

1. Introduction

This paper looks at different options for expanding the use of new carbon mechanisms as one of the important tools for incentivising private financial flows and enhancing resource allocation towards mitigation activities.. The CMIA supports in principle the ultimate development of a global carbon market as one of the key means to incentivise appropriate mitigation actions. The use of crediting mechanisms serves as both a risk mitigation and revenue stream enhancing instrument.

In order to achieve a greater coverage of the carbon market, the CMIA believes it is important that the current mechanisms are reformed in order that the future expanded infrastructure evolves from the existing mechanisms and that the significant learning achieved and progress made under the clean development mechanism (CDM) is capitalised upon. Therefore, the two caveats to this paper are that CMIA first and foremost proposes that the current reforms of the mechanisms, in particular the CDM, are carried out, speeded up and dramatically increased; and secondly, that new mechanisms grow out of and work alongside the existing market to avoid undermining the confidence in internationally-supported carbon markets, which are still young and fragile – if confidence is lost in the world's political willingness to address GHG emissions, it will be hard attract investment back to the sector and business will not be able to deliver.

The only currently available international mechanism to address GHG emissions in emerging economies is the CDM. This mechanism needs immediate and effective implementation of agreed reforms and an ongoing standardisation to operate more efficiently providing gradual evolution to enable far greater emissions reductions. The CDM has proven the concept of international crediting mechanisms in the context of carbon markets and has made possible significant emission reductions. However, it has taken nearly a decade to build up the mechanism to this point, including the infrastructure within the UN, as well as the support industry such as third party validators, technical experts and consultants. New crediting mechanisms, as explained below, will probably be more complex and it can not be expected that they could be operational at any scale within a shorter timeframe unless they utilise the existing knowledge and systems. Given the time required to deliver a significant number of CDM projects and the slow rate of uptake of Programmatic CDM, it is even more important to start on the definition and implementation of new crediting mechanisms sooner rather than later.

Some of the concepts discussed below could be implemented within the existing CDM if the current narrow interpretations are expanded. However, for the purpose of the discussions going on internationally, these are discussed as separate new mechanisms in this paper.

Until any of the new concepts are operational and proven, the eligibility for the CDM should not be affected and projects that need second and third crediting periods need to be able to continue under the same framework. When these new crediting mechanisms are in place, they should be more efficient than the project-by-project approach of the CDM, and attract projects from sectors that are more mature. With a natural gradual shift that is likely to start, the support industry can plan and grow with it.

The CMIA is strongly of the opinion that the development of any of these new, or reformed, more-efficient international crediting mechanisms should be used for the purpose of incentivising greater emission reductions in the most cost effective way, and not as a tool to force targets on non-Annex I countries.

2. Overview of the framework

This paper proposes a global architecture for the management of greenhouse gas (GHG) emissions, helping countries implement their national low carbon development strategies. It is based upon the concept of applying different emission reduction mechanisms to different sectors of a country's economy in the context of nationally appropriate mitigation actions (NAMAs), based on the development status of that sector, national circumstances and local technical and institutional capacities. The development status is

reflected in the capacity of the host country's institutional infrastructure. The more advanced the technical capacity and institutional infrastructure, the more capable the host country is of implementing more advanced emission management initiatives. The objective is to create a series of entry levels for economic sectors with varying institutional capacity and then incentivize more ambitious and advanced initiatives on the basis that they have the potential to generate a larger number of emission reductions, deploy new technology, utilize more capital and deliver better sustainable development benefits to the host country economy. Developing institutional infrastructure can be one of the objectives of the mechanisms.

Actions initiated under the different policies or support mechanisms could be financed in a variety of ways, ranging from a demand for carbon credits, internationally supported actions through to investment driven by incentives created by host country policy that is not dependent on purchasing credits or international support.

To be clear, we are suggesting that developing countries identify more advanced sectors of their economy and place these on a route to reaching national strategies or objectives that can transmit a price signal to investors. However, this transition takes place over decades and is financed through much more powerful mechanisms than the CDM can achieve. This transition comes with repeated cycles of access to new technology and investment from capital markets. At the same time, host sectors and countries will benefit from sustainable development at a scale which CDM has not reached. For example, projects which promote widespread energy efficiency have very marked benefits for the host economy through savings from the subsidy of energy costs and savings from the reduced need for capacity expansion.

In order to follow the discussion and rationale, it is necessary to have a brief understanding of the overarching architecture, which is provided here.

The paper recognizes five distinct options which are briefly described below and are then explained in more detail in the rest of the paper:

- 1) The clean development mechanism in this proposal is the most basic form of GHG emission management. It is suited to sectors of the economy which are not well structured. For example, sectors of the economy which are not regulated, permitted, have no GHG or environmental reporting obligations and perhaps do not even have the capacity to promulgate and enforce regulations. The investment incentive in this mechanism is driven by a demand for carbon credits which are mainly used as pure offsets with no host country responsibility for the emissions reductions.
- 2) Benchmark Mechanisms (BM) set a performance target for a defined group of entities (population) which exceeds the current performance. Achieving the benchmark is therefore a demonstration of environmental integrity in that it is certain to move beyond crediting emission reductions below business as usual (BAU). "Own action" credits are therefore generated to the extent that the benchmark exceeds current BAU performance. Credits are only awarded for performance beyond the benchmark, ensuring environmental integrity.. Implementation of a benchmark needs greater technical capacity and institutional infrastructure compared to CDM because entities under the benchmark must be defined and managed; data gathered and the project implemented across multiple "sites". But in return, a benchmark initiative can encompass any number of site specific initiatives which improve performance. Benchmark initiatives are suited to sectors of the economy which are immature or growing rapidly and where it is not possible to restrict absolute growth in GHG emissions – in other words sectors where growth in GHG emissions is equal to or greater than growth in output. Benchmark mechanisms set relative targets which enable a sector to grow in an unconstrained manner but reward it if it can reduce the GHG emission intensity of that growth.
- 3) A Crediting Baseline Mechanism (CBM) would set a sector or sub-sector-wide emissions intensity target and the host country would be free to exceed this target by a variety of means, including nested market mechanisms. Crucially, there is no international penalty if the sector does not exceed the target, and the

