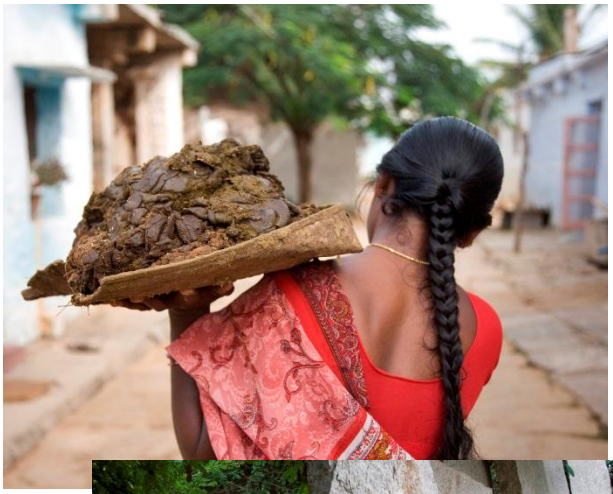
MRV Manual for CDM Programme of Activities

Navigating the monitoring, reporting and verification pitfalls of programmatic CDM project activities



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Lakshmi Devamma, a villager in Chintamani Taluk in India, where the Bagepalli CDM Biogas Programme is in operation, now collects cow dung instead of firewood for cooking.

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List of Abbreviations

CDM	Clean development mechanism
CDM EB	CDM Executive Board
CER	Certified emission reductions
CME	Coordinating / managing entity
CPA	Component project activity
CPA-DD	Component project activity design document
DNA	Designated National Authorities
DOE	Designated Operational Entity
FSC	Forest Stewardship Council
MRV	Monitoring, reporting and verification
PDD	Project design document
PoA	Programme of activities
PoA-DD	Programme of activities design document
QA/QC	Quality assurance / quality control
QMS	Quality management system
RACI	Responsible, Accountable, Consulted and Informed
SSC	Small-scale
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard

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Introduction

1 INTRODUCTION

This manual is designed to help readers navigate the pitfalls of preparing a Monitoring, Reporting and Verification (MRV) system for Programme of Activities (PoAs) under the Clean Development Mechanism (CDM). Although the focus of this guidebook is the CDM, the reader will find that many of the recommendations and findings can also be transferred to other offset programmes.

Programme of Activities have been seen as one of the ways to scale up climate change mitigation activities as well as the generation of carbon credits. Since its launch there has consequently been a steady growth of registered PoAs. Nonetheless, there have only been a few that have made it to issuance as yet, whilst at the same time the overall number of CDM Component Project Activity (CPA) inclusions by PoAs has been variable. This manual looks in detail at the lessons learned with CDM PoAs so far and examines the different pitfalls. The manual also takes into account experiences from other schemes with programmatic approaches.

Target audience

1.1 Target audience - how can the manual be used

This manual is aimed to provide information to all stakeholders within the carbon market that are interested in the process of implementing a PoA or interested in buying their credits from a PoA. It follows up on the CDM PDD Guidebook: Navigating the Pitfalls (1) and provides valuable information to among others:

- the coordinating / managing entity (CME) that has set up the PoA and is managing the PoA,
- other parties than the CME participating in CPAs;
- buyers of carbon credits;
- Designated Operational Entities (DOE); and
- Designated National Authorities (DNA)

It is also recommended that this manual is read together with the CME Starter Kit - A Manual for Management systems at coordinating/managing entities (CMEs) (2) and the Sampling Manual - A guide to Sampling under the CDM with specific focus to PoAs (3).

What are PoAs?

1.2 What are Programme of Activities (PoA)

The definition for a Programme of Activities (PoA) which is used by the CDM Glossary (4) is as follows:

> 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 GHG removals by sinks that are additional to any that would occur in the absence of the PoA, via an unlimited number of CPAs.

The origin of PoA lays in a political decision at the COP in 2005 when the CDM Executive Board had requested from the Parties clarification on whether a PoA could be seen as an individual project that should be covered under a similar arrangement as with the bundled project approach or whether it should be excluded from the CDM. At the same time the market has been pushing for a more pragmatic approach to the design of bundled projects in particularly in relation to the starting time of the individual projects within the bundle. Both bundled projects and PoAs aim to lower the entry threshold of individual project activities which individually would be too small, not able to ascertain the required knowledge, or the financial liquidity needed for the implementation of individual CDM project activities. By bringing similar projects together under one PoA, each individual project could participate in the CDM whilst at the same time efficiencies could be obtained by increasing the overall size and resources, in doing so lowering the burden for each project activity individually within the PoA.

Like stand-alone CDM projects, PoAs have an equivalent version within the traditional Company/Product Certification world. Where CDM project validation/verification can be compared to the concept of certifying Companies/Products, PoA draws its parallels with Group Certification in the Company/Product Certification world. Under the Group Certification a number of identical companies are assessed as one in order to reduce the overall costs of certification and thereby lowering the entry level of companies to becoming certified. Although the terminology and the frameworks are different, it was found that much of the early experience with Group Certification is also found within the development/implementation of today's PoAs, and as such some of the solutions applicable to Group Certification are relevant for today's pitfalls of the CDM Programme of Activities.

Although PoAs and Group Certification are designed to make it easier for the individual participant, it should be noted that under the PoA/Group Certification there remains the need to assure that all participants fully comply with the methodology/standard. For example, even if the check on additionality may be done at PoA level, there will be a need to demonstrate that each single CPA meets the PoA eligibility criteria which ensures that the arguments for demonstrating additionality of the PoA are also valid for each CPA. Failure to be able to demonstrate this will lead to a failure in achieving a successful validation/verification or certification.

What is MRV?

1.3 What is Monitoring, Reporting and Verification (MRV)

Monitoring, Reporting and Verification (MRV) is a widely used terminology both within and outside the Climate Change community. MRV originates from within the principles of quality assurance and system management and can be related back to the quality management circle of plan, do, check and act (Figure 1), in which the MRV (check & act) ensures that the overall system is continuously subject to an internal and external improvement process.

Figure 1: Quality management system principles

In the climate change negotiations there is sometimes a different usage for the terminology of MRV, in some of the negotiation text MRV stands for Measuring, Reporting &Verification. Nonetheless, the more common use of MRV is Monitoring Reporting & Verification. This is because the word "monitoring" represents more a system in which measurements are being made, where the word "measuring" relates generally only to the actual measuring itself. Within this publication MRV will always refer to Monitoring, Reporting &Verification.

The underlying concept of MRV is that after a project has been designed and implemented, one assesses how well the project performs and if all planned aspects have been implemented as originally was assumed. This performance check occurs against a set of parameters for which values are reported and an assessment can be made on whether the observed value is below, above or the same to the original value at the time of planning or previous monitoring moment.

Example 1: Example of Monitoring

A project activity wants to reduce the amount of energy used by the project. The original usage by the project was 1000 kW over a period of a month, the consequent months the usages is monitored and the project observes values of 990 kW, 980kW, 1000 kW. The systematic observation of the amount of energy used at the end of the month is considered monitoring.

At a result of the monitoring the project is able to turn a predicted outcome (pre project activity) in to a proven fact (post implementation of activity). By reporting and verifying the outcome of the monitoring, the project is able to adjust its new predictions of future performance, which forms the basis of the Quality Management Circle.

The concept of monitoring and reporting is generally well understood and considerable efforts are put in place to undertake these activities. The verification activity on the other hand is not always fully understood within the MRV. The verification process constitutes the assessment of the observed value against the expected value at the time of planning. Verification thus intends to check that a project meets its objective. Consequently, the verification process in principle signals the need to take action or not. This concluding process is often missed within the MRV system

where projects monitor and report all different parameters, but fail to conclude if the monitoring provides them with the answers that they need in order to determine that the project is performing well or not.

Example 2: Monitoring the wrong parameter

In an energy efficient lighting project (distribution of CFLs) the project participants monitor the number of CFLs being purchased and distributed to their partners. This is the natural parameter to monitor for the project participant as this parameter is directly related to the project's financials. However, the parameter needed to determine the project's emission reductions are the number of CFLs actually being installed in household. Due to stockpiling at the distribution partners and in households, the number of CFLs purchased is not the same as the number of CFLs actually installed in households.

In order to identify what to monitor, one needs to identify the parameters that determine if a project is performing well or not. Having identified those parameters, only those parameters need to be included in the MRV. Where the MRV does not allow making such a conclusion, one could question whether the right actions/parameters have been monitored and reported on. This issue and the impact on the work that has to be done within a PoA will be discussed in more details in the following chapters.

Comparison with other standards having programmatic approaches

2 MRV - GENERAL FRAMEWORK

2.1 Requirements for MRV in other programmes

As already outlined earlier the CDM is not unique in its usage of the concept of PoAs, both other offset programmes as well as other environmental programmes use similar principles. Table 1 gives an overview of a number of other offset, environmental and quality management programmes that also have programmatic approaches in their programme, each with a short background on what the programme aims to achieve.

Table 1: Other certification/offset standards applying the concepts of PoAs

Verified Carbon Standard (VCS) Offset Programme	• Carbon offset programme developed in 2007 for the voluntary carbon market to provide assurance that projects validated and verified under this programme have demonstrated to achieve real quantified emission reductions. • "Grouped projects are projects structured to allow the expansion of a project activity subsequent to project validation. Validation is based upon the initial project activity instances identified in the project description. The project description sets out the geographic areas within which new project activity instances may be developed and the eligibility criteria for their inclusion. New instances meeting these pre-established criteria may then be added to the project subsequent to project validation, as set out in the sections below. These sections provide the requirements for all grouped projects, which are further expanded upon in VCS document AFOLU Requirements. VCS methodologies may also provide additional specifications for grouped projects." (5)
Gold Standard (GS) Offset Programme	• The programme was developed to allow the generation of quality carbon credits, where originally the programme was designed to be an extension of the CDM and address specific co-benefit activities not capture or assessed under the CDM the programme. It now has both a CDM and Voluntary Market standard. Both standards allow PoAs and follow the same concept as the CDM using the same terminologies abbreviations although its definition for a PoA differs from that of the CDM: • "'Programme of Activities (PoA)' means a set of interrelated measures to reduce GHG emissions or result in net anthropogenic greenhouse gas removals by sinks, applied within a designated area defined in the baseline methodology". (6)

Forest Stewardship Council (FSC)

Environmental Product Certification Programme

- Certification standard introduced in the 1990's to combat the increasing deforestation of tropical forest. The standard allows the certification of the management of forest in accordance with 10 Principles and Criteria as well as the products that originate from these forests. Companies can elect to only certify a single forest domain or a group of forests or forest companies.
- Group certification is designed to help reduce the costs of certification - the cost per group member is much cheaper than if they applied to have one certificate each.
- Group certification is a way for more than one forest operation to be certified under a single FSC certificate. The certificate is held by one organization or person on behalf of a group of forest owners or managers who agree to participate in the group.

ISO 14001

Environmental Management Sytem Certification Programme

- Certification standard developed by ISO for environmental management, with the objective to effectively reduce the environmental impacts of a company that has undergone ISO 14 001 certification. As part of the certification the company commits itself to make an inventory of all its environmental impacts and reduces the negative impacts over time.
- Group certification is designed to help reduce the costs of certification.

ISO 9001

Quality Management System Certification Programme

- Certification standard developed by ISO for quality management, with the objective to effectively manage the operations of the company resulting in a consistent delivery of services or products in line with the company's objectives and policies.
- Group certification is designed to help reduce the costs of certification.

Specific elements of programmatic approaches

Although each of these programmes has its own particularity and also has their own requirements, one can compare them against how they have organised their principles of operation. Table 2 compares the different schemes against the following elements:

- **Objective to reduce costs**: Has the programme introduced the programmatic concept in order to reduce the overall costs of the individual participant who otherwise would not have access to obtain certification?
- **One legal entity**: Does the programme require that there is one legal entity which represents the whole programme and who has the ultimate responsibility to assure that all the members within the programme comply with the rules and regulations of the specific programme.
- **Defined responsibilities**: Does the programme require that under the management system the co-ordinator and the other participants have defined responsibilities that assure that collectively they result in meeting all the requirements of the programme.

- **Suspension of programme**: Does the programme require the verifier to suspend verification of the whole programme if it finds that during its assessment one of the parts of the programme is not complying with the requirements of the programme?
- **Assessment based on sampling**: Is the verifier assessing the programme able to assess the effectiveness of the system based on sampling the management system of the programme, and can the verifier use the findings of this sampling as a basis of its verification opinion on the whole programme?
- **Does the programme co-ordinator have to check all the programme participants:** Does the standard require that the programme co-ordinator as part of its quality control and programme operating procedures has to assess the compliance of each programme participant on a regular/annual basis?

Table 2: Overview on the specific elements of programmatic approaches

	CDM	VCS	GS	FSC	ISO 14001	ISO 9001
Objective to reduce costs	✓	✓	✓	✓	✓	✓
One legal entity	✓	✓	✓	✓	✓	✓
Defined responsibilities	✓	✓	✓	✓	✓	✓
Suspension of programme	✗	✗	✗	✓	✓	✓
Assessment based on sampling	✓	✓	✓	✓	✓	✓
Does the programme co-ordinator have to check all programme participants	✓	✓	✓	✓	✓	✓

One can find from Table 2 that many of these elements are covered in the different programmes, and as such PoA developers are encouraged to examine in more detail these programmes as the experience of these programmes can be valuable when designing a PoA. One aspect that differs between traditional group certification and PoAs in different offset programmes is that the programme does not get suspended if there is any non-compliance at the CPA or PoA level. Nonetheless, a non-compliance at a CPA may still lead to the fact that no emission reductions are issued to the whole PoA for a particular monitoring report. This is similar to the fact that a group manager loses its certificate in case one of the group companies does not comply with programme requirements under a more traditional certification programme.

2.2 Requirements for MRV applicable to CDM Programme of Activities

This section summarises the main requirements for monitoring, reporting and verification of CDM PoAs. Most of the MRV requirements are the same as for stand-alone CDM project activities, and this section does not aim to go into detail of all MRV requirements, but focuses on the requirements that a PoA developer will have to pay specific attention to.

2.2.1 Methodology specific requirements

Each CDM project activity is linked to a specific methodology or several methodologies. A monitoring plan specific to the proposed CDM project needs to be

Specific methodology requirements for PoAs

developed based on the monitoring requirements prescribed by the applied methodology(ies). Over the past 10 years considerable experience has been built within monitoring. We have seen that as such the requirements for monitoring in CDM methodologies and the specific monitoring plans contained in the Project Design Documents (PDDs) of CDM project activities have evolved from a single paragraph that states that all is being monitored to a detailed plan with clearly defined requirements for the individual parameters.

In principle, CDM methodologies are applied in the same way to a PoA as to a stand-alone CDM project activity. This is particularly true for large scale methodologies. However, when looking at the small scale methodologies, one notices that several small scale methodologies have specific additional requirements when applied by a PoA (Table 3). This is partly due to the fact that small scale methodologies contain simplifications which may have a considerable negative impact on the overall environmental integrity when deployed in a large scale set up as potentially possible in a PoA. Hence, these additional requirements focus on the mitigation of any possible negative impacts as mentioned above. These requirements typically also increase the necessary data collection. Also some large scale methodologies contain additional requirements applicable to PoAs.

Table 3: Methodologies with specific PoA requirements

Small scale methodology	Large scale methodology
Renewable energy	
AMS-I.A, AMS-I.B, AMS-I.C, AMS-I.D, AMS-I.E, AMS-I.F, AMS-I.J, AMS-I.K	ACM0002
Energy distribution / Energy demand	
AMS-II.A, AMS-II.B, AMS-II.C, AMS-II.D, AMS-II.E, AMS-II.F, AMS-II.G, AMS-II.H, AMS-II.I, AMS-II.K, AMS-III.AG, AMS-III.AH, AMS-III.AM, AMS-III.AN, AMS-III.AR, AMS-III.AV	-
Fugitive emissions from fuel	
	AM0009
Waste handling and disposal	
AMS-III.B, AMS-III.D, AMS-III.E, AMS-III.F, AMS-III.I, AMS-III.J, AMS-III.AF, AMS-III.AO	ACM0001, ACM0010, ACM0014, ACM0022
Chemical/manufacturing industries	
AMS-III.K, AMS-III.L, AMS-III.M, AMS-III.N, AMS-III.P, AMS-III.Q, AMS-III.Z, AMS-III.AC, AMS-III.AS, AMS-III.BG	-
Transport	
AMS-III.S, AMS-III.AA, AMS-III.AY, AMS-III.BC	-

Methodologies not allowed to be used in PoAs

Hence, although some methodologies have special requirements if applied in a PoA, CDM methodologies originally developed for stand-alone CDM project activity may be applied by PoAs. However, some small scale methodologies are for the same reasons as described above not applicable to PoAs at all (Table 4).

Table 4: Small scale methodologies not allowed to be used in PoAs

Renewable energy	*Transport*
AMS-I.G, AMS-I.H	AMS-III.T
Waste handling and disposal	*Fugitive emissions from fuel*
AMS-III.AJ	AMS-III.W
Chemical/manufacturing industries	
AMS-III.O, AMS-III.V, AMS-III.AD, AMS-III.BD	

2.2.2 Combination of methodologies

Combining methodologies in PoAs

As many PoAs are broad in nature, PoAs are more likely than stand-alone CDM project activities to apply more than one technology/measure and/or methodology. On the other hand, there are specific requirements that apply for a PoA which intends to apply more than one methodology. There are requirements relating to

- permitted combinations of methodologies
- the real case CPAs that need to be submitted at the time of requesting registration of the PoA

There are specific CDM requirements with regard to the combinations of methodologies that are permitted and the combinations which first require an assessment of cross-effects and possibly approval by the CDM EB before being applied in a PoA.

Combination of large scale methodologies or combination of a large scale methodology with a small-scale methodology(ies)

The combination of large scale methodologies or the combination of a large scale methodology with a small-scale methodology must be explicitly permitted in the large-scale CDM methodologies that are applied by the PoAs. If a combination is not explicitly permitted, a revision of the methodology must be first requested and approved.

Combining small-scale methodologies

PoAs applying a combination of methodologies for a PoA are eligible where it is demonstrated that there are no cross effects between the technologies/measures applied. In particular, the combinations of approved methodologies listed in section F of the General guidelines to SSC CDM methodologies (5) may be applied without further assessment of cross effects. Other combinations may be applied as long as potential cross effects are analysed by PoA developers, and the cross effect analysis is validated by a DOE. Where potential cross effects do exist, the CME shall propose methods to account for such cross effects. It must be noted that the methods to account for such cross effects require approval by the CDM EB prior to registration of the PoA, thus requiring that a deviation request is submitted as part of the validation of the PoA.

For PoAs applying a combination of technologies/measures and/or methodologies for a PoA, there are also specific requirements with regard to the number of real case CDM Component Project Activity Design Documents (CPA-DDs) that need to be available at the time of commencing the validation of a PoA or requesting the registration of a PoA. In cases where the real case CPA-DDs available at the time of the publication of the Programme of Activities Design Documents (PoA-DD) for global stakeholder consultation do not cover all generic CPA types, at least one real case CPA-DD corresponding to at least one of the generic CPA types needs to be provided. The real case CPA-DDs for each of the remaining generic CPA types may only be provided at the time of request for registration of the PoA or after the registration of the PoA. In the latter case, the real case CPA-DD needs to be provided for approval by the CDM EB using the process of requesting CDM EB approval of a post registration change process in accordance with the CDM project cycle procedure (6).

