

Boosting the CDM: Insights into what makes Programmes of Activities successful

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Abstract

This paper summarises a study providing insights into the implementation status of Clean Development Mechanism (CDM) Programmes of Activities (PoAs), considering the current low prices for Certified Emissions Reductions (CERs). By design, there are notable differences between PoAs and traditional CDM projects. For example, PoAs are designed to be a scalable framework rather than a single project to better serve underrepresented regions and technologies. Whilst CDM projects have been studied extensively, there is little research on PoAs specifically.

Researchers conducted case studies with stakeholders for active and stalled PoAs to identify PoA-specific issues and opportunities and gain insights into business models used. Researchers found that PoA stakeholders want higher CER prices, increased access to upfront financing and support, simplification and streamlining of CDM processes and increased certainty of outcomes.

The paper also provides recommendations on how the international climate community can best to support existing PoAs in the current market context, including strategies to (a) make outcomes more predictable, (b) increase access to financing, (c) build local capacity (d) streamline CDM processes. It was beyond the scope to address possibilities for increasing CER prices.

These results are part of the research project “Concepts and Country-Specific Strategies for the Carbon Market Post 2012” for the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

Background: Programmes of Activities in the Clean Development Mechanism

The Clean Development Mechanism (CDM) was introduced by the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) to help Parties meet their emission targets cost-effectively, and has grown into one of the most important carbon market instruments. In 2007, the Programmes of Activities (PoAs) modality was introduced to facilitate the development of underrepresented project types (such as projects targeting numerous small dispersed sources of emissions) or implemented over time or over large areas by several actors.

By October 2015, over 285 PoAs were registered (UNFCCC, 2015). By design, there are notable differences between PoAs and traditional CDM projects:

- PoAs are designed as a framework rather than a project: The design of a traditional CDM project (including its size, location, costs) is known ex ante, whilst it is not for a PoA. The essence of the PoA approach is to provide a general framework that allows for the implementation and expansion of mitigation activities over time through the inclusion of multiple Component Project Activities (CPAs) reflecting different characteristics (such as different locations for the same intervention type) under the same PoA umbrella.

- The scale of PoAs is dynamic: The scale and estimated emission reductions are known ex ante for a traditional CDM project. PoAs can be implemented over long periods of time. The scale and associated emission reductions can only be known ex post, and influenced by the revenues from the Certified Emissions Reductions (CERs), issued by the previous CPAs included under the same PoA.
- The main sectors/technologies targeted are different: Traditional CDM projects are mostly large renewable energy and methane abatement activities whilst PoAs are often household level, e.g. cook stoves, lighting, or solar photovoltaics (PV).
- The business models represented are different: PoAs are more attractive for ex ante public support, due to the potential for replication and upscale of small scale activities with potentially greater sustainable development benefits compared to traditional CDM projects.

These unique characteristics influence the role CER revenues play in the implementation of the mitigation activities and the impact that lower-than-expected CER prices have. For traditional CDM projects, CER revenues usually go to the owner of the assets and contribute to the cash flow of the mitigation activity. For PoAs, CER revenues are used in a variety of ways. For example, they might be used by the coordinating and managing entity (CME) to disburse subsidies (e.g. reduce cost to households using an improved cook stove) or to cover administration costs. Anticipated CER revenues can have a direct impact on the size of the PoA (e.g. the number of cook stoves installed). The impact of changing CER prices will effect PoAs differently if compared to traditional CDM projects, which has implications for the types of support needed.

Current Status of PoAs

Current CER prices, driven by the lack of demand, are posing a risk to the continuation of all CDM projects, including PoAs. Warnecke, Day and Klein (2015) found that between 64% and 79% of registered CDM projects are fully implemented with their CDM component in full operation, yet net CDM-benefits are generally insufficient for project continuation, and there is a high risk of the loss of mitigation activity as well as the loss of capacities developed.