target may be negotiated to a level below business as usual to ensure environmental integrity and ensure that emission reductions occur that are beyond offsetting. Such a mechanism requires much more institutional infrastructure than Benchmark Mechanisms. These kinds of initiatives are suited to sectors of the economy which are close to mature and where it is increasingly possible to break the link between growth in GHG and growth in output.

4) A Selective Cap Mechanism (SCM) or Cap and Trade mechanism which defines binding caps for selected sectors in developed economies which do not wish to take on an economy wide cap. The “binding” element means that the host country is obligated to ensure that the overall cap is met and this can be done through internal reductions within the captured facilities, via using domestic credits from non-capped sectors or via surrender of credits sourced from other mechanisms. The binding cap drives global emissions downwards and is applied to sectors where it is possible to break the link between growth in GHG emissions and growth in economic output.

5) Economy wide caps which drive global emissions downwards and require the host country to address emissions across the entire economy.

Throughout the paper, emphasis is placed on the transition of sectors from one option to the next, without wiping the slate clean each time but rather building on and evolving the scope of the mechanisms over time. The starting point for least developed sectors is clearly CDM, and the expertise and infrastructure developed for CDM contributes greatly to understanding of each of the mechanisms. More developed sectors may engage directly in more advanced and powerful mechanisms. Over a timescale of decades, all sectors can transition to more advanced mechanisms, utilizing new technology and new financing packages each time.

CDM remains the basic mechanism and the other mechanisms build on the understanding that CDM has created. However, it is implicit in this framework that host Governments have the vision and will to build capacity to utilize enhanced crediting mechanisms. More advanced mechanisms give greater access to finance and technology and speed up a move to a low carbon economy hence delivering sustainable development benefits.

3. Policy framework

The Kyoto Protocol establishes several market-based mechanisms to help achieve emission reductions at a lower cost: CDM, JI and international emissions trading. Based on the principle of common but differentiated responsibilities and circumstances the Kyoto Protocol establishes quantified emissions limitations and reduction commitments for Annex 1 Parties.

The approach to an overarching architecture for the management of GHG emissions described in this paper can be applied in two ways:

- 1) From the traditional Annex I and Non Annex I perspective taking into consideration national circumstances and looking at the development status and opportunities of each national sector in the economy; or
- 2) From a more diverse perspective, where national circumstances and differences are still recognized, yet all countries consider the development and opportunities of each sector of the economy.

The latter perspective provides a number of advantages:

- 1) This approach does not depart from any of the principles of the UNFCCC yet provides greater flexibility to recognize and take into consideration national circumstances, capacities and opportunities.

- 2) It helps identifying sectors of a given economy that are not sufficiently well developed to account and manage GHG emissions under market mechanism whilst sectors of another economy are sufficiently advanced such that they can engage in more advanced forms of GHG emission management, emission reductions and financing. In other words, targets which are applied to an entire economy are implemented via measures which are applied to part of the economy – for example the EU ETS is only applied to certain sectors of the economy whilst other sectors (e.g. agriculture, domestic emissions and transport) are addressed in other ways but are not eligible to participate in such a wide range of financing mechanisms.
- 3) CDM is currently used to support, for example renewable energy infrastructure in countries which have sufficiently well developed energy infrastructure to support variable tariffs. Instead of using CDM to promote a small numbers of renewable energy projects on an individual project by project basis, the host country could adopt a different approach to attract much large amounts of capital on more favorable terms with the objective of developing a significant fleet of renewable energy assets.
- 4) Recognizing the development status of different sectors allows further refinement and finer resolution of the concept of differentiated responsibilities but also recognizing different opportunities. Countries can identify those sectors of their economies which are mature and can apply different mechanisms to these sectors compared to those sectors which are growing rapidly and/or which lack the institutional infrastructure required to manage GHG emissions.
- 5) In effect, different market mechanisms can be applied to economic sectors reflecting their maturity shown by, for example, ratio of growth in GHG emissions to growth in economic output.
- 6) Data availability, technical capacity and institutional infrastructure are key to improving a given sector's ability to receive both public and private international finance and new technology. By focusing on ways of collecting comparable and reliable data and the transformation of institutional infrastructure, host parties will be creating an enabling environment within which to increase the scope of emission management and emission reduction activities that can be undertaken.¹

In summary, a global architecture can be applied within the context of the current targets but it would be better to move towards a situation whereby all sectors of all economies are differentiated. The table below shows how the Annex 1 / Non-Annex 1 divide is replaced by a gradual change in the application of different mechanisms. Over decades, the more advanced mechanisms spread towards the bottom left of the table. (All terms are described in the following sections of this paper).

¹ It is important to note that market mechanisms are not limited to carbon markets. For example, a market approach has also been applied to energy efficiency and renewable energy generation. However, any market approach will require the same amount of data quality and institutional infrastructure.