Example 3: PoA implementing efficient cookstoves and water purification technologies

A PoA implementing efficient cookstoves and water purification technologies may have CPAs in which only efficient cookstoves are distributed to households, while in other CPAs only water purification technologies are distributed and finally in the remaining CPAs both efficient cookstoves and water purification technologies are distributed. For this type of PoAs, a generic CPA will have to be described for each type of CPA and part II of the PoA-DD will have to be repeated and completed for each generic CPA type.

The PoA may be submitted for registration including a real case CPA-DD distributing efficient cookstoves only. However, before CPAs distributing water purification technologies and/or CPAs with both efficient cookstoves and water purification technologies can be included to this PoA, the first CPA distributing water purification technologies and/or CPAs with both efficient cookstoves and water purification technologies must be approved by the CDM EB.

2.2.3 Monitoring plan

Monitoring plan for PoAs

The CDM project standard (7) requires that project participants shall develop a monitoring plan in the PDD for monitoring of all parameters used to calculate baseline, project, and leakage emissions as well as other relevant parameters required by the applied methodology. The monitoring plan shall among others define

- the operational and management structure to be put in place to implement the monitoring plan;
- the definition of responsibilities and institutional arrangements for data collection and archiving to ensure that data monitored and required for verification and issuance is kept and archived electronically for two years after the end of the crediting period or the last issuance of CERs, whichever occurs later;
- the quality assurance and quality control (QA/QC) procedures;

- the uncertainty levels, methods and the associated accuracy level of measuring instruments to be used for various parameters and variables; and
- the specifications of the calibration frequency for the measuring equipment.

Different to stand-alone CDM project activities, a monitoring plan for PoAs must be developed at two levels.

A generic monitoring plan for a generic CPA (or each type of generic CPAs in case the PoA comprises different types of CPAs) must be described in part II of the PoA-DD form. This monitoring plan shall list the relevant parameters to be monitored and describe the QA/QC procedures to be applied by the CME. However, this monitoring plan will typically not include any details on, for example, the specific accuracy level of measuring instruments and the specifications of the calibration frequency. The generic monitoring plan may only contain minimum requirements in this regard, such as the minimum accuracy class of a measuring instrument and/or the minimum calibration frequency.

The monitoring plan included in the CPA-DD of a specific CPA describes the monitoring parameters to be monitored for the specific CPA and will include the details on the measuring instruments. It will also adapt the generic monitoring plan described in the PoA-DD to the specifics of the CPA.

Elements to be included in the different level of the PoA and CPA monitoring plans

Table 5 Elements to be included in generic and CPA specific monitoring plan

Monitoring plan elements	Generic monitoring plan	Specific CPA monitoring plan
• *Operational and management structure to be put in place to implement the monitoring plan*	• Description of operational and management role of CME and identification of the role of other entities than the CME.	• Identification of all other entities involved in the specific CPA (in addition to the CME) and their roles
• *Definition of responsibilities and institutional arrangements for data collection and archiving*	• Definition of the responsibilities of the CME	• Definition of the responsibilities of all other entities involved in the specific CPA
• *Quality assurance and quality control (QA/QC) procedures*	• Description of QA/QC procedures and QA/QC role of the CME	• QA/QC role of other entities involved in the specific CPA
• *Uncertainty levels, methods and the associated accuracy level of measuring instruments to be used for various parameters and variables*	• Minimum requirements in terms of accuracy of measuring instruments to be used	• Accuracy level of specific of measuring instruments to be used in the specific CPA
• *Specifications of the calibration frequency for the measuring equipments*	• Minimum requirements for calibration of measuring equipment	• Calibration frequency of specific measuring equipment to be used in the specific CPA

Depending on how a PoA is organised, the responsibilities and institutional arrangements for data collection may for some PoAs be defined in the generic monitoring plan and apply to all CPAs, while in other PoAs the responsibilities and institutional arrangements for data collection are defined specifically for each CPA. Neither the CDM project standard (7) nor the standard for Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (8) specify how responsibilities and institutional arrangements for data collection need to be defined. As such, PoAs developers and implementors may define responsibilities and institutional arrangements for data collection as found suitable for the specific PoA. Nonetheless, as shown in later section of this manual, a clear definition of responsibilities and the institutional arrangements for data collection is essential for a successful implementation of a PoA.

2.2.4 Monitoring report

Monitoring report for the PoA

After the project is implemented project participants shall provide information on how data and parameters have been monitored for all parameters required by the applied methodology and the registered monitoring plan for the monitoring period in question.

In accordance with the CDM project standard (7) project participants shall for each parameter:

- Provide the values of the monitored parameter;
- Describe the equipment used to monitor each parameter, including details on accuracy class, and calibration information (frequency, date of calibration and validity), if applicable as per monitoring plan;
- Describe how the parameters are measured/calculated and the measurement and recording frequency;
- Provide and/or identify the source of data (e.g. logbooks, daily records, surveys, etc.);
- Provide the calculation method of the parameter, where relevant;
- Describe the QA/QC procedures applied (if applicable per monitoring plan);
- Provide information about appropriate emission factors, IPCC default values and any other reference values that have been used in the calculation of GHG emission reductions or net GHG removals.

For PoAs the same reporting requirements apply as for stand-alone CDM project activities. However, it must be noted that emission reductions generated by all CPAs of the PoA are to be reported in one single monitoring report[1]. This can potentially result in lengthy and over-complex monitoring reports. As such, it is recommended

[1] At the time of writing this manual, the CDM-EB was evaluating a revision of the rules to allow a CME to have two issuance requests for a PoA for a single monitoring period, thus allowing the CME to group CPAs into two groups and present each group separately for verification and issuance.

All CPAs of the PoA are to be reported in a single monitoring report.

that a PoA applies standardised monitoring plans across all CPAs, so that information can be presented in an easy-to-understand form, such as standardized tables.

The requirement that all CPAs of the PoA are to be reported in a single monitoring report will also have to be considered by the CME when deciding on the cut off dates for monitoring and when selecting the monitoring period which shall be subject to verification. All CPAs with a crediting period covering the monitoring period or part of the monitoring period will have to be included in the monitoring report for that monitoring period.

Figure 2 below illustrates how monitoring reports will - as CPAs are implemented and included to the PoA - have to include information on several CPAs. In the example below the CME may choose to not include emission reductions of CPA 2 in the first monitoring period as the amount of emission reductions generated by the CPA during that monitoring period may only be very small and thus not justifying the costs for reporting and verifying the information for CPA 2. In this case, information on the implementation status of CPA 2 still needs to be included in the monitoring report, but the CME may not provide information on the monitored parameters for this CPA and simply states that no emission reductions will be claimed for this CPA. However, it must be noted that the emission reductions generated by CPA 2 during this first monitoring period will be lost and can not be claimed as part of later monitoring periods.

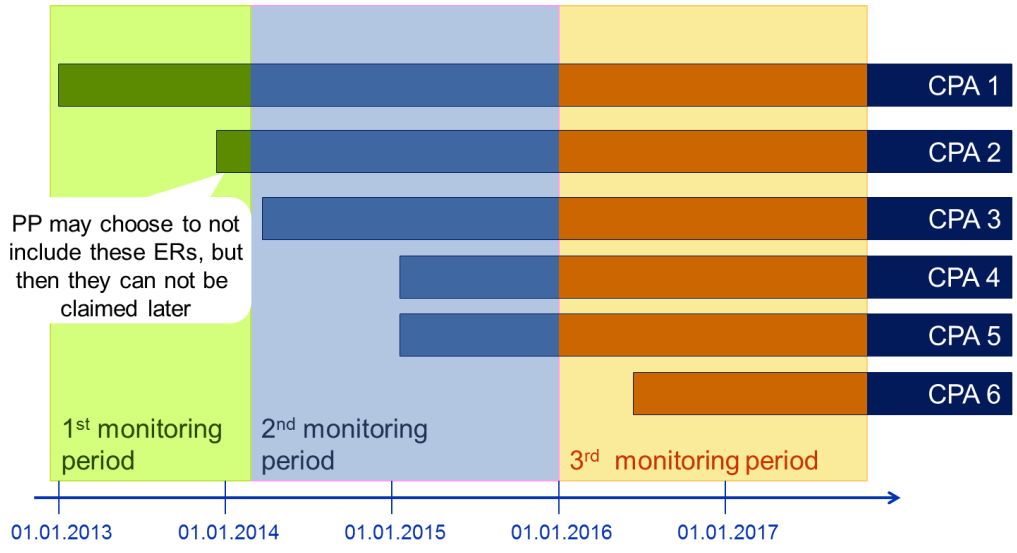

Figure 2: Selecting monitoring periods for the verification of a PoA

2.2.5 Changes to the PoA design

Although not directly related to monitoring and reporting, another key difference between PoAs and stand-alone CDM project activities must be emphasised. A stand-alone CDM project activity may be implemented with a project design different from the project design described in the PDD or the project design may be altered during the project's lifetime. Changes to the project design, such as changes in the effective

Limitations in changing the PoA design post registration of the PoA

output capacity, the addition of component or extension of technology, the removal or addition of one site (or more) of a project activity registered with multiple-sites can be dealt with through a post registration change. Such changes are permitted as long as the change in project design does not adversely impact the applicability and application of the applied methodology, the scale of the project activity or the additionality of the project activity. The current CDM project standard (7), however, does not allow similar design changes to a PoA, and the only design changes permitted for a PoA are the following:

a) Changes to programme boundary to expand geographical coverage or to include additional host countries;
b) Changes to the eligibility criteria under the circumstances indicated in the standard for the Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (8) (e.g. to implement changes decided by the CDM EB if an issue related to environment integrity is identified)
c) Addition of specific case CPA-DDs corresponding to generic CPA-DDs if a PoA includes more than one generic CPA-DD, and if no corresponding specific case CPA-DDs were submitted at the time of request for registration of the PoA
d) Changes to apply the provisions of the most recent versions of the CDM sampling standard (9).

2.2.6 Sampling and surveys

Sampling standard and guidelines

Due to the dispersed nature of many PoAs, sampling and/or surveys are often used in PoAs for the determination of parameter values. As such, although the requirements contained in the CDM sampling standard (9) apply equally to PoAs and stand-alone CDM project activities, the CDM requirements for sampling and surveys are in particular relevant to PoAs.

This manual will not repeat the guidance already provided in the KFW Sampling Manual (3). However, this manual will highlight some of the MRV specific issues that are relevant when sampling and/or surveys are used in PoAs for the determination of parameter values.

Experience with sampling in PoAs has so far raised the following questions and an answer to these questions is provided below:

a) How detailed and elaborated must a sampling plan be for requesting the registration of a PoA or the inclusion of a CPA?
b) How can a single sample plan be applied across CPAs?
c) How shall a CME handle a situation where the sample size estimated in the sample plan does not achieve the required confidence interval and precision?
d) How shall a DOE verify the results from a sample?

a) How detailed and elaborated must a sampling plan be for requesting the registration of a PoA or the inclusion of a CPA?

Looking at the feedback received by the UNFCCC as part of the UNFCCC's completeness checks of PoA registration requests have shown that it is not sufficient that a PoA-DD and the first real case CPA-DD submitted with the PoA only states that sampling plan will be developed in accordance with the CDM sampling standard (9). The PoA-DD, including the information on the generic CPAs to be included in the PoA, need to elaborate on the type of sampling that the CME plans to undertake and how the sample size is to be determined. For each real case CPA, the sample size needs to be determined and included in the monitoring plan for the specific real case CPA.

The PoA will also have to explicitly address whether the PoA may apply a single sample plan across different CPAs. If a PoA wants to apply this option, the PoA needs to describe the criteria that CPAs would have to meet in order to be considered homogeneous and thus suitable for a single sample plan across these CPAs.

b) How can a single sample plan be applied across CPAs?

The CDM sampling standard (9) allows the use of a single sampling plan, i.e. the sampling is done at the PoA level or for a group of CPAs to estimate parameter values. It states: "*the populations of all CPAs in the group are combined together, the sample size is determined and a single survey is undertaken to collect data e.g. if the parameter of interest is the daily usage hours of light bulbs, it may be feasible to undertake a single sampling and survey effort spread across geographic regions of several CPAs when either homogeneity of included CPAs relative to the light usage hours can be demonstrated or the differences among the included CPAs is taken into account in the sample size calculation.*" The sampling standard allows for a single sampling plan for two different situations, i.e. CPAs are homogeneous relative to the parameter of interest or the differences between CPAs relative to the parameters of interest can be taken into account for the analysis of the survey results. The simplest case would be that all the CPAs in the group can be shown to be homogeneous. However, the choice of a single sampling plan does not necessarily mean all the CPAs need to be homogeneous. There can be several CPAs, all following the same plan but the CPAs could be different, or slightly different with respect to certain parameters of interest.

The relevant criteria for applying a single sample plan are in essence the same criteria as a CME would apply to stratify a population in case a stratified sampling approach is used. However, clear guidance on the degree of stratification (how many homogeneous groups) and the definition of homogeneity have not yet been provided by the CDM EB. The below text box lists the aspects that were identified during the 9th CDM Roundtable (a roundtable organized by the UNFCCC Secretariat gathering members of the CDM EB, its panels, project developers and DOEs) and which may be considered by a PoA developer when deciding on stratifying a sample population or determining whether a group of CPAs is sufficiently homogenous for application of a single sample plan.

Aspects to be considered by a PoA developer when deciding on stratifying a sample population

- Technology has comparable input/output characteristics, e.g. CFLs operating on grid electricity;
- Technology is fixed or portable but not both, e.g. portable LED lanterns and LED lamps operating on the grid may have different retention rates during the crediting period;
- Power rating of technologies is comparable, e.g. project CFLs have the rating 8 W, 10 W and 12 W or cookstoves being distributed have the rating 10 kW thermal and 15 kW thermal;
- End-users of technology have comparable socioeconomic conditions (e.g. middle class households);
- Geographic locations of project equipment has negligible impact on the parameter, e.g. biogas digesters installed in colder climates have different output rates than those in warm climates;
- Installation dates of CPAs are not significantly different, e.g. when the retention rates of CFLs are being investigated, it may be possible to show that the commissioning dates of CFLs within the CPAs chosen do not show failure rates of over 5 per cent within the time periods chosen.

c) How shall a CME handle a situation where the sample size estimated in the sample plan does not achieve the required confidence interval and precision?

The CDM sampling standard provides the reliability targets for the sampling effort by the CME. It also requires that if the estimates from the actual samples fail to achieve the targeted minimum levels of precision, additional data collection through supplemental samples need to be undertaken to reach the required level of precision. Although many PoA stakeholders have requested the CDM EB to also accept pragmatic methods, such as applying conservative default values or applying conservative discounts in estimating emission reductions instead of supplemental samples, in case the targets are not met, no such methods are yet generally accepted by the CDM EB and applying such a method would require the prior approval by the CDM EB (through the prior approval of a post registration change, i.e. a temporary deviation from the monitoring plan, in accordance with the CDM project cycle procedure (6).

d) How shall a DOE verify the results from a sample?

The standard for sampling and surveys for CDM project activities and PoAs suggests that when a sampling approach is applied by the project proponents, the DOE may use acceptance sampling to assess the sampling plan of the project proponent. While acceptance sampling (a common quality control technique to determine whether to accept or reject a set of data) is not mandatory to be applied by a DOE, it is a widely used statistical method to assess sampling plans and sampling results and no other form of verification approach is suggested in the CDM sampling standard. However, implementing the acceptance sampling method and performing a field/onsite check of a subsample of the CME's sample may not be viable for a DOE verification/validation

under all circumstances, especially for PoAs which are implemented in a dispersed manner where field/onsite checks involve long travel and thus result in unreasonable transaction costs for verification. Hence, DOEs typically apply other criteria to decide on field/onsite checks for verification in addition to scrutinizing documentary evidence available in the CME's office. These criteria include the volume of emission reductions and the DOE's judgment on the reliability of documentary evidence and the quality and reliability of the CME's monitoring system. In this regard, the objective of the sampling by the DOE is to check the effectiveness of the system and not to determine again the value of the parameter that is being determined through sampling, but to instead confirm that the data provided by the CME is reliable.

2.2.7 Verification of PoAs

Verification of PoA

The requirements for verification of stand-alone CDM project activities apply equally to PoAs. Obviously, verification of PoAs will also have to assess the PoA specific requirements mentioned above. In particular, emission reductions generated by all CPAs of the PoA are to be reported in one single monitoring report and thus all CPAs are jointly subject to verification by the same DOE. Moreover, a DOE having performed validation activities for a PoA (validation of the PoA, inclusion of CPAs, renewal of the PoA, or renewal of crediting period of CPAs) is not permitted to carry out verification of this PoA, even if the PoA is small-scale.

There are also elements in the verification of PoAs that are in addition to the elements typically assessed as part of the verification of a stand-alone CDM project activity. These additional elements are twofold and further described below:

- Much more than in verification of a stand-alone CDM project activity, the DOE needs to assess the management system of the PoA as the CME in a PoA has specific responsibilities and shall develop and implement a management system;
- Since all CPAs of a PoA are presented jointly for verification in one monitoring plan and since in addition some PoAs may apply a single sampling plan across a group of CPAs, there is a level of complexity that is typically not encountered by a DOE in the verification of a stand-alone CDM project activity.

The DOE needs to assess the management system of the PoA to confirm that the CME's responsibilities are adequate and that the management system is implemented.

The CME in a PoA has specific responsibilities, and the standard for the Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (8) requires that the CME shall develop and implement a management system that includes the following:

- A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;
- Records of arrangements for training and capacity development for personnel;
- A procedure for technical review of inclusion of CPAs;
- A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA);

- Records and documentation control process for each CPA under the PoA;
- Measures for continuous improvements of the PoA management system;
- Any other relevant elements.

Much more than in a stand-alone CDM project activity, the CME thus has the responsibilities to check the information provided by the different CPAs before this information is presented to the DOE. This applies both to the inclusion of CPAs where the CME needs to verify that a CPA complies with the eligibility criteria for including a CPA before the CPA is presented to a DOE for inclusion as well as the information provided by a CPA before this information is included in the monitoring report for the PoA and presented to the DOE for verification. The checks by the CME are thus part of the verification process of the information presented for a CPA. As such, and as also required by the standard for the Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (8), the DOE needs to assess that the management system described in the PoA-DD is implemented and effective and thus ensures that information on CPAs has already undergone an initial check by the CME. The results of the DOE's assessment of the CME's management system will influence the level of detail that the DOE will have to apply in its verification. The more a DOE can confirm that the CME's management system is effective and ensures accurate reporting of a PoA's emission reductions, the more a DOE can rely on the information provided by the CME and limit the size of the sample of information that the DOE will have to check in detail. In its assessment of the CME's management system, the DOE should in particular assess and confirm that there is a clear definition of roles and responsibilities of the entities involved in the PoA, that the CME has provided adequate training to the entities involved, and that the CME has implemented a rigorous control of records and documentation for each CPA.

PoA monitoring reports typically introduce a level of complexity that is not encountered by a DOE in the verification of a stand-alone CDM project activity.

The requirement that all CPAs of a PoA are jointly subject to verification may create a level of complexity that a DOE has to manage in its verification approach. Complexity may be a result of the following:

- The requirement that information on all CPAs of the PoA is to be reported in one single monitoring report potentially result in lengthy and over-complex monitoring reports. Similarly, the verification report may become rather lengthy in its description of how the information in the monitoring report was assessed.
- A DOE will have to take into account the possible existence of CPAs complying with different versions of the PoA. The DOE will need to account for this in its assessment and also in its sampling approach, to ensure that a statistically sound sample of CPAs from each version of the PoA is being verified.
- The DOE may encounter situations where findings in one CPA impact the verification of all other CPAs. Issues with monitoring in one CPA, for example, may require a temporary deviation to be approved by the CDM EB for this CPA. As a result, the issuance request for the whole PoA has to be put

on hold until the temporary deviation is approved by the CDM EB although there are no issues identified with all other CPAs.