For the PoAs included in their study, they found that almost half are not implemented, just over a third are operating regularly, one PoA in ten submit monitoring reports, and very few are issuing CERs. That study also found that PoAs typically reported needing a higher CER price than traditional CDM projects to continue operation and that PoAs struggled even more with the complexity of CDM procedures and requirements. As many did not scale up as much as planned, the relative verification and issuance costs were disproportionately high. (Warnecke, et al., 2015)

Paper Overview

This paper summarises a study providing insights into the implementation status of CDM PoAs, considering the current low CER prices. (Larkin, et al., 2016) Whilst CDM projects have been studied extensively, there has been little research on PoAs specifically.

The paper summarizes six case studies conducted with stakeholders for active and stalled PoAs, discusses key findings and themes found for PoAs and provides recommendations on how the international climate community can best to support existing PoAs in the current market context.

Method and Case Studies

Methodology

The results are part of a multi-phase research project “Concepts and Country-Specific Strategies for the Carbon Market Post 2012” (FKZ UM 13 41 173) for the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). These results build on findings presented in Warnecke, Day and Klein (2015) and focus exclusively on PoAs.

In-depth case studies of six PoAs that were part of the sample in Warnecke, Day, Klein (2015) were conducted. Case selection targeted PoAs in less- and least developed countries and a range of technologies, business models and implementation statuses from cases with current contact information (see Table 1).

Semi-structured telephone and in-person interviews with CMEs, consultants, and stakeholders involved in the CDM infrastructure were conducted August – September 2015, and supplemented with literature reviews. The case studies do not aim to be representative of all PoAs. Instead, they provide insights from the field and up-to-date perspectives on PoAs. The interviews addressed implementation and operational status; monitoring, verification, and credit issuance activities; PoA business model and use of CER revenues; barriers faced; and support needs.

Table 1. Overview of the PoA Case Studies

Geographic scope	Sector	Sub-sector	Implementation and operation status	Monitoring, verification & credit issuance	Barriers and support
A country in Southeast Asia	Methane avoidance	Palm oil waste	Not implemented, not operating	No M,V&I	CER prices PoA procedural complexity
Regional – Central America	Hydropower	Run-of-river	Expanding slowly	Ongoing	CER prices PoA procedural complexity
Regional – Central and South America	Hydropower	Run-of-river	Expanding, albeit slower than expected at first	Monitoring ongoing; V&I not started	CER prices PoA procedural complexity
A South American country	Hydropower	Run-of-river	Expanding, albeit slower than expected at first	Ongoing Upcoming issuance request	CER prices PoA procedural complexity
An African country	EE in households	Lighting	Expanding slowly	Monitoring ongoing; V&I not started	Uncertainty around the CDM PoA procedural complexity
Regional - Africa	EE in households	Stoves	Issued once, Expanding	Ongoing	Uncertainty around the CDM PoA procedural complexity

Case Study #1: Methane Avoidance in a Southeast Asian Country

Status. As with many methane avoidance projects, this PoA is on hold, waiting for CER prices to recover. It targets methane avoidance through adding biogas recovery equipment to

wastewater systems treating effluent at existing palm oil mills throughout the country. A typical CPA would consist of bio-digester(s) or covered lagoon(s), flaring and/or biogas utilization systems for one to several mills. It was registered in 2012, and, originally when the process started in 2010, dozens of locations were considered after piloting one site. However, after registration, CDM activities were suspended and no new CPAs are being added beyond the one originally registered. The mitigation equipment has not been installed under the first CPA, i.e. the CPA is not implemented and it is not operating. It would have reduced over 27,000 tCO₂e annually.

Business model & CER revenues. The biogas recovery equipment is too expensive for palm oil mills to invest in on their own. The owner of the palm oil mills had been considering participation in the CDM, but was not sure how to proceed when they were approached by the CME who had significant international CDM experience.

The CME handles the greenhouse gas (GHG) mitigation activity and takes on the CDM risk. It provides technical support for the CDM-related process and covers the cost of equipment, CDM registration, and verification, which is to be reimbursed from CERs. Part of the remaining revenue goes to the palm oil mill owner along with, if applicable, the revenues from the sale of the biogas and electricity generated. The CME manages the overall process of including new CPAs, each of which being the installation of a GHG mitigation activity in a palm oil mill.

Business model & support. The business model is only viable with sufficient CER revenues. Most small projects that could be included as CPAs under the PoA cannot bear the costs of the equipment and cannot provide the necessary maintenance services required under the CDM without external assistance.

