for small scale forestry P-CDM projects.

May 2009: The CDM EB at its 47th meeting issued 4 documents for P-CDM. It revised procedures for PoA Registration and CER issuance under a PoA and the guidelines on de-

[1] Conference of Parties serving as Meeting of Parties for the Kyoto Protocol.

bundling for small scale CPAs under a P-CDM project[2]. Besides, it also addressed the major barrier of high liability to DOEs undertaking validation for P-CDM projects through revised procedure for 'reviewing erroneous inclusion of a CPA'. Also, the restriction that only one methodology can be applied under a P-CDM project is also lifted and a document on the procedures to get approval from the CDM EB for applying multiple methodologies under a P-CDM project was also issued.

2.2.2 Existing International Rules on P-CDM

The existing international rules regarding P-CDM implementation can be found in the document 'Guidance on the registration of project activities under a programme of activities as a single CDM project activity (Version 2.1) Annex 38 to the EB 32nd meeting Report.' Some salient features are;

Coordinating or Managing Entity (C/ME): (1) A PoA shall be proposed by the C/ME; (2) the C/ME is; (i) a project participant authorized by all participating host country DNAs involved, and (ii) identified to communicate with the EB, including on CERs distribution.

The physical boundary of a P-CDM project can be more than one country provided that it can get a letter of approval (LoA) from each participating host Party.

This provision is designed to benefit small countries where even nationwide emission reductions from some activities / measures are too small to be economically viable due to high CDM transaction costs. In such situations, a programme can be developed to cover two or more countries with similar circumstances in terms of the activity to be implemented.

Host Country Policies and Regulations: A PoA needs to comply with all current EB guidance about local/regional/national policies and regulations. PoAs addressing mandatory policies and regulations are permissible under the conditions that it is demonstrated that there is poor enforcement and widespread noncompliance of the policies / measures, or if enforced, the PoA could increase the enforcement beyond the mandatory level.

This is in line with the additionality demonstration required by the CDM rules, the P-CDM activity should result in additional emission reduction compared with what would happen in its absence.

Project participants of a PoA shall make arrangements with the C/ME about communications, CER distribution and change of project participants. Project participants may or may not be involved in every CPA of the PoA. The procedures for changing project participants apply.

Double Counting: The C/ME 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 CPAs are subscribed to the PoA. These measures are to be validated and verified by DOE.

[2] The 4 documents issued at EB 47 include: Annex 29 - "Procedures for registration of a programme of activities (PoA) as a single CDM project activity and issuance of certified emission reductions for a programme of activities" (version 03); Annex 30 - "Procedures for review of erroneous inclusion of a CPA" (version 01);Annex 31 - "Procedures for approval of the application of multiple methodologies to a programme of activities" (version 01) , and Annex 32 - "Guidelines on the de-bundling for SSC project activities" (version 02).

Additionality: The PoA shall demonstrate that net GHG emission reductions or removals for each CPA are real and measurable, accurate, and are uniquely attributable to the PoA. Clear information about leakage, additionality, baseline establishment, baseline emissions, eligibility and double counting for each CPA should be provided.

Requirements for CPA: Each CPA shall be uniquely identified, defined and localized in an unambiguous manner including the exact start and end date of the crediting period and shall meet requirements set in the PoA.

Duration of the PoA, (1) Shall be a maximum 28 years for regular projects and 60 years for afforstation / reforestation (A/R) project activities, at the time of request for PoA registration. Any CPA can be added to the PoA at any time during the duration of the PoA by the C/ME. The crediting period of a CPA will be either a maximum of 7 years (21 for A/R) subject to at most 2 renewals, or a maximum of 10 years (30 for A/R) with no option of renewal. However, CPA crediting periods shall be limited to the end date of the PoA. In other words, all CPAs' crediting periods must end no later than the expiration of the PoA.

Same Methodology (or methodology combination) and one type of technology / set of measures: All CPAs of a PoA shall apply the same approved baseline and monitoring methodology, involve one type of technology or set of interrelated measures in the same type of facility/installation/land. More than one methodology can be used in combination under a PoA, but such combination needs approval from the CDM EB.

Monitoring: The emission reductions or removals of each *CPA* shall be monitored as per the registered monitoring plan. The verification method or approach shall ensure the accuracy of emission reductions.

2.2.3 Step-by-Step Explanation on the Procedures for P-CDM implementation

The introduction of P-CDM has not lead to any institutional changes in the existing international CDM regime, under which, the COP/MOP functions as the highest authority for decision making. The CDM Executive Board implements COP/MOP decisions concerning CDM implementation, approves CDM methodologies and projects, issues CERs, accredits DOEs under the support of multiple working groups, including the Accreditation Panel, the Meth Panel, the Afforestation and Reforestation working group, the Small scale working group, and the CDM Registration and Issuance Team.

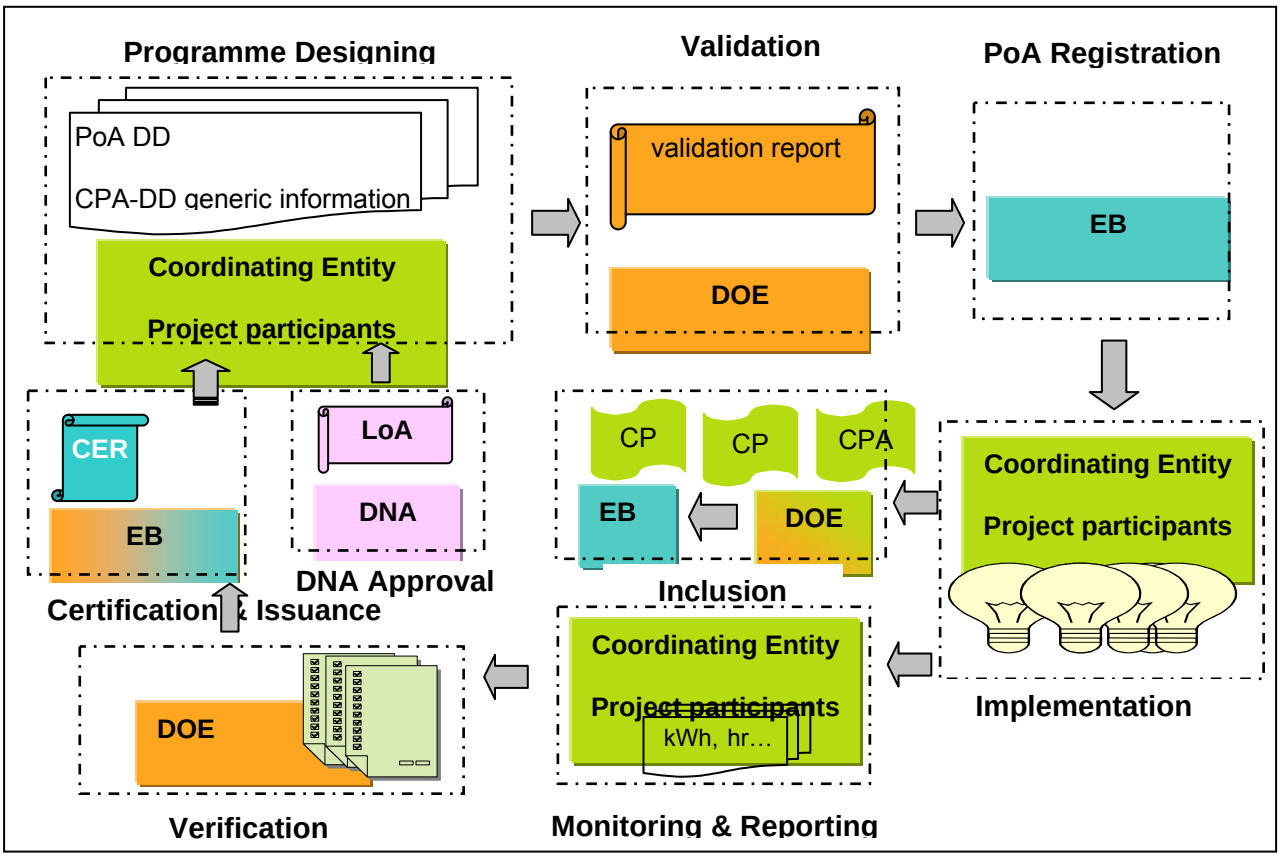
The procedure for implementing a P-CDM project

The latest EB decisions regarding procedures for P-CDM implementation can be found in EB 47th meeting Report Annex 29[3]. Like any other CDM project, a P-CDM project also needs to get approval from the DNAs of the relevant project participants to show that it contributes to sustainable development in the host country and the greenhouse gas emission reductions are real, measurable, and lower than the would-be level in the absence of the PoA.

[3] 'Procedures for Registration of a PoA as a Single CDM Project Activities and Issuance of CER for a PoA (Ver. 3)

Similarly, a PoA also needs to go through the standard CDM project cycle of validation, registration, implementation and monitoring, verification and CER issuance. However, the small actors who do the real emission reductions need not to register as project participants and communicate with the CDM EB. Instead, the coordinating entity is responsible for communicating with the CDM EB and claim CERs under the P-CDM project activity. An important feature is the inclusion of CPAs after the registration of a PoA and the procedures regarding identification of erroneous inclusion and the exclusion of erroneous CPAs (see Figure 3).

Figure 3. P-CDM Project Cycle



Source: Prepared by the authors based on EB rules

Programme designing

The implementation of a CDM project starts with the preparation of the PDD by the project proponent. Similarly, the P-CDM project cycle starts with the coordinating entity preparing documents showing how it plans to implement the programme for emission reductions or removal. But instead of only one project design document (PDD), the C/ME needs to prepare 3 documents: (i) a programme design document (PoA design document, PoA-DD), (ii) a generic activity design document (generic CPA-DD), which is a template to be filled by future CPAs, and could include some guidance on how each part shall be filled, (iii) a completed CPA-DD based

on a real case CPA; for example a CPA could be replacing 5000 bulbs in a village with CFLs under a programme of efficient lighting.

According to the forms issued by the CDM EB, a PoA DD and a CPA DD should have the following contents:

Table 5. PoA DD vs CPA DD

Contents of PoA DD	***Contents of CPA DD***
a) The Coordinating/managing entity, Host Party(ies) and PoA participants b) The boundary for the PoA c) The policy/measure or stated goal that the PoA seeks to promote d) Confirm that the proposed PoA is a voluntary action by the C/ME. e) Additionality Demonstration f) A typical CPA to be included in the PoA g) Eligibility criteria for CPAs h) PoA starting date and duration (Max 28 yr; 60 yr for A/R projects) i) Operational and management arrangements j) Monitoring plan for a CPA k) The sampling method/procedure to be used by DOEs for verification l) Environmental analysis of the PoA m) Stakeholder consultations n) Confirm no use of ODA	a) Geographic reference or other means of identification, Name/contact details of the entity/individual responsible for the CPA b) the Host Party c) Starting date, type and duration of the crediting period of the CPA d) Information showing how each CPA meets requirements about: (i). Eligibility criteria; (ii). The demonstration of additionality; (iii). calculations of baseline emissions and estimated emission reductions e) Environmental analysis f) Local stakeholder consultations g) Confirmation that the CPA is neither registered as a CDM project activity nor included in another registered PoA

The CDM EB issued 4 PoA DD and CPA DD forms/templates, one each for large-scale non-forestry programmes, small scale (SSC) non-forestry programmes, large scale forestry programmes, and small scale forestry programmes. The PoA DD forms of the large scale and small scale PoAs are same. The CPA DD forms for large scale CPAs and small scale CPAs are also similar.

In summary:

Forms for non-Forestry PoAs

- PoA DD forms for large scale and small scale PoAs are the same
- CPA DD form for large scale and small scale non-forestry PoAs are also the same except that: SSC-CPA-DD form has an extra subsection - “A 4.6. Information to confirm that the proposed SSC CPA is not a de-bundled component”.

Forms for Forestry PoAs

- Large-scale PoA DD form and SSC PoA DD form differ in subsection “A6. Technical description of the A/R programme of activities”, and in number of tables in the section about methodology selection and application
- Large scale CPA DD form and SSC CPA DD form are the same except that the SSC-CPA DD form has an extra subsection “A.9.Information to confirm that the proposed small-scale A/R CPA is not a debundled component”.

Obtain Letter of Approval (LoA) from host country DNA

Once the PoA DD and CPA DD have been prepared, the C/ME shall obtain LoA for the implementation of the PoA from each Host Party and Annex I Party involved in the PoA. In regular CDM, there are unilateral CDM projects also which do not have involvement of an Annex I country and hence do not require it to be indicated in the PDD. There is no specific regulation for P-CDM on this, and hence it could be assumed that although the host country LoA is a must, the rule for Annex 1 involvement is same as in the regular CDM. It should be mentioned the LoA is for the whole PoA, and not for each specific CPA. Once a PoA is registered, CPAs can be added and no EB approval is required during the adding process.