The above thus needs to be taken into account by the DOE in their planning of PoA verifications. Similar to the earlier recommendation that a PoA should present information from all CPAs in standardized format, also the verification report should present the verification findings in a standardized format.

3 INSTITUTIONAL ARCHITECTURE FOR MRV

3.1 Overview of different types of PoAs

In chapter 2 of the CME Starter Kit (2) the importance of the organisation of the PoA is discussed and in particular the need to clearly define the responsibilities within the PoA. The CME Starter Kit (2) illustrates the set-up of the CME and other entities participating in a PoA as shown in Figure 3 below.

Figure 3: The CME and other entities involved in the PoA

Grouping PoAs in four PoA Group Types considering the different division of responsibilities in a PoA

Based on this principle of defining responsibilities within a PoA, this manual groups PoAs into four different types of PoAs considering the different division of responsibilities in a PoA:

PoA Group Type I.	CME is responsible for all the monitoring reporting activities and the CPA implementor is only responsible for the implementation of the project activity (Figure 4).
PoA Group Type II.	CPA implementor is responsible for all the monitoring reporting activities and the CME is only responsible for the collection of the reports and submission to the DOE for verification (Figure 5).
PoA Group Type III.	CME and CPA implementor have split their responsibility with regards to the monitoring activities, but all the reporting and monitoring of key parameters remain under the responsibility of the CME (Figure 6). This type is a blend of type I and II but type I is dominating.
PoA Group Type IV.	CME and CPA implementor have split their responsibility with regards to the monitoring activities, the CPA implementor is primarily responsible for the monitoring and reporting of the parameters, but some of the reporting and monitoring activities remain with the CME (Figure 7). This type is a blend of type I and II but type II is dominating.

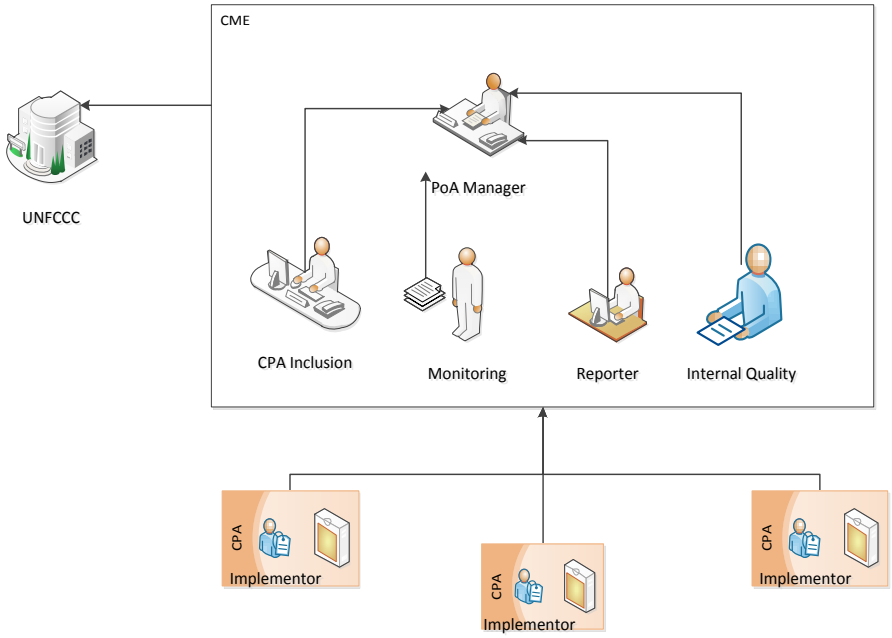

Figure 4: PoA Group Type I

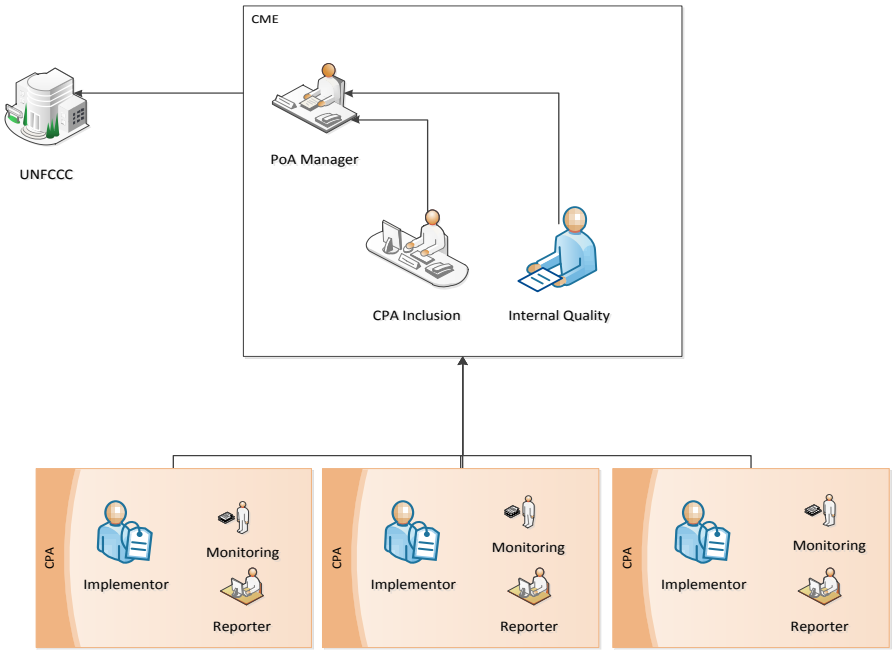

Figure 5: PoA Group Type II

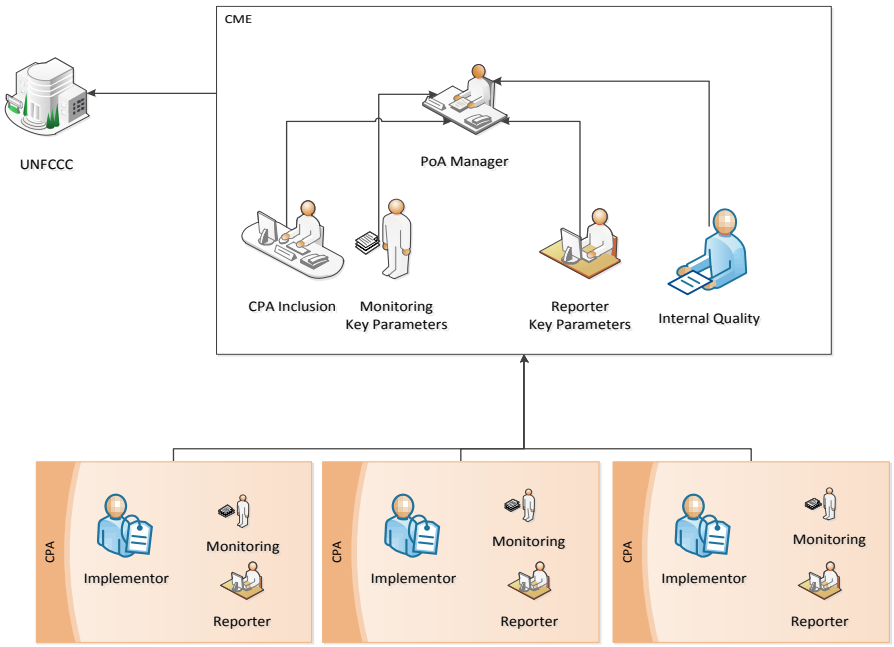

Figure 6: PoA Group Type III

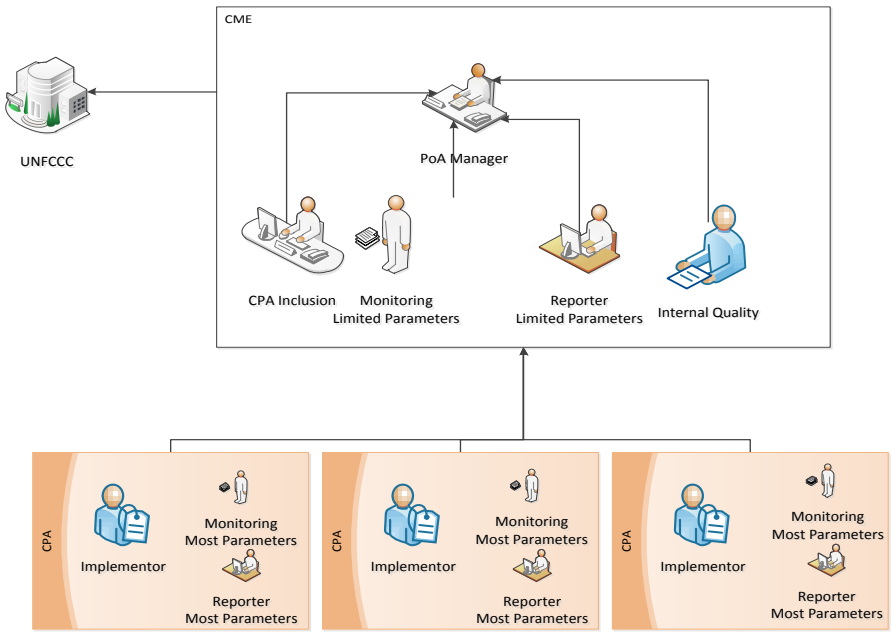

Figure 7: PoA Group Type IV

Aside from the four types provided above there are endless variations to the above main types depending on the PoA's local circumstances and the capabilities within the CME and /or CPA implementors within the PoA. Nonetheless, as shown in Table 6 below the majority (62 %) of the registered PoAs (as of June 2013) fall under the PoA Group Type II, followed by PoA Group Type I (21%).

Table 6: Registered PoAs by PoA Group Type

PoA Group Type	Number of registered PoA	Percentage of total
PoA Group Type I	28	21%
PoA Group Type II	82	62%
PoA Group Type III	7	5%
PoA Group Type IV	16	12%

3.2 Current MRV capacity and capabilities

MRV capacity and capabilities for PoAs are expected to be limited

The MRV capacity and capabilities for PoAs are expected to be more limited than the MRV capacity and capabilities so far seen with stand-alone CDM project activities. Limited monitoring and reporting capacity and capabilities need to be expected due to the following:

- Several PoAs are implemented in countries being considered amongst the least developed countries (LDC) or in countries with typically are less developed than the countries hosting the majority of the CDM project activities registered so far. While PoAs have thus been successful to introduce CDM to many more countries and as such have contributed to the desired improvement of the geographical distribution of the CDM, this also results in many PoAs being implemented in countries with no or only limited CDM track record. LDCs typically also lack the institutional framework that more advanced developed countries have, such as having accredited laboratories for performing calibration of measuring equipment as required by most CDM methodologies.
- Several CMEs are newly established organisations, established for the purpose of the PoA only. Moreover, CMEs typically cooperate with local NGOs or other local organisations for the distribution of the PoA measures and for the monitoring and reporting on PoA implementation. These local organisations, as well as typically also the CME, are organisations that have limited experience with quality management systems, and, if newly established, are typically also subject to significant organisational and staff changes. Experience with implementing quality management systems in PoAs are thus expected to be much more limited than what one has seen so far with registered CDM projects which are mainly developed and implemented by existing industry which has a track record of implementing an effective quality management system.
- The majority of PoAs are targeting poor households and depend on these households to correctly implement and operate the technologies introduced by

the PoA. Some PoAs may even rely on part of the monitoring and reporting being carried out by members of these households. The level of literacy amongst these households may be rather limited. As such, providing households with a manual, or other written instructions, will in many cases not be sufficient, and in person training of targeted household members needs to be provided. Experience has also shown that households are more likely to adequate a PoA technology when they have benefits from properly operating the technology (e.g. reduced need to collect firewood when correctly operating an efficient cookstove). Some CMEs have also reported that households tend to take better care of PoA technologies when the household has to purchase the technology compared to a PoA that distributes the PoA technology for free.

The above indicated limitations need to be considered by the CME in the development of their management system for a PoA and the design for training of involved personnel. Drawing on the current experience with CDM only will not be sufficient. Moreover, similar to the experiences made by many CDM project developers during the early days of CDM verifications, CMEs will have to closely monitor the initial implementation and the monitoring and reporting from their CPAs in order to be able to identify deviations from the planned implementation of the CPA and the monitoring plan and to take immediate corrective actions to address these deviations before a large amount of emission reductions may be at risk to not be verifiable due to these deviations.

Last but not least, capacity and capabilities constraints are also likely to be experienced by DOEs in the verification of PoAs. The constraints may be a result of the DOE not having local staff in host countries which have historically only seen few CDM projects so far. Also the complexity of PoA verifications described in section 2.2.7 will likely constrain a DOE as the DOE will first have to prepare and gain experiences with this complexity. Moreover, given that sampling and/or surveys are often used in PoAs for the determination of parameter values, DOEs will also have to develop verification methods and gain experience with assessing sampling plans and results from sampling and/or surveys.

3.3 Recommended MRV practices and associated institutional architecture

Institutional architecture for MRV in PoAs

A clear definition of roles and responsibilities of the parties and personnel involved in a PoA is an essential element of the PoAs management system and also crucial for effective implementation of the PoA and its monitoring plan.

A responsibility assignment matrix, also known as RACI matrix, may be applied as a tool for definition of roles and responsibilities of the parties and personnel involved in a PoA. For each task and deliverable relevant to the MRV of a PoA, the responsibilities may be assigned using the responsibilities described below.

Assigning responsibilities to the different entities involved in the PoA

Responsibility assignment matrix (RACI matrix)

A responsibility assignment matrix describes the participation by various roles in completing tasks or deliverables for a project or business process. It is especially useful in clarifying roles and responsibilities in cross-functional/departmental projects and processes.

The four key responsibilities most typically used in a RACI matrix are the following:

Responsible: Those who do the work to achieve the task. There is at least one role with a participation type of responsible, although others can be delegated to assist in the work required

Accountable (also approver or final approving authority): The one ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those responsible. In other words, an accountable must sign off (approve) on work that responsible provides. There must be only one accountable specified for each task or deliverable.

Consulted: Those whose opinions are sought, typically subject matter experts; and with whom here is two-way communication.

Informed: Those who are kept up-to-date on progress, often only on completion of the task or deliverable; and with whom there is just one-way communication.

Very often the role that is accountable for a task or deliverable may also be responsible for completing it. Outside of this exception, it is generally recommended that each role in the project or process for each task receive, at most, just one of the participation types. Where more than one participation type is shown, this generally implies that participation has not yet been fully resolved, which can impede the value of this technique in clarifying the participation of each role on each task.

A PoA specific or, if necessary, a CPA specific list of tasks and deliverables should be developed by the CME and then responsibilities may be assigned to the parties and personnel involved in the PoA and CPA using a RACI matrix. Below list of tasks and deliverables may be used by the CME as a starting point. However, there may be further tasks and deliverables not listed below which are relevant for the specific PoA or CPA.

Table 7 List of tasks and deliverables relevant to a PoA or CPA

Monitoring and reporting process	Activity / tasks	Deliverables
Monitoring of implementation of CPA	Distribution and installation of PoA technologies	Installation records
	Training of entities distributing and installing PoA technology	Training plan and records Installation manuals
	Training of users of technology	Training plan and records Operating manuals
	Survey to confirm correction installation of PoA technology	Survey plan, survey checklist and survey report
	Testing of performance of equipment (in case PoA requires compliance with a performance specification)	Test report
Monitoring equipment	Purchase and installation of suitable monitoring equipment which comply with the requirements stipulated by the monitoring plan	Equipment manual and technical specifications Installation records and testing Factory calibration records
	Training of personnel in operating and maintenance of monitoring equipment	Training plan and training records Operating and maintenance manual
	Calibration of monitoring equipment	Calibration records
	Repairing / replacing defect monitoring equipment	Repair record / record of replacement
Monitoring of parameters	Perform measurements and record measurement results	Measurement records
	Read meters and record meter readings	Logbooks Daily records
Monitoring surveys	Development of plan for survey / sampling plan, including determination of sample size	Survey / sampling plan
	Execution of survey	Questionnaire Reporting form Survey records
	Statistical analysis of survey results	Survey report

Monitoring and reporting process	Activity / tasks	Deliverables
Reporting - PoA database	Development of database	Database specification and documentation Input forms
	Data input to database	Populated database
Reporting - Data processing	Calculation of project emissions, baseline emissions and leakage	Emission reduction calculation spreadsheet
Reporting – Monitoring report	Reporting of emission reductions in monitoring report	Monitoring report
Reporting - Quality assurance / Quality control (QA/QC)	QA/QC of PoA database	QA/QC report
	QA/QC of survey report	QA/QC report
	QA/QC of measurement reports / logs	QA/QC report
	QA /QC of emission reduction calculations	QA/QC report
	QA/QC of monitoring report	QA/QC report

Example 4: RACI table for solar water heating system PoA

Task	Task description	CME	CPA imple-mentor	Tech-nology provider	Internat. consul-tant	Local consul-tant	End user (house-hold)
1	Distribution and installation of SWH systems	A	R	I			
2	Training of entities distributing and installing the SWH systems	A		R			
3	Training of users of technology	A	R	C			
4	Survey to confirm correction installation of SHW systems	A			R		
5	Testing of performance of SWH systems	I		A/R			
6	Purchase and installation of right monitoring equipment	A	R				
7	Training of personnel in operating and maintenance of monitoring equipment	A	R				
8	Calibration of monitoring equipment	A	R				
9	Repairing / replacing defect monitoring equipment	A	R				
10	Perform measurements and record measurement results	A	R				
11	Read meters and record meter readings	A	R				
12	Development of plan for survey / sampling plan, including determination of sample size	A	C		R		
13	Execution of survey	C			A	R	
14	Statistical analysis of survey results	C			A/R	C	
15	Development of database	A	C		R		
16	Data input to database	C			A/R		
17	Calculation of project emissions, baseline emissions and leakage	C	I		A/R		
18	Reporting of emission reductions in monitoring report	A/R	I		C		
19	QA/QC of PoA database	A			R		
20	QA/QC of survey report	A			R		
21	QA/QC of measurement reports/logs	A			R		
22	QA /QC of emission reduction calculations	A			R		
23	QA/QC of monitoring report	A/R					

4 MRV - FRAMEWORK FOR POAS

Designing and developing an effective and cost efficient framework for MRV within a PoA requires project participants to determine the different tasks that need to be done within the MRV system. Some of these tasks will be specific to the methodology that is being used and others are uniform within each PoA. Chapter 3 has outlined these generic tasks and these can be allocated to the different players within the PoA based both on their capability, efficiency as well as the potential cost. This chapter describes the various frameworks for allocating the tasks to the CME and CPA implementor based on the PoA Group Types defined in section 3.1. These frameworks can be used by the CME to create its own MRV framework by expanding this framework with the specific tasks that originate from the methodology(ies) being used by the PoA.

4.1 Appropriate monitoring & reporting options for different PoAs

The objective of the monitoring is no different from the monitoring of that within a stand-alone CDM project, i.e. monitoring the parameters that determine the overall emission reductions. Nonetheless in order to achieve this, a CME will have to undertake additional monitoring activities that relate to the scale of the overall PoA and the manner in which and by whom data is being collected and processed from a CPA to CME level. Below we will look at the monitoring activities and options that are specific to the individual PoA Groups.

4.1.1 PoA Group Type I

PoA Group Type I is to a large extent the closest to a stand-alone CDM project, although obviously the scale and the resources needed will most likely be considerably larger than within a stand-alone CDM project. Since the CME is fully responsible for all the monitoring activities, the internal quality control (indicated with —··▶in Figure 8) on data, training and performance is fully under the control of the CME and by setting up QA/QC procedures similar to those that can be found in a stand-alone CDM project, all the monitoring data should be collected effectively.