No Emission Reduction Purchase Agreement (ERPA) has been signed and the CME investigated other funding sources from the national government as well as international aid, but none seemed viable for this project. Even with cheaper equipment and easier monitoring processes, the PoA would not be worth implementing, as prices between 5 and 10€/tCO₂ are needed.

Whilst the CME stressed the viability of the business model as a concept, it is dependent on cost recovery through the CER and enabled by the CME's willingness to take on the risk.

Whilst low CER prices are the main barrier, this PoA has also struggled with the complexity of the CDM cycle, the slow pace, and burden of the UNFCCC process, especially linked to the Designated Operational Entity (DOE) and obtaining the Letter of Approval from the Designated National Authority (DNA). The disproportional burden is larger when only one CPA gets included. From a financial and time management standpoint, this type of PoA may only be worth doing if there are enough CPAs to share the burden and costs.

Case Study #2: Regional-Scale Hydro in Central America

Status. The purpose of this PoA is to provide a platform that can develop sustainable small grid-connected run-of-the-river hydro projects in Central America. Each PoA is expected to comprise one or more hydropower plants with a combined installed capacity of up to 15 MW. Initially, 15 CPAs were to be included covering two countries in Central America. It is active, but progressing much more slowly than anticipated. The PoA has not issued yet. Three CPAs have been registered, two additional CPAs in two countries are currently undergoing an eligibility check and are in the final stages of audit.

These CPAs are all going through the inclusion process at the same time to minimise costs, as the inclusion of one CPA turned out to be more expensive and time-consuming than expected. Small hydroelectric projects are difficult to implement and the costs of entering the carbon market is an issue. Documenting that CPAs fulfil the required social and environmental conditions also is more complex than anticipated. The CME still hopes to include up to 10 CPAs during the crediting period, but the fall in CER prices makes it difficult to identify new projects to include. Also, the uncertainty about the future of CDM makes project developers sceptical and hesitant to prepare necessary documentation to meet CDM, environmental and social requirements.

For example, the electricity prices in one of the countries have fallen drastically and are expected to remain low for several years. Projects will not be developed until energy prices recover, slowing down inclusion of new projects in the PoA. Also, some regions face growing opposition to hydro from local communities, particularly when there were inadequate stakeholder consultation processes in the past. In addition, contracts typically take a long time to finalise, investors are unstable and can change over the years or there are security and safety issues around the plants.

Business model & CER revenues. The CME is based locally and has a regional development focus, providing a variety of complementary services, using the CDM registration process as a learning tool. It provides full CDM services, including documentation, support in dealing with the auditors, data collection and organising stakeholder consultations. In the past, the CME bore the costs for initial validation, but now project implementers pay a membership fee and invest in the initial costs. The CME shares remaining CER revenues with project developers.

Barriers & support. The CER price is the biggest barrier: CER prices 20% lower than expected do not cover the costs of inclusion of CPAs within the PoA nor do they encourage projects to stay on board and afloat. The PoA received international support to register, but have not received further support. They are considering registering with Gold Standard for higher prices.

The complexity of the CDM process and the significant time lags between CDM stages are seen as major obstacles; though the monitoring process is straightforward for this type of project.

The CME noted inconsistency between auditors, and the individual perspective and experience of the DOE can make a big difference in the project experience. It is a continuous learning process and further information and documentation is often requested. As DOEs are usually located abroad, additional site visits are not feasible. How much experience the DOE auditor has with similar CDM activities, as opposed to other certification systems or technologies, can make a big difference. Precise information is often not available. For example, requested financial statements may not yet exist at such an early stage. Moreover, Designated National Authorities in the targeted areas change over time and interpretations can vary from one to the next. Clear guidelines on interpreting inconsistencies would reduce confusion for project implementers.

Case Study #3: Scale Hydro in Central and South America

Status. This PoA also targets new grid-connected run-of-the-river hydroelectric plants and operates on a regional scale in Central America, with the targeted countries partially overlapping in territory with the PoA described above, although, no competition between the two was reported.

This PoA is active, though only one CPA has been included so far. Each PoA includes one or more plants with a combined installed capacity of up to 15 MW. More are being added gradually, with two expected by the end of the year and seven more within the next few years.