Host status\ Sector	LDC (Africa)	DC (China, India)	Advanced DC (Mexico)	Developed (Non-Kyoto)	Developed (Kyoto)
Power	CDM	BM / CBM	CBM/SCM	SCM	Economy Wide Caps with JI
Heavy industry	CDM	BM	CBM	SCM	
Light industry commercial	CDM	BM	CBM	SCM	
Domestic	CDM	BM	BM	BM	
Transport	CDM	CDM	BM	BM	
Ag CH4 / wastewater	CDM	CDM	BM	BM	
LFG	CDM	CDM	CDM	Domestic projects	
CMM	CDM	CDM	CDM		
Gas flaring	CDM	CDM	CDM		
High GWP	CDM / law	Law	Law	Law	Law

* Domestic projects in uncapped sectors in developed countries may be subjected to different additionality tests e.g. regulatory additionality as currently applied under The Climate Action Registry.

4. The supply and demand conundrum

Which comes first, the supply of emission reductions (ERs) or the demand for them? Obviously, neither supply nor demand is going to materialize on their own and countries which are suppliers of emission reduction credits are only likely to engage in mechanisms to supply if they know:

- a) there will be demand for the emission reductions and
- b) supplying the ERs will not prejudice the host country's ability to make future strategic cuts in their own GHG emissions in light of their own priorities.

In relation to a) it is the responsibility of developed countries to set clear targets to drive global emissions downwards. These targets will be fulfilled by a combination of domestic action and emission reductions sourced from a variety of suppliers. If developed countries are confident that adequate supply will be available, they can set strong caps that can be achieved cost-effectively without adversely impacting the economy.

In relation to b) there are two important points to understand:

- 1) If and when a host country or sector has taken on a target or quantified objective, experience has shown that the cap will best be determined by reference to the technological ability to reduce emissions and the availability of historical emissions data. Even in the case where an arbitrary cap is allocated for the first period and wind-fall profits may arise, this is unlikely to be repeated in a second phase, so by not engaging with carbon market mechanisms now, host countries are holding off benefitting from new technology, reduced costs, more sustainable development for, at most, a five year windfall which may not materialize for many years.

- 2) The time scale over which sectors or the economy will take on binding or voluntary caps is measured in decades, not years. As further detailed below, new technologies will be developed and implemented over time scales of decades such that, for example, today's new technology can be implemented with carbon finance now and in 15 or 20 year's time, another new technology will be available and carbon finance can be used once again to finance the implementation of the next wave of technology.

So holding back on taking steps to provide a supply of emission reductions fails to make the most of available carbon finance and denies the host country the benefits of reduced GHG emissions (which include reduced costs of raw materials and fuels, reduced subsidies for fuels, increased availability of fuel for economic development, deployment of new technology etc).

In turn, developed countries must set the binding international caps which drive global emissions downwards. Clearly, the mechanisms which provide the emission reductions to offset developed country emissions must ensure that the emission reductions are real, measureable and long-term – these criteria are addressed below. This relates to the need for robust MRV (monitoring, reporting and verification) procedures at both a mechanism level and a national level. Since finance for mechanism based projects will only flow if MRV exists, it is in all Parties' interests to support the development of suitable MRV procedures.

Critics of the current CDM point to non-additional projects which undermine the credibility of the carbon market. It is impossible to ensure that all emission reductions are equal in their environmental integrity and the CDM has set a very high standard for such environmental integrity. Two points defend the environmental integrity of emission reduction mechanisms:

- 1) Any initiative that speeds up or brings forward the deployment of a lower emission technology generates real emission reductions. Even to the extent that technology is advanced by only a few years. On this basis, the length of a crediting period for a project may be re-considered. A one-off crediting period avoids excessive generation of emission reductions whilst almost certainly giving investors time to satisfy their investment criteria.
- 2) Given the current scientific projections about the tipping point and feedback mechanisms associated with global warming, there is a strong crisis time preference which puts additional value on emission reductions this year compared to next year. Just like money, the global environment will benefit more from actions taken today compared to tomorrow.

For these reasons, developed countries should advance their commitments to reduce GHG emissions, setting binding international caps which are met by a combination of domestic action and international emission reduction credits. The mechanisms below describe further how uncapped sectors in developed countries can also participate to provide domestic emission reduction credits to help meet binding targets.

5. Flexibility mechanisms and institutional infrastructure

At present, the investment community faces a lack of suitable incentives for large scale investment in emission reduction projects. As will be described below, the CDM is only suitable for individual technological interventions on individual or, under PoA, multiple sites. As such, CDM does not present a large enough opportunity to invest to match the amount of capital that may be made available (potentially a significant proportion of the \$100 bn per annum aspiration in the Cancun Agreement); nor can the CDM provide the volume of emission reductions that strong binding international caps and economy wide caps may demand.

However, there are sectors of the economy which are capable of doing significantly more than just CDM. This could involve both scaled up mechanisms financed through emission reduction crediting mechanisms and opportunities to combine credit sales with incremental investment in own-effort actions without

adversely affecting economic development trajectory. These sectors are typically identified as those which have more advanced and better developed institutional infrastructure. For example, the power sector is critical to the economy in all countries and in all but the least developed nations, there is probably a high level of institutional infrastructure which is used to regulate power generation, transmission and distribution. E.g. the host Governments probably have a Ministerial level representative whose responsibilities include the efficient operation of the power sector; power plants will be permitted and will be required to report specific data; regulations can be passed and have a high likelihood of implementation or enforcement. Similarly, heavy industry sectors such as cement and iron and steel may be supported by institutional infrastructure that presents better opportunities for the reporting and management of GHG emissions, coupled with the energy-intensive nature of the sectors meaning that there is a high concentration of emissions across relatively few sites.