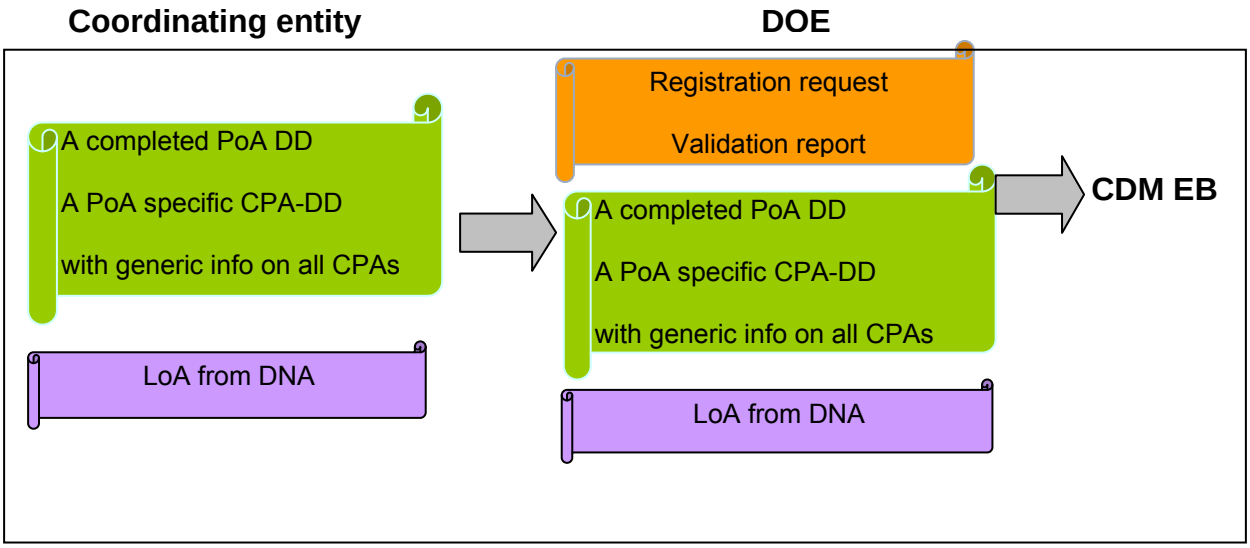
Validation by DOE

To be registered, the C/ME needs to engage a Designated Operating Entity (DOE) for validation of the project documents and registration related communication with the EB. The DOE will check the documents to ensure that the information provided in the PoA-DD and CPA-DDs are real and accurate and the methodology application is proper. The DOE will also put PoA DD and CPA DDs on the UNFCCC website for public comments. The period for public comments is 30 days. The DOE will take into account the public comments. If the DOE finds the P-CDM project is properly designed, it will issue a positive validation report and a request for registration to the CDM EB.

In addition to the correctness of the information, validation by the DOE will also address the following requirements arising out of the modalities and procedures for CDM:

- a) Additionality of the PoA;
- b) Eligibility criteria for inclusion of a proposed CPA in the registered PoA, including criteria to be used for demonstration of additionality of a CPA;
- c) Operational and management arrangements established by the CM/E for the implementation of the PoA;
- d) Consistency between POA-DD and the PoA specific CPA-DD to be used for inclusion of a CPA in the registered PoA.

Figure 4. Request for PoA Registration



Source: prepared by the author based on EB regulation

Registration

After the DOE has sent the request for registration, a small scale Programme will be automatically registered after 4 weeks and a large scale one after 8 weeks unless 3 EB members or a DNA of a country involved in the programme object and request for review.

Implementation of CPA and Monitoring

Once the PoA has been registered, the first real case CPA that is submitted together with the PoA DD and generic CPA DD can have its crediting period started. The CPA implementer will implement the CPA and carry out the monitoring according to the monitoring plan in the CPA-DD. To prepare for DOE verification, the coordinating/managing entity has the following responsibilities:

- Carry out the monitoring according to the monitoring plan in the PoA DD and the CPA DD;
- Maintain all monitoring reports of all CPAs in accordance with PoA DD and CPA DD; and
- Make available all monitoring reports requested by a DOE for verification purposes.

Submission of extra CPAs - Inclusion of a CPA under a registered PoA

After a PoA has been registered, more CPAs can be included in the registered PoA at any time over the duration of the PoA. More entities can have their activities join the PoA according to the coordination and management arrangements indicated in the PoA DD. To do this, they need to prepare a CPA-DD based on the generic CPA-DD template submitted during the PoA registration. The specific procedures are:

- The C/ME forwards the completed CPA-DD form to the same DOE that requested registration of the PoA for consistency checking. More than one CPA-DD can be submitted at one time.

- DOE will check the CPA-DD for consistency with the PoA and if finds no problem, include the proposed CPA(s) in the registered PoA by uploading the CPA-DD to the UNFCCC CDM website. The uploadings are grouped and can be at most once per month.

- CPA-DD(s) uploaded by the DOE will be automatically included in the registered PoA and displayed on the view page of that PoA. The DOE, the C/ME and the DNA are automatically notified of the change in the status of the PoA.

The CPA inclusion does not involve the 4-week public comments period and the 4-week (small-scale) or 8-week (large scale) period between submitting request for registration and actual registration. CPA inclusion/registration is thus carried out on fast track, which is a big advantage of P-CDM given the long time lag between validation and registration of regular CDM projects.

DNA or EB members find errors in the CPA included and consequences of CPA exclusion

To include a CPA, only consistency check by the DOE with the registered PoA is carried out. Hence, to make sure that the DOE carries out the checking with due diligence and to avoid errors, the following procedure has been established for reporting erroneous inclusion of a CPA by CDM EB members or the concerned DNA:

- If a DNA of a PoA or an EB member identifies any error that disqualifies a CPA from inclusion in the PoA, they should report the error to the EB Secretary.
- The EB will decide whether or not to exclude the CPA from the PoA and the decision will take effect immediately. The C/ME, the DOE that included the CPA, and the DNAs involved will be informed of the error and the decision of the EB.
- Excluded CPA will not be covered by any CDM project
- The DOE that included the CPA, will acquire and transfer, within 30 days of the exclusion, the amount CERs issued to the PoA as a result of the CPA having been included, to offset figure in the CDM registry by the EB.

Measures to limit DOE liability: Due to the high liability and risks to DOE in case of erroneous inclusion of a CPA, finding a DOE to do the validation and inclusion had become a major barrier to P-CDM implementation. To solve this problem, in May 2009 the CDM EB at its 48th Meeting established a time limit for reporting erroneous inclusion of CPAs, which is within one year after the inclusion of CPA into a registered PoA or six (6) months after the issuance of CERs for that CPA, whichever is the later.

Procedures for review of erroneous CPA inclusion

After the CDM EB decides to carry out review of erroneous inclusion of a CPA, the actions listed below will follow:

- Further inclusion of new CPAs and issuance of CERs to the concerned *PoA* will be put on hold and the CPAs already submitted will be reviewed.

- A DOE, who is not associated with this PoA, will conduct the review and report the results to the EB.
- A team established by the EB will analyse the DOE review report and make a recommendation.
- The EB will decide whether to exclude additional CPAs and if so, the consequences are described. Only after all required cancellations have been confirmed, the hold can be lifted.

As a PoA may have many similar CPAs and some other CPAs may also have problems, the EB has set the following rule for review of CPAs:

- Step 1: review a 10% random sample of all CPAs in the PoA, and the CDM EB will decide: 1) whether to exclude any CPA from the registered PoA; and 2) whether to extend the review
- Step 2: if the EB decides to extend the review, then a further 15% random sample of all the CPAs will be reviewed, and the CDM EB will again decide: 1) whether to exclude any CPA from the registered PoA; and 2) whether to extend the review
- Step 3: based on the review results, the EB may decides to further extend the review to all the CPAs.

DOE Verification

The procedures for verification, certification, request for issuance of CERs and review of requests for issuance of CERs for P-CDM are similar to the procedures for regular CDM projects.

Although small scale regular CDM project can engage the same DOE for both validation and verification, a P-CDM project, even of small scale, needs a DOE that has not done the validation/inclusion/crediting period renewal for the P-CDM project to perform the verification. To contract a DOE that has already worked on the PoA to do the verification, EB approval is needed.

The verification needs to be done for all the CPAs included in the PoA with a crediting period which overlaps with the specified monitoring period. The monitoring periods need to be successive.

Request for issuance of CERs for a PoA

Based on the results of its verification activities, the DOE will submit a request for issuance of CERs for the PoA by filling up and submitting related form through UNFCCC CDM website. The request includes the CPAs covered and the monitoring period verified for each CPA. The periods verified for each CPA need to be consecutive. Such requests for issuance of CERs by the DOE should not be more than once every 3 months.

A review of the CER issuance request can be called for by a Party involved or three EB members but such request for a review needs to be within 6 weeks from the date of receipt of the request for issuance of CERs. If no request for review is received by the CDM EB within the stipulated period, then the CERs will be issued.

The coordinating/managing entity will then submit a request to the EB for distribution of CERs issued in accordance with agreement between project participants.

Crediting Period Renewal under P-CDM

To renew the crediting period of a CPA, the C/ME needs to fill out the latest version of the CPA-DD and forward it to a DOE. The DOE will check the CPA-DD against the latest version of the PoA and other requirements. If there is no problem, then the DOE will upload the CPA-DD at the UNFCCC CDM website. Such uploads should not be more frequent than once per month.

Payment of Registration Fee for P-CDM

During the CDM project cycle, CDM project proponents need to pay 3 kinds of fees to the CDM EB: CDM registration fee is paid upon project registration, and share of proceeds to cover administrative expenses (SOP-Admin) is paid at the time of CER issuance along with a 2% Adaptation Levy on CERs generated. In essence, the registration fee is an advance payment of the SOP for the first year. Under regular CDM projects, these fees are paid by the project proponent while in case of P-CDM activities, they have to be paid by the coordinating/managing entity. Registration fee is calculated based on expected average annual CER generation from the project during the crediting period and calculated as follows:

- ✓ the rate is USD 0.10/CER for the first 15,000 tCO_2e;
- ✓ USD 0.20/CER for the part exceeding 15,000 tCO_2e;

  However, no registration fee has to be paid for CDM project activities with expected average annual emission reduction below 15,000 tCO_2e over the crediting period, the upper limit for registration fee is USD 350,000, and in case a project activity is not registered successfully, any amount above USD 30,0000 will be refunded.

SOP-Admin amount is calculated as follows: USD 0.10/CER for the first 15,000 tCO_2e issued for a project in a calendar year; USD 0.20/CER for the part exceeding 15,000 tCO_2e.

For P-CDM projects, as at the time of PoA registration, the Coordinating/Managing Entity may find it difficult to estimate how much emission reductions could be generated under the PoA. Hence, the CDM EB has clarified that the registration fee for a PoA will be based on the total expected annual emission reductions of the CPA(s) that are submitted with the PoA. The amount of fee to be paid and the procedures for payment will follow mutatis mutandis the existing rules for the payment of the registration fee. For each CPA which is included subsequently, no registration fee is to be paid.

2.3 Methodological Issues Related to P-CDM Implementation

Methodology applications in the P-CDM activities are at CPA level, and not at PoA level. Therefore, if all the CPAs under a PoA individually do not exceed the SSC threshold, SSC methodologies can be used. This implies that a P-CDM project could follow the simplified modalities and procedures for SSC CDM projects even if its average annual emission reduction exceeds the small-scale size limit.

Simplified modalities and procedures for small-scale projects

In order to reduce transaction costs for small-scale projects (energy efficiency projects for example), simplified modalities and procedures include the following:

- Requirements for Project Design Document are reduced;
- Baselines methodologies are simplified;
- Monitoring plans are simplified;

SSC methodologies have wider scope of application compared to large scale approved methodologies. The methodologies for small scale project activities fall in three categories; Type I – renewable energy project activities with a maximum output capacity up to 15 megawatts (or an appropriate equivalent); Type II – energy efficiency improvement project activities which reduce energy consumption, on the supply and/or demand side, by up to the equivalent of 60 GWh per year; Type III –other project activities that both reduce anthropogenic emissions by sources and directly emit less than 60,000 tonnes of carbon dioxide equivalent annually.

Revisions to Small-scale methodologies for application under P-CDM

As part of the simplified modalities and formalities for small-scale CDM projects, regular CDM projects do not need to consider leakage. But P-CDM needs to address the leakage issue. Hence, the CDM EB at its 33rd meeting in June 2007 revised the majority of the approved small scale CDM methodologies by then for application under P-CDM.

As indicated in Table 6, now most existing small scale methodologies have some specific provisions to address leakage issues when they are applied to CPAs under a PoA.