Business model & CER revenues. The CME is an international CDM consultant covering all CDM-related activities and outsourcing local activities (e.g. site visits) to a regional consultant.

Barriers & support. The PoA struggles with low CER prices and difficulties finding CER buyers. The first CERs are expected to be issued by the end of 2016. Uncertainty has increased due to challenges on the spot market, which does not allow the CME to guarantee any revenue to potential new project owners. Furthermore, it is difficult for project developers to get loans. Project developers are hesitant, as these projects are not seen as bankable and transaction costs are too high. The CME therefore struggles to identify and attract new CPAs to include in the PoA.

The CME said they probably would not have developed the PoA if they had known CER prices would drop to current levels. To mitigate this, the PoA sought recognition under the Gold Standard to highlight the project's sustainable development effects and thereby enhancing its attractiveness on the voluntary market. They have not received international support, and do not plan to apply for it.

Case Study #4: Hydro in a South American Country

Status. This case study is another grid-connected run-of-the-river hydro PoA operating in one South American country. It covers new plants or capacity expansions of existing plants up to 15 MW. Four CPAs are included, with more to be added in phases. Up to 10 more CPAs are expected by the end of 2016. The first issuance was successfully concluded by the end of 2015.

Around 50% of the energy produced in this country stems from hydro, and small hydro power plants are considered an established technology. The CME operates internationally as a CDM business, paid through fees from developers and revenue shares. They work with local and regional consultants who handle onsite visits and project documentation.

Business model & CER revenues. The PoA received public funding for registration and the inclusion of a first set of CPAs. This PoA benefits from having negotiated a signed agreement with sufficient and fixed CER prices early on, for a secured amount of CERs, before 2021.

Barriers & support. The main barrier is the low carbon price, although this is mitigated by an existing ERPA. Another barrier is the registration and inclusion process that has taken longer than expected. Also, the CME, experienced with other CDM projects and PoAs globally, noted the DOE for this PoA had contributed to the delays due to a lack of professionalism and familiarity with the CDM rules and regulations for CPA inclusions. The modest CER revenues now expected will not compensate for the increased complexity of the calculations and verification process.

Case Study #5: Efficient Household Lighting Throughout an African Country

Status. This PoA replaces incandescent bulbs with self-ballasted compact fluorescent lamps (CFLs) to reduce residential electricity consumption with a house-to-house installation programme throughout the African country. One CPA has been included, with at least three more planned. Each CPA is expected to reduce over 30,000 tCO₂e annually. Yet, with higher prices and more government funding, more CPAs could have been included. The CFLs distribution strategy for the first CPA has been finalized and monitoring should start soon.

Business model & CER revenues. The CME is an international bank that coordinates the overall PoA and supports other CDM project developers in the country. The project developer helped with CDM documentation, are active throughout the process and will sell the CERs. CER prices of around €10 were expected when the PoA was structured.

The project developer is the national power company, who registered the PoA to use CER revenues to help offset costs (e.g. marketing and outreach), which were not already covered through the national government's broader energy efficiency initiatives. Also, CER revenues will be used to enhance energy access, by supporting a revolving loan fund, for new electricity applicants unable to meet the cost of electricity connection upfront. Otherwise, more efficient lighting means forgoing electricity sales for the utility. The national government is receiving support, in the form of loan guarantees and other concessions from an international development agency.

Whilst the technology is allowed as a traditional CDM project, the flexible scope of the PoA modality worked well as they were not sure what level of volume to expect beyond the pilot phase. Yet, the CPAs have to be split in order to fit the CDM methodology and be considered small-scale.

Barriers & support. The biggest challenges have been the lack of technical and human capacity in the country to deal with delays and the CDM complexity. Providing adequate data to the DOE was cumbersome and challenging, with many modifications. Monitoring is also time consuming. The level of effort is far beyond what was anticipated, and could be seen as excessive given the uncertainty of outcomes. This is affecting the trust of the stakeholders in the CDM.