In contrast, sectors such as small and medium enterprises, light commercial, buildings, the domestic sector, transport, and many other important sectors of the economy do not have any such institutional infrastructure and managing and reporting of GHG emissions in these sectors presents a wide range of difficulties.

This split is already recognized within the EU ETS where only certain activities within certain sectors are captured whilst other sectors are excluded.

In the following section we discuss the essential infrastructure for GHG emission management and how that varies across different sectors and countries, which then leads to the concept of designing different GHG emission management mechanisms for sectors with different developmental status.

5.1. Limitations of the CDM

The CDM has been designed to facilitate the diffusion of emission reducing technologies and to contribute to sustainable development of the host country. There are several key components to the CDM which limit its scope of application:

- 1) Emission reductions must be calculated by reference to a baseline which is established at the outset of the project and which is based on a hypothetical scenario analysis
- 2) The project activity must be shown to be additional to business as usual using either methodology specific steps or the additionality tool
- 3) In verifying the emission reductions, the DOE must check that the project has been implemented as planned and that the parameters listed in the methodology have been monitored correctly.
- 4) CDM is limited to project-by-project application, and emission reductions are driven only by demand for credits from other countries.

These criteria, and others, are drawn from the Marrakech Accords and are enshrined in the CDM project cycle, including the construction and definition of methodologies; the additionality tool; the DOE's validation and verification procedures, the Validation and Verification Manual, CDM project design, monitoring plans, monitoring reports and 10 years of implementation etc.

The result of this design, intentionally or not, is that CDM project activities can only tackle one, or in some cases two types of technology interventions per project. For example, a typical CDM project activity is generation of renewable energy OR waste heat recovery OR non-CO2 GHG abatement etc. Those projects that include two activities are limited to situations involving methane where there activities can be either the collection of methane for destruction and / or collection of methane for power generation.

As such, the CDM can be viewed as a one dimensional mechanism facilitating the deployment of one technology on one site.

Programme of Activities (PoA) allows a single technology to be applied on multiple sites and hence has the ability to promote CDM from a one dimensional tool to a two dimensional tool.

It is not explicitly clear, but in practice it is not possible to implement multiple project activities on one site unless they are completely independent of one another. For example energy efficiency technologies have not been widely successful under the CDM because typically a facility owner would implement multiple activities in an EE program which would affect the overall power consumption and hence GHG emissions. This can only work under CDM if each of these activities is listed in the methodology and PDD and implemented and monitored exactly as planned.

The global economy needs mechanisms that facilitate a three dimensional approach to emission reductions – i.e. mechanisms that permit the application of multiple technologies on multiple sites.

Benchmarking of performance achieves this goal because it focuses on GHG emissions of a whole site or installation per unit of output. A benchmarking approach would not require such restrictions on the scope of the project activities. Similarly other broader measures such as Crediting Baseline Mechanism can cope with multiple activities, in a similar fashion to mandatory schemes such as the EU ETS, which has few restrictions on what facility owners can do to reduce their emissions (for example, they cannot close their facility and continue to receive allowances.)

To develop a CDM project, the only host country requirement is a letter of approval from the designated national authority (DNA). The rest of the work is done by the host facility, the project participants (PPs) the designated operational entity (DOE), the CDM Executive Board (EB) and the UNFCCC Secretariat. There are almost no institutional infrastructure requirements for the host country.

To develop Benchmark or Crediting Baseline Mechanism projects, significantly more data, technical capacity and institutional infrastructure is required. This is explained further below.

5.2. Essential infrastructure for GHG emission management

A number of institutions are essential to the accounting and reporting of emission reductions. The following matrix provides an overview of where the different institutional responsibilities lie under the different mechanisms.

This table shows a steady transition from almost total reliance upon the UNFCCC Secretariat, the CDM EB and Project participants combined with minimal host Government support to almost total reliance upon the host Government with minimal support from the UN bodies. These two extremes are represented by the CDM on one hand and having quantified economy wide emission targets on the other. In the latter case, the Parties simply prepare national inventories following the relevant guidelines and report these to the UNFCCC who review them.

In between these two extremes there is a vast array of entities and activities that cannot currently be captured by nor incentivized through market mechanisms. The CDM has registered in the region 2900 projects throughout Non-Annex 1 countries. This means that around 2900 individual technological interventions have been motivated by the CDM. Whilst this is a notable achievement, it must be a tiny fraction of the total number of facilities which could host an emission reduction project. On the other hand, EU ETS has captured over 14,000 facilities in a subset of the economy, with multiple interventions being undertaken within each facility to reduce GHG emissions. It is clear that, under the current design, a massive proportion of the global economy cannot participate in and benefit from carbon finance.