Table 6. Revisions to Small Scale Methodologies for Application under P-CDM

Small-scale CDM Methodologies	**Application under P-CDM**	
	Applicable or not	Leakage
Type I: Renewable energy projects <15 MW		
AMS-I.A. Electricity generation by the user	√	- Enough surplus biomass for biomass projects - Scrapping of replaced equipment if PoA entails replacement of equipment
AMS-I.B. Mechanical energy for the user	√	
AMS-I.C. Thermal energy production with or without electricity	√	
AMS-I.D. Renewable electricity generation for a grid	√	
AMS-I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User	Does not contain information on application under P-CDM	
Type II: Energy efficiency improvement <60 GWh savings		
AMS-II.A. Supply side energy efficiency improvements - transmission and distribution	√	Monitor and check scrapping of replaced equipment if it involves replacement of equipment
B. Supply side energy efficiency improvements - generation	√	
C. Demand-side energy efficiency programmes for specific technologies	√	
D. Energy efficiency and fuel switching measures for industrial facilities	√	- Fossil fuel switch - Monitor and check scrapping of replaced equipment if PoA entails replacement of equipment
E. Energy efficiency and fuel switching measures for buildings	√	

F. Energy efficiency and fuel switching measures for agricultural facilities and activities	√	
G. Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass	Does not contain information on application under P-CDM	
H. Energy efficiency measures through centralization of utility provisions of an industrial facility Technology	√	- Scrapping of replaced equipment if applicable
I. Efficient utilization of waste energy in industrial facilities	√	
J. Demand-side activities for efficient lighting technologies (deemed savings)	√	- Fossil fuel switch - Scrapping of replaced equipment
Type III: EB27:<60 ktCO_2e reduction		
A. Urea offset by inoculant application in soybean-corn rotations on acidic soils on existing cropland	√	
B. Switching fossil fuels	√	- Fossil fuel switch
C. Emission reductions by low-greenhouse emission vehicles	√	- Fossil fuel switch - Scrapping of replaced equipment
D. Methane recovery in animal manure managements systems	√	- Scrapping of replaced equipment
E. Avoidance of methane production from biomass decay through controlled combustion	√	
F. Avoidance of methane production from biomass decay through composting	√	
G. Landfill methane recovery	√	
H. Methane recovery in wastewater treatment	√	
I. Avoidance of CH_4 production in wastewater treatment through replacement of anaerobic lagoons by aerobic systems	√	
J. Avoidance of fossil fuel combustion for CO_2 production to be used as raw material for industrial processes	√	
K. Avoidance of methane release from charcoal production by shifting from pit method to mechanized charcoaling process	√	
L. Avoidance of methane production from biomass decay through controlled pyrolysis	√	
M. Reduction in consumption of electricity by recovering soda from paper manufacturing process	√	
N. Avoidance of HFC emissions in rigid Poly Urethane Foam (PUF) manufacturing	√	
O. Hydrogen production using methane extracted from biogas	Not expected to be applied under P-CDM	
P. Recovery and utilization of waste gas in refinery facilities	√	- Scrapping of replaced equipment
Q. Waste gas based energy systems (gas/heat/pressure)	√	
R. CH_4 recovery in agricultural activities at household/small farm level	√	
S. Introduction of low-emission vehicles to commercial vehicle fleets	√	- Fossil fuel switch - Scrapping of replaced equipment
T. Plant oil production and use for transport applications	Further analysis and revision is needed for application under P-CDM	

U. Cable Cars for Mass Rapid Transit System (MRTS)	Further guidance on leakage is needed for application under P-CDM	
V. Decrease of coke consumption in blast furnace by installing dust/sludge recycling system in steel works		
W. CH_4 capture and destruction in non-hydrocarbon mining activities	x	Not applicable for P-CDM
III.X. Energy efficiency and HFC-134a recovery in residential refrigerators	√	- Scrapping of replaced equipment
III.Y. Methane avoidance through separation of solids from wastewater or manure treatment systems	√	
III.Z. Fuel switch, process improvement and energy efficiency in brick manufacture	√	
III.AA. Transportation Energy Efficiency Activities using Retrofit Technologies	Does not contain information on application under P-CDM	
III.AB. Avoidance of HFC emissions in Standalone Commercial Refrigeration Cabinets		
III.AC. Electricity and/or heat generation using fuel cell	√	Leakage from lifecycle of natural gas production and supply outside the project boundary
III.AD. Emission reductions in hydraulic lime production	Further guidance on leakage is needed for application under P-CDM	
III.AE. Energy efficiency and renewable energy measures in new residential buildings	√	No special considerations required.
III.AF. Avoidance of methane emissions through excavating and composting of partially decayed municipal solid waste (MSW)	√	- Scrapping of replaced equipment
III.AG. Switching from high carbon intensive grid electricity to low carbon intensive fossil fuel	√	- Lifecycle GHG emissions from fossil fuel production and supply
III.AH. Shift from high carbon intensive fuel mix ratio to low carbon intensive fuel mix ratio	√	

Source: prepared by the authors

Most large scale approved methodologies do not have specific provisions for application to P-CDM. However, there is one exception. AM0075 - Methodology for collection, processing and supply of biogas to end-users for production of heat, which clearly indicates that it can be applied under a PoA.

Criteria for determining de-bundling under P-CDM

To avoid the misuse of the special and simplified procedures for small-scale CDM project activities, it is prohibited to de-bundle a large-scale projects into two or more small-scale projects, both in case of regular and P-CDM projects. Table 7 shows the criteria for determining bundling under regular CDM and for P-CDM.

Table 7. Criteria for determining de-bundling under regular CDM vs. P-CDM

Regular CDM Projects	P-CDM (CPAs)
With the Same project participants	Of the same activity implementer as the proposed small scale CPA or a coordinating or managing entity, which also manages a large scale PoA of the same sectoral scope;

the same project category and technology/measure;	the same technology/measure
Registered within the previous 2 years	
Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point	In the same geographical area; the boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.

The criteria 1 km distance at the closest point can make it difficult to implement a large number of small activities via a CPA using a small scale methodology. For example, an enterprise implementing CPAs of efficient lighting among households in a city may find it is very hard to define the borders of each CPA to make sure that they are at least 1 kilometre apart. The CDM EB has established some regulation to address this problem:

If each of the independent subsystems/measures (e.g. biogas digester, solar home system) included in a CPA is no greater than 1% of the small scale thresholds defined by the small-scale methodology applied, then that the CPA is exempted from performing de-bundling check i.e. considered as being not a de-bundled component of a large scale activity.

Procedures for getting EB approval for applying more than one methodology under a PoA

Many regular CDM projects apply more than two methodologies, and some even apply three. For example, over 100 landfill gas capture and electricity generation projects use the combination of two methodologies; one methodology for landfill gas capture and the other for biogas for electricity generation. Similarly, the projects that use coalmine methane for electricity generation also apply two methodologies, one for coalmine methane capture, the other for electricity generation from methane. Similarly, biomass residue-for-energy projects tend to combine the methodology to avoid methane emissions from biomass decay with the methodology for energy production from renewable sources.

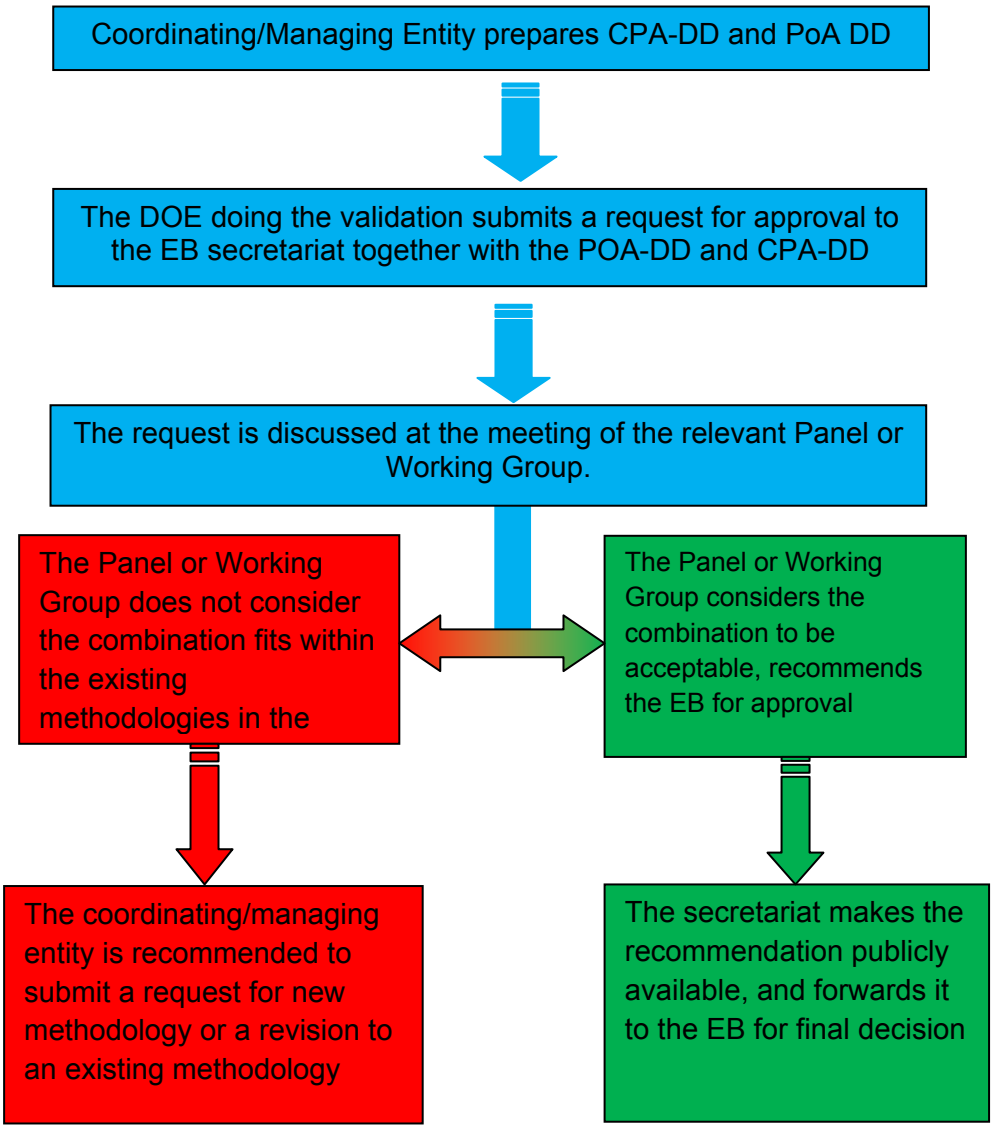
There are also several CDM projects that apply three approved methodologies. One of the registered projects in the pipeline even combines four methodologies [4]. Combination of methodologies is particularly relevant for the P-CDM activities that target at promoting renewable energy production and energy efficiency improvements among small end users. There are a few projects with P-CDM characteristics that combine three methodologies. One typical example is the Kuyasa Low-cost urban housing energy upgrade project from South Africa. This project uses three emission-reduction measures for households: improving ceiling insulation, installing solar water heaters, and replacing incandescent bulbs by efficient CFLs. There are two registered projects from Moldova, which use energy efficient boilers to replace old and energy inefficient boilers to supply heating energy to public buildings such as hospitals,

[4] This is the project of GEEA-SBS Biomass Treatment Project in Alegrete, Rio Grande do Sul from Brazil. It applies four methodologies: AMS-III.G. - Landfill methane recovery; (2) AMS-III.E. - Avoidance of methane production from biomass decay through controlled combustion; (3) AMS-I.D. - Grid connected renewable electricity generation; and (4) ACM 2 - Consolidated methodology for grid-connected electricity generation from renewable sources

schools, government buildings etc. Besides this, these projects also include improving insulation of heat supply pipes and buildings. The projects combine three methodologies; energy from renewable source, fuel switching, and energy efficiency improvement in buildings.

To reduce monitoring and transaction costs, it is economic to take multiple measures for the same facilities/households as in many such cases each measure often generates a small amount of emission reduction. Therefore, the restriction that only one methodology can be applied under a PoA has been abolished by the EB and application of multiple methodologies is now allowed. However, combining different methodologies needs to be approved by the EB in advance. Figure 5 illustrates the procedure to seek EB approval.

Figure 5. Procedure for getting EB approval for combining Methodologies under a PoA



Source: Prepared by the authors based on EB 47 Report Annex 31

As indicated above, approval of a methodology combination by the CDM EB is carried out at the validation stage. It is submitted through the DOE performing the validation and the EB decision is based on recommendations of the relevant methodology panel or working group.

Methodology Change:

- If an approved methodology is put on hold or withdrawn, not for the purpose of inclusion in a consolidation, no new CPAs can be added to the PoA in accordance with the relevant timelines.
- If the methodology is subsequently revised or replaced by inclusion in a consolidated methodology, the PoA needs to be revised accordingly, and changes validated by a DOE and approved by the EB. Subsequent CPAs have to use the new PoA. CPAs included prior to the methodology was put on hold, need to apply the new version of the PoA while renewing the crediting period.