As the final version of the PoA Design Document was only approved three years after registration due to a change in the monitoring methodology, the PoA is significantly behind schedule, which has also increased costs. However, the Designated National Authority has been helpful with tackling issues that arise. Yet, after overcoming barriers, the CDM is still seen as a 'good thing, despite the challenges', making a difference in the lives of customers and to the environment.

Case Study #6: Improved Cook Stoves in Africa

Status. This PoA seeks to provide carbon accreditation and access services to independent organisations supplying efficient and affordable cook stoves for low and medium income households. It currently includes six African countries and involves various suppliers, users, and sizes for both firewood and charcoal stoves. One CPA has been included, with eleven additional CPAs in process. The existing CPA is expected to reduce up to 49,000 tCO₂e once fully implemented. In 2016, they will add another country and a second methodology to incentivise stove users to switch to renewable biomass fuels, generating credits at a higher rate. However, filing changes are as complex, if not more so, than registration. The PoA has issued its first credits.

Business model & CER revenues. The CME is based in the region and focuses on raising money without carrying debt from international sources to support cook stove projects. A small Ignition Fund has been created, and six CPAs are being added at a time to reduce DOE costs.

Project developers are supplier organisations that visit households, check that stoves are in use, and remind households they are allowed free annual maintenance, which is an important aspect of the PoA design to increase sustained stove use. Also, if carried out properly, annual maintenance events can directly satisfy CDM MRV requirements for CER issuance. Project developers receive initial services from the CME for free, then pay for inclusion and MRV services. Developers keep all CER revenue to reimburse carbon-related expenses or share with stove users.

The PoA is not vulnerable to low carbon prices in the compliance market, as they registered under the Gold Standard and are also involved with Fairtrade International's new carbon credit standard. Prices on their first issuance in the voluntary market were sufficient; over €10/tCO₂.

Barriers & support. PoAs like this are helping countries gather in-house expertise on CDM practices and building PoA knowledge that can target other sectors, scales and countries in the future. Motivation is growing regionally to scale up activities like these. Yet, the uncertainty and scepticism about CDM's future is a major barrier. Another barrier is a need for cash flow and liquidity for CPA implementers and finding funding sources for each individual CPA.

Every step in the CDM process seems much slower than expected. Conversations between the CME, DOEs and staff are challenging, and processes confusing. CPAs need ongoing support, due diligence work, and patience to be successful. Having an expert DOE with clear knowledge of required documentation, a good relationship with the auditor and continuous staff training all help.

Also, there are significant country differences in Designated National Authority experiences. One was quite helpful in producing a standardised baseline for improved cook stoves, especially targeting schools or urban institutions, which saved time and sped up the learning curve for MRV procedures. Finally, the regional collaboration centre has also provided support.

Discussion and Key Findings

This section highlights key findings from the case studies and extensive literature review. Many findings confirm the existing perceptions of state of the CDM market or overlap with suggestions for further support addressing traditional CDM projects, such as presented in Warneke, Day, and Klein (2015) and in CDM Executive Board Meeting Reports (2015). Yet this paper provides more detailed findings and recommendations specific to PoAs.

PoAs are Slowly Progressing, but there are Challenges

The PoA modality fills a need. The flexibility of adding new CPAs to PoAs is allowing many new concepts to be tested. It particularly supports the ability to scale up after initial pilot concepts are tested, which is especially relevant in new areas or for new technologies. Also, for some measures, respondents report that the MRV methodology makes more sense this way. Aggregating is viewed by participants as valuable to minimise incremental costs and capture economies of scale in learning. Though, one interviewee noted that locking in a particular technology could hinder PoAs from keeping pace with technology improvements.

The possibility of regionally coordinated activities was highlighted by some interviewees as particularly valuable, in part because they help increase economies of scale and can include several countries. Half of the case studies happen to represent regional PoAs that are successfully operating in multiple countries with territories that are not necessarily contiguous. Also, some PoAs could come close to sector-wide upscaling of mitigation actions, if fully implemented. Two case study interviewees noted that it would have been helpful if their PoAs had an even broader geographic scope as this would have facilitated a more robust marketing and promotion strategy. There are successful examples of PoAs driven by or heavily influenced by the public sector, such as the African lighting case study as well.