Analysis of institutions required for the implementation of emissions management mechanisms

Function	Institution infrastructure under different mechanisms					Objective
	CDM	BM	CBM	SCM	Economy wide cap	
Defining the framework for establishing the boundaries/parameters of sectors in general	CMP	CMP	CMP	CMP / Host Govt	Host Govt	Harmonization and Efficiency
Characterizing/documenting the relevant pool of national assets within each sector accordance with the framework above	n/a – CDM is project specific	Host country “coordinating entity” can be PP, Trade Association (TA), Govt	TA or Government dept. Must have strong support as legislation may be required	Host Govt	Host Govt	Harmonization
Applying for “certification” of the project / national sector for inclusion in a scheme	PPs	PPs with Govt / TA support	TA or Govt	Host Govt	Host Govt	Harmonization
Certifying the project / sector as characterized by host country	DOE	DOE or Host Accredited Entity (HAE)	DOE or HAE	HAE	HAE	Harmonization
Defining methodology or calculation modalities for benchmark/ baseline setting within each sector [including methods for adjustment to accommodate economic growth]	CDM EB and meth panel	BM EB and meth panel	NLM EB and meth panel	Host Govt	Host Govt	Efficiency
Establishing the project baseline or national baseline for approved/certified sectors in accordance with the calculation modalities	PPs	PPs / Host country coordinating entity	TA / Govt dept	Host Govt	Host Govt	Efficiency
Verifying project activity / implementation or that national sectoral data collection methods and baseline calculations comply with the modalities	DOE	DOE or HAE	DOE or HAE	HAE	HAE	Credibility
Defining criteria for accrediting independent verifiers	CMP	CMP	CMP	Host Govt	Host Govt	Credibility and Harmonization
Accrediting independent entities for verification of project / sectoral baselines	CDM EB	BM EB	CBM EB	Host Govt	Host Govt	Credibility

Certifying national sectoral baselines and proposed baseline updating schedules [for accommodating of economic growth]	DOE	DOE or HAE	DOE or HAE	HAE	HAE	Efficiency
Defining MRV standards of emissions performance of assets seeking sectoral credits	CDM EB and meth panel	BM Executive Board (EB) and meth panel	CBM EB and meth panel	Host Govt	Host Govt	Credibility, Efficiency, and Harmonization
Establishing meaningful provisions for non-compliance response and enforcement	n/a	n/a	n/a	CMP	CMP	Credibility, Efficiency, Legality, and Harmonization
Carrying out MRV in accordance with established standards	PPs	PPs / project coordinator	Incumbents	Incumbents	Incumbents	Credibility, Efficiency, Legality, and Harmonization
Spot Checking MRV performance of host country administrators [and DOEs]	CDM AP	BM AP	CBM AP	Host Country Accreditation Authority	Host Country Accreditation Authority	Credibility, Efficiency, Legality, and Harmonization
Issuing credits / allowances	CDM EB	BM EB	CBM EB	Host country govt	Host country govt	Harmonization and Tradability
Establishing a [global] credit registry that allows for the international and inter-system trade of the sectoral credits	CMP	CMP	CMP	CMP	CMP	Harmonization and Tradability

5.3. Developing infrastructure for flexibility mechanisms

The above sections have described the institutional infrastructure which is required for the different kinds of mechanisms. It is also implied that sectors will progress from one mechanism to another over time.

Improvement in institutional infrastructure can be achieved in two ways:

- 1) By making the transformation of institutional infrastructure one of the objectives of the flexibility mechanisms. Instead of the two objectives of helping annex 1 countries meet their QELRCs cost effectively and promoting sustainable development, we now have a third objective. All project activities under the mechanisms should contain an element of institutional infrastructure development – including MRV systems and capacity, training of staff, education of graduates etc.
- 2) By requesting support for institutional development from financial commitments made under the Cancun Agreement or other sources of ODA.

Sectors can move from one mechanism to another via renewed waves of investment in line with the roll out of newer technologies.

Example: Consider domestic energy consumption in a developing country. It is a totally unregulated sector and the government is not planning to introduce legislation such as a ban on the sale of incandescent light bulbs or incentives for domestic insulation and improved heating technology.

Step 1: CFLs can be financed and implemented via a PoA style CDM offset project. After 10 years, many of the CFLs will be failing.

Step 2; The project could be re-financed on the basis of moving from CFL to LEDs. This could be done under a benchmark methodology (with a benchmark based on CO₂ emissions per annum per household). It would be possible to establish such a benchmark because after 10 years of the CDM project, good data would be available on lighting usage.

Step 3: Based on the population database (ie the participants in the benchmark project), a new project could be implemented to address CO₂ emissions per household per degree day. This would be a new benchmark which would take into consideration energy consumption for lighting, heating/cooling and cooking. Emission reductions could be achieved by promoting a switch to agricultural residue fuels to displace coal, more efficient air conditioners and also by financing insulation, draft proofing, double glazing etc, and possibly by then, new building materials and energy efficiency technologies. In 30 or 40 years, emissions from the domestic sector will be significantly reduced, the new technologies will have been financed by the production of successive waves of emission reductions and the host economy will have benefitted in several important ways – not least reduced reliance upon fossil fuels and reduced consumption of (subsidized) energy.

The institutional infrastructure required to support these initiatives increases from one step to the next but the host country has time to adapt to these changes.

6. Description of the GHG emission management framework

6.1 Ground floor: Regulation

6.1.1 Introduction

Regulation has a special role in the framework. Regulatory measures are required to address specific sources of GHGs and may be applicable to certain gases in certain sectors irrespective of their development status.

It is proposed that regulation would be used as a means of abating emissions of very high GWP gases i.e. HFC23, SF₆ and N₂O from chemical processes.

Existing facilities in least developed sectors would be entitled to one crediting period to claim CERs under CDM. Thereafter they would be treated as all other sources of high GWP in more developed sectors. These sources would be required to abate GHG emissions, and subject to CDM style verification, the costs of abatement would be refunded or credits would be bought by a multilateral agency, for retirement, at a low fixed cost.