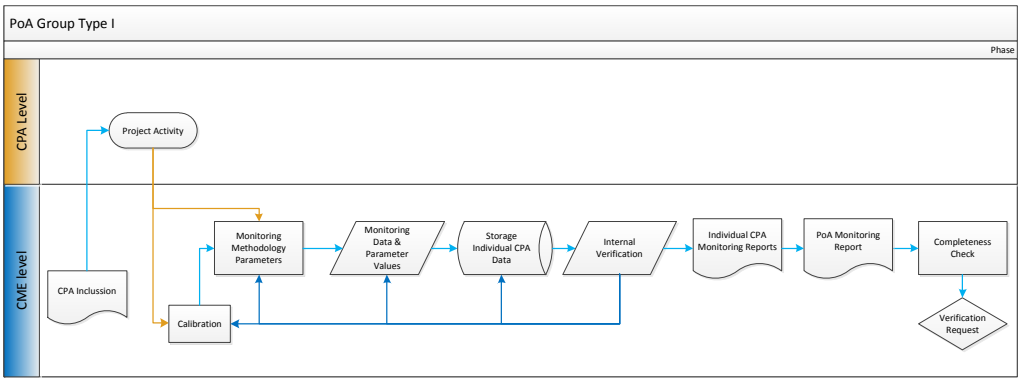

Figure 8: Monitoring framework for PoA Group Type I

As the PoA will have multiple CPAs with identical sets of parameters to be monitored, the only additional requirements on the CME are to assure that the data of each individual CPA is uniquely stored. The use of a centralised database normally can achieve this purpose.

4.1.2 PoA Group Type II

PoA Group Type II appears to be very similar to the PoA Group Type I. However, in reality this PoA Group generally can see a high degree of variation among the different PoAs with a similar CPA activity. The origin in this variation lays with the fact that each CPA is responsible for their own monitoring (indicated with ⟶ in Figure 9). There could be an equal number of ways in which the monitoring can be done, and the CME will have to be able to assess whether each of these approaches are in line with the methodologies and monitoring plan applicable for the PoA & CPAs (indicated with ⟶ in Figure 9). Consequently, the CME will not only have to review the monitoring reports that have been submitted by the CPA implementors at time for the issuance request, but it will also have to put up a monitoring system that assesses that the monitoring activities undertaken by the individual CPA implementors are in line with the monitoring plan of the respective CPA-DD and methodology (indicated with ⟶ in Figure 9). Such system can not rely only on a desk review assessment, but will also involve site visits to the CPAs to assess some of the data that has been reported by the CPA implementors to determine if the reported situation is true. This internal quality control system consequently needs to be able to confirm that data is correct as well as to be able to deal with any non-compliance and how those are to be addressed by the individual CPA implementor and how the CPAs internal system (indicated with ⟶ in Figure 9) is able to detect its own non-compliances. The PoA internal monitoring system, if well designed, will already define before implementation what will be done at the time that any error in the monitoring data has occurred. It will for example define whether a) automatically all emission data of that CPA is reduced to zero, b) there is a standard default value that can be applied to allow conservative re-calculations of the emission data, or c) the CME will have to request a post-registration change for the deviation from the monitoring plan.

The more the monitoring plan within the PoA limits the choice of monitoring methods for the CPA the lower is ultimately the variation. However, experience has shown that normally CMEs will try to retain flexibility within their PoA as they like to be able to include as much potential CPAs as possible. On the other hand, it is not always possible to determine the available variability of the potential CPAs at the time of designing the PoA and its monitoring plan. In those cases additional care should be taken not only in the design itself, but also in the assessment of the CPAs capability at the time of inclusion (refer to Pitfall 2). Therefore, it is important that the CME will build a strong internal quality control system which is able to scale up if and when this is required based on the growth of the number of CPAs (refer to Pitfalls 6, 13 and 15).

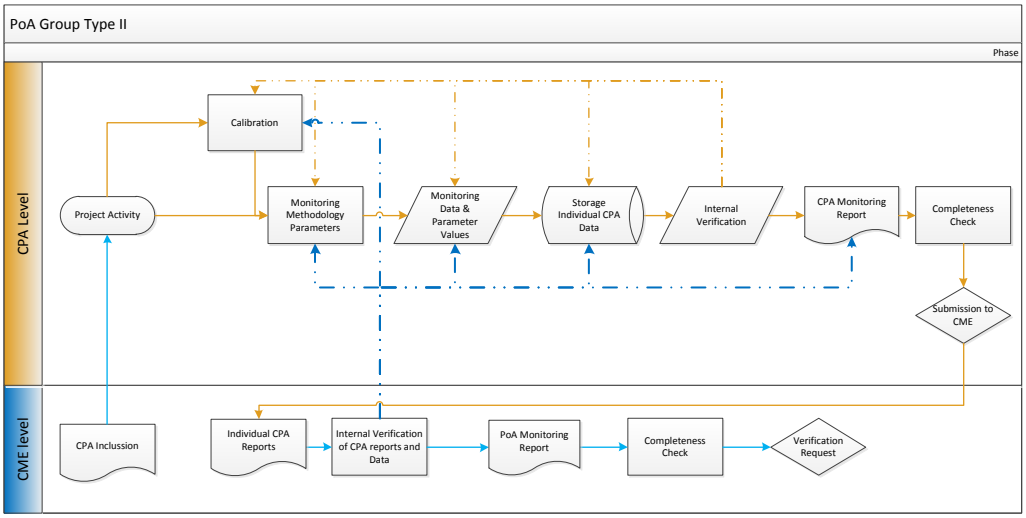

Figure 9: Monitoring framework for PoA Group Type II

4.1.3 PoA Group Type III

Splitting the responsibilities between the management of the CME and the CPA has a number of advantages. Not only will it be easier to spread the resources more easily and integrate the monitoring activities into the day to day activities of the CPA, it also allows the CME to assure that the monitoring activities delegated to the CPA participants are within their capability - whilst assuring that certain value of generic parameters required by the individual CPA are not re-monitored by the each individual CPAs (i.e. national emission grid factor, national survey results, etc.). It should however be noted that splitting up the responsibilities also creates a potential loss of consistency in the manner in which the monitoring and reporting is being done. Balancing the level of consistency with the delegation of responsibilities is key in the successful combinations within PoA Group Type III.

In the PoA Group Type III the CPA is normally made responsible for the monitoring and reporting of data for parameters that are close to their own interest and activities and that do not necessarily require high levels of CDM knowledge (indicated with → in Figure 10). Examples are the hours of electricity use, frequency and duration of usage of a cookstove, number of light bulbs in the house, etc., which are monitored by the CPA implementor whilst the CME is normally tasked to monitor the total number of light bulbs installed, electricity grid emission factor, travel distance, etc.

It is therefore very important that within the framework of monitoring and reporting both parties clearly understand the roles and responsibilities under which the monitoring and reporting is being done and how they are linked with the ultimate requirements of the PoA and CPA monitoring plan and applicable methodologies (refer to Pitfalls 5 and 18). At the same time the CME will have to develop an internal verification/audit protocol that will verify that the agreed roles and responsibilities are followed by each individual party involved in the monitoring of the CPA (indicated with ⇢ in Figure 10). Such internal verification closely follows the same principles and activities undertaken by a DOE performing the verification of data and monitoring systems. In doing so the CME can raise internal non-conformities to a CPA

implementor when it does not comply with the requirements / agreements made between the CPA and the CME and demanding corrective actions to bring them back in line with the requirements.

Particular attention should thereby not only be paid to all the different measurement requirements but also the timing of delivery and data collection (refer to Pitfalls 16 and 23). Failing to do so can lead to considerable delays in the issuance of CERs for the whole PoA if one or more CPAs do not deliver in time the required data for the CME to complete its PoA monitoring report.

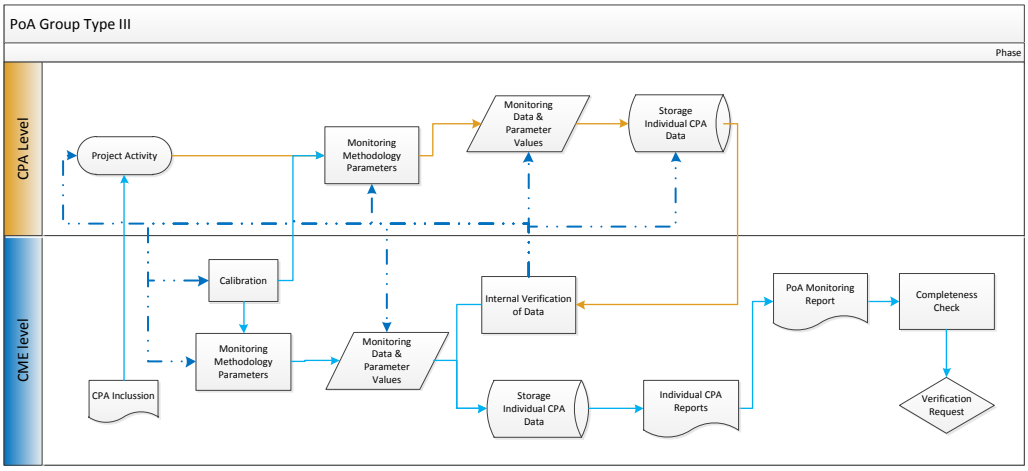

Figure 10: Monitoring framework for PoA Group Type III

4.1.4 PoA Group Type IV

The PoA Group Type IV is similar to the PoA Group Type III but the main difference is that the CPA implementor is more responsible for making sure that the CDM requirements are met and for the preparation of the CPA monitoring report.

As a consequence, because the CPA implementor takes on more responsibility, the role of the CME becomes twofold. On the one hand the CME will have to develop and manage an internal system that controls the CPAs performance (indicated with ⋯► in Figure 11), on the other hand it has to act as an information provider to each individual CPA implementor by providing them with data for the relevant parameters for which the CME has taken the responsibility for monitorng and reporting (indicated with ⟶ in Figure 11).

This option is more commonly found where the individual CPAs are expected to have a high level of CDM & technical capacity and the role of the CME is more to facilitate sharing of transaction costs, marketing and coordination of the PoA, whereby the overall infrastructure of the CME is kept to a minimum. The CME does, however, remain at all times responsible for the PoA, and as such assuring adequate resources of the CME are essential to the overall success of the PoA (refer to Pitfall 15).

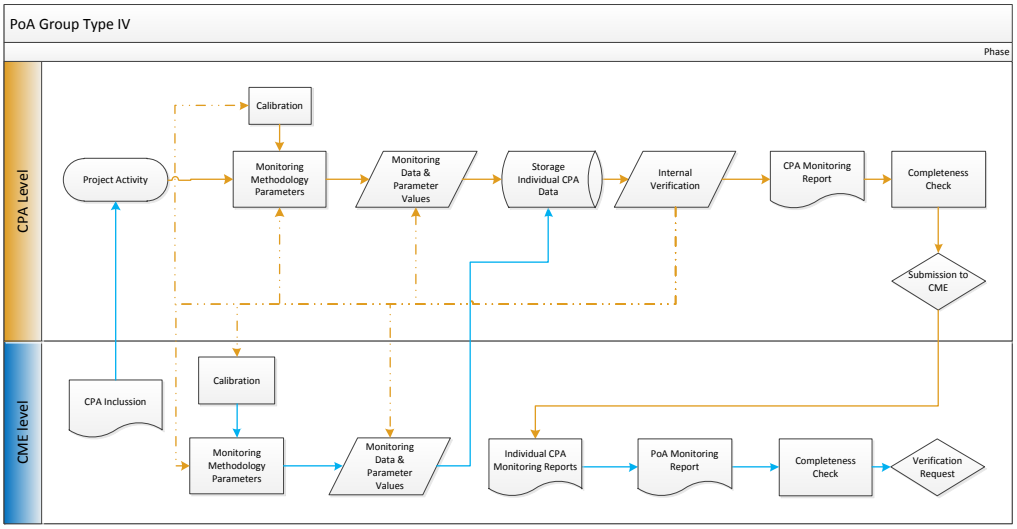

Figure 11: Monitoring framework for PoA Group Type IV

4.2 Appropriate verification options for different PoAs

Verification of a PoA can be quite different from the verification of a stand-alone CDM project. As not only does the DOE have to confirm that the PoA meets the requirements of the applied monitoring plan and methodology and is implemented as described in the PDD, it also has to assess the management system that the CME applies in order to determine the overall reliability of the information provided in the monitoring report.

A particular finding by a DOE in an audit can lead to different outcomes with regard to how the non-conformity is phrased and at whom it is addressed. This is illustrated by the example below. As a consequence, although the verification process in general remains the same, the actual time needed for executing the audit varies considerably between PoAs even if they appear similar in scope and activity. To illustrate this further, the following sections look at the different PoA Group Types and discuss how verification is expected to be done. These sections will also describe the factors within the PoA design that may lead to an increase in audit time, as well as they will describe some of the consequences of non-conformities that can be raised by the DOE.

Example 5: Impact of a non-compliance during a PoA verification

During an audit the Auditor finds that one of the meters within the CPA is not calibrated within the required frequency.

The PoA design stipulates that each CPA implementor is responsible for its own monitoring of data. Before the audit concludes on its findings the Auditor discusses the findings with the staff of the CME's internal quality control unit and asks them:

1. When was it that this CPA was last audited by the control unit of the CME;
2. What were the findings of that audit; and
3. What actions were taken following the findings?

Based on the answers that the Auditor receives the Auditor can conclude on whether

a non-conformity is to be raised, how non-conformity is to be phrased and whether the non-conformity is to be raised against the CME or the CPA.

When would the Auditor not raise a non-conformity?

In the response to the three questions the Auditor learns, for example, that an internal audit was done just prior to the audit of the Auditor and the non-conformity was also identified by the internal quality control unit. This unit consequently requested the CPA implementor to modify its data taking into account the late calibration rules of the CDM and had already received the updated monitoring report which was used in the final monitoring report submitted to the DOE at the start of the verification.

When would the Auditor raise a non-conformity against the CME?

In the response to the three questions the Auditor learns, for example, that an internal audit was done prior to the audit of the Auditor and the non-conformity was also identified by the internal quality control unit. This unit consequently did not take any steps to request the CPA implementor to make modifications to its monitoring report in line with the CDM requirements. In this case the non-conformity is evidence that the internal auditing is not working and the Auditor will raise a non-conformity on the CME's internal quality control system. Moreover, the Auditor can not assume that calibration records of other CPAs within the PoAs are up to date and in line with the frequency required by the monitoring plan. In order to close this non-conformity the CME not only will have to update the results of the monitoring report of the CPA in which the non-conformity was found, but the CME will also have to provide evidence that other CPAs do not have the same issue or, in case that they do, that also their records have been corrected in line with relevant CDM requirements.

When would the Auditor raise a non-conformity against the CPA implementor?

In the response to the three questions the Auditor learned, for example, that an internal audit had taken place prior to the date that the calibration had to be done by the CPA and the results of that audit showed that all information was in compliance with the monitoring plan at that point of time. The Auditor also observes that for other CPAs the internal quality control by the CME identified errors in the calibration frequency and in each case the interventions by the internal quality control unit had adequately assured that the monitoring report was corrected in line with relevant CDM requirements. In this case the Auditor will raise a non-conformity against this particular CPA to request a correction of the monitoring report for this particular CPA in line with relevant CDM requirements. However, the Auditor can assume that calibration records of other CPAs within the PoAs are up to date and in line with the frequency required by the monitoring plan and that any non-conformities with the calibration frequency would have been identified by the CME's internal quality control system.

4.2.1 PoA Group Type I

As outlined in section 4.1.1 PoA Group Type I is the closest to a normal stand-alone CDM project, with the exception that the DOE typically applies sampling to check the information report for all CPAs. Since the CME is responsible for all the monitoring and reporting, monitoring and reporting is normally done in a uniform manner. Nonetheless, this might not always be the case (refer to Pitfall 3) where the CME allows a non-uniform manner of monitoring and reporting in order to respond to specific CPA implementor's demands within the PoA.

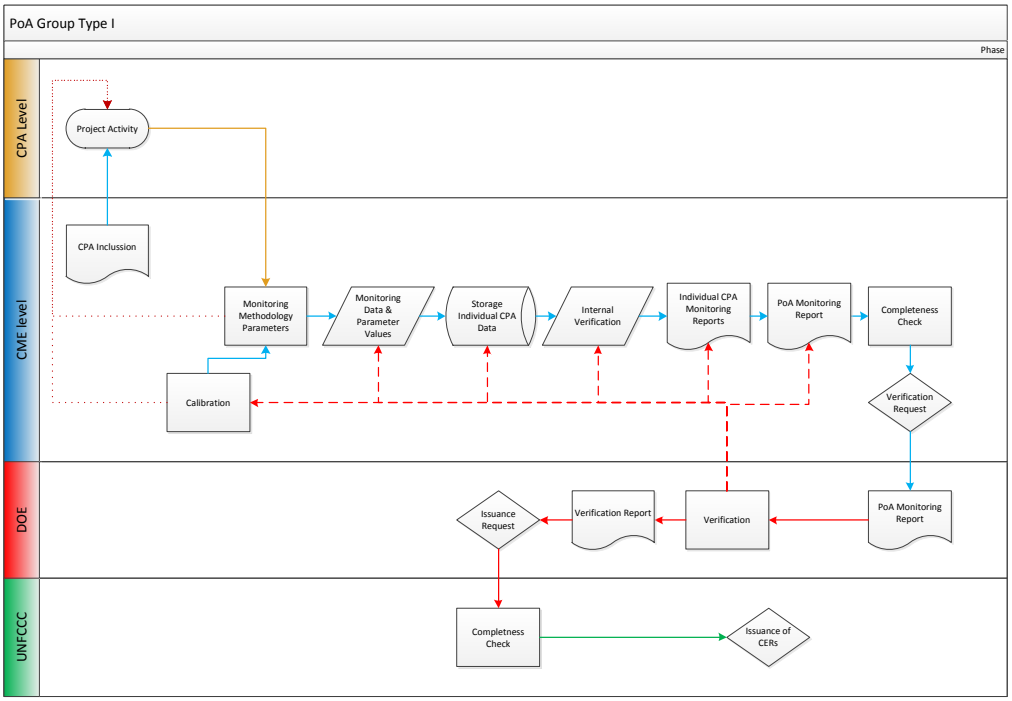

Figure 12: Verification framework for PoA Group Type I

Because of the fact that all responsibilities lay with the CME the focus of the verification will be on the CMEs monitoring system (indicated with - - -▶ in Figure 12) using the appropriate sampling of the CPAs (indicated with ·····▶ in Figure 12) to obtain the evidence of the actual compliance with the monitoring plan and methodology requirements of the PoA.

4.2.2 PoA Group Type II

Verification in PoA Group Type II focuses on the activities that are managed by the individual CPA implementors. Because of the fact that the CPA implementors are responsible for all the monitoring and reporting, the focus of the verification is more towards the uniformity between the CPAs as well as the CME's internal quality control process. A DOE's risk assessment will take into account the expected and known variability in performance of the individual CPAs against the CPA-DD requirements. This is because one CPA implementor may be taking more care in the implementation of the CPA-DD requirements than another CPA implementor within the PoA, or the abilities and capacity for monitoring and reporting between the CPA implementors may vary.