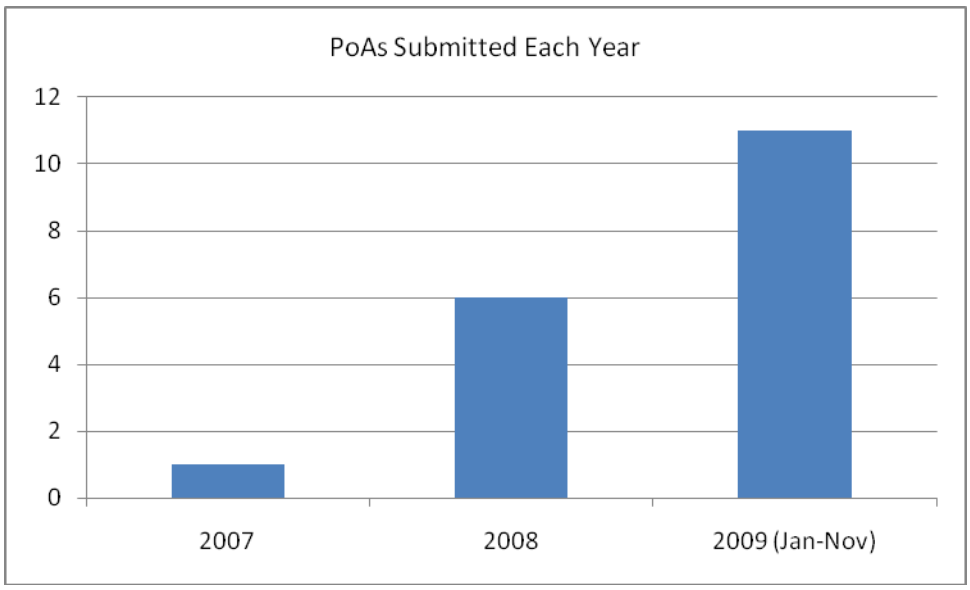
2.4 Progress of P-CDM Implementation to Date

PoA is a relatively new approach for the CDM and only 18 P-CDM project proposals had been submitted to the UNFCCC until November 2009. Of these, two have been registered. It may require capacity building as well as devising appropriate institutional mechanisms for implementation. The managing entity for a PoA can be from the public sector or the private sector. A CPA implementing agency can also be from either the public sector or the private sector. End users can play an important role in a project - they can be involved in operation, maintenance, monitoring and verification activities of the project. This can be achieved through an appropriate incentive mechanism. For example, in case of solar home systems, end users can be motivated through financial incentives in the event they maintain their systems well.

The 18 PoAs submitted to the UNFCCC as of 31 Oct, 2009

Although the CMP1 decided in December 2005 that a programme of activities can be registered as a single CDM project, P-CDM became operational only in July 2007, after the CDM EB had issued guidance and procedures for P-CDM registration in June 2007 and the PoA DD and CPA-DD for large and small scale non-forestry P-CDM projects in July 2007. Then the first PoA – a programme that promotes the installation and use of Solar Home Systems in Bangladesh was submitted with public comments starting on the same in Dec 2007. Since then, 6 P-CDM projects were submitted in 2008, and another 11 have been submitted in the first 11 months of 2009 (see Figure 6).

Figure 6. Number of P-CDM projects (PoAs submitted and public comments started)



Source: prepared by the authors based on information at http://CDM.unfccc.int

Among the 18 P-CDM projects already submitted to the UNFCCC, only two of them have been registered. One of the programmes promotes efficient lighting in Mexico and another programme submitted by a big meat producer from Brazil promotes biogas capture and combustion from animal waste among its contracted farms. The remaining 16 programmes are still under validation.

As indicated in Table 8, among the 18 existing programmes, eight are about promoting the use of renewable energy, seven are about improving energy efficiency, two are about reducing methane emissions from animal waste and municipal solid waste, and one is about reducing emissions with low GHG-emitting vehicles. Among the eight renewable energy programmes, three are about solar water heating; and solar home systems, biomass, biogas digester, hydropower, and hydraulic energy each have one project. Among the eight energy efficiency projects, three are about promoting energy efficient lighting, two are about improving cooking stoves, one is about improving energy efficiency of coffee production, and the last one is about improving efficiency of transformers to reduce grid losses. As indicated in Table 6, the 18 existing programmes are from 13 developing countries in Asia, Africa, and Latin America. So far, China alone has submitted three programs. India, South Africa and Bangladesh have already submitted 2 programs each and are the forerunners in P-CDM implementation. Moreover, all the existing programs take advantage of the simplified modalities and formalities for small-scale CDM projects and choose to apply small scale methodologies.

Table 8: The 18 PoAs submitted to the UNFCCC as of 31 Oct, 2009

PoA Technology & Measures	Host country	Methodology	Status
Solar water heating	South Africa	AMS-I.C.	Validation
Solar water heating	Tunisia	AMS-I.C.	Validation
Solar water heating	Viet Nam	AMS-I.C.	Validation

Solar home system	Bangladesh	AMS-I.A.	Validation
Small hydro	Honduras	AMS-I.D.	Validation
Hydraulic rams for irrigation and household water supply	China	AMS-I.B.	Validation
Household biogas digester programme	China	AMS-I.C	Validation
Promotion of Biomass Based Heat Generation Systems	India	AMS-I.C.	Validation
Efficient lighting	Mexico	AMS-II.C.	Registered
Efficient lighting	Senegal	AMS-II.C.	Validation
Efficient lighting	India	AMS-II.J.	Validation
Energy saving at instant coffee production factories	South Korea	AMS-II.D.	Validation
SGCC In-advance Distribution Transformer Replacement Program	China	AMS-II.A	Validation
Improved Cooking Stoves	Bangladesh	AMS-II.G.	Validation
Heat Retention Cooking	South Africa	AMS-II.C.	Validation
CH4 capture and combustion from animal waste management systems (AWMS)	Brazil	AMS-III.D.	Registered
Municipal waste composting	Uganda	AMS-III.F.	Validation
Vehicle scrapping and recycling program	Egypt	AMS-III.C	Validation

Source: prepared by the authors based on info at http://cdm.unfccc.int

In P-CDM implementation, as the hub for all communication with the CDM EB, DOEs, DNAs and CPA implementers, capacity and expertise of the the coordinating/managing entity to a large extent determines the fate of a PoA. In the P-CDM rules, it is stipulated that the C/ME could be private or public entities. Among the existing 18 P-CDM projects, 12 have C/MEs from the private sector, while the other 6 PoA's coordinating entities are from the public sector, especially national authorities on energy and environmental issues. Six DOEs have been involved in validation of the existing 18 PoAs. Among them, TÜV-SÜD and DNV are the market forerunners; each validating 5 of the PoAs, TÜV-Nord has 4, and AENOR has 2 under its name, while PwC and JQA have validated 1 PoA each. The following Table 9 also provide a list of the PDD consultants that help prepare the PoA DD and CPA DD.

Table 9. The Coordinating/Managing Entities, Validating DOEs, and PDD Consultants of existing PoAs

PoAs	Coordinating/managing Entity	Type	DOEs	PDD Consultants
Solar water heating in South Africa	Prostart Traders 40 (Pyt) Ltd, t/a New Energies (Pyt) Ltd	Private	PwC	EcoSecurities
Solar water heating in Tunisia	Tunisian National Agency for Energy Conservation	Public	TÜV-SÜD	EcoSecurities
Solar water heating in Viet Nam	The Energy Conservation Center (ECC) of Ho Chi Minh City.	Public	JQA	Mitsubishi UFJ Securities

Solar home system in Bangladesh	Grameen Shakti, Bangladesh.	Private	DNV	Grameen Shakti
Small hydro in Hongduras	Hidroeléctrica de Masca S.A. de C.V. (Hidromasca)	Private	TÜV-SÜD	OneCarbon
Hydraulic rams for irrigation and household water supply in China	BORDA/atmosfair, Germany	Private	TÜV-Nord	Atmosfair, BORDA, Zhejiang University
Household biogas digesters in Hunan, China	Beijing Hebaiyi Ecological Energy Development Co., Ltd	Private	DNV	Gaia Consulting Oy
Promoting biomass-based heat generation in India	Thermax Sustainable Energy Solutions	Private	TÜV-Nord	Asia Carbon
Efficient lighting in Mexico	Cool nrg Mexico SRL de CV	Private	DNV	Cool nrg Carbon Investments
Efficient lighting in Senegal	the Senegalese Rural Electrification Agency (ASER)	Public	AENOR	WB-CF
Efficient lighting in India	Bureau of Energy Efficiency, India	Public	TÜV-SÜD	Bureau of Energy Efficiency
Energy saving at instant coffee factories in South Korea	Dongsuh Foods Corporation (owner of the coffee factories)	Private	DNV	Climate experts
SGCC In-advance Distribution Transformer Replacement in China	State Grid Corporation of China	Private	TÜV NORD	1)World Bank Carbon Finance Unit and 2) Additional Consulting and Engineering
Improved cooking stoves in Bangladesh	JPMorgan Ventures Energy Corporation	Private	TÜV-SÜD	HED Consulting, JP Morgan
Heat Retention Cooking in South Africa	JPMorgan Ventures Energy Corporation	Private	TÜV-SÜD	JP Morgan, Molora Consulting
CH4 capture and combustion from AWMS in Brazil	Sadia Institute	Private	DNV	Sadia (coordinating entity)
MSW composting in Uganda	National Environmental Management Authority, Uganda	Public	AENOR	Sampath Kumar
Vehicle scrapping and recycling in Egypt	Egyptian Ministry of Finance	Public	TÜV NORD	World Bank Carbon Finance Unit

Source: prepared by the authors based on info at http://cdm.unfccc.int

To enable small countries to benefit from the CDM, the EB decided that a PoA can cover a part of a country, whole country or several countries.

As shown in Table 10 below, most of the existing 18 PoAs have the whole or part of their host countries as their boundaries.

The only exception is the South Korean instant coffee project, which covers only two instant coffee factories of the coordinating entity. Hence, although it is being implemented through a PoA, it is closer to bundling. Most of the existing PoAs have the duration of "up to 28 years", the upper limit for PoA's duration. The only exception to this is the Uganda municipal solid waste composting PoA, whose duration is 7x3 =21 years. As for the CPA crediting period, out of the existing 18 PoAs, 6 have their CPAs with renewable crediting period, while the remaining 12 have CPAs with 10-year fixed crediting period.

Table 10. Boundaries, Durations, and CPA Crediting Periods of existing PoAs

Techs	PoA Boundary	PoA Duration	CPA crediting period
Solar water heating in South Africa	Whole South Africa	28 years, from Mar 2007	10 years
Solar water heating in Tunisia	Tunisia	28 years, from Jan 2007	10 years
Solar water heating in Viet Nam	South of Viet Nam	28 Years, from May 2009	7 x3 years
Solar home system in Bangladesh	Bangladesh	28 years, from 2007	7x3 years
Small hydro in Hongduras	Honduras	28 years, from Jan 2009	7x3 years
Hydraulic rams for irrigation and household water supply in China	8 counties in Zhejiang Province, China	28 years, from Jan 2008	10 years
Household biogas digesters in Hunan	Hunan Province of China	28 years, from May, 2008	10 years
Biomass-based heat generation in India	India	28 years from Dec 2007	10 years
Efficient lighting in Mexico	Mexico	28 years, from Nov 2008	10 years
Efficient lighting in Senegal	12 geographically distinct concessions of the Rural Electrification Plan in Senegal	28 years, from Jan 2009	10 years
Efficient lighting in India	India	28 years, from Nov 2007	10 years
Improved cooking stoves in Bangladesh	Bangladesh		7 x 3 years
Heat retention cooking stoves in	South Africa		7 x 3 years

South Africa			
Energy saving at instant coffee factories in South Korea	two instant coffee production factories of Dongsuh Foods Corporation	28 years, from May 2008	10 years
CH4 capture and combustion from AWMS in Brazil	five states of South, South-East and Midwest Brazil	28 years, from PoA registration date	10 years
MSW composting in Uganda	Municipalities in Uganda	7x3=21 years, from Oct 2007	7 x 3 years
Vehicle scrapping and recycling in Egypt	Egypt	28 years from April 2009	10 years

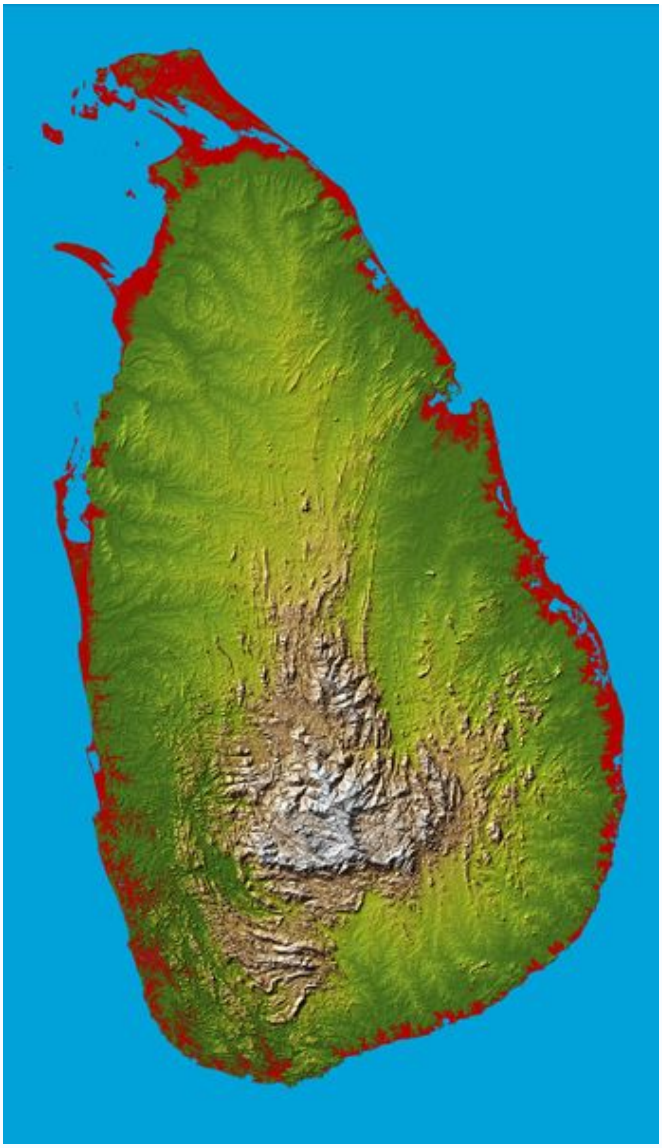
3. The Potential Benefits of P-CDM Implementation in Sri Lanka

The opening of the CDM to programme of activities has several important benefits. First, it promotes the participation of energy efficiency projects in the CDM. The structure of CDM programmes lends itself particularly well to energy efficiency or renewable energy activities to small end-users. Energy efficiency is one of the most promising sectors for improving the adequacy and reliability of the power system, increasing energy security and reducing emissions in developing countries. In fact, the World Energy Outlook estimates that energy efficiency could account for 65% of the energy-related emission reductions attainable through policies and measures currently under consideration in developing countries (IEA 2006). Yet this opportunity has not been captured by regular CDM. Emission reduction activities in these areas are often dispersed, have high transaction costs and relatively low credit flows. P-CDM is also relevant for promoting the production and use of renewable energy – which like solar and wind, wave, micro hydro, are often dispersed.