Alternatively, the High GWP credits could be excluded from markets such as the EU ETS on the basis that these are some of the most cost effective credits which host countries can use towards their “own action”.

6.1.2 Description of the project methodology

In this case, existing CDM style monitoring, reporting and verification rules would apply for facilities producing high GWP gases in least developed countries. It may be that there are no such facilities in least developed countries which have not already acted under CDM.

For emitting facilities in the more developed sectors, the existing CDM monitoring and reporting criteria and procedures could remain in force with verified costs refunded on issuance of ERs.

6.1.3 Validation and monitoring requirements

Existing CDM procedures would apply

6.1.4 Potential funding mechanisms

The emission reduction activities could be paid from a levy on ERs from the mechanisms (ie from the share of proceeds or a mitigation fund) or from donor funding via a multi-lateral agency such as the GEF.

6.1.5 Required institutional infrastructure

Very little institutional infrastructure required. This approach only requires that host governments mandate and ensure that all relevant facilities abate their emissions consistent with the UNFCCC methodologies. The host government needs to know which facilities are included. In some instances limitations over the import and export of precious metal catalysts would need to be addressed.

6.1.6 Political ramifications

CERs from high GWP projects are the mainstay of CER supply at present; the EC has now moved to limit the access for these credits to the EU ETS, restricting supply in the future.. If new mechanisms can be introduced to increase the supply of ERs, then the loss of high GWP CERs need not impact the supply side. Establishment of a financing mechanism to ensure that existing abatement activities continue could gain widespread political support.

6.2 Level 1: Enhanced CDM

6.2.1 Introduction

The CDM has been a highly successful means of developing project based emission reduction activities. A massive amount of expertise and experience has been gained from the CDM; many lessons have been learnt.

However, the CDM is to an extent, a victim of its own success. It is now overloaded and struggles to cope with the size of the project pipeline and simultaneous demands for reform. This proposal is for an enhanced CDM system that would continue to operate in certain sectors.

The CDM is a project based mechanism which promotes a single project activity on a single site. Additionality is proved by establishing a baseline and then proving that the project activity is a) not the baseline and b) impossible to implement on the ground of financial or other barriers. This approach, though laborious, has proven effective when applied to individual technological interventions and as a consequence, typical CDM projects include construction of renewable energy plant, fuel switch from eg coal to biomass, abatement of a high GWP gas, replacement of existing equipment with more efficient equipment.

However, most notably, CDM projects do not enable project developers to undertake multiple activities on one site and, if the baselines interact with one and other, CDM actually stops multiple activities taking place. As a consequence, the CDM is not promoting wide scale adoption of multiple new technologies throughout industrial sectors.

Furthermore, the efforts of project developers to expand the scope of the CDM are frustrating the broader objectives of the mechanism. The submission of renewable energy projects into the registration process has drawn the CDM Executive Board (EB) into a long and protracted debate around host country energy policies, which in turn delays the EB's work on other issues.

Under this new architecture, the CDM would focus on least developed sectors of the global economy which would take the CDM to least developed countries and to least developed sectors in developing and advanced developing countries. The CDM EB and their panels could focus their time and resources on top down methodology development, simplified rules and modalities, capacity building etc and work to promote a flow of investment into these under-developed sectors. This is ongoing work but the system currently lacks human capacity to implement the above.

6.2.2 Description of the project methodology

CMP 6 provided the CDM EB with guidance on the implementation of standardized baselines under the CDM. Importantly, Standardized Baselines were defined as including both the definition of baseline emissions and/or additionality. Accordingly, the CMIA considers that this is a signal to the EB to become more creative with the rules around the CDM. CMIA has proposed the adoption of alternative types of methodologies to complement the existing approaches of normal or large scale / consolidated, small scale and micro scale meths. Each of these approaches additionality in a different way and we propose that there at least four other types of methodologies which could be explored – benchmark meths (promoting multiple technological interventions in specific facilities or sub-sectors); modeled baselines (ideal for the built environment); deemed saving meths (ideal for energy saving technologies) and positive additionality lists for technologies which are considered to be automatically additional (ideal for application to least developed sectors such as the domestic energy consumption sector, charcoal production etc).

In addition, an alternative approach to additionality could be developed for least developed sectors. This approach is based on the concept of social or crisis time preference. If one assumes that the lowest emission technologies are ultimately implemented, then the only question is “when will that implementation take place?” If the CDM can bring implementation forward, then it will generate real emission reductions. Given that least developed sectors, by definition, lack institutional infrastructure (skilled workforce, basic regulations, planning processes, markets, access to capital....) it may be safe to assume that a new technology is unlikely to be implemented within the next 10 years. Therefore actions which implement the technology can generate emission reductions for at least 10 years, without having to go through any more complex additionality arguments.

A standardized approach to BOTH baselines and additionality would enable the CDM to attract much more investment into least developed sectors.

6.2.3 Validation and monitoring requirements

As currently in operation. The effective application of standardised baselines and improved additionality should vastly improve the validation and registration process. In addition, better treatment of uncertainty within methodologies would help to improve the environmental integrity of the mechanism.

6.2.4 Potential funding mechanisms

As currently in operation, but would achieve a significant boost with more certain demand for CERs.

6.2.5 Required institutional infrastructure

Institutional infrastructure in host countries is kept to a minimum because ultimate oversight is by international bodies. Local DNAs have a greater opportunity to participate in the establishment of standardized baselines, and this can be seen as a step on the road to creating improved emission management infrastructure. The host country can use the projects to help develop and build a monitoring, reporting and verification culture in the host sector. The projects can also be used as the basis for starting gather information about the sector with a view to better managing GHG emissions from this sector in the future.