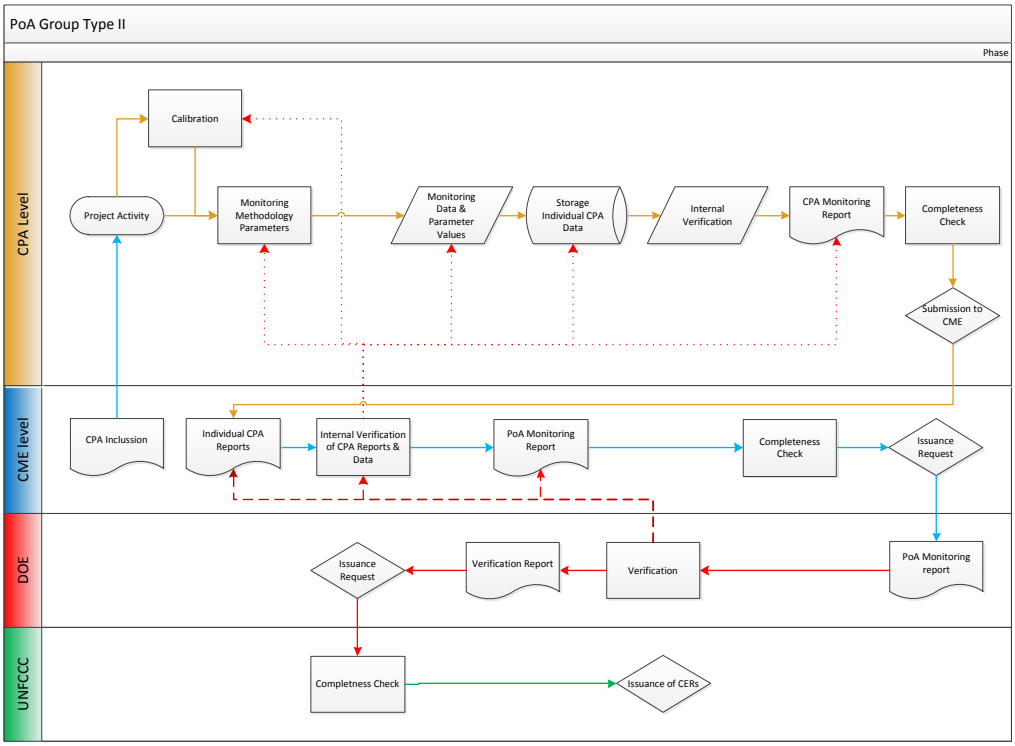

Figure 13: Verification framework for PoA Group Type II

The role of the CME on the other hand can best be compared with the role of an internal DOE that verifies individual stand-alone CDM projects. In the same way a DOE checks compliance with the relevant requirements for each individual stand-alone CDM project before submitting an issuance request to the UNFCCC, the CME will need to check each CPA individually (indicated with —··▶ in Figure 13) and confirm that they meet the relevant requirements prior to accepting the CPA monitoring report to be part of the PoA monitoring report. Consequenlty, the DOE will in its verification process not only focus on the monitoring and reporting by individual CPA implementors, but it will also have to test and check the internal quality control of CPA reports and data that the CME has implemented (indicated with - - -▶ in Figure 13). The DOE will assess the monitoring activities and data reporting process of the CPA implementors based on a sample, which is determined taking into account the internal quality control process of the CME (indicated with ·····▶ in Figure 13). The DOE will select CPAs where the internal quality control of the CME identified non-conformities as well as CPAs that according to the internal quality control of the CME did not have any issues.

Unlike to PoA Group Type I, non-conformities that the DOE finds within the sample of the CPA will lead to raising questions around the effectiveness of the CME's internal quality control system, and in order to close any non-conformities, a CME would normally not only have to demonstrate that the CPA with the non-conformity is now in compliance, but it will also have to show that other CPA do not have similar problems. On the other hand, if the CME has visited all the CPAs and done an internal quality control, the DOE can normally only check a small sample of CPAs on

the basis that the DOE has confidence in the effectiveness of the CME's internal quality control process.

4.2.3 PoA Group Type III

Verification of PoA Group Type III can have many different forms. However, the primary question that will have to be answered in determining the focus of the verification is who is responsible for the collection of relevant data for the CPAs and the PoA monitoring report. Within PoA Group Type III this responsibility typically remains with the CME on the basis that most of the important monitoring parameters stipulated by the monitoring plan and methodology are to be monitored by the CME as within PoA Group Type I.

The focus of the verification (indicated with - - → in Figure 14) is therefore like within PoA Group Type I on the monitoring activities undertaken by the CME whereby the monitoring activities by individual CPA implementors will be assessed through the assessment of the internal quality control of these information by the CME (indicated with ····→ in Figure 14), as well as the sample of CPAs that the DOE uses to test the overall monitoring activities undertaken by the CME.

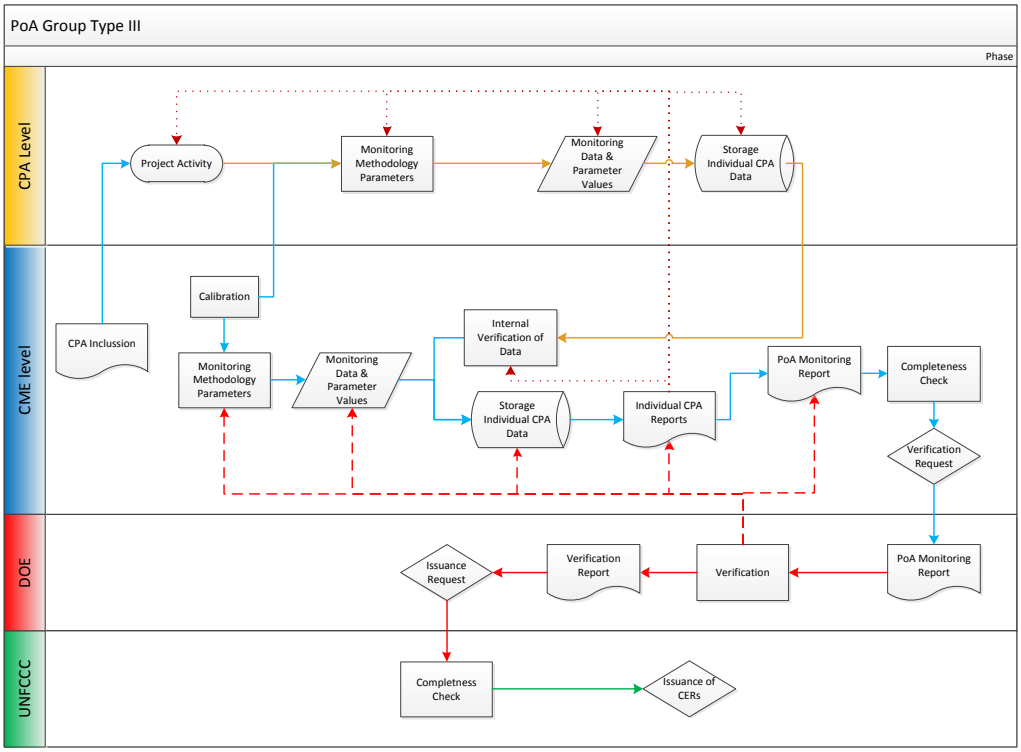

Figure 14: Verification framework for PoA Group Type III

With this verification process the DOE will not interact significantly with the CPA implementors. The CPA implementors' knowledge on CDM does thus not have to be high, as compliance with CDM requirements are taken care of by the CME. This results in the DOE focusing during verification purely on the specific tasks undertaken by the CPA implementors without necessary the need to actually discuss with the CPA implementors how their activities meet the CDM requirements.

4.2.4 PoA Group Type IV

Verification of PoA Group Type IV (Figure 15, please note that this figure does not repeat the quality control by the CME as shown in Figure 11) is equally divers in its options as PoA Group Type III. However, the focus here is that the individual CPA implementors are responsible for the monitoring and reporting for the CPA, whereas the CME is responsible for the drafting of the PoA monitoring report. This means that the verification will like with PoA Group Type II focus on how the CME is controlling that each individual CPA implementor is collecting the right data and how the relevant parameters for each individual CPA is correctly monitored (indicated with -·-▶ in Figure 15) and whether the CME is having proper internal quality controls to determine that each individual CPA complies with relevant CDM requirements (also indicated with ---▶ in Figure 15). Since the CPA implementors are responsible for the reporting, the verification will also be looking at how the monitoring undertaken by the CME is being passed on to the CPA and how the CPA is able to control that this information is correct (indicated with ·····▶ in Figure 15).

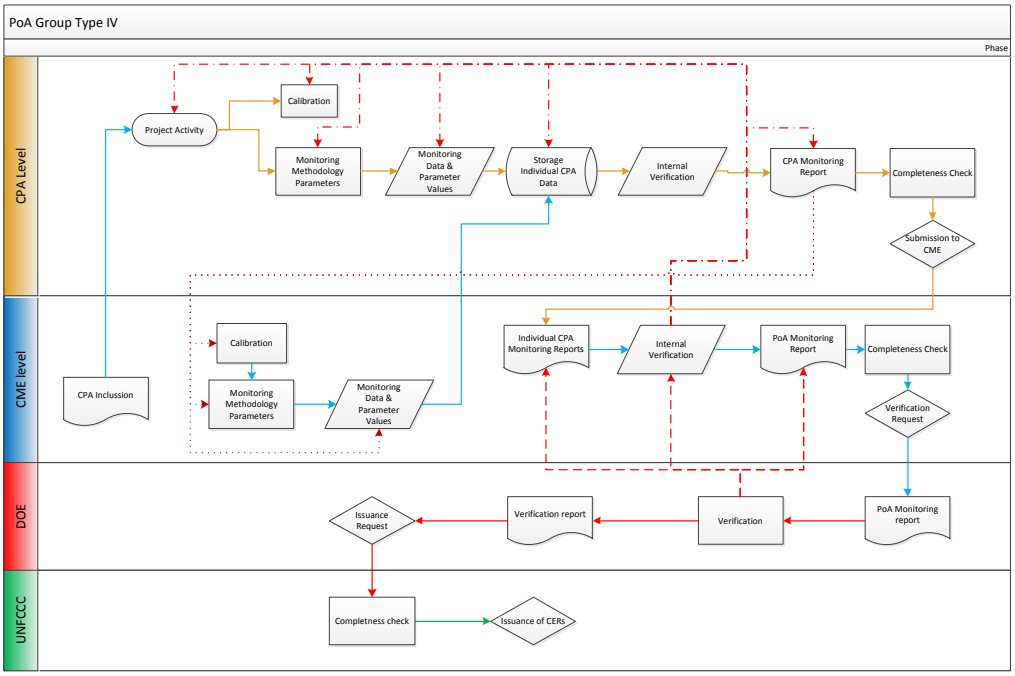

Figure 15: Verification framework for PoA Group Type IV

With this verification framework, the actual capacity to monitor within the CME can be relatively low, although the CME remains ultimately responsible for all monitoring. Instead, the CME can benefit of the CPA implementors' own monitoring abilities. At the same time non-conformities raised during verification might potentially be quite complex to close out in case the non-conformity is not clearly limited to the specific CPA in which the non-conformity was found, but could be found equally in other CPAs. Consequently, the CME will have to re-assess systems applied by the different CPA implementors in order to determine the possible presence of the same non-conformity in other CPAs.

Pitfalls not specific to PoAs, but general MRV pitfalls

5 MONITORING PITFALLS AND HOW TO AVOID AND MITIGATE IMPACTS OF THESE PITFALLS

As part of the identification of the pitfalls that managers of the CME and CPAs can encounter when developing and implementing a PoA, the authors of this manual have interviewed a number of different CMEs and DOEs that currently have been involved in the monitoring, reporting and verification of registered PoAs. The interviews were done by phone and based on a generic list of questions which were aimed to explore how the CME and CPA implementors originally designed the PoA and how it was implemented, as well as the experience gathered during the monitoring, reporting and verification. Not all CMEs and CPAs had yet the experience of undergoing a full verification although all had started the full implementation of the PoA as well as the implementation of the respective monitoring plan. From these interviews a list of pitfalls has been identified. In addition, known pitfalls from other certification programmes have been examined in order to see to what extent these are also applicable to PoAs or can be expected to occur when more project developers and implementors continue to expand their activities into PoA implementation.

Some of the pitfalls that were identified were not specific to the PoA but are common pitfalls that are also found within stand-alone CDM project activities such as:

- Monitoring frequency deviates from the requirements of the monitoring plan
- Monitoring plan not drafted in accordance with the monitoring methodology
- Metering model not consistent with the PDD
- Lack of proper content and structure of the monitoring plan
- Equipment has not been calibrated according to applicable standards

This manual focuses on the pitfalls that are more specific to PoAs or have a more significant impact on the success of PoA implementation. Nonetheless, the reader is encouraged to also look at the pitfalls identified in the CDM PDD Guidebook (1). A summary of the pitfalls identified in that guidebook and a description of how they apply to PoAs is provided in the text box below. The numbering of these pitfalls is consistent with the numbers in the CDM PDD Guidebook (1).

Pitfall 31: Physical location of CPAs not specific

For CDM projects in general and also for CPAs in PoAs, it is essential to provide the exact location of each project activity to avoid double counting. This is especially important for PoAs as numerous CPAs that are similar are included under the same programme. The PP is required to implement a system/procedure to avoid including a new CPA that has already been registered either as a CDM project activity or as a CPA in another PoA. This is especially challenging when the projects are microscale projects and not uniquely identifiable using a GPS coordinate, e.g. improved cookstove distribution projects.

Mitigation actions: Good practice is to state the exact latitude and longitude of each location where measures by the PoA are implemented, state the exact address of each location and state the proximity to some important landmarks. It is also good practise to physically mark technology being distributed by the PoA.

Pitfall 35: Project Implemented Differently

The actual project is not always implemented in exactly the same way as it was described in the CPA-DD. The most common differences are that actual installed capacities are slightly different or that projects using biomass as fuel change the types of biomass depending on the type of biomass being available locally. While there is a process for stand-alone CDM project activities for handling such cases where a project is implemented differently from the project design described in the PDD and this can be dealt with through a post registration change, the current (7) does not allow similar design changes to a PoA.

Mitigation actions: Any changes during the project implementation stage need to be avoided. Nonetheless, if they occur they should be recorded, and any related documentation should be updated, in particular if the change has an impact on the emission reductions. This impact should be identified and also be reflected in the calculations and the monitoring report. Depending upon the nature of the changes to project activities, a prior approval of the post registration change by the EB is required.

Pitfall 37: Impractical Monitoring Plan Adopted

The monitoring plan is often taken directly from the applicable approved methodology. As a result, when the project is implemented, a project developer finds that the plan does not work well or even does not apply to the project, and changes to the monitoring plan have to be made. Similar to stand-alone CDM project activities, the monitoring plan of a PoA and/or CPA can be revised through a post registration change. However, most revisions to a monitoring plan require prior approval by the CDM-EB and thus delay the verification and issuance of CERs from a PoA.

Mitigation action: CPA implementors and the CME need to follow the monitoring plan in the CPA, and show evidence that the plan is being implemented. They must also ensure that the monitoring plan is practicable for implementation by the CPA implementors, and initiate appropriate steps to facilitate implementation of the plan. At validation, the DOE should check that systems are in place for such implementation. An initial verification of the project activity may be carried out as way of early identifying possible discrepancies. Alternatively, periodic internal audits need to be conducted by the CME and corrective actions are to be taken as soon as possible.

Pitfall 38: Errors in transferring and archiving data

Data is sometimes recorded in logbooks or other hard copy records and subsequently transcribed to an electronic format, such as databases or data sheets. During this process there can be an error transferring data, and the final numbers are not the same as the actual measurements. Given the typical nature of PoAs, PoAs are particularly prone to such errors.

Mitigation actions: In cases where a manual process is in place for entering data, or even where the records are generated automatically, a quality control/assurance process should be put in place, e.g., by always having another person cross-check

manually recorded and transferred data. Internal audits can be a good tool for reviewing the quality of the data.

Pitfall 39: Monitoring equipment not adequate, causing data to be lost for a period of time

In some cases the monitoring equipment turns out to be unsuitable for the purpose of monitoring project performance. In this case, changing the monitoring device may be necessary. If different monitoring equipment needs to be installed, until the new equipment is put in place, the project performance cannot be monitored. As a result, there will be no evidence to demonstrate that the project resulted in emission reductions for that period.

Mitigation actions: Verify technical and commercial specifications of equipment and measurement devices with the technology suppliers.

Pitfall 43: Inefficient document control and data archive

Taking into account the long-time horizons of CDM projects, which can have crediting periods of 10 years if a fixed period is chosen, or 7 years in the case of a renewable period (renewable up to two times, for a maximum total of 21 years), an efficient document control and data archive system should be in place. In many cases, the data for more than one year will have to be included in the monitoring reports and needs to be reviewed and verified by the DOE. However, experience shows that sometimes these records are not readily retrievable or even not available, especially when only a hard copy is kept.

Mitigation actions: Document control and data archiving should be based on a quality standard such an ISO 9001.

Pitfall 48: Poorly installed and tagged monitoring equipment

During the verification activities, it has been observed that monitoring equipment is poorly installed and tagged, making it difficult for the maintenance personnel to perform the required quality control and checks as described in the registered PDD. This may result in low-quality data. In some cases, monitoring equipment is installed at a place where it is impossible to reach once scaffolding is removed, making it difficult for the verifier to check the equipment.

Mitigation actions: Make sure the installation of monitoring equipment is well planned for easy access, to facilitate quality control and checks of local displays.

Monitoring pitfalls in PoAs

5.1 Pitfalls in monitoring of PoAs

In total 27 pitfalls have been identified as part of the development of this manual. 11 pitfalls are mainly related to verification and are discussed in chapter 6. The remaining 16 pitfalls are mainly related to monitoring and are discussed in detail below in Table 8. Each pitfall is allocated to one of the below pitfall groups:

- PoA Organisation: Pitfalls that are related to the manner in which the PoA is organised and/or run
- Performance: Pitfalls that are related to performance of the PoA in terms of expected CERs and the actual achieved CERs
- CDM Familiarity: Pitfalls related to the knowledge and awareness of technical requirements such as CDM rules, methodology specific requirements and the rules related to sampling.

Table 8: List of identified monitoring pitfalls

	Type of Pitfall	Pitfall Group
Pitfall 1	Failure to test PoA design prior to CPA role out	PoA Organisation
Pitfall 2	Scope of the PoA too wide and too complex	PoA Organisation
Pitfall 3	High monitoring costs due to non-standardized project implementation.	PoA Organisation
Pitfall 4	Insufficient control and access to PoA participants	PoA Organisation
Pitfall 5	Lack of communication between CME and CPA participants	PoA Organisation
Pitfall 6	Unclear / overlapping responsibilities in relation to monitoring activities	PoA Organisation
Pitfall 7	Insufficient or lack of knowledge/understanding of CDM.	CDM Familiarity
Pitfall 8	Failure to maintain continuity within PoA.	PoA Organisation
Pitfall 9	Lack of knowledge by CME or CPA participants relevant to monitoring and sampling.	CDM Familiarity
Pitfall 10	Failure to determine local partners' ability to deliver upon requirements	CDM Familiarity
Pitfall 11	Too optimistic in the expected CER generation	Performance
Pitfall 12	Failure to identify human behaviour as a source of introducing systematic errors	Performance
Pitfall 13	Lack of basic skills among staff	Performance
Pitfall 14	Difficulties with maintaining interest in PoA participation	Performance
Pitfall 15	Underestimation of work load & costs required to run PoA	Performance
Pitfall 16	Monitoring starts late and not immediately after PoA/CPA implementation	Performance

5.2 Description of measures for avoiding and mitigating impacts of these pitfalls

5.2.1 PoA organisation

Pitfall 1

Small mistakes in PoA design can lead to significant loss of CER potentials as the same mistake is multiplied among all CPAs.