3.1 The Profile of Sri Lanka

Sri Lanka had a population of 19.9 million in 2007 and it is expected to further increase to 21.7 million by 2020. Sri Lanka's 20 million people live on a total area of 65,610 square kilometers, making it its population density rank the 41st highest in the world. Within the country, the population density is highest in western Sri Lanka, especially in and around the capital. Sri Lanka is a country without proven reserves of fossil fuels such as coal, oil, and natural gas. Its fossil fuel energy consumption completely relies on import. The island consists mostly of flat-to-rolling coastal plains, with mountains rising only in the south-central part. Its highest point, Mount Pedro, is 2,524 meters above the sea level. Sri Lanka's electricity mainly comes from hydropower.

Figure 7. Topography of Sri Lanka



However, with the rapid increase in energy consumption in recent years, the potential for further construction of large hydropower projects is very limited. Hence, it is projected that fossil fuels will contribute to a larger share of the country's energy supply. The per capita electricity consumption was only 420 kWh per year in Sri Lanka in 2004, which was about one third of the 1222 kWh per capita average annual electricity consumption among all developing countries.

Agriculture, industry, and service respectively contribute to 13.4%, 29.4%, and 57.3% of Sri Lanka's GDP. The country's main agricultural produce are rice, sugarcane, grains, pulses, oilseed, spices, tea, rubber, coconuts, milk, eggs, hides, beef, and fish. Sri Lanka's main industries are processing of rubber, tea, coconuts, tobacco and other agricultural commodities; telecommunications, insurance, banking; clothing, textiles; cement, petroleum refining, information technology services(CIA World Factbook).

Sri Lanka's main import commodities include textile fabrics, mineral products, petroleum, foodstuffs, as well as machinery and transportation equipment. And its major exports are textiles and apparel, tea and spices; diamonds, emeralds, rubies, coconut products, rubber manufactures, and fish (CIA World Factbook).

From 1990 to 2007, Sri Lanka's GDP has been growing at an average annual rate of 3.9% on a constant price basis. Sri Lanka's real GDP growth rate was estimated to be 7.7% in 2006 and 6.8% in 2007. After the end of the internal war in 2009, it is expected that country can concentrate on economic development and will witness robust economic growth. This may lead to rapid energy demand growth in the coming decades.[5]

Thirty four percent of the total population, or 6.7 million people, had no access to electricity in Sri Lanka in 2005. Renewable energy development could play an important role in providing more people with access to energy. Locally available renewable energy sources, in the form of solar thermal, solar PV, biogas, agricultural residue, and hydro, could play an important role in improving standard of living for this segment of the population by giving them access to electricity, reducing indoor air pollution, and freeing poor people (especially children and women) from the tedious chore of collecting firewood. It can also contribute to the protection of the local forest and ecological system, while at the same time reducing CO_2 emissions. Moreover, as a tropical country, Sri Lanka has good solar energy resources.

Sri Lanka has a tropical monsoon climate. Another environmental challenge the country faces is protecting its forest. From 1990 to 2005, Sri Lanka's forest area shrank at an average annual rate of 1.2%. By 2005, only 29.9% of the land area remained covered with forest. Deforestation, soil erosion, wildlife populations threatened by poaching and urbanization are among the top environmental challenges facing Sri Lanka. Disposing and treating waste-water and solid wastes is another major environmental problem.

3.2 Sri Lanka's progress with CDM implementation

Sri Lanka was an early starter in CDM implementation. The CDM became operable after the Kyoto Protocol entered into force in February 2005. Two months later, three CDM projects from Sri Lanka had been submitted and put up at the UNFCCC website for public comments. To date, 29 projects have been submitted, of which 3 failed to pass the DOE validation process, and three passed the DOE validation but had their requests for registration were rejected by the CDM EB . Five projects have been registered, one needs some minor revision before it can be registered, and the rest 17 are still in validation stage. As indicated in Table 9, although in 2008 and 2009 Sri Lanka submitted another 12 projects, none of them have requested for registration yet. According to local experts, there are one hundred more CDM projects at the PIN or PDD preparation stage. However, the bottlenecks they encounter to the registration process include shortage of qualified personnel at DOEs to carry out the validation and verification, stricter quality control at the CDM EB, and more detailed requirements in the newly released validation and verification manual by the CDM EB. The EB's action in suspending some DOEs have also made DOEs more prudent in carrying out the validation. According to a Danish CER buyer, the

[5] The data are from the UNDP Human Development Report 2007/2008 and Human Development 2009.

DOE validation and verification prices have almost tripled since 2007. Also with 2012 approaching, the lack of breakthrough in the post-2012 climate negotiations and uncertainties about post-2012 CER market demand are some factors influencing the slow progress of CDM implementation. The slump in CER prices in early 2009 due to lower CER demand from the EU ETS after financial crisis is another factor making CDM project developers hesitant to spend large sums of upfront costs to develop the PDD, finding CER buyer, and paying DOE for validation.

Table 11. Progress of CDM Implementation in Sri Lanka

	2005	2006	2007	2008	2009
Rejected/Validation terminated		3	3		
Registered	4	0	2		
Validation		5	0	4	8
Total	4	8	5	4	8

Source: Based on information on the UNFCCC website

In terms of project type, hydro and biomass are the two most important CDM project types in Sri Lanka (see Table 12). There are also a few fugitive emission reducing, methane avoidance, cement, and wind CDM projects submitted to the UNFCCC. Hydro is also the most advanced project type in terms of project registered: four out of the five registered projects are hydropower projects.

Table 12. CDM Implementation in Sri Lanka

	Terminated		In pipeline			Total
	Validation terminated	Rejected by the EB	Registered	In registration process	Validation	
Biomass	2		1	1	4	8
Fugitive					1	1
Hydro	1	2	4		9	16
Methane avoidance					2	2
Wind					1	1
Cement		1				1
Total	3	3	5	1	17	29

Source: UNEP Risoe CDM Pipeline (dated 1 Nov 2009)

Sri Lanka has 9 provinces. The existing 23 projects that are still under validation or have already been registered are scattered in 7 of these provinces (see Table 13). The two provinces that have most CDM projects are the Central Province and the Sabaragamuwa Province; both have large number of hydro projects. Uva province has two methane emission avoidance projects

while the Western Province has 3 out of the 6 biomass CDM projects. The wide geographic distribution of these existing CDM projects indicate that Sri Lanka has built up its local CDM expertise and awareness, which paves the way for further scaling up of CDM implementation.

Table 13. Geographical Distribution of the 23 CDM Projects under validation or registered

Sri Lanka Provinces	Biomass energy	Cement	Fugitive	Hydro	Methane avoidance	Wind	Total
Central	1			8			9
Eastern	1						1
North Central							0
Northern							0
North Western			1			1	2
Southern				2			2
Uva				1	2		3
Sabaragamuwa	1			9			10
Western	3						3
Total	6	0	1	20[6]	2	1	30

3.3 The benefits of P-CDM for Sri Lanka

A PoA is preferable when activities (CPAs) are small and identical in nature but dispersed geographically and / or temporally. It is helpful when the exact type, size and location of all CPAs may not be known at the time of registration of a PoA. The only requirement is to submit one CPA along with the POA. It is also ideal for small countries to join hands and submit one PoA, since physical boundary of a PoA can be extended to cover more than one country.

A PoA's duration can be as long as 28 years (60 years for afforestation and reforestation programmes) and needs to be stated at the time of request for registration of the PoA. Crediting period for CPAs is similar to normal CDM project activities, which can be a maximum of 7 years and subject to two renewals, or a maximum of 10 years fixed. For afforestation / reforestation it is 20 years renewable or 30 years fixed. However, a CPAs crediting cannot extend beyond the POA life (maximum 28 years). It means that it may not be very useful to add activities that have long lives towards last few years of the PoA duration.

Other characteristics of a POA include low transaction costs since CPAs, that are added after the POA has been registered, do not need to go through the CDM Board. The concerned DOE can include it in the POA after checking the CPA against the registered PoA. Also, registration fee is paid only at the time of POA registration, based on expected emissions reductions. In

[6] There are actually only 13 hydropower projects in the pipeline. But 5 of the hydropower projects actually each have locations in two provinces, and another one located in three provinces, hence here it shows the total number is 20.

case of changes in methodology, the CPAs already included in the POA are not affected as the new methodology applies to only new CPAs.

As indicated in the previous section, Sri Lanka has no proven reserves of fossil fuels and relies on import for fossil fuel consumption. Like many oil importing countries, the instability in oil prices has made energy security a top national priority for Sri Lanka. Meanwhile, Sri Lanka also faces some major environmental challenges which include decrease in forest coverage, water pollution, disposal of solid waste, as well as local air pollution.

Moreover, the country has built up a CDM pipeline, accumulated the necessary local expertise and awareness about CDM among the private sector and government agencies. However, the slow progress and high transaction costs of CDM registration process have become major barriers to the up-scaling of CDM implementation in Sri Lanka.

Like many small developing countries, most of Sri Lanka's enterprises are small or medium in size. The major industries are processing of rubber, tea, coconuts, tobacco, and other agricultural commodities, telecommunications, insurance, banking, clothing, textiles and information technology services, which are characterized by low energy intensity. Although cement and petroleum refining are also among the list of main industries in Sri Lanka, their products are mainly for domestic consumption and not so big in size. Hence, the potential of large single CDM projects are limited in Sri Lanka. Instead, most of the potential projects are small in size.

P-CDM can be an important instrument and help Sri Lanka get the technology, management practices, and necessary finance to boost her strategy of building a sustainable energy system. It can overcome the barriers of a regular CDM project. With coordination and management left to the coordinating entity, P-CDM can significantly lower the CDM knowledge requirements and transaction costs for each CPA implementer, thus lowering the threshold for CDM activity. In Sri Lanka, it can be used for energy efficiency, renewable energy and waste treatment projects.

4. P-CDM for MSW Sector in Sri Lanka - Potential and Recommendations

In Sri Lanka, municipal waste collection rate is only around 40%. Most of collected waste is transported and dumped in open fields. Some of the open dump sites were located next to residential areas and busy roads, and seem to be a threat to public health and safety. Hence, Sri Lanka Ministry of Environment and Natural Resources and Sri Lanka Carbon Fund are keen to seek P-CDM implementation in the waste sector as a way to solve the problem of managing and disposing of the ever increasing municipal solid waste. This section provides some observations and suggestions on how to implement P-CDM in the municipal solid waste sector in Sri Lanka based on the sectoral background report prepared by the local expert, discussions with local stakeholders during the site visits, the group work during the workshop, relevant reports and literature.

4.1 Significant potential to implement P-CDM in the MSW sector

It is estimated that 6400 tonnes of solid municipal waste is generated in Sri Lanka every day (Vanniarachchy, 2009). A World Bank (1999) report predicted that by 2025, Sri Lanka's daily waste generation will triple from the 1995 level and reach 10650 tonnes per day. As shown in Table 14, the majority of the municipal solid waste is biodegradable, which can cause discomfort and public health and safety issues to the population exposed to it. When dumped in large quantities, the organic part decomposes anaerobically and generates methane, which can cause fire and explosion. Methane has a global warming potential of 21, which makes methane avoidance projects good candidates for CDM.

Table 14. Composition of Municipal Solid Waste in Sri Lanka

Waste type	**%**
Bio-degradable (short-term)	56.57
Paper	6.47
Wooden	6.35
Sawdust/paddy husk & cloth/ garment waste	6.04
Bio-degradable (long-term)	5.94
Polythene & Plastic	5.91
Building	3.89
Metal	2.76
Slaughter house	2.34
Glass	2.03
Other	1.68

Source: MENR (2005)

At the national level, the Ministry of Environment and Natural Resources and the Central Environment Authority are in charge of municipal solid waste policy making. At the local level, 331 Local Authorities are in charge of local MSW collection and disposal. Waste collection and disposal are either directly performed by local governments or contracted to private companies. The strong government influence in the sector makes it easy for a central government agency to coordinate programmes.