6.3 Level 2: Benchmark Mechanism

6.3.1 Introduction to Benchmark Mechanisms

The term “Benchmark” and its derivatives have been discussed in the climate change space for quite some time. There are CDM methodologies which claim to be benchmark methodologies and there are plenty of sectoral studies on benchmarks, but the full potential of benchmarks in the climate change world has yet to be described.

For the purposes of this proposal, a benchmark is considered to be the same as the term emission intensity level and is an expression of performance in terms of CO₂e emissions per unit of output for a defined group of entities or facilities (population). Examples of a benchmark include:

CO₂e per tonne of product in the cement, steel, ceramic, paper industries

CO₂e per MWh in the electricity sector

CO₂e per household per degree day for heating (or cooling) households

CO₂e per passenger km or per freight km

CO₂e per \$GDP

A benchmark is not necessarily a target. It only becomes a target when it is incorporated into a Benchmark Mechanism whereby performance which exceeds the benchmark results in the generation of emission reductions. Even then, non-achievement of the target would not carry penalties.

A benchmark differs from an emission intensity factors such as a grid emission factor if the population used to define these terms is different. Hence a benchmark might be defined for a population of power plants which are within a defined size range and use a specific technology (eg combined cycle coal fired plants in country x in the range of 150 to 500 MW capacity). In this case the benchmark would differ from a grid emission factor which is calculated using a combine margin calculation.

A benchmark is closely related to the level of technology penetration in a given sector. When a sector is dominated by a single technology, then one single benchmark can accurately describe the performance of all participants. For example, if the majority of households in a region burn coal for heating, then a single benchmark which describes emissions of CO₂ per household per degree day can be applied to the entire population. However, when a sector consists of lots of different sized facilities, of different ages using different technologies, it is impossible to define a meaningful single benchmark that applies to all facilities. The cement sector is a good, and well researched example. The new methodology (under consideration at the time of writing) entitled “CDM methodology for cement and clinker production facilities based on benchmarking” New NM0302 (currently available at http://cdm.unfccc.int/methodologies/PAMethodologies/publicview.html?meth_ref=NM0302) provides an analysis of emission intensities for cement plants which shows that emissions range from 300 Kg per tonne

of cement to 900 Kg per tonne. This reflects the wide range of performance in this sector and, as the comments from the Methodologies Panel show, identifying one single benchmark is subjective and problematical even within one country.

Applying a benchmark methodology under the existing rules and modalities of the CDM is impossible for several reasons:

- 1) The additionality test is designed to assess the barriers to the implementation of a clearly defined activity, typically one technological intervention. A benchmark methodology considers the overall performance of an entire facility and allows multiple technological interventions, all of which will improve the overall performance. It is impossible to apply the CDM additionality tool to this kind of an activity.
- 2) The PDD requires that emission reductions are linked to specific interventions which create the emission reductions. Where multiple interventions take place, this is not practical.
- 3) During the monitoring of the project activity, DOEs are required to verify specific parameters listed in the PDD. Since a benchmarking approach provides flexibility to implement an open-ended list of interventions, it is impossible to provide a list of specific parameters to be monitored. As a result, the existing monitoring and verification component of the CDM procedures, including the VVM and DOE accreditation standards, cannot be applied.

Recognizing these important characteristics leads to two different considerations:

In a population with a single dominant technology (e.g. where more than [95]% of entities utilize the same basic technology), a single benchmark can be defined, based on the existing performance of the population the nature of the proposed project activity. Given that a new and lower emission intensity technology exists, it then follows that the vast majority of the population can participate in a project or program to install the new technology and in the process, the vast majority will benefit. Those who have already adopted the technology (early actors) potentially lose out on the opportunity to participate but they are, by definition, few in number. In this scenario, a project can proceed with (amongst other things) relatively little involvement from Government (although such a project can also be implemented by Government).

In a population with a range of technologies already present, no single measure can benefit all the participants and indeed, in a competitive scenario, those who have already invested in newer technology may effectively be penalized if their competitors get assistance to up-grade to a newer technology. Under this scenario, the relatively disadvantaged will object, potentially paralyzing the initiative. To make it work (amongst other things), Government or (strong) Trade Association involvement is required. For example, Government may decide to support the program by levying a tax on the beneficiaries and re-distributing it to those who have already invested in the technology; or Government or a Trade Association may set about defining strata within the population and defining a representative benchmark for each stratum.

The essential difference is that in the first situation, significant Government / administrator involvement is not essential whilst in the second situation, it is. As a consequence, it is clear that in order to succeed, Benchmark Mechanisms need two different approaches, in some ways similar to the current distinction between small scale and "normal" CDM. These two approaches are termed Single Technology Benchmarks and Multi-Technology Benchmarks and they are described below.

6.4 Level 2a: Single Technology Benchmarks

6.4.1 Introduction

Single Technology Benchmarks (STB) are suitable for situations where technology penetration is uniform and the sector or population uses the same basic technology (efficiency of operation of individual units is

not an issue because, as described below, the benchmark is established through surveys and an average value is calculated).

The project activity is the installation of a newer / cleaner technology. Obvious examples would include CFLs replacing ILBs (already possible under small scale CDM); replacement of coal fired heaters with biomass fired heaters (possible under CDM but difficult); switching from petrol to CNG in vehicles; upgrade of air conditioning equipment in buildings; refrigerators etc.