Some PoAs are being implemented, albeit at a reduced scale. The implementation status of PoAs highly depends on the sector targeted and business model. The case studies confirm that PoAs solely relying on CER revenues are at risk of stopping. PoAs benefiting from other sources of financial support (e.g. non-CER revenues, public funding, and donors) tend to be operating, although on a reduced scale and/or at a slower pace, yet new registrations and CPA inclusions continue as stakeholders adapt. The PoA modality is especially playing a role in the development of CDM activities in underrepresented regions and groups, especially in African countries, where they make up a considerable portion of the total CDM population.

It is challenging for PoAs to achieve critical mass. PoAs need a critical mass of CPAs to spread the cost and administrative effort. However, PoAs are having difficulty registering as many CPAs as anticipated, due in part to low CER prices, procedural complexity and delays, as well as market scepticism. It is harder for CMEs to find appropriate CPAs and to convince potential project developers to participate. The ability to capture economies of scale is hindered in current market context - not only the low prices themselves, but the disillusionment and ongoing perceived burden in the face of limited human and technical capacities.

Data on MRV and issuances is limited. Only one PoA case study has issued credits of the six considered, and another planned to request its first issuance shortly. Reasons for not requesting issuances were low CER prices, having no buyer and high MRV and issuance costs. As the PoA pipeline is young, more follow up will be needed for later stages, i.e. MRV processes and issuances.

Factors for Continuation

PoAs that made it this far hope to persevere. The PoAs still active or temporarily halted believed they had invested enough to get to the registration process that they would prefer to see it through and not abandon the effort. In some cases, it was not feasible to stop for legal or contractual reasons or it would not reduce sunk costs. But PoAs want a more enabling environment. For example, by raising awareness of existing PoAs, and to make participation in more attractive.

Most PoAs indicated needing CER prices in the €5 – 10 range. Most are not receiving public support and few report receiving sufficient contributions from other sources, like electricity sales. There needs to be enough incentives and availability for multiple CPAs to distribute costs, else the ratio of administrative and monitoring costs will be too high, with low CER prices.

PoAs with early contracts and/or pursuing voluntary scheme are better off. PoAs that were able to secure long-term contracts early on are in a much better position, even when they are only for modest CER values, due to increased certainty, as are PoAs with profiles attractive on the voluntary market (such as the Gold Standard or Verified Carbon Standard).

PoA Experiences Vary Widely

As with traditional CDM projects, PoA experiences vary widely not only by country and technology, but, also by the role of CER revenues as and organizational structure of the PoA, such as how risks are distributed and the level of investment/risks of entities involved. The nature and quality of the CDM infrastructure (DNAs, DOEs, consultants) also impact the deployment of PoAs.

The business model influences the PoA experience. One clear theme is that implementation status appears to be significantly influenced by the role CER revenues play in the business model. The case studies discussed above represent a variety of organizational models. One is driven by one of the handful of international carbon consulting firms accepting the risks that are still active in this way, and another is led by an international firm leveraging local consultants on a fee-for-services basis. Two are led by locally-based organisations using an aggregation model, using membership fees or other mechanisms help cover what the credits do not, where they offer a variety of services including CDM expertise.

The PoA modality is used here as a tool to provide an umbrella for the structuring and management of the programme as well as part of the financing. The remaining PoA is driven by the national power company, partially supported by the national government, who is leveraging international financing for a variety of initiatives. These examples of business models fit into the following broad categories, which are not exhaustive:

- Upfront financing of the CDM-related activities by an entity (public, private, or NGO) who assumes some/all risks in exchange for emission rights.
- Driven by a CME PoA coordinator with CDM experience who solicits project developers and contracts CER buyers. To offset upfront costs, they may solicit donor funding and/or charge fees to project developers, who may then receive some or all of the CER revenues.
- International donor and/or national government (full or partial) support to the implementer who may also take responsibility for marketing the CERs.

These cases further illuminate themes found previously, such as capturing economies of scale in learning as well as overall effort through multiple CPAs per PoA is important. Local CMEs with appropriate local context and CDM experience, facilitates this more than relying solely on international consultants. The case studies handled this in various ways, often using locally-based aggregating organizations invested in PoA success, as well as offering CDM expertise.