Pitfall 1: Failure to test PoA design prior to CPA role out

Description

PoAs were designed and set up to allow the inclusion of a large number of CPAs that perform the same project activity under the same methodological criteria. The design of any PoA consequently has a direct impact on all the CPAs within the PoA. The experience with stand-alone CDM projects as well as early experience with PoAs has shown that the implementation of the project activities post design phase is seldom fully in line with the original design and or assumptions. Either methodology requirements are not followed or the original design was not possible to implement. While a stand-alone CDM projects can address such changes centrally, a PoA not only has to look at the individual incident but also how this impacts all the remaining CPAs within the PoA. This often occurs where the PoA is based on the initial CPA without testing its design over a possible number of scenarios that can be present in new CPAs in the future.

The impact of the pitfall

Some changes in the design of the PoA are likely to be inevitable. Stand-alone CDM projects have shown that such deviations can already result in significant reductions in the emission reductions claimed by the project. Taking into account that within the PoA there is a multiplier effect (i.e. repetition of same error), changes in the design can have a considerable larger impact on the final emission reduction potential of a PoAs. At the same time correcting any errors normally introduce a significant burden to the PoA and its CPAs due to the size and complexity of the PoA. Certain design changes can consequently be such that the overall success of the PoA implementation and continuation can be put to question.

A change of the PoA database may also be necessary if actual implementation of the PoA is different than anticipated. The database was designed to comply with CDM requirements, but it did for example not adequately reflect the reality of information available (e.g. database designed to use postal code, but postal codes were not available). While changes to the PoA database may be implemented rather easily, collecting new or different information on already existing CPAs is time consuming and costly.

Example 6: Error in NCV default factor

A PoA has determined that it will measure the net calorific value (NCV) of the biomass used by the PoA. This value can be used by all the CPAs to calculate their emission reduction. The NCV in line with the monitoring plan and methodology shall be collected monthly. During the implementation the CME found that after 4 months the NCV did not change significantly and consequently stopped measuring

the monthly NCV. As a result, all CPAs have insufficient monitoring data after the initial 4 months due to the fact that the NCV was not monitored in line with the methodology / monitoring plan.

Example 7: Monitoring procedures not followed by subcontractor

The CME has contracted a third party to undertake the monitoring of the CPAs relevant parameters. The CME provided the relevant training to the subcontractor prior to implementing the monitoring activities. Following considerable turnover of staff within the subcontractor and ineffective internal training by the subcontractor of its new staff, some of the information is no longer collected or only by those that had the original training from the CME. Consequently not all information within the monitoring reports of the CPA can be relied upon. In order to determine the impact of this error all records of the respective staff will have to be assessed in order to determine which CPAs are affected by the errors introduced by the staff not following the procedures.

Example 8: Change of monitoring equipment

In the monitoring plan monitoring equipment was specified. However, during the CPA implementation it was found that wrong equipment was installed which does not have the accuracy stated in the monitoring plan. To address this, the monitoring equipment in all CPAs will have to be replaced by another type of equipment which is in line with the methodology and/or monitoring plan.

Mitigating actions

PoA developers and implementors can implement a pilot before large scale deployment of CPAs within the PoA. In the event that a pilot programme can not be set up, an assessment of the CPA implementation should be made after the implementation of the first CPA or at the latest after the first three to five CPAs in order to determine the discrepancies and level of errors within the CPAs. This allows gathering of valuable experiences on which elements of the PoA design that work and the elements that do not work and thus mitigates the risk of having to make corrections to a large number of units.

Pitfall 2: Scope of the PoA too wide and too complex

Pitfall 2

PoA flexibility is good, but too much flexibility may result in a PoA to be overly complex and difficult to manage.

Description

PoAs are designed and set up to be flexible, and project developers are given considerable freedom in the way that they want to gather and include CPAs that meet the PoA eligibility criteria. The CME/PoA developer can therefore design its PoA in many different ways in terms of scale, region, technologies etc. in order to fit its overall objectives and achieve cost efficiencies. Such freedom is certainly an advantage when looking at the development of programmes that not only focus on the climate change benefits but also at development-benefits such as energy access in

poorer and least developed regions. On the other hand, however, the drive by the PoA developers to be innovative and ambitious may result in unintended or poorly understood complexities within the overall PoA design.

Looking at the pipeline of PoAs that have been developed and/or are in early stage of design, one observes several PoAs that are ambiguous in the geographical spread (e.g. multi country) and technology combinations. However, there has been little to no evidence that such programmes can effectively be implemented, although evidence is emerging that such ambiguous scopes have been scaled down. The original PoA-DD published for these PoAs was in many cases revised as a result of the validation process, and the final PoA-DD submitted for registration spreads across a smaller geographic area and/or uses less technology combinations.

The impact of the pitfall

Generally one can see that where there are PoAs that have an ambiguous scope (i.e. the whole of Africa) there tends to be a general believe that having only one CME and a large number of CPAs in the various countries will significantly decrease the transaction costs of the PoA and maximize the number of emission reductions that can be brought to market. Although this may be true to a certain extent, experience has shown - not only in the early experience of PoAs but also in other certification programmes - that such programmes are extremely hard to manage. Local variations, partners and other circumstances may easily impact the ability of a particular CPA within one of the countries and consequently impact all the other CPAs within the other countries. Addressing a simple issue of one country not having available in its market the required monitoring equipment may increase considerably the logistical requirements on the CME to assure that the CPA obtains the equipment from another country as well as its calibration, increasing the overall costs for all within the PoA.

To a large extent running a PoA in multiple countries faces similar challenges as a company entering a new market and/or offering the same products within different countries. Although the product might be the same the actual marketing, reception of the product in the different countries may vary due to local habits, believes etc. This may result in PoAs having potentially to introduce many post registration changes to the PoA and the CPAs in order to adapt the design to the local circumstances.

Even if the PoA is implemented within one country it can be quite ambiguous particularly if it intends to integrate multiple technologies within the PoA that can provide the same product (i.e. different renewable technologies) but have multiple baselines (cookstoves replacing charcoal and wood versus cookstoves replacing only charcoal). Similar to the aspect of multiple countries, the different options that one needs to consider for each technology may make the PoA considerable more complex, and it is time consuming to demonstrate compliance of the PoA with relevant CDM requirements. Again, the impact of one technology not being in line with the CDM requirements is that this will affect all the other technologies included in the PoA and its ability to have its emission reductions verified and certified.

Mitigating actions

In the event that a PoA intends to implement multiple technologies in several, countries and/or have other complex structures the PoA developer should:

- seek as early as possible the validation of the proposed PoA design in order to have the design assessed and to determine that all CDM requirements are met.
- internally assess and test whether the design can be realistically implemented within the proposed scope of the PoA, not only looking at the availability of infrastructure and equipment, but also in line with Pitfall 1 the level of organisational complexity and skills needed in order to operate the PoA and the CPAs.
- consider whether running all PoA activities as one or several PoAs. Where the PoA is operating in a number of different countries and e.g. travel between these countries is sub-optimal, or where local subcontracting circumstance may vary considerable, it is more cost effective to run and register not one but several PoAs. By doing so, one will be able to make more easily adaptations to the PoA in the respective PoA-DD to address the specific local circumstances.

Pitfall 3: High monitoring costs due to non-standardized project implementation

Pitfall 3

The more a CPA is allowed to be customised, the higher are the overall monitoring costs at PoA level.

Description

Experience with stand-alone CDM projects has shown that the monitoring costs can be considerable. One of the objectives for the introduction of PoAs was to be able to potentially reduce the overall monitoring cost to the individual CPA and by doing so bring into the CDM a larger number of small project activities. Although in general it can be said that such reductions can be achieved, there is also experience that shows that the ultimate monitoring cost have ballooned due to the fact that the PoA developer did not sufficiently considered the implications of customizing CPAs to the demands & abilities of the specific CPA. This results into not having one monitoring system, but a set of small monitoring systems that each need to be managed effectively, whereby the opportunity to have lower overall monitoring cost is being lost.

Early experience with stand-alone CDM projects has shown that project developers did not pay sufficient attention to the concepts of what is required to be monitored and with what purpose (see Pitfall 39 of the CDM PDD Guidebook (1)). The monitoring plans of early CDM projects often contained simple statements in the monitoring plan saying that everything is to be monitored without clearly understanding what this meant until the moment that project actually had to implement the monitoring plan. Much of that initial confusion has been now addressed with the development of more detailed monitoring requirements within the methodologies. However, these developments have to date not addressed the specific CME management requirements.

The impact of the pitfall

The non-standardised monitoring may only appear to lead to a small increase of monitoring costs at CPA level, but for whole the PoA it may lead to considerable higher monitoring costs - thus defecting the original purpose of the development of PoAs to reduce monitoring costs.

To the same extent, due to the fact that there is a non-standardised monitoring system, the DOE will have to increase its sampling size because the number of CPAs with different monitoring system will increase and consequently considered in the DOEs sampling plan. This is leading directly to an increase in transaction costs because DOEs will have to spend additional time in verifying compliance of the monitoring system by the different CPA groups within the PoA.

In section 3.1 it was noted that in most PoA cases the CPA implementors are made responsible for the implementation of the specific monitoring plan. Not having a standardised process for the monitoring of the parameters that each CPAs within the PoA has to follow means that the CME will have to be able to assess each individual monitoring system as part of its internal system to assure that the CDM methodology requirements are being met. This can considerably increase the overall cost for the CME even though it is not actually doing the monitoring itself.

Mitigating actions

In order to keep the costs to a minimum the PoA developers should:

- promote the standardization of CPAs and develop standardized monitoring practices. Where standardization is not feasible or desired, a clear assessment of the cost impacts should be made as part of the decision making of introducing a non-standardization.
- not develop a monitoring system that is only applicable for one CPA in case a non-standardized monitoring system is required. In such a case, a cost-benefit assessment needs to be made if the particular CPA shall become part of the PoA or should be not included in the PoA.

Pitfall 4: Insufficient control and access to PoA participants

Description

Pitfall 4

Effective controls are needed for implementing PoAs successfully.

Developing a PoA demands a large number of actors to be interested to be part of the PoA and its objectives, either as subcontractor or as CPA implementors. In order to get these actors all interested and willing to participate, the PoA developer will need to appeal to the interest of the specific actor. In doing so the PoA developer naturally focuses on the benefits that the actor is able to obtain by becoming part of the PoA organisation or CPA. Agreements consequently are made to confirm the commitments of either party (i.e. CER payment, to undertake monitoring, etc.).

Experience from other certification programmes and early PoA implementation has shown, however, that such agreements tend to focus too much on the benefits and not sufficiently on the responsibilities and mechanisms that will be used to bring parties in line with the agreed roles and responsibilities. It is often assumed that the benefits are

such that parties have an interest in following the agreement and as such continue to cooperate with the PoA. However, experience has shown that this is not always true, as situations change and consequently the ability or the interest of a party may differ from the original assumptions at the start of the PoA implementation (see examples below).

Example 9: Access to households

A PoA aiming to introduce CFLs in households contains in its project design that in a dedicated number of households metres are installed that record the number of hours that lights are used. The participating households were given an upfront financial incentive if they agreed to be part of the monitoring group. On a monthly basis a subcontractor is visiting the households to record the readings, which get consequently transmitted to the CPA implementor. After the initial 6 months the number of submitted data points starts to drop and after 5 months the CPA implementor checks with the subcontractor why he is providing only a small number of readings. The subcontractor informs the CPA implementor that an increasing number of households do not allow him into the house to take the reading.

When contacting the households directly to remind them of the agreement, the households continue to refuse entry because it is too intrusive to their livelihood and they had not understood that an external subcontractor, who they did not know, would be doing the reading. Because the agreement did not stipulate any details on this matter, the CPA implementor is not able to enforce the agreement with the households and in addition also has to set up replacement households to make up for any shortfall in order to meet the monitoring requirements.

Example 10: High expectations

During the development of the PoA the PoA developer informed the various CPA implementors about the advantages of joining the PoA and the money that they would receive based on the sale of carbon credits. After the initial pay-out of CERs which was linked to the market value of the CER, the price significantly dropped resulting in considerably lower amounts of revenues paid out for the second payment, which consequently meant that the CPA implementors considered it financial unattractive to continue monitoring certain parameters. Since the agreement did not stipulate an internal quality control system to which the CPA implementor had to adhere to, the CME is not able to force the CPA implementor to undertake the monitoring, leading to an inability to claim any or all emission reductions.

The impact of the pitfall

Having insufficient control over the PoA participants may not immediately result in the loss of emission reductions, but generally will do so soon after the PoA is being implemented and the number of CPAs is starting to grow. This is due to the fact that

the initial CPAs have been part of the initial development of the PoA and as such may have developed a higher level of loyalty then those that have only joined later because they have for example seen the benefits without fully understanding the work involved.

Example 9 showed that the impact is not necessarily limited to a lower amount of claimable emission reductions. It may also directly impact on the overall cost of doing monitoring. Because of the fact that certain households have dropped out of the PoA, additional households need to be found to provide the necessary information needed to meet the required sample size stated in the monitoring plan of the CPA-DD and in order to allow the PoA to still claim emission reductions.

Mitigating actions

Acknowledging in an early state during the planning of the PoA that it is equally important to plan how to attract CPA participants and plan how to manage them is key for the overall PoA success, the CME should:

- clearly document the responsibilities and expectations upfront between parties, including details on what the course of action will be if either party does not deliver on its responsibilities,
- have an internal quality control system which is able to identify any non-compliance and enforce corrective actions by the relevant party by embedding them within the agreements,
- assure long term benefits and not only short term benefits upfront which can be quickly forgotten after the benefits are no longer tangible,
- not be too eager to include every possible CPA as some CPAs may represent a risk to the overall PoA,
- maintain regular interaction with CPAs and its participants.

Pitfall 5: Lack of communication between CME and CPA participants

Pitfall 5

What makes PoA work? Communication, Communication, Communication!

Description

A PoA can be considered a large organisation that has different departments responsible for different aspects needed to deliver a product or service. As with any large organisation, effective communication between the departments leads to success and those that generally have a poor communication between departments will do poorly. Direct parallels can be seen with PoAs; however, unlike a large organisation the participants within the PoA do not always share the same views on the common goal and tend to be only interested in their own aspects within the PoA. The different players within the PoA therefore also tend to have different priorities, cultural backgrounds and experience leading to different interpretations of a successful outcome for the PoA.

The impact of the pitfall

Poor communication between the CME and the CPA implementors generally will lead to misunderstandings and a failure to deliver the necessary information which in turn

will lead to not having a complete set of data needed for the monitoring reports and verification.

It also can lead to other problems in the overall running of the PoA such as those found under Pifalls 4, 6, 8 and 14.

Mitigating actions

- The PoA developer should never underestimate the effort that it has to make to enhance and strengthen communications between the different actors within the PoA organisation.
- Continuous efforts should be made to allow communication between the different players within the PoA.
- Regular meetings to discuss the performance of the PoA should be part of the overall PoA design as well as an open communication policy that facilitates interaction between CMEs and CPA implementors, whereby not only the PoA specific areas are covered, but also the areas outside the PoA which are of interest for the respective partner within the PoA, e.g. cookstove projects may have regular interactions with the communities on the running of the cookstoves and in addition also regular sessions that deal with health issues or school facilities.

Pitfall 6: Unclear / overlapping responsibilities in relation to monitoring activities

Pitfall 6

Equality important as outlining responsibilities is to think about how to hold accountable the different PoA participants.

Description

In the CDM Starter Kit (2) it was already outlined that there is a need to define the responsibilities between the CME and the CPA "*Even the simplest CME will have an organizational structure with defined roles, authority and responsibilities. … The CME management structure needs to be defined so that the PoA can function effectively over its many years of operations.*" However, it is not uncommon that the CME sets up the roles and responsibilities in an unclear manner or neglects to define them. Not seldom this is because the initial organisation is small and the roles and responsibilities are dictated by the circumstances. Once the organisation, however, grows or during staff turnover, no attention is paid to document and define the organisation of the CME and CPA and the roles and responsibilities within the organisation. Unclear and/or overlapping responsibilities do not necessarily cause a problem as long as all the monitoring activities are carried out by the different actors within the PoA. The CME could even ultimately use the extra monitoring data to perform additional quality control checks. However, generally this is not the case, and instead data does not get monitored because it is assumed that somebody else within the PoA organisation will take charge of the collecting of the data, consequently leading to a loss of essential monitoring data.

The impact of the pitfall

The lack of documentation defining the organisational structure and responsibilities will inevitably lead to misunderstandings among the PoA participants on what their

specific role and responsibilities are within the CME and/or CPA. In turn this will lead to a lack of oversight on what needs to be done in order to keep in line with the relevant CDM requirements. Such lack of oversight could result in activities, such as monitoring, not being done at all which then result in a loss of claimable emission reductions or a duplication of work leading to an increase in cost for running the PoA.

Moreover, if responsibilities are not properly defined, the CME will also not be able to hold other entities accountable for performing the tasks that they were supposed to perform.

Mitigating actions

The PoA management system needs to clearly define and document the CME and CPA implementors' responsibilities in relation to monitoring activities including:

- processes that will be used when the responsibilities are not fulfilled by either party;
- mechanisms of control to assure that the ones responsible are also accountable;
- mechanisms for regular review and updating of the organisational structure and roles & responsibilities.

5.2.2 CDM familiarity

Pitfall 7: Insufficient or lack of knowledge/understanding of CDM

Pitfall 7

CDM is complex and CME needs to be aware of the efforts necessary to keep up with existing and new requirements.

Description

PoAs are relatively new within the CDM and have attracted both experienced CDM developers as well as new players, such as NGOs which predominately have their origin in the field of development aid within least developed communities. Both groups are faced with gaps within their existing knowledge, either in the field of working within communities or with the CDM. Even those organisations that do have experience in both are migrating from a stand-alone CDM to a multi project PoA system and are facing new challenges for a first time. Early experience with PoA has shown that PoAs are being set up wrongly or ineffectively. A common response obtained from the interviews has been "*If we had to do it all over again we would certainly have done it not the way we currently have designed the PoA or done it considerably differently*". This is not only because of limited experience with CDM requirements for PoAs, but also limited experience with how these requirements are to be communicated to the different participants in the PoA. The challenge is to translate technical CDM requirements into instructions that are applicable and easily understood by to those that do not know CDM at all but have to perform tasks relevant to the PoA.

The impact of the pitfall

The impact of insufficient knowledge of the CDM is similar in stand-alone CDM projects and PoAs, i.e. a potential of significant loss of claimable emission reductions. However, where maintaining adequate CDM knowledge for stand-alone CDM

projects is already challenging, within the framework of PoAs this has an even larger impact because of the fact that there is generally a larger variation between the different parties involved in the PoA - in terms of education, living standards, etc. Not being able to correctly translate the very specific and technical language of the CDM methodologies and other CDM requirements to understandable language that can be used at grass root level can halter the overall implementation of a PoA.

The same is true when it comes to making staff and participants understand why things have to be done and why it can not be done differently. Just referring to relevant CDM requirements often results in creating a negative effect as it creates the perception that the CDM rules are the barrier to the successful implementation of the PoA. Over time such negative feelings will turn against the PoA's ability to successfully implement the PoA.

Mitigating actions

PoA developers will have to understand that although they ultimately have to relate to the requirements of the CDM, this does not need to mean that everybody should need to know everything of the CDM.

The interviews with PoA developers have indicated that PoA developers have gradually moved away from explaining all their partners the background and requirements of the CDM through dedicated training programmes. Such training programmes now tend to explain the same material in a way that relates more to the participants' daily routines and livelihood - thereby not necessarily talking about CDM terms such as additionality and baselines, but instead talking about differences in lifestyle and habits. This way the CME is still making it understood why certain things have to be monitored, but without linking it to language and processes not understood or foreign to the respective participants. Making this transition not only has shown that information is better collected and provided, but also participants have become more active in participating in other ways to enhance the process and their environmental awareness.