The waste collection rate is low and a large share of the MSW is not collected. According to an ADB report, 66% of the low-income communities do not have access to municipal solid waste collection services and simply throw their garbage into nearby canals, drains, or reservation lands (ADB, 2006). One advantage of P-CDM is the roll-out effects and ability to include unlimited number of CPAs. Through implementation of a programme with a duration up to 28 years, not only the waste that is currently collected and dumped in open sites, but also the currently uncollected waste, as well as future increases in the MSW generation, can be included in a single P-CDM project.

The prevailing practice of waste disposal is unmanaged open dumps without any lining and fencing requirements (A. van der Wel, V. Post, 2007). This causes severe environmental

problems and therefore requires environmental-friendly waste disposal technologies and practices.

During implementation of the (ongoing) Pilisaru project, 13 composting plants have been built, and 30,000 household composting bins have been distributed. The successful experiences and awareness raising under the Pilisaru Project make it easier to solicit public support for implementing more MSW composting projects in Sri Lanka.
Compared with the current MSW disposal practice (open site dumping), MSW composting will need investment in composting facility. Without CDM, continuing the current practice of open site dumping is a more financially attractive option than composting. Hence, investment analysis can be used to demonstrate the additionality of MSW composting in Sri Lanka, indicating that without CDM, composting will not be implemented.

Most cities are small in size and in the largest city Colombo, there are multiple MSW dumping sites. The small quantity of MSW reaching each dumping site every day means in most cases, a composting facility alone cannot reach the upper limit of small-scale CDM. Such features make P-CDM a good choice: once the programme is registered with one composting facility, other similar composting facilities could be included in the program. All other existing facilities or newly added facilities can be covered by their own CPAs. Since project is already registered as a P-CDM project and most of the fixed costs are already covered, facilities added to the programme incur very low transaction costs.

4.2 Issues to be considered when implementing P-CDM for the MSW sector in Sri Lanka

Programme scoping and additionality demonstration: The Sri Lanka Central Environmental Authority launched the Pilisaru programme in 2008[7], which declares the target to make Sri Lanka garbage free by 2012. 5 billion rupees of government budget was allocated under the programme to subsidize the building and operation of composting plants, and subsidies are offered to encourage households buy composting containers at discounted price and carry out composting at home. The government's original plan was to fund the programme through donor support; from South Korea, Japan, the World Bank, and the Asia Development Bank. There are evidences that the Pilisaru has encountered some problems in finding sites for waste treatment and has not received any funding from donors, except some money from South Korea. The discussions with local stakeholders indicated that the Pilisaru may be able to build compost plants only in some of the cities, covering a part of their MSW generation. Hence the government is planning to use P-CDM to catalyze the transition from open dumping to composting for MSW treatment.[8] In CDM, the project proponents need to demonstrate that their proposed project activities face financial, technical, institutional or other barriers, which prevent the proposed project activity from taking place in the absence of CDM. Similarly, a P-CDM coordinating entity needs to show that without P-CDM, the coordinating entity will not initiate the proposed programme and without the incentives or support provided by the programme, the

[7] The Lanka Sun, Saturday, 03 May 2008, 'Pilisaru' to make Sri Lanka's garbage disappear by 2012'. http://lankasun.com:8000/index.php?option=com_content&task=view&id=4571&Itemid=26
[8] The Sunday Times, 06 Sept 2009, Dompe dump: Detractors Vs defenders - Environment Minister and other officials paint positive picture of landfill pilot project, as protests pile up. http://sundaytimes.lk/090906/News/nws_18.html

activities will not be implemented. The coordinating entity needs to provide evidences to show prior considerations of P-CDM in the design and decision making of the programme. This may cause some additionality problem. Recently, the CDM EB rejected some Chinese wind projects because compared with past projects, these projects were getting lower tariff subsidies from the Chinese government. The EB argued that the tariff was intentionally lowered to make these projects additional. Such issues may have to be considered while preparing and submitting a PoA for MSW composting.

There is also the issue if composting by households and composting at compost plants could be combined in a single PoA. Composting by households and composting at composting plants involve different types of investments and their investment analysis may be quite different. Also the incentive schemes offered to local municipalities and households to promote composting are likely to be different.

Coordinating Entity: Finding a proper coordinating entity is critical to ensure the success of a P-CDM project. The coordinating entity's coordinating capability and quality of work will to a large extent influence the fate of a P-CDM project. A PoA duration can be up to 28 years, and all the communications by the CDM EB concerning issues related to the PoA, including all CPAs covered under the PoA and distribution of CERs issued, are made with the coordinating entity. Also to coordinate a P-CDM project, the coordinating entity needs to be able to offer technical andr financial support (in some cases) to the CPA implementers and other actors involved in the programme. For successful implementation of the PoA, the coordinating entity and the coordination and management arrangements need to be stable over the PoA duration. So far there is no provision for changes in coordinating entity and the coordination and management arrangements.

Programme Design: Another key issue to be considered is design of the programme. To make a programme successful, various players in the programme implementation may need to be incentivized to cooperate, and their concerns suitably addressed. Discussions with stakeholders indicated that multiple stakeholders may be involved in the implementation of the MSW composting programme including the MENR, Sri Lanka Carbon Fund, local authorities, private businesses (contracted to build and run the composting facilities), and entities engaged in MSW collection and separation. The programme design will need to consider a variety costs including the CDM-related costs, investment and operational costs of the composting facilities, and MSW collection and separation costs. The CER ownership/sales revenue should also be shared in a way that it stimulates the participation of local authorities.

Management and operational arrangement: Management and operational arrangements need to ensure that there is no double counting; the composting facilities covered under the PoA should not be covered by any other regular CDM project or P-CDM project. This needs to be done through contracts between the CPA implementers and the coordinating entity.

Household composting vs centralized composting: Two types of composting activities are currently being promoted by the government in Sri Lanka. These are centralized MSW

composting at composting sites / facilities, and household composting with cement or plastic composting bins, with typical waste holding capacities of 160 liters and 200 liters. The ongoing Pilisaru programme promotes both types of composting activities. It offers subsidies, technical support, and awareness raising support for composting at centralized sites/facilities, and has provided 30,000 plastic composting bins at discounted prices to households with no access to waste collection services. From discussions it seemed that the local government agencies are interested to include both centralized composting and household composting in one P-CDM program. Despite the fact that both types of composting may use the same small-scale CDM methodology, and are promoted by the same organization, including them in one P-CDM project can be complicated for the following reasons:

- Monitoring and verification: For composting by households, each CPA will have many households, and sampling will need to be used for monitoring, reporting, and verification. For centralized composting, each facility or several composting facilities of one municipality could constitute a CPA, and this may not require sampling for monitoring, reporting, and verification.

- If household composting and centralized composting both target the same MSW, successful implementation of household composting may influence the contents of the MSW received by the centralized composting facilities, influencing their baseline emissions and emission reductions.

- Although it is not prohibited to include two types of CPAs in a P-CDM project, so far, all the existing 18 P-CDM projects submitted to the UNFCCC have chosen to include only one type of CPA. The complications are thus avoided.

Of the 18 projects, so far only one PoA is in the process of registration and the rest are in validation stage. Considering that a large number of CDM projects are waiting for registration, it may be best to avoid complexity and facilitate and focus on centralized composting in the design of the MSW program.

4.3 Methodological Issues

Table 1 provides a list of existing approved CDM methodologies for MSW sector. It can be seen that there are 4 large scale methodologies and 4 small scale methodologies that could be applied by regular CDM projects or PoAs for the MSW sector. These methodologies cover multiple technology options for emission reduction from MSW, including controlled combustion, composting, gasification, landfilling and LFG capture, producing residue-derived fuel or mechanical, thermal treatment of MSW, controlled pyrolysis, and air venting to landfills to avoid methane generation. So far, landfilling and capturing landfill gas for flaring or energy production is most popular technology choice for CDM.

One of the problems in Sri Lanka is that many existing open dump MSW sites are in downtown areas, close to residential areas or busy streets (as witnessed in Colombo during the visit). To address the environmental problems caused by the dumps, including risk of fire and explosions, waste needs to be removed to some other locations and disposed in an environmental-friendly

way. As indicated in the table below, AMS-III.E is applicable to both, fresh MSW that would otherwise be landfilled, and existing MSW that is already landfilled. This methodology could be used if Sri Lanka plans to use CDM to support removal of MSW from existing open dumps.

From the mission, it became clear that the preferred MSW disposal technology in Sri Lanka is composting. In view of the small size of each composting facility and the requirement that methodology is applied at CPA level in a P-CDM project, AMS-III.F. is the most suitable methodology for a MSW composting PoA in Sri Lanka.

Baseline emission calculation for the MSW composting in Sri Lanka: As methane generates in anaerobic conditions, whether the MSW is properly landfilled or dumped in open will be a major factor in determining the amount of methane generated. This is addressed in the "Methodology Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site. (Ver 04)" for AMS-III.F through the use of Methane Correction Factor (MCF), which is based on the different MSW disposal methods in the baseline.

Project proponents can choose from 4 MCF values:

- 1.0 for anaerobic managed solid waste disposal sites. These must have controlled placement of waste (i.e., waste directed to specific deposition areas, a degree of control of scavenging and a degree of control of fires) and will include at least one of the following: (i) cover material; (ii) mechanical compacting; or (iii) leveling of the waste;
- 0.5 for semi-aerobic managed solid waste disposal sites. These must have controlled placement of waste and will include all of the following structures for introducing air to waste layer: (i) permeable cover material; (ii) leachate drainage system; (iii) regulating pondage; and (iv) gas ventilation system;
- 0.8 for unmanaged solid waste disposal sites that are deep and/or with high water table. This comprises all SWDS not meeting the criteria of managed SWDS and which have depths of greater than or equal to 5 meters and/or high water table at near ground level. Latter situation corresponds to filling inland water, such as pond, river or wetland, by waste;
- 0.4 for unmanaged-shallow solid waste disposal sites. This comprises all SWDS not meeting the criteria of managed SWDS and which have depths of less than 5 meters.

After discussion with local experts, it is suggested that for most of the open dump sites in Sri Lanka, the MCF value could be taken as 0.4.

Among the 18 PoAs already with the UNFCCC, the one from Uganda is for MSW composting and could be used as an important reference in the MSW composting PoA design in Sri Lanka. The Uganda MSW composting programme was used as an example and explained during the workshop[9].

Table 14: Existing Approved CDM Methodologies for MSW Sector

Methodologies	Applicability	No. of Projects

[9] Documents of the program could be found at the following weblink: http://cdm.unfccc.int/ProgrammeOfActivities/Validation/DB/HP4RCRTEE2TQTH1BO7QXKW3JB1M9KC/view.html

AM25 -Avoided emissions from organic waste through alternative waste treatment processes – ver 11	Addresses project activities where fresh waste (including MSW), originally intended for land filling, is treated either through one or a combination of the following process: • composting, • gasification, • anaerobic digestion, • RDF (residue-derived fuel) processing/thermal treatment without incineration, and • incineration.	53
AM39 - Methane emissions reduction from organic waste water and bioorganic solid waste using co-composting – Ver 2	For project activities that avoid methane emissions: • Resulting from anaerobic degradation of the organic wastewater in open lagoons or storage tanks; and • From natural decay of bioorganic solid waste in landfills.	23
AM83- Avoidance of landfill gas emissions by in-situ aeration of landfills –Ver 1	Land filled waste is treated aerobically on-site by means of air venting (overdrawing) or low pressure aeration with the objective of avoiding anaerobic degradation processes and achieving aerobic degradation. By aeration of the landfilled waste, LFG emissions are avoided.	0
ACM1 - Consolidated baseline and monitoring methodology for landfill gas project activities –Ver 11	Landfill gas capture, where the baseline scenario is the partial or total atmospheric release of the gas. The project activities include gas flaring, producing energy from gas, direct gas use by consumers through gas distribution network.	193
AMS-III.E. - Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/ thermal treatment –Ver 5	1. In absence of the project, methane is produced from biomass or other organic matter that: (a) Would have otherwise been left to decay under clearly anaerobic conditions throughout the crediting period in a solid waste disposal site without methane recovery, or (b) Is already deposited in a waste disposal site without methane recovery. 2. Following measures taken under the CDM project to avoid emissions due to waste decay: (a) Controlled combustion; (b) Gasification to produce syngas/producer gas; (c) Mechanical/thermal treatment to produce refuse-derived fuel (RDF) or stabilized biomass (SB).	62
AMS-III.F. - Avoidance of methane emissions through controlled biological treatment of biomass – Ver 5	(a) Aerobic treatment by composting and proper soil application of the compost; (b) Anaerobic digestion in closed reactors equipped with biogas recovery and combustion/flaring system.	67
AMS-III.G. - Landfill methane recovery – Ver 5	• The capture and combust methane from landfills(i.e., solid waste disposal sites) • The recovered may also be utilized for thermal or	24

	electrical energy generation and hydrogen production	
AMS-III.L.- Avoidance of methane production from biomass decay through controlled pyrolysis – Ver 2	Avoid CH4 emissions from biogenic organic matter decay through controlled pyrolysis	0
AMS-III.AF. Avoidance of methane emissions through excavating and composting of partially decayed municipal solid waste (MSW) --- Version 1	(a) Aerobic pre-treatment by aerating the existing SWDS to achieve a safe operation environment for the subsequent excavation; (b) Excavating the MSW from the SWDS and separation into inert and non-inert materials; the excavation phase has to commence immediately after the preaerationphase, i.e., without significant time lag; (c) Composting the non-inert material and proper soil application of the compost.	0

Source: UNFCCC CDM website http://cdm.unfccc.int & UNEP Risoe CDM Pipeline – dated 1 Aug 2009

There are a lot of MSW dumps in downtown area that have been planned to be removed in Sri Lanka. Until late July (when visit to Sri Lanka was made and workshop held), there was no CDM methodology for reducing emissions from existing waste dumps. However, at the 50th EB meeting held in October 2009, the AMS-III AF was approved, which is designed for the composting of partially decayed municipal solid waste from existing waste dumps. This means that a PoA could be submitted to compost both: the waste from existing dumps and the newly collected waste.