As prices dropped, some evolved to a membership model or entry payment to offset costs not covered by CERs. Cases where the CDM component is additive and optional to a base activity and reliant on CER revenue (such as for methane avoidance from palm oil waste), were more likely to be put on hold until more attractive CER prices or other alternate funding sources are secured.

For PoAs with significant investment costs and alternative sources of revenue in the future (such as for renewable generation), continued implementation appears to be in part due to the irreversibility of sunk costs, where CER revenues only represent part of the investment structure.

PoAs attractive in the voluntary compliance market due to social characteristics were more likely to continue. For example, the cook stove PoA targeting underserved populations is successful and not vulnerable to compliance credit prices as they registered under the Gold Standard label.

Many PoAs reliant on international consultants for CDM knowledge, equipment or other components were stranded as international consultants went bankrupt or pulled out. These PoAs are unlikely to be implemented unless local stakeholders take over or find new funding resources.

The ultimate number of CPAs included typically depends heavily on the actual costs and revenues, including access to and the role of CER revenues, as well as the ability to identify suitable CPAs amidst market scepticism. Low CER prices limit the expansion of scalable activities especially for PoAs with high ongoing investment costs (e.g. a few € per cook stoves). Any price increases would likely lead to rapid expansion where the infrastructure is in place and upfront transaction costs already have been incurred so that marginal cost/effort is low. The CME for the cook stove case study believes they have ‘barely scratched the surface’, and projects like these are seen as a way to make a massive profound impact in people’s lives, crossing country boundaries.

There are differences between DNAs. Country experiences are driven in part by the capacities of the local DNA and CMEs report huge differences in DNA experiences. Interviewees active in multiple countries mentioned that the experience, even within the same PoA, can vary widely. DNA staff change over time and interpretations evolve, increasing confusion for project developers. Interviewees mentioned that developing national templates would be welcomed.

There are differences between DOEs. The specific DOE contracted can have a tremendous influence on PoA experience, e.g. how much experience the auditor has with similar CDM activities. As DOEs are usually located abroad, additional site visits may not be feasible, increasing the burden on the project developer responding to unexpected information requests. Having an expert DOE with clear knowledge of the required documentation, a good relationship with the auditor as well as continuous staff training facilitates success.

Auditors coming from other certification backgrounds without sufficient local or CDM context can be perceived as having unrealistic expectations with many data requests, such as for records that would not yet exist. Interviewees suggested combining inclusion and verification of several CPAs to mitigate this issue. Two interviewees noted DOEs are not linked to market prices or evolving complexity. One suggested that DoE contracts should have been made variable based on market developments.

Overreliance on external consultants with no regional presence is risky. Whilst there are successes involving international CMEs from developed countries, the most successful themes include combining the international context and knowledge of CDM processes with a strong local presence and a business model that encourages investment in PoA success and ongoing local capacity building. This issue is particularly poignant given how many international consultants departed the market, often leaving a disempowered local developer. Locally-driven PoAs also were more likely to build in long-term maintenance into the business model.

Few international support efforts are seen. An interviewee emphasised that whilst more international support can help, it must be high enough to cover abatement and administration costs, which can be high. Also, the temporary support without building capacity is not sustainable.

Barriers and Needs

The risk profile leads to significant barriers. Many PoAs struggle to secure sufficient upfront financing. Expectations that third-party consultants or specialty firms will assume upfront financial risks until CER issuance is unrealistic for many PoA types, especially with low CER prices. Yet public funding is unable to meet the challenge, though can better leverage private finance. Many PoAs need substantial upfront investment to test a new concept in an emerging area under significant uncertainty on what CDM processes will require and/or uncertainty regarding future revenue streams. This is exacerbated by significant unanticipated procedural delays. A less ambiguous message would give more confidence that PoAs should continue under the CDM.

PoAs want the process to be simpler, quicker, and more predictable. The CDM is still seen as overly complicated. Consistent with previous findings, all interviewees said each stage of the process is slower than expected and there is significant uncertainty around CDM procedures. CER prices less than 20% of forecast do not cover costs nor do they encourage CPAs to stay afloat. Interviewees said CDM texts, concepts and methodologies are not user friendly. Some stated that CPA developers would benefit from more administrative support, e.g. a salesforce database or local staff that understand local constraints. Yet, interviewees are noticing and appreciating UNFCCC efforts, such as with regional collaboration centres and standardised baselines.