Training of technicians and others are essential to ensure correct implementation and operation of the CPAs. Implementation, maintenance, operation and/or monitoring of CPAs may be performed by dedicated subcontractors which sufficiently understand the CDM requirements, instead of relying on many individuals. Tangible and direct benefits to the individuals responsible for implementation, maintenance, operation and/or monitoring of CPAs typically results in better CDM project performance (e.g. a project which allows the operator to utilize the biogas from a digester for electricity generation is typically better operated than a project where biogas is only flared).

Pitfall 8

A CME should be realistic in its expectations regarding the PoA's organisational capacity.

Pitfall 8: Failure to maintain continuity within PoA

Description

At an early stage PoA developers have recognised that having local expertise at all levels of the PoA is essential for the success of the PoA. Where local expertise is not present this should be built through training and assistance. This is particularly true for the field of monitoring and reporting, which are concepts that are not necessarily known within the regions where PoAs are most often used or are viewed with suspicion. Even though this is typically already acknowledged at an early stage, experience has also shown that setting up the right expertise within the region alone is not sufficient. Maintaining this expertise is equally if not more important for the success of an PoA.

Many organisations and people that get involved in CDM & PoA at a local level are new to the general concept that systems put in place will have to be implemented for the full duration of the PoA. Setting up a local business and manage it within the legislative framework of the host country may in itself already be a challenge by itself. Partner companies that were selected at the time of implementation of the PoA by the PoA developer may no longer exist after a few years into the implementation.

On the other hand because PoAs are new, people see this as new opportunities and an opportunity to change their live. Such expectations can not always be met by the PoA developer and/or activities of the PoA, and as such participants may be disappointed and seek other interests.

The impact of the pitfall

Having a poor continuation of staff and processes is often a recipe for failure. It normally leads to delays and repetition of activities as the new staff/organisations have to become familiar with the PoA. Not recognising that there may be a significant turnover of staff and or subcontractors will inevitably result in the PoA not performing as planned and the PoA generally being late in its delivery of deliverables. Although the high turnover in particular staff may have a negative impact on the PoA performance, staff turnover can have a positive impact on the region where the PoA is implemented - particularly in areas where there is a low level of job skills, and the PoA training provided is a stepping stone for local people to enter into new job opportunities as they leave the PoA with higher levels of education and job training. Moving back into the communities, they apply their new skill sets either to support other PoAs or they work in other sectors.

Mitigating actions

The CME must plan for staff turnover.

The PoA management system and actual operating processes must be documented.

The CME must develop a system for capturing the experiences gathered by the CME and other CPA participants, so that it is available to others and more easily transferable to new organisations.

Pitfall 9

Sampling is not only statistics, it also requires understanding the objective of the sample.

Pitfall 9: Lack of knowledge by CME or CPA participants relevant to monitoring and sampling

Description

With the amount of data that potentially needs to be monitored to assess the PoAs performance and to determine the PoA's emission reductions, sampling is essential in order to keep the costs of monitoring down whilst assuring that all CDM requirements are being met. However, sampling needs to be well understood in order to be effective. Sampling large number of samples does not necessarily give the right answer or accurate answer. Particularly not when it is not known what the sample groups is or what the objective of the sample is, i.e. what needs to be proven or what value needs to be established.

Although the CDM EB has prepared a number of guidance on sampling and the KFW sampling manual (3) has already provided some assistance, many PoAs struggle with getting the sampling right. This is particularly the case where the CME and or CPA implementors try to combine different parameters in one sampling process. Obviously by doing so, the CME or CPA implementor is able to reduce the cost of sampling and the overall burden on the PoA. However, not keeping in mind the objective of the need for the different parameters that need to be sampled will lead to a poor sample design.

Stand-alone CDM projects have shown that monitoring and sampling require considerable experience in order to assure that the monitoring and sampling meets the requirements of the UNFCCC, and this is even more so in PoAs where the variability is considerable larger and more divers.

These issues are equally relevant when looking at PoAs where generally the complexity is increased, due to the fact that more actors are involved in the monitoring, and monitoring often includes sampling. In addition, PoAs will have variability that will affect the design and sampling approaches. The monitoring and sampling is also not only focused on the methodological requirements, but also needs to address quality management processes that allow the CME to determine that the monitoring is done in line with the CDM requirements.

Example 11: Sampling cookstoves

A PoA is being developed and set up for poor communities in and around city dwellings (100 km radius of the city centre). The PoA introduces cookstoves in order to replace charcoal and firewood. In order to determine the emission reductions the PoA will need to sample households to determine the amount of charcoal and/or firewood that the households no longer use.

In the sampling design the CME decides for its sample determination that it will treat all the households as once sample pool and determines its sample size and performs a random sampling.

A local University study has shown that all communities living within 50 km radius of the city centre use only charcoal and those that live up to 80 km use a mixture of

charcoal and firewood where those that live more than 80 km away from the city centre solely use firewood.

By considering the population group as one, the CME most likely will have to sample a considerably large number of households in order to get the precision of the sample within the required 90% confidence level. However, if the CME had decided to make use of the University study information it probably could have reduced the overall sampling considerably by splitting the population up in 3 groups: those that live within 50 km of the city centre, between 50km and 80km and those living more than 80km from the city centre. In the first and the last group it would be expected that all the households use either charcoal (< 50km) or firewood (>80km) and as such the sample can be kept small and will only try to proof that provided information of the University Study is correct, while the majority of the sampling would go to the households between 50 and 80 km of the city centre to determine the mix charcoal/firewood used by the households.

Example 12: Internal quality sampling

The same PoA as in the above example has set up an internal quality control system which intends to check if the data provided from the original sampling is correct.

During the initial sampling 200 households were sampled, the CME decides to sample randomly 10 households (5% of 200) and compare the findings with the 200 households originally sampled. The results vary widely and the CME decides that a new sample of 200 households needs to be done.

Unfortunately, the CME did not realise that by taking a random sample it did not get any information on the quality of the work done by the original monitoring staff. In order to do so the CME would have had to take a sample of the same households that were originally sampled by the monitoring staff, and compare the findings with the findings recorded by the original monitoring team. If the sample shows that in say 2 or 3 cases the findings differ, the CME would then be able to conclude that the original sample is not reliable.

The impact of the pitfall

The pitfall and corresponding errors normally lead to an:

- an over- or under-sampling of the parameter to be monitored,
- higher monitoring costs due to an over-sampling or need for resampling due to under-sampling or other errors in the sampling
- loss of emission reduction because parameter(s) were not correctly sampled.

Mitigating actions

CME should provide specific training to the CPA implementors to ensure proper monitoring and sampling. Moreover, the CME needs to frequently survey the monitoring practise of the CPA implementors and provide feedback to CPA implementors to allow for continuous improvement of the CPA implementors.

The CME should carry out a risk assessment of parameters to identify high risk parameters and increase control of these parameters. Where the CME does not have the competence in house, specific expertise should be contracted to perform these tasks.

Pitfall 10

A CME should be realistic in its expectations regarding the present and future capacity of its partners.

Pitfall 10: Failure to determine local partners' ability to deliver upon requirements

Description

From early on PoAs have focused on using much of the local or regional experience. This was partly to have lower costs, as well as to maintain continuity, local ownership of the PoA and access to local knowledge. This is certainly the case if the PoA developer was planning activities in local communities or low income households, since often local NGOs or distribution organisations already existed within the region. Local resources, although knowledgeable of the local circumstances, may however not always have all the answers to the issues relevant in the running of the PoAs. Assuming that these local resources with their local knowledge are able to implement the PoA and/or effectively assist in the roll-out has shown to date that this was seldom true. Local partners were either not sufficiently staffed to take on the additional work in relation to the PoA or did not have the required expertise needed to effectively implement the PoA. Because the work of the PoA was not seen as being priority, the local organisation may have stopped its PoA related activities and as such is no longer able to provide the service to the PoA.

The impact of the pitfall

Failing to have the right partners throughout the implementation of the PoA can seriously hamper the PoA's ability to achieve its targets and in the extreme case the PoA will have to stop its operations.

Not only can the PoA have to terminate its activities, but this also can have a lasting negative impact within the local community/region. It is not uncommon to see that a failure of a well-intended PoA within a local community will make it much harder to set up new PoAs within the region because communities will expect the same to happen as during the initial PoA.

Mitigating actions

The CME must be involved in project implementation, so that problems can be identified and resolved as early as possible and before it is too late.

The CME may also identify possible other partners that may be engaged in case the originally identified local partner is not able to perform its tasks.

Pitfall 11

Experiences from pilot projects are valuable input for a more realistic estimate for the PoA's emission reductions.

5.2.3 Performance

Pitfall 11: Too optimistic in the expected CER generation

Description

All CDM projects are likely to have a different level of performance than what originally was anticipated when the activities were designed and planned. Hence, projects may result in less emission reductions than anticipated. Looking at the UNEP Risø Pipeline (10) it can be seen that the average CER generation is around 91% of the originally expected CERs. The average performance of different technologies varies from as low as 31% to as much as 169% of the original expected CER volume, whereby particularly the project types that are considered innovative or new often have a relative poor performance compared to the project types that are closely linked to already existing practices. Unlike the well tested project activities, such as reducing emissions from industrial gases, the innovative project activities - and PoAs are also often considered innovative - include assumptions used to estimate the emission reductions that are based on theory and have not yet fully been proven and/or tested. Consequently, in the early stages of the PoA performances are lower because of unforeseen problems with the implementation and/or because of having to change the design when the original assumptions turned out to be wrong.

Similar problems can be expected within the PoAs, and having a 31% performance rate of the CPAs may well mean that the PoA will no longer be viable.

The impact of the pitfall

Systematic reduction in actual emission reductions at CPA level compared to the estimated amounts will have a compounded effect on the whole PoA as the under-performance is likely to be systematic and thus under-performance is multiplied by the number of CPAs within the PoA.

As PoA often limit their activities to carbon reductions whilst the revenues predominantly rely on the sale of the emission reductions, the impact of a lower performance limits the PoAs ability to deliver on all its activities.

Mitigating actions

Implementation of pilots before large scale deployment of a PoA allows gathering valuable experiences and allows to, as necessary, screen out units which performance is likely to not justify the costs for monitoring, reporting and verifying the emission reductions.

The internal quality control needs to be increased in order to be able to detect early in the process if the assumptions of the PoA are being confirmed or whether changes are needed that require a re-evaluation of the PoA's overall performance.

Pitfall 12

The behaviour and motivations of the different parties involved may represent as source for systematic errors.

Pitfall 12: Failure to identify human behaviour as a source of introducing systematic errors

Description

Monitoring the performance of the PoA and assuring compliance with all CDM criteria as well as PoA and CPA specific criteria result in a large amount of data. Whether the data can be considered reliable is essential for the success of the PoA and its ability to claim emission reductions. Reliability of data can be questioned as a result of wrong collection or usage of equipment but also due to human behaviour. Of course human errors are common, but a PoA developer can also run into human errors that are not the typical human errors, but that originate from the fact that the responsible monitoring staff/organisation has other interests and priorities than the PoA.

Example 13: Executing monitoring company has other priorities

Within a PoA a farmers NGO is requested to assist with the collection of necessary parameter information for the PoA. It is agreed that the monitoring of the relevant parameter can be easily integrated with the recording of NGOs farm visits. For this additional work the PoA pays the organisation. However, the staff of the organisation which visits the farms does not see any benefits. They are only requested to file out an additional piece of paper which record the different parameters needed by the PoA. The staff of the organisation does neither really understand the PoA nor why this information is necessary, but it starts collecting the information. However, after a while it stops doing it since it takes in their view too much time and diverts the attention of their main purpose of the visit to the farm.

Example 14: Incentive programme

For example households may not provide the right (intended or non-intended) data because they fear that if they provide the real data, and not the information that they think the survey is interested in, they may not qualify for participation. As such it could be found that households indicate that they do not have CFLs in use because they are afraid that admitting to this may lead to them not receiving any CFLs for free.

Example 15: Firewood collection time

Households may over- or underestimate the distance they travel to collect firewood because they are not used to express distances in time/metres etc. Such intended or non-intended errors will result in inadequate survey results.

The impact of the pitfall

In the event that the human behaviours factor is not sufficiently addressed, the impact can be significant to the extent that none or part of the emission reductions can be claimed.

Mitigating actions

CMEs should adequately inform participating households/CPA participants about the PoA and the criteria for inclusions and exclusions, whilst including safety valves within the survey to cross check data on reliability. Where there is a significant risk of intended misinformation, e.g. because it will assure access to free CFLs, the CME may wish to remove such incentives as part of its PoA design. The design should be such that in terms of emission reduction claims, these additional activities bearing elevated risks are not included within the PoA/CPA project boundaries and emission reductions calculations.

Pitfall 13: Lack of basic skills among staff

Pitfall 13

The CME needs to confirm that CPA participants have suitable basis skills.

Description

Development of PoAs has seen particularly attraction in countries and regions that have seen little development, and frequently PoAs focus on the poorer communities. Due to this focus there are many PoAs that are being developed in and with communities that have little formal education. Basic skills, such as reading and writing, are presumed to be present, but in reality these skill may be lacking both within the communities that are targeted by the PoAs as well as among the available skilled workers or those that will be trained within the region. The CDM has a high level of requirements in terms of documentary evidence, and although many of the small scale methodologies address some of these concerns, PoAs will often have to look at new tools that allow both the communities as well as the employees to provide information without the need of writing/reading the information in order to obtain reliable and consistent information needed in order to meet the CDM requirements.

The impact of the pitfall

In the worst case, monitoring and reporting is not carried out in the initial phase of the PoA implementation and the CME has to forego the emission reductions generated by the PoA until the CME identifies the gaps in monitoring and reporting and addresses these.

Mitigating actions

The CME should make sure that the management system considers the level of literacy of the persons involved in CPA implementation and monitoring and reporting. The management system should as far as possible build on already established practices. Protocols for the implementation and monitoring and reporting may use symbols and/or pictures or other means which also allow persons with low literacy to apply these protocols.

Pitfall 14

A CME should not oversell its project, but be realistic in what benefits the PoA can provide.

Pitfall 14: Difficulties with maintaining interest in PoA participation

Description

PoAs bring together a large number of organisations and individuals which either work directly or indirectly with the PoA. Many of these individuals and organisations may not have a direct interest in the CDM component of the PoA but have other interest (i.e. access to cheap energy, efficient cookstoves, light bulbs etc.). In order to bring these organisations inside the PoA, the CME or PoA developer often highlights these other benefits of the PoA with a focus on those elements that are of interest to the particular stakeholder group. If successful this often leads to an overall interest of many parties and a willingness to join the PoA. However, when allowing the PoA to be quickly rolled out once the CPAs are being implemented and the monitoring starts, it is not uncommon to see that CPAs become less interested in the PoA as they see an increasing number of demands put on them which for them are not of interest. Lack of understanding of why certain information needs to be collected and/or the frequency of this is being experienced by the CPA participants as intrusive or beyond the commitment agreed upon at time of joining, leading to a lower willingness to cooperate or even continue the implementation of the CPA. This is particularly true if the cash benefits fall far below the expected cash benefits (low CER price) at the time the PoA was being developed and promoted.

The impact of the pitfall

The CDM itself has seen only little experience and most PoAs are still in the initial expansion phase. Some initial observations suggest that PoAs are expected to behave similarly to other certification programmes that have programmatic approaches. Experience from those certification programmes has shown that in the initial growth of these programmes, there is a decline in the number of participants that actively participate within the programme. The drop is most often a result of the participants being dissatisfied by the benefits of the PoA.

Mitigating actions

CME will need to make clear to all CPA participants the expectations on the long run and the impact that non-compliance may have on the overall benefits that the CPA participants may gain from the PoA.

The CME needs to pay attention that CPA participants have a realistic understanding of the benefits as well as constrains that comes along with the PoA participation. Clear examples of what can and what can not be done and achieved should be included within the information package that is being used to gain interest with the CPA participants.

Pitfall 15

A CME should be conservative in its assumptions on timelines and costs for implementation.

Pitfall 15: Underestimation of work load & costs required to run PoA

Description

PoAs are able to drastically reduce the transaction costs by bundling project activities and thereby avoiding individual validation and verification costs. However, in return to this reduction in transaction costs, some of the project costs will go up due to the fact that the internal PoA organisation will have to build capacity to take over some of the work that normally would have been done as part of the DOEs validation or verification (see also section 2.2.7 and 0). Although this is generally understood by the PoA developers, the true value of these additional costs is often underestimated or poorly understood. Although the initial cost with a limited size of CPAs within the PoA may have been well assessed and determined, little or no experience exists within the CDM on what the cost would be once the PoA starts to really increase in size. The amount of work that needs to be done as part of annual returning activities is not seldom underestimated, particularly when there is a high level of variety within the PoA and the individual CPAs.

The impact of the pitfall

Underestimating the workload may lead to a high workload and poor quality and deliverance of the monitoring and reporting units' within the PoA and potential loss of emission reduction claims.

Mitigating actions

Good monitoring and reporting is essential in being able to claim effectively the maximum amount of emission reductions within a PoA. However, the costs associated can also considerably impact the overall project viability. As such PoA developers and CMEs need carefully assess the true needs and costs at the different stages of the PoA development, i.e. start up with limited CPA numbers, growth period when large amount of CPAs enter into the PoA and maintaining the PoA during the stable operational stage of the PoA were only a limited number of new CPA will enter into the PoA.

Pitfall 16

Planning the CPA starts with carefully taking into account the whole PoA cycle

Pitfall 16: Monitoring starts late and not immediately after PoA/CPA implementation

Description

When a CPA becomes operational, monitoring of performance needs to also immediately take place, even though the actual verification of the emission reductions may not take place until 1 to 2 years after the CPA starts operation. On the basis that only emission reductions can be claimed for the period for which monitoring data is available, any delay in the start of the monitoring will result in a loss of emission reductions. Particularly PoA implemented in communities that do not have a direct link with the PoA or do not have a direct interest in the emission reductions, the communities may not understand the need of the monitoring and its timing.

The impact of the pitfall

The PoA may find that it will lose emission reductions due to the fact that the crediting period start-date has to be altered to start when the latest CPA started its monitoring.

Mitigating actions

After each CPA start the CMEs should assure that it not only looks at the correct installation of the technology, but also checks that monitoring has started and that information is collected in line with the CPA-PD requirements in order to assure that collected monitoring data is of sufficient quality.

Verification pitfalls in PoAs

6 VERIFICATIONS PITFALLS AND HOW TO AVOID AND MITIGATE IMPACTS OF THESE PITFALLS

6.1 Pitfalls in verification of PoAs

The 11 pitfalls that were considered to be mainly related to verification are listed in Table 9 below and discussed in details in this chapter. Even though also several of these pitfalls are also related to monitoring and reporting, they are considered verification pitfalls, because they typically become apparent in the verification process only and relate above all to the implementation of the MRV system instead of the design of the MRV sytem.

The verification pitfalls are clustered into the following four pitfall groups:

- QMS: Pitfalls that are related to inadequate quality management systems (QMS)
- CDM rules: Pitfalls related to issues that that may arise during verification which are related to barriers in current CDM requirements
- Verification process: Pitfalls that result in delays in the verification process or result in increased verification costs.
- Implementation: Pitfalls related to inadequate implementation of the monitoring plan and systems for monitoring and reporting.