5. P-CDM for Renewable Energy in Sri Lanka – Potential and Recommendations

Based on the sectoral background report prepared by the local expert, presentations made by various participants during the workshop, and discussions with local stakeholders during the site visits, the potential for P-CDM in Sri Lanka and related issues have been discussed in this part of the report.

5.1 Potential for P-CDM for Renewable Energy in Sri Lanka

Three important components of the Sri Lankan National Energy Policy (2006) include energy security, promotion of indigenous resources and meeting basic energy needs of the masses and to enhance their living standards. Biomass, petroleum and hydro have been major energy sources in Sri Lana with share at 47, 43 and 10 percent (approx.) of primary energy consumption in 2007. In line with the energy policy, share of petroleum has been targeted to reduce to 8 percent from 66% for grid electricity (in 2007), and share of non-conventional sources brought to 10 percent from negligible contribution. Though overall contribution of hydro in percentage terms would come down to 28 percent from 34 percent during the same period, there may be overall increase in the gross contribution due to growth in energy consumption, projected 3 percent for primary energy for 2007-15 period. Therefore, renewable energy growth can be expected to be quite robust through expansion of hydro power, and non-conventional

energy contribution. From the report; *Status and Potential of Renewable Energy in Sri Lanka (Joseph, 2009)*, Biomass, Hydro, Solar Photovoltaic, Solar Thermal and Wind emerge as the areas for development of renewable in Sri Lanka in the near future. The overall potential, as indicated in the report, is given in Table 15.

Table 15. Renewable Energy Potential in Sri Lanka

Item	Potential	Remarks
1. Agro Residues (i) Bagasse	Current: 2.4MW (17 GWh at 80 PLF) Future: 12.6 MW	From current surplus bagasse (at 20%). Future potential estimate based on the government plan to increase sugar production 6 times.
(ii) Paddy Husk	8.7 MW (60 GWh)	12 MW already installed, so no more can be supported.
(iii) Saw Dust	6.5 MW (44 GWh)	A part of saw dust is utilized as fuel for industrial heat application.
(iv) Coconut shell	19 MW (133 GWh)	From all the coconut shells, but collection and transport can restrict the practical potential.
2. Energy Plantations	30 million TOE	From 2.5 million ha (40% of land is underutilized land); total primary energy demand was about 10 million tOe in 2007. Gliricidia wood based electricity generating projects in the range of 1 MW to 10 MW have been planned.
3. Hydro Power	800 MW (2052 GWh)	This is besides existing 1326 MW (generating 3948GWh).
4. Solar PV	Good solar radiation to support solar programmes	Grid will cover 95% households as per plan. Balance 5% could use Solar PV systems. 125000 solar PV systems in use now from the WB Project.
5. Solar Thermal	Good radiation for SWH programmes	Currently, crop drying and some SWH installations are main solar thermal applications in Sri Lanka.
6. Wind Energy	1000 MW (Economic potential)	USAID study indicated very high technical potential. Some projects are in pipeline.
7. Bio Methane	Large potential (technical)	Economics need to be studied

Source: Joseph, 2009.

The report also mentions Bio Ethanol from molasses but overall potential is small and most of the molasses is already used by the sugar industry.

It can be seen that most of the renewable energy projects based on these resources could be good candidates for CDM. In an another study (Batagoda, 2008), CDM potential in Sri Lanka was estimated as follows (Table 16);

Table 16. CDM Potential in Sri Lanka

Sector	Energy Reduction/ substitution Potential per Year	CO_2 Reduction Potential per year (tCO_2/y)
Hydro Power	250 MW	613,200
Wind	480 MW	672,768
Biomass (Electricity)	300 MW	1,680,000
Biomass (Industrial Heat)	162 tOe	512,000
Biomass (Absorption Refrigeration)	100 MW	400,000
Energy Conservation: Electricity (Industry)	20,400 tOe	64,700
Energy Conservation: Petroleum (Industry)	36,000 tOe	113,800
Transport	206,000 tOe	600,000
Agro-residue Rice Husk	20 MW	112,000
Agro-residue Sawdust	20 MW	112,000
Total		**4,880,468**

Source: Batagoda, 2008.

In addition to this, the National Energy Policy of Sri Lanka states[10] :

"The Government will endeavour to reach a minimum level of 10% of electrical energy supplied to the grid to be from NRE by a process of facilitation including access to green funding such as CDM. The target year to reach this level of NRE penetration is 2015."

From the governmental policy and above studies it is clear that potential is fairly good and Sri Lanka can benefit from the CDM.

5.2 Feasibility of Renewable Energy P-CDM Projects

A review of current P-CDM projects in the CDM pipeline (see Table 17) proposed by various parties indicates that a variety of renewable energy P-CDM projects may be possible in Sri Lanka.

Table 17. Current Renewable Energy P-CDM Projects in pipeline

[10] http://www.mope.gov.lk/uploads/policy/National%20Energy%20Policy%20English.pdf

Project Title	Host Country	Methodology	Reductions (tCO_2e)
Installation of Solar Home Systems in Bangladesh	Bangladesh	AMS-I.A. ver. 12	34,854
New Energies Commercial Solar Water Heating Programme in South Africa	South Africa	AMS-I.C. ver. 13	967
Masca Small Hydro Programme	Honduras	AMS-I.D. ver. 13	3,952
Solar Water Heater Programme in Tunisia	Tunisia	AMS-I.C. ver. 13	9,539
Installing Solar Water Heating Systems in the South of Viet Nam	Viet Nam	AMS-I.C. ver. 14	2,542
Hydraulic rams for irrigation and domestic water supply in Zhejiang, China	China	AMS-I.B. ver. 10	1,000
Promotion of Biomass Based Heat Generation Systems in India	India	AMS-I.C. ver. 15	4,500

Of the areas identified with potential, viz., Biomass, Hydro, Solar Photovoltaic, Solar Thermal and Wind, it may be easiest to start with Hydro, Solar Thermal (primarily solar water heating), solar photovoltaic (solar home systems mainly), and then move on to wind and biomass.

Programmatic CDM for Hydro Power

Hydropower is an important energy resource in Sri Lanka. A total of 1326 MW of hydro power projects have already been installed in Sri Lanka and a potential for 800 MW exists. A few major sites are still classified as 'not economically feasible' for development (Joseph, 2009). This implies that the sites cannot be developed commercially unless some support from outside is provided. CDM may be able to bridge this gap. A large number of these may be small projects-below 15 MW. These can be gradually added to the grid or used on stand-alone basis. The sites are thus dispersed, and new plants will be added over period of time. Size of plants can vary but that does not create any issues so long large scale projects are excluded. Monitoring and verification is also relatively easy in case of power plants. Therefore, micro and mini hydro power plants can be covered by a programme of activities.

Programmatic CDM for Solar Thermal (Solar Water Heaters)

Solar water heaters (SWH) can be used to heat water both in households and in industries and replace a part of fossil fuel used for this purpose. Water can be heated to 60-80 degree C for household as well as commercial use, for example in hotels, hospitals, restaurants, industries, canteens, hostels etc. Solar water heater can be targeted at these sectors and users and systems added over period of time. The sites in case of SWH can be quite dispersed (in case of households), but SWHs can be added continuously through a programme. The systems in most cases are small, making transaction costs very high to cover it under a normal CDM project. Current low level of SWH penetration in Sri Lanka indicates presence of barriers in their

dissemination without CDM. Solar water heater programmes are therefore good candidates for P-CDM programmes.

5.3 Issues and Recommendations

There are several issues that Sri Lankan government may need to address for smooth functioning of the CDM Programme in general and P-CDM in particular. These have been discussed and recommendations given in this section.

General Issues for CDM

i. **Grid Emissions Factor:** As pointed out by stakeholders during consultation, there is a need to provide them the information on emission factor of the grid. It is much easier for Ministry of Power and Energy (or one of its divisions) to provide the grid emissions factor to CDM project developers, instead of everyone struggling to get grid information, making their own calculations and then coming out with emission factor, which may vary across project developers.
ii. **Economic viability of projects:** In some cases, economic viability can be an important barrier to project implementation, which CDM can overcome. Businesses may have their own criteria as to what is the IRR needed by them for a project to be viable. Small enterprises may however face problems- many stakeholders needed some sort of guidance from the government as to what rate of IRR should be considered for the economic viability. Some guidance on this can be provided through a publication freely accessible to project developers.
iii. **Banks do not recognize CERs as financing source:** This problem is faced by entrepreneurs in many developing countries. Financial institutions may not take into consideration any receipts from sales of CERs in the initial appraisal of project. This is due to a lack of capacity to estimate the risks, and factor it in their appraisal. Capacity building of financial institutions is needed for this purpose.
iv. **Tariff setting for Renewable Energy:** According to **Policy Decisions of Ministry of Power and Energy**[11], "Cost- Based Technology-specific three tiers tariff structure" were introduced from January 2007 for the following renewable energies, instead of earlier "avoided cost based tariff structure".

    - Mini hydro Projects of 10 Mw or less

    -Wind power projects of 50 Mw or less,

    -Biomass (including Dendro)

    -Municipal Solid waste,

    -Agro &Industrial waste,

    -Waste heat recovery

There has been apprehension from some stakeholders that "If the tariff-setting is cost-based, it would automatically make projects economically viable, and hence problem of CDM- eligibility."

[11] http://www.mope.gov.lk/uploads/policy/policyen.pdf

Firstly, this argument assumes that economic viability criteria of entrepreneurs is same as that of government, and costs are uniform across the entrepreneurs, none of which may be true (since efficiency of enterprises vary). Therefore, economic viability may still be a barrier for many entrepreneurs. Secondly, even if issue of economic viability is resolved, there may still be several barriers to implementation- a reason due to which actual implementation of these projects is far below the potential. Therefore, mere tariff-setting by the government may not make projects ineligible for the CDM.

v. **CDM Projects facilitation:** Though the CDM can be successful and function best when driven by stakeholders with financial stake (project developers, CDM experts, finance institutions etc.) yet it may need initial capacity building and facilitation through appropriate institutional and financial mechanisms. Therefore, setting up Sri Lanka Carbon Fund in April 2008 was an important step in this direction. The Fund now needs to be staffed and made functional, a vital step to promote CDM in Sri Lanka. The Fund, though under Ministry of Natural Resources and Environment, does not even find a mention at their website (until this report was prepared).
vi. **National Rules for CDM:** Absence of any CDM National rules was one of the important issues raised by stakeholders. A national guideline for CDM could be prepared to facilitate project developers and other stakeholders interested in CDM. The issues such as CDM Fee, treating CER revenue as a part of project cash flow (for tariff setting), sharing of CER revenue etc. could be addressed and included in the guidelines.

Specific Issues for P-CDM

i. **Additionality Issue for Renewable P-CDM Projects:** In case of hydro projects, a question may arise that these are not additional since several projects have been implemented in the past, or that these are a part of the regular plan. From the earlier discussions, it however seems that most of the remaining potential is now that of difficult and expensive sites, where CDM can facilitate implementation. Most of the entrepreneurial interest in the projects is owing to CDM, and several of them may not come up in absence of CDM. There may be other barriers as well, besides economic barrier, especially for mini and micro hydro projects. In case of P-CDM, to establish additionality of a POA, it needs to be proved that in absence of P-CDM, the measure will not be implemented, or a mandatory policy / regulation will not be enforced. Alternatively, that the POA will lead to greater level of enforcement of the mandatory policy / regulation.
ii. **Coordinating Entity, Programme Design, and Management and Operational Arrangements:** These are same as in the case of MSW and relevant sections in the MSW part can be referred for this.
iii. **Methodology:** Existing methodologies for renewable energy can be used for P-CDM as well. Although covering one type of projects will make it simple to design as well as monitor the programme, it may be possible to include more than one type of projects also in one P-CDM programme. This is relevant in cases where projects are very small in nature and only one type may not provide enough incentive for CDM implementation.

iv. A list of approved methodologies for Renewable Energy is attached as Table 18a and Table 18b.