Recommendations

The following recommendations can benefit all PoAs and may also benefit traditional CDM projects. PoAs have distinct characteristics, yet ongoing efforts by the UNFCCC to simplify processes for traditional CDM projects also aid PoAs. Interviewees want higher CER prices, increased access to upfront financing and support, simplification and streamlining of the CDM processes as well as increased certainty of outcomes. Whilst clear and sustained market signals are vital to restore trust and for PoAs to reach their potential, it is beyond the scope to engage in debates how to increase CER prices. Instead, we focus on strategies to (a) make outcomes more predictable, (b) increase access to financing, (c) build local capacity, and (d) streamline CDM processes.

Recommendations to make outcomes from pursuing CDM more predictable include:

- CDM reforms. This can be partly accomplished through process reforms that address timetables for and predictability of the CDM process and associated costs.
- Expand local capacities and facilitate knowledge exchange. Increasing local experience and knowledge of CDM processes and financing options will help PoAs predict outcomes.

Recommendations to increase access to finance include:

- Stimulate and de-risk local investments. Unpredictability negatively impacts PoA costs and the ability to obtain financing. More innovative financing approaches are needed. As is clear from broader discussions on financing mitigation, risks need to be balanced from the perception of the investor. This issue is more complex than providing funding as it centres on who pays, such as for unanticipated delays. Local entities in developing countries piloting new concepts are not well equipped to carry long-term financial risk and

uncertainty. National governments and local and international financing institutions are better equipped to manage these risks.

- Funnel international support to de-risk and facilitate private sector investment where they may realistically play a role (Larkin et al., 2015, World Bank, 2014). Mechanisms include concessional loan terms, insurance that creates a floor price for the implementer and/or creating initial ‘seed’ or incubator funding. For example, the ignition fund in the cook stove example consists of loans provided by banks that would be written off if no credits are issued. This concept could be modified to address funder priorities (such as allowing write-offs only in certain conditions), securitising debt or through insurance.

Recommendations to help build local capacities include:

- Helpdesk, templates, examples. More resources that enable CMEs to seek advice are needed. This includes more templates, tools and trainings addressing CDM processes. A helpdesk could also address resources for accessing finance, developing business models or outreach strategies. Existing DNAs, regional collaboration centres and the Climate Technology Centre and Network (CTCN) could also expand duties.
- Raise awareness of PoAs. Existing scalable PoAs would benefit from efforts that raise awareness and benefits of participation, and reduce uncertainty or scepticism.
- Facilitate local collaboration, and encourage additional CPAs within existing PoAs to deepen local CDM experience, such as by further promoting regional collaboration centres as resources with good practices appropriate to the region.

Recommendations to simplify and streamline CDM processes include:

- Streamline CDM processes to reduce the time from initial investment to outcome.
- Simplify CDM processes wherever practical in ways that maintain environmental integrity, reduce costs and administrative burden on entities with limited capacities.
- Build DNA capacities. Increase consistency across DNAs and standardise expectations, e.g. through calculation templates. Encourage DNAs to facilitate linking with the CDM regional collaboration centres and other networks.
- Increase DOE consistency. Increase consistency of DOE approaches, such as with guidelines on interpretations of key issues, templates and within the accreditation approach.

Conclusion

Current low CER prices are posing a risk to the continuation of all CDM projects, including PoAs and thereby hindering GHG mitigation activities internationally. Whilst CDM projects have been studied extensively, there has been little research on PoAs specifically in the past.

This research suggests that whilst PoAs are unique, many of the broader strategies being implemented or considered by the CDM Executive Board and other stakeholders to further support traditional CDM projects will also benefit PoAs. It also highlights several findings and recommendations specific for PoAs that further broadens the evidence base for CDM.

Interviewees want higher CER prices, increased access to upfront financing and support, simplification and streamlining of the CDM processes as well as increased certainty of outcomes. The CDM Executive Board and other stakeholders should focus on making outcomes more predictable, increasing access to financing, building local capacity, and streamlining CDM processes.

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