Table 9: List of identified verification pitfalls

	Type of Pitfall	Pitfall Group
Pitfall 17	Underestimating the importance of implementing & maintaining a PoA management system and relevant internal quality assurance processes	QMS
Pitfall 18	Inadequate system for handling and archiving monitoring records	QMS
Pitfall 19	Lack of regulatory process to handle PoA design changes	CDM rules
Pitfall 20	Cumbersome and unclear regulatory process in relation to sampling plan	CDM rules
Pitfall 21	Variety in statistical concepts	Verification process
Pitfall 22	High verification costs in case the DOE identifies any non-conformities in the sample	Verification process
Pitfall 23	CPAs not monitored at same time	Verification process
Pitfall 24	Inconsistent reporting by CPAs within a PoA	Verification process
Pitfall 25	Sampling is not done at random resulting in the sample not providing reliable results	Implementation
Pitfall 26	Double-counting due to not being able to clearly separate the equipment installed by one PoA from the equipment installed by another PoA	Implementation
Pitfall 27	Missing CPA data (addresses, distributed units, proper disposal of replaced units)	Implementation

6.2 Description of measures for avoiding and mitigating impacts of these pitfalls

6.2.1 Quality management system (QMS)

Pitfall 17: Underestimating the importance of implementing & maintaining a PoA management system and relevant internal quality assurance processes

Pitfall 17

The PoA management system and its internal quality assurance processes must be developed at an early stage and must be expanded as the PoA grows in size and complexity.

Description

The strength of a PoA is that it allows a project developer to start off small whilst expanding its activities as more CPAs become available. This has advantages because it is not necessary to have extensive management systems in place immediately, and a CME can start with a rather simple system only. However, there is also a danger that the PoA expands faster in size than the management systems is further developed and implemented. There is also an underestimation of the amount of work needed to build the PoA management system needed when the PoA reaches its full potential/size. The more the PoA grows in size, the more the CME will have to rely on a PoA management system that assures adequate monitoring and reporting in line with CDM requirements. This is particularly true if the CME does not have experience with the implementation of management systems. Not having a track record with implementing a management system, the CMEs tend to underestimate the amount of work necessary to develop and manage such a system and also to assure that such a system is properly implemented as an integral part of the daily operations of the CPAs.

Management systems are generally not well known within the PoA organisations or are considered not appropriate because a management system is only perceived to be relevant for large organisations. However, each level of organisation has its own need for a management system and in particular for an internal quality assurance system adapted to the size and complexity of the PoA. Because the CDM project standard (7) requires each PoA to have a management system, all PoAs have developed a management system and some internal quality assurance procedures. However, the implementation of this system and the corresponding procedures is not always done - either because they are not considered relevant, appropriate or staff is not seeing the benefit of such system and procedures. Another reason for a poor implementation may be a consequence of underestimation of work load & costs required to run PoA (refer to Pitfall 15) and as such not enough financial or human resources are available to implement all the internal quality assurance measures.

The impact of the pitfall

Both cases described above would lead to a failure of implementing the processes that have been embedded within the PoA-DD and CPA-DD and consequently an issuance of a non-conformity during the verification process. This may not necessarily affect the overall emission reductions that are being claimed within the monitoring period.

Mitigating actions

A PoA management system should be developed as soon as possible at an early stage when the overall PoA is still small in size. CME should also assure that the PoA

management system is a living system that is integrated as far as possible into the daily operations of the CPAs and is not a "paper system" that is seen as a burden to the overall operations. Frequent internal audits at the start of the PoA implementation will help to fine-tune the system while the number of CPAs is still small and changes within the management system do not have significant impacts on the overall PoA.

Whilst the objective of internal quality assurance measures and procedures may not vary much within the different PoAs, the actual adequate implementation of such measures are directly linked to the people and organisations involved within the PoA. Internal quality assurance measures should clearly reflect not only the needs as defined within the methodology or CDM requirements, but also the organisations & staff abilities and practises and cost limitations. Appropriate training and ensuring awareness of the objectives and reasons for the management system and its internal quality assurance measures should be carried out in a way that relates to the people that receive the training as well as assures that the benefits of a proper management system and internal quality assurance system are well understood.

Pitfall 18: Inadequate system for handling and archiving monitoring records

Description

The larger the PoA and the more CPAs being operational, the more records are being exchanged between the CPAs and the CME and the more people are involved in handling and archiving monitoring records. In early stages of the PoA, such monitoring records are typically handled by a small group of persons without clearly documenting how the handling and archiving monitoring of records is to be done. As the volume increases and more persons are involved in the handling and archiving of monitoring records, the roles and responsibilities becomes unclear for those that were not part of the process from the beginning. Not only the submission and archiving of monitoring records itself, but also the timing for doing so, becomes an issue. With monitoring records being submitted at different time intervals, it becomes difficult to rely on the overall data and correctly use the data in the determination of emission reductions.

Pitfall 18

Records are necessary evidence for verification. Without an adequate system for handling and archiving records emission reductions can not be verified.

The impact of the pitfall

This pitfall eventually leads to an inability to claim any emission reductions from a specific monitoring period as evidence in the form of monitoring records is not available at verification.

Also the failure to adapt the procedures for handling and archiving monitoring records after changes to the project design and in particular the monitoring system, which impact the type of monitoring records being generated, could lead to insufficient monitoring records being available at verification to sustain the reported emission reductions.

Mitigating actions

It must be assured that from the start clear instructions for handling and archiving of monitoring records are developed and documented. These instructions need to be

updated as the PoA grows and more people are involved in the handling and archiving of monitoring records, and in case there is a change in the design of the monitoring system, which impacts the type of monitoring records that are generated. Moreover, internal checks of the system for handling and archiving of monitoring records need to be performed on a regular basis to identify any errors within the system.

6.2.2 CDM rules

Pitfall 19: Lack of regulatory process to handle PoA design changes

Pitfall 19

Changing the PoA design post registration faces many regulatory barriers that need to be addressed prior to implementation of the changes.

Description

The current CDM project standard (7) and the project cycle procedure (6) only allows design changes of PoAs which are related to

a) Changes to programme boundary to expand geographical coverage or to include additional host Parties,
b) Changes to the eligibility criteria under the circumstances indicated in the standard for Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (8) (e.g. to implement changes decided by the CDM EB if an issue related to environment integrity is identified),
c) If a PoA includes more than one generic CPA-DD, addition of specific actual case CPA-DDs corresponding to generic CPA-DDs for which a specific case CPA-DD has not been submitted at the time of request for registration of the PoA,
d) Changes to apply the provisions of the most recent versions of the CDM sampling standard (9)

No other types of changes to the PoA design are permitted.

The impact of the pitfall

Other changes than those described above may result in the verification of the PoA to be suspended until the CDM EB has adopted rules for handling such PoA design changes.

Mitigating actions

The PoA design and its description in the PoA-DD should as far as possible allow for possible future design changes.

When the CME identifies a need to change the design of the PoA, an assessment of the requirements of the most recent CDM project standard (7) needs to be carried out to check whether such a change is allowed before actually implementing the change.

Pitfall 20

A good and robust sample design is key for the success of the PoA as there are no easy solutions to situations where the sample does not achieve the intended confidence level and precision.

Pitfall 20: Cumbersome and unclear regulatory process in relation to sampling plan

Description

As outlined in the Sampling Manual (11) "*Sampling is typically very important if a relative high number of units or appliances are replaced, modified or installed under the project activity. The sampling approach is taken to enable such projects and make them feasible in terms of transaction costs…*". Since PoAs by design typically have a high level of variation in the parameters that require monitoring the right sampling approach is crucial for the PoA implementation.

Not only a good understanding of statistics but also a good understanding of the dynamics among the different parameters is important in designing an appropriate sampling plan at PoA level as well as CPA level. The current rules and guidance provided by the CDM EB are still providing limited clarity in this regard. The focus of the guidance documents is on rules for the design, however, not so much on what needs to be done if the sampling plan is not achieving the intended confidence levels and/or precision.

The impact of the pitfall

This pitfall may lead to PoAs not being able to have emission reduction claims verified and certified without having to redo large parts of the sampling in order to obtain the required confidence levels and precisions.

Mitigating actions

PoA developers and implementors should pay considerable attention to the sampling plan with the help of staff that have good experience in data collection and assessment. Where possible, pilot sampling should be performed to verify whether the assumptions made for designing the sampling plan are adequate, and the sampling plan thus is likely to deliver the level of precision that was intended. The overall design should also take into account that typically the implementation of the sampling plan will not achieve 100% data collection for various reasons, so that always a larger sample size than statistically needed is required.

6.2.3 Verification process

Pitfall 21

When using non-traditional sampling concepts, they need to be adequately described and preferably confirmed with independent experts.

Pitfall 21: Variety in statistical concepts

Description

As indicated in Pitfall 20, sampling is key in the success of the PoA. However, with unclear regulations there is a wide variety of statistical options that can be used in order to demonstrate the values of the parameters sampled with the intended precision and confidence levels. The use of these different options depends widely on the statistical knowledge and experience of the one designing the sampling plan as well as the one verifying the implementation of the sampling plan. This is particularly true where the statistical concept used by the PoA is not following the best practise

methods used in the CDM sampling standard (9) and the CDM sampling guidelines (12).

The impact of the pitfall

Such difference in statistical concepts could lead to non-conformities or delays within the verification process with ultimately a risk of loss in emission reductions.

Mitigating actions

Where the CME elects to use a statistical concept which is not mentioned within the CDM sampling standard (9) or the CDM sampling guidelines (CDM EB 2012), the PoA developer should put extra effort in assuring that it properly documents its sampling concept as well as confirms with independent experts in statistics that the applied sampling concept is appropriate. The documentation for the applied sampling concept and the statement by independent experts need to be provided to the verification team in order to assure that during the audit the verification team is able to assess the sampling concept and confirm compliance with the requirements of the CDM sampling standard (9).

Pitfall 22: High verification costs in case the DOE identifies any non-conformities in the sample

Pitfall 22

A small sample size by the DOE may have lower verification costs, but in case the DOE identifies any non-conformities, closing these non-conformities is costly.

Description

In their verification process DOEs will have to undertake a risk assessment in order to determine how they can assure that within their assessment they can best confirm compliance with relevant CDM requirements and potentially identify any non-conformities within the PoA and/or CPA implementation and monitoring report data. Based on this assessment a DOE will develop a sample plan which will aim to check the data that the PoA used to determine the PoA's emission reductions during the monitoring period. The size of such sample is normally selected balancing the desire to have a sample size that it sufficiently large to determine any possible non-compliances with the desire to have a sample size that is minimizing the costs of verification and thus keeping the overall transaction costs to the PoA to a minimum.

Where DOEs, however, are confronted with a non-conformity, a bigger sample is required by the DOE in order to confirm the extent of the non-conformity and the likelihood of similar occurrences of the same non-conformity in the data outside the sample. The DOE may also require a new sample in order to determine that the corrective action undertaken by the CME is indeed addressing the non-conformity in all the CPAs that are possibly affected by the non-conformity.

The impact of the pitfall

The PoA may be faced with significant higher transaction costs than originally budgeted due to the increased time that the DOE needs to take the new or extended sample.

Mitigating actions

Although a CME can never prevent that a DOE has to increase its overall sample size compared to the initial sample size if the DOE find non-conformities, CMEs are able to reduce such risk. Thorough internal quality assurance processes throughout the PoA implementation as well as regular checks of the monitoring data can pick up and correct potential non-conformities before the DOE performs its verification assessment. This consequently reduces the risk that the DOE identifies non-conformities that require an additional sample to be drawn by the DOE.

A larger sample size typically allows a DOE to evaluate if the observed non-conformity is an isolated incident or whether it is a systematic error. Hence, the initial sample size applied by the DOE should be designed to be sufficiently large to enable an evaluation of the nature of the non-conformity. In other words, the sample size should be large enough that one or two occurrences of discrepancies as observed by the DOE during verification do not necessarily lead to the conclusion that similar discrepancies are likely to exist in the data not sampled by the DOE and that the observed discrepancies can be considered isolated occurrences. The additional costs for a larger initial sample are generally lower than the additional costs that incur when a DOE has to do further sampling after the initial sampling has been concluded.

Pitfall 23: CPAs not monitored at same time

Pitfall 23

The start and end of monitoring periods is equal for all CPAs included in the PoA.

Description

The CDM requires that at the time of the verification all the CPAs that are operational and have crediting periods starting prior to the end of a selected monitoring period end date are included in the monitoring report for the period that is under verification. Since the CPA generally do not start all at the same time the actual monitoring of the respective parameters normally start at different times within the PoA cycle. There is consequently a tendency to start up the monitoring activities independently as well. Although this may not be per se a problem, it should be noted that there is often a need to finish all monitoring at the same time at the end of the selected monitoring period. It is not uncommon to find that the CME of a PoAs have not identified that CPAs which were recently included have a crediting period starting just before the end date of the monitoring period.

The impact of the pitfall

Emission reductions from these CPAs can not be included in the monitoring report either because insufficient records are available for these CPAs due to the monitoring plan not yet being properly implemented at these CPAs or because these CPAs are simply by mistake omitted from the monitoring report. As a result, PoAs are required to forfeit the emission reductions generated by these CPAs for the selected monitoring period.

Mitigating actions

CMEs must assure that monitoring plans are properly implemented upon the start of the CPA. The CME should also clearly determine a common date in which the

monitoring period will end and should select this date considering the start date of the different CPAs. The selection of the monitoring cut-off date should be selected well in advance to ensure that sufficient time is made available to assure that all necessary information is collected, correct and available at the time the PoA monitoring report is prepared. An assessment must also be made whether there are any planned new CPA inclusions around the end date of the monitoring period. In order to prevent the inclusions of CPAs that only recently joined the PoA within the monitoring period the CME could introduce a procedure that will prohibit any new CPA inclusions to occur within 2-4 months (to be determined by CME) before the end of the selected monitoring period.

Pitfall 24

Consistent monitoring and reporting among CPAs reduces risk of incorrect reporting and allows for effective verification.

Pitfall 24: Inconsistent reporting by CPAs within a PoA

Description

Upon the publication of the monitoring report of the PoA at the start of the issuance request the PoA is required to present all monitoring results of all CPAs within the PoA in one report (refer to section 2.2.4).

The requirement to include all CPAs of a PoA in one monitoring report make the overall monitoring report rather lengthy. Moreover, the complexity of the report may be increased where the PoA allows a multitude of different monitoring report types between the CPAs.

The impact of the pitfall

A lengthy and complex monitoring reporting may not allow for an effective verification, resulting in delays in the verification process. Although some variation could be required based on the fact that different technologies and or methodologies are being used within the PoA, a more uniform set of monitoring reports will make it easier to integrate the different reports as well as aggregate the emission reductions.

Mitigating actions

The CME should evaluate the pro and cons of allowing different monitoring and reporting options vs. imposing a uniform monitoring and reporting system on all CPAs of a PoA. If different monitoring options are applied, the CME must ensure that these options are clearly described and identified, so that the DOE performing the verification easily understands the different monitoring options being applied.

6.2.4 Implementation

Pitfall 25

A CME must understand what makes sampling random whilst the sampling must be practical and cost efficient.

Pitfall 25: Sampling is not done at random resulting in the sample not providing reliable results

Description

With the increase in the size of the PoA, the relative sample size (relative to the total population) typically decreases. However, sampling also becomes potentially more complex and the importance of having a truly random sample increases. This is

particularly true where the PoA measures are spread over a large geographic area (compared to an early stage of the PoA where all measures are typically implemented in smaller area only). Also the relative sample size may be smaller, the sample points identified at random will be spread over a larger geographic are. Performing inspections on a random sample thus requires a significant amount of logistical efforts in order to collect the right data. In order to keep the logistical efforts manageable as well as the overall cost of sampling at an acceptable level, the CME can apply different sampling techniques (stratification, cluster etc.) that can reduce the overall costs as well as mitigate logistical challenges.

The impact of the pitfall

An incorrect sample design and/or incorrect implementation may lead to the sample not being considered random. Human behaviour of personnel performing sampling is also an important factor to consider in order to ensure random sampling as illustrated by below example.

Example 16: Impact of human behaviour on the randomness of a sample

A surveyor may be sent to a specific household. However, since there is nobody present, the surveyor visits the neighbour instead. He/she believes that by doing so the CME will get the required information. However, the selected other household may be significantly different from the household that was targeted by the sampling plan. For a survey attempting to determine the average lifetime of a CFL, for example, the date when the CFL was installed in the household is important. The household just across the street of the household targeted by the sample plan may have installed the CFL much later than the household targeted by the sample plan. Hence, information from that other household is not relevant for the parameter to be determined through the sample. In fact, if the information is included in the sample, it may even result in the sample providing an incorrect estimate for the parameter in question.

Mitigating actions

It must be assured that staff responsible for the design and execution of the sampling are properly trained and have clear instructions on how the sampling is to be done. These instructions should not only include clear instructions of what to do when inspecting the selected sample population, but also instructions on what the surveyor can do in the event that no sample can be taken at the selected sample location. As an internal quality assurance the CME should also include a re-measurement of a sample of the sample population in order to determine the accuracy of the survey work.

Pitfall 26

With several PoAs distributing similar technologies in the same geographical area, having a unique identifier is essential to avoid double counting.

Pitfall 26: Double-counting due to not being able to clearly separate the equipment installed by one PoA from the equipment installed by another PoA

Description

Different CMEs may implement different PoAs, distributing similar technologies (e.g. cookstoves, CFLs) in the same geographic area. Making sure that one PoA is thus not including a technology being distributed by another PoA is thus important to avoid double counting. As long as the exact locations of the measure implemented by a PoA are not publicly available, this requires that different CMEs work together and provide to each other information on their PoAs. However, given that the CMEs are potentially competing for projects in the same geographical area, the CMEs of these PoAs may not always be willing to give each other sufficient access to their databases. Hence, each CME should have a system in place that allows it to clearly identify its own technologies without having to rely on information provided by other CMEs.

The impact of the pitfall

An incident of double counting could have significant consequences. It may not have significant consequences in terms of misstating emission reductions, but occurrence of double counting can significantly impact the credibility of a PoA.

Mitigating actions

Whenever possible, the CME may physically mark the technology distributed in their PoA, such as engraving a logo in a cookstove or a CFL. This way, the technology distributed by one PoA can be clearly distinguished from the similar technology being distributed by another PoA in the same geographical area.

If applicable, the CME may enter into agreements with the CMEs of other PoAs that promote the same technology in same geographical areas to allow information exchange with these PoAs.

Pitfall 27

Understanding what data is essential is important when defining the monitoring plan. A parameter included in the monitoring plan has to be monitored with no exception.

Pitfall 27: Missing CPA data (addresses, distributed units, proper disposal of replaced units)

Description

As part of the monitoring plan the PoA generally sets up an elaborate recording system that allows the CME to identify the individual CPA implementor and its participants within the CPA. Frequently, data collection forms are used to support this process. However, during the implementation of the data capturing even basic information does not always get collected. Poor levels of enforcements or changes in the PoA design may lead to data not being collected. Particularly data that might be rather repetitive and well known to the person collecting the data at the time of collection (address, CPA number, complete unit number, etc.), may lead to incomplete data sets at the time that the records are submitted to the CME. On the other hand a change in the design of the PoA's monitoring plan or change of monitoring equipment may mean that some of the original data no longer has to be collected as there is a new way of identification that relies on other data.

The impact of the pitfall

Failing to update the data collection form normally means that the DOE will raise a non-conformity for not collecting all data as stipulated by the monitoring plan. In case the required information is no longer available, part of the emission reductions may not be verifiable or the emission reductions that can be claimed must be discounted using conservative assumptions for the parameters for which information is lacking.

Mitigating actions

CMEs should assure that there is a high level of internal quality control and training of the data collectors in order to identify at an early stage in the process whether collected data is insufficient/incomplete. Following each change within the PoA in relation to the monitoring plan, technology provider, etc., the CME should implement an assessment of the data collection forms and processes to determine that all data that is being collected is still relevant and up to date.