Table 18a. Existing large scale CDM Methodologies for Renewables and Their Application (as of 30 Sept 2009)

Biomass: (not applicable for non-renewable biomass, EB21)	Projects
AM7 Analysis of the least-cost fuel option for seasonally-operating biomass cogeneration plants	0
ACM3 Emission reduction through partial substitution of fossil fuels with alternative fuels in cement manufacture(ver 7.2)	24
ACM6 (ver 9)Grid-connected electricity from biomass residues (includes AM4 & AM15)	271
AM36 (ver 2.2): Fuel switch from fossil fuels to biomass residues in boilers for heat generation	17
AM42 (ver 2): Grid-connected electricity generation using biomass from newly developed dedicated plantations	2
AM82: Use of charcoal from planted renewable biomass in the iron ore reduction process through the establishment of a new iron ore reduction system	0
Zero emission renewables	
ACM2 (ver 10)Grid-connected electricity generation for renewable sources (no biomass)	1411
AM26 (ver 3) Zero-emissions grid-connected electricity generation from renewable sources in Chile or in countries with merit order based dispatch grid	7
AM19 (ver 2) Ren. Energy project replacing the electricity of one single fossil plant (excl. biomass)	0
AM72 (ver 1.1) Fossil Fuel Displacement by Geothermal Resources for Space Heating	0

Source: UNEP Risoe CDM Pipeline, dated 1 Oct 2009

Table 18 b. Small scale CDM Methodologies for Renewables and their Application (as of 31 Sept 2009)

Small-scale CDM Methodology	**Projects**	**PoAs**
AMS-I.A. Electricity generation by the user	31	1
AMS-I.B. Mechanical energy for the user	4	1
AMS-I.C. Thermal energy production with or without electricity	326	3
AMS-I.D. Renewable electricity generation for a grid	1504	1
AMS-I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User	5	

Source: UNEP Risoe CDM Pipeline, dated 1 Oct 2009

6. Conclusions

P-CDM was designed to reform CDM, to lower the CDM related transaction costs, to enable more countries and marginal communities benefit from CDM, and to encourage public sector and private sector to coordinate programmes that could bring about transition toward low GHG emissions involving large number of small activities. Since the CMP1 in 2005 decided that programme of activities to implement stated policies or goals can be registered as a single CDM project activity in 2005, there have been some progresses in making P-CDM operational. The CDM EB issued the guidance and procedures for P-CDM implementation first time in June 2007. Since then, the EB has revised some rules to address some of the barriers to P-CDM implementation. These include allowing use of more than one methodology under a programme, setting time limit for identification of erroneous CPA inclusion, revising the rules for debundling under a PoA, revising many small scale methodologies for application to CPAs, asking new CDM methodologies to indicate whether and how they can be applied to a PoA, and issuing templates for PoA DD and CPA DD. By the end of November 2009, 18 PoAs from 12 countries have been submitted to the UNFCCC, of which 2 has been registered, and others are under validation process.

Many countries have shown their strong support for P-CDM. One strong indication is that since 2005, every annual United Nations Climate Conference has included some decisions regarding P-CDM implementation and encouragement to countries to submit programmes, and suggestions to the CDM EB to establish and improve the rules and procedures. Although the negotiations about Post-2012 international climate regime are still going on, most countries want to retain CDM, and make it a more effective market instrument to stimulate private sector investment for emission reduction activities in developing countries, while enabling developing countries to contribute to climate change mitigation without causing negative impacts on their economic development and poverty elimination.

Sri Lanka, despite lack of fossil fuel reserves, is increasingly shifting to fossil fuels to meet her growing energy demand. It can be expected that most of the country's increased energy demand will be met from imported fossil fuels. It can be moderated through measures involving energy efficiency improvement and increased use of renewable. P-CDM can be helpful in this by catalysing the necessary financing and access to technology. P-CDM thus has potential to benefit Sri Lanka by supporting energy efficiency improvement, renewable energy development, forest protection, and wastewater and waste treatment. The case studies on P-CDM for municipal solid waste composting and renewable energy use in Sri Lanka indicate that there is significant potential to use P-CDM in these two sectors in Sri Lanka. Methodologies are available, the EB has simplified rules and procedures, and there are 18 P-CDM projects already submitted to the UNFCCC, which provide good example for preparation of similar programmes for Sri Lanka. P-CDM can provide access to finance as well as technology and determining type of activities and sectors from the perspective of environmental impacts and sustainable benefits are the exclusive rights of the national governments. Hence, to use P-CDM to realise the potential for energy efficiency improvement, renewable energy development, forest protection, and waste water and solid waste treatment, governmental guidance may be needed on national criteria and procedures for P-CDM project approval (by DNA), role of public sector and private sector for taking lead as coordinating entities, and sharing of costs and benefits.

Sri Lankan government has already sets up a carbon fund, which can be a good platform to move forward in this direction. The Sri Lanka Carbon Fund, as a partnership fund between Ministry of Environment and Natural Resources and private sector, can advise relevant agencies in P-CDM implementation, help pool resources and expertise in the country, and support development of some programmes in the municipal solid waste sector and renewable energy sector. Both sectors are good candidates for P-CDM implementation in the country; in case of municipal solid waste sector, the experience from the Pilisaru programme can be very helpful. The renewable energy sector is also a good candidate as one of the P-CDM projects from Sri Lanka since most of the CDM projects submitted so far by Sri Lanka are renewable energy projects and there are opportunities for similar small projects. Renewable energy activities are also relatively easy to monitor and their additionality easy to demonstrate.

A good programme design is key to success of P-CDM. The programmes need to be properly designed to cover the programme coordinating costs, offer the necessary technical, financial and CDM support to each CPA implementer, and provide incentives for participation of more CPA partners. Role of coordinating entity is critical in designing as well in P-CDM implementation and hence coordinating entity needs to be carefully selected and provided necessary support to carry out their work smoothly.

References:

A. van der Wel, V. Post (2007), *Solid Waste Management in Sri Lanka: Policy & Strategy*, CORDAID Tsunami Reconstruction 4, Project Report, December 2007

Amarawickrama, H. A., Hunt, L. C. "Electricity demand for Sri Lanka: A time series analysis", *Energy* 33 (2008) 724–739

Asia Development Bank (ADB), 2006: *Urbanization and Sustainability in Asia - Case Studies of Good Practice*, Roberts, B. and Kanaley, T. (ed.), Published 2006. Printed in the Philippines. Available at: http://www.adb.org/Documents/Books/Urbanization-Sustainability/urbanization-sustainability.pdf

CIA (Central Information Agency, USA), World Factobook, available at https://www.cia.gov/library/publications/the-world-factbook/

Energy Forum, 2008, "Report of the National Workshop on Municipal Solid Waste Composting" Organized under the contract National forum on Solid Waste Management in Sri Lanka Within the framework of the LOGO South country programme Sri Lanka" Held at the Amaya Reef Hikkaduwa, Galle, Sri Lanka Held on November 20-21-22, 2008, Organized by Energy Forum.

Fenhann, J. W., UNEP Risoe Centre CDM Pipeline, available at www.cdmpipeline.org

Hayashi, D., Michaelowa, A., Dransfeld, B., Niemann, M., Marr, M.A., Oppermann, K., Neufeld, C.S. (2009), P*oA Blueprint Book - Guidebook for PoA coordinators under CDM/JI*, KfW Bankengruppe, First printing May 2009, Frankfurt am Main KfW Bankengruppe.

Jayasinghe, P., (2005): *The Biomass Energy Sector in Sri Lanka – Successes and Constrains*. The proceeding for a three-day conference that was held in August 2005 in Colombo, Sri Lanka

on the theme of “Issues for Sustainable Use of Biomass Resources for Energy.” The Author is president of the Bio Energy Association of Sri Lanka.

McEachern, M., Hanson, S., “Socio-geographic perception in the diffusion of innovation: Solar energy technology in Sri Lanka”, *Energy Policy* 36 (2008) 2578– 2590

Ministry of New and Renewable Energy, Government of India, *Framework for Programmatic CDM Projects in Renewable Energy*,

Ministry of Power and Energy, Government of Sri Lanka, *National Energy Policy and Strategies of Sri Lanka*, Oct 2006

Mizuno, Y. (ed.) (2009): *CDM in Charts*, ver.8.0 July 2009. Institute for Global Environmental Strategies (IGES). Available at: http://enviroscope.iges.or.jp/modules/envirolib/upload/835/attach/charts.pdf

Pereraa, K.K.C.K., Rathnasiria, P.G., Senaratha, S.A.S., Sugathapalaa, A.G.T., Bhattacharyab, S.C., Salamb, P. A., “Assessment of sustainable energy potential of non-plantation biomass resources in Sri Lanka”, *Biomass and Bioener*gy 29 (2005) 199–213

Priyantha D.C. Wijayatunga, Kanchana Siriwardena, W.J.L.S. Fernando a, Ram M. Shrestha, Rahula A. Attalage, Strategies to overcome barriers for cleaner generation technologies in small developing power systems: Sri Lanka case study, Energy Conversion and Management 47 (2006) 1179–1191.

Sri Lanka Central Environmental Authority (2004), *Technical Guidelsines on Municipal Solid Waste Management*, Prepared by: Hazardous Waste Management Unit, Environmental Pollution Control Division, Central Environmental Authority, 2004

Sri Lankan Ministry of Environment and Natural Resources (MENR), 2005, Database of Municipal Solid Waste in Sri Lanka

Vanniarachchy, S.A., 2009, *Status and Potential of Municipal Solid Waste in Sri Lanka*, June 2009

Wijayatunga, P. D.C., Fernando, W.J.L.S., Shrestha, R.M., “Greenhouse gas emission mitigation in the Sri Lanka power sector supply side and demand side options”. *Energy Conversion and Management* 44 (2003) 3247–3265

World Bank, What a waste: Solid Waste Management in Asia (May 1999), Urban Development Sector Unit, East Asia and Pacific Unit, World Bank, Washington D.C. Available at: http://siteresources.worldbank.org/INTEAPREGTOPURBDEV/Resources/whatawaste.pdf

Annex I. Sources of Important Information for P-CDM Implementation

1. List of P-CDM projects that have been submitted to the UNFCCC: http://cdm.unfccc.int/ProgrammeOfActivities/Validation/index.html[12]
2. List of P-CDM projects that have been registered at the UNFCCC: http://cdm.unfccc.int/ProgrammeOfActivities/registered.html
3. Forms/templates for P-CDM projects: http://cdm.unfccc.int/Reference/PDDs_Forms/PoA/index.html

Forms - Programme of Activities	Format		Version	EB	Annex
CDM-PoA-DD-SSC-AR - Programme of Activities Design Document form for SSC-AR project activities	PDF (188 KB)	MS Word (196 KB)	01	36	30
CDM-CPA-DD-SSC-AR - CDM Programme Activitiy Design Document form for SSC-AR project activities	PDF (191 KB)	MS Word (217 KB)	01	36	31
CDM-PoA-DD-AR - Programme of Activities Design Document form for A/R project activities	PDF (187 KB)	MS Word (148 KB)	01	36	28
CDM-CPA-DD-AR -CDM Programme Activity Design Document form for A/R project activities	PDF (184 KB)	MS Word (125 KB)	01	36	29
CDM-PoA-DD - Programme of Activities Design Document form	PDF (101 KB)	MS Word (120 KB)	01	33	41
CDM-CPA-DD - CDM Programme Activitiy Design Document form	PDF (93 KB)	MS Word (108 KB)	01	33	42
CDM-SSC-PoA-DD - Small-Scale CDM Programme of Activities Design Document form	PDF (105 KB)	MS Word (120 KB)	01	33	43
CDM-SSC-CPA-DD - Small-Scale CDM Programme Activity Design Document form	PDF (97 KB)	MS Word (111 KB)	01	33	44

4. The CDM EB guidance on P-CDM: http://cdm.unfccc.int/Reference/Guidclarif/PoA/index.html

[12] To get the whole list, as the first P-CDM project was submitted in December 2007, so putting any before date that (for example: typing 01/07/2007) in the Period for Comments (open date) from _____.

Guidance - Programme of Activities (PoA)	Version	EB	Annex	Paragraph
Guidance on programme of activities (85 KB)	-	35	-	15
Payment of a registration fee for a programme of activities (PoA) (57 KB)	-	33	-	60
Eligibility of activities under the CDM (86 KB)	01	33	-	30
Guidance for determining the occurrence of de-bundling under a programme of activities (PoA) (141 KB)	02	47	32	-
Guidance on the registration of a programme of activities as a single CDM project activity (77 KB)	02.1	32	38	-

5. The CDM EB decisions on P-CDM activity implementation procedures

http://cdm.unfccc.int/Reference/Procedures/index.html

Procedures - Programme of Activities	Version	EB	Annex
Registration of a programme of activities as a single CDM project activity and issuance of CERs for a PoA (167 KB)	03	47	29
Procedures for review of erroneous inclusion of a CPA (108 KB)	01	47	30
Procedures for approval of the application of multiple methodologies to a programme of activities (104 KB)	01	47	31