The project activity needs support from Government similar to the level of a host country Letter of Approval currently required for CDM, although the program could also be implemented by the Government.

6.4.2 Description of the project methodology

See guidance on establishing a benchmark in Annex.

The example below would assume that the project introduces a step change to current practice and therefore the benchmark would be the best commercially available technology (BCAT). Current practice can be quantified through surveys.

Working together, the DNA and Project Participants must first establish what constitutes the best commercially available technology and ideally, undertake a survey to establish the ex ante performance. BCAT would be defined by desk study, expert opinion, technology tests and equipment performance criteria. This survey could be supported by the host Government (DNA), a trade association, industry, a donor or others.

The survey to establish current practice could use historic data if it is available (although it is unlikely that it would be available). The survey must be designed to calculate the average performance with minimum variation.

Depending on the nature of the project activity, the benchmark may be the more conservative of BCAT or lower 95% CI of current performance. See proposed guidance in Annex which would help to set a benchmark relative to the level of the predominant technology to be installed under the project.

Either way, the benchmark is set at a level below the existing average performance, and the margin between the benchmark and the existing performance represents mitigation action undertaken without the support of carbon credit sales. As this margin defines the host country contribution, and does NOT give rise to credits, the exact or accurate determination of the mean performance is less important. Only if the benchmark is the lower 95% confidence interval (rather than BCAT) is it important to minimize the variation around the mean.

The survey is likely to involve significant data collection from a representative sample of the population supported by calculations to convert, for example, fossil fuel usage into CO₂ emissions per unit of activity. The DNA can help to ensure the success of the process in consultation with other Government Agencies, institutions and academic bodies / universities / research units etc.

A benchmark methodology therefore deals with the definition of:

- 1) Mean performance and lower 95% CI
- 2) Best commercially available technology
- 3) State of the art technology and finally
- 4) What technologies would constitute a step change in performance.

Technical issues to calculate emission reductions can be drawn from existing CDM meths.

As stated above, Government, trade association or others may help to establish best commercially available technology, state of the art technology and so on.

Crediting period: Bearing in mind that the objective of this mechanism is to scale up emission reduction activities, it is anticipated that projects are implemented across large populations / sectors / regions / states / provinces and therefore significant time lag may arise from the start to finish of the implementation phase. Crediting periods need to be modified accordingly with sufficient flexibility to account for delays in implementation, as has been implemented under PoA.

However, it is suggested that the crediting period for a specific piece of equipment should be limited to 10 years or the equipment lifetime, whichever is shorter. This seems reasonable because the impact of cash flows on IRR beyond 10 years is very small, and the higher the weighted average cost of capital (WACC), the lower the impact. Despite the increased certainty of the incentive relative to CDM, these are still likely to be relatively high risk projects so the WACC will usually be well into double figures.

Monitoring: Periodically, probably annually, the survey is repeated to establish the ex post performance. A similar sampling design should be applied and if the measure has been successful, the ex post performance will be lower than the benchmark. This must be proven at a statistically significant level.

Baseline: The benchmark is the baseline and since the baseline is a measure of emissions intensity, it is automatically adjusted for changes in the level of activity.

Environmental integrity is assured if the ex post performance is (statistically significantly) below the benchmark. No credits are awarded for the improvement in performance between the current mean performance and the benchmark. The benchmark has been set and is applied to a defined population such that none of the participants already exceed the benchmark. Achieving the benchmark is therefore, by definition, a sign that each entity has departed from BAU and is acting additionally. Additionality *per se* does not therefore need to be proven.

Credits to be awarded to each operator/entity (or the co-ordinator, depending on the specific design of the project) are then calculated based on the difference between the two benchmarks times the number of units of activity.

6.4.2.1 Fixed or variable benchmarks

A fixed benchmark is a benchmark which is set a constant level for the duration of the crediting period. A variable benchmark changes over time, typically becoming increasingly stringent, reflecting a general increase in efficiency over time.

The most important factor is not whether the benchmark is fixed or variable, it is knowing what the benchmark is for the duration of the crediting period. If there is a proposal to re-assess the benchmark periodically it will completely undermine the certainty for investors. It is therefore essential that they know how many emission reductions they will achieve over the crediting period based on different levels of production.

Other points to consider:

Changes in the benchmark are more likely to be related to operational improvements rather than capital investments. Quantifying the benchmark at the level of best commercially available technology or state of the art technology already assumes good management or better.

The difference between current management and best management of the existing technology is reflected in the host country contribution and therefore does not lead to credits. The effect of adopting a fixed

benchmark may be that host country contribution declines slightly over a 10 year crediting period but the credits from performance which exceeds the benchmark, remain constant (relative to output).

Consequently, a strong argument can be made for a fixed benchmark but this does not mean to say that:

- 1) a host country could not insist on a variable benchmark (which would in effect keep the host country contribution constant and decrease the credit generation); or
- 2) that there may be specific technical reasons as to why a variable benchmark is more appropriate.

6.4.3 Validation and monitoring, reporting and verification requirements

Unlike CDM, monitoring of an Single Technology Benchmark is a top down process, where the ex ante performance, the benchmarks and ex post performance are determined through a survey process and not through the measurement and monitoring of individual project parameters.

Validation is therefore a matter of checking the definition of the population; that the survey procedures have been implemented correctly and that the ex ante performance and benchmark have been correctly calculated.

There may be project specific activities to verify, but otherwise, monitoring is a matter of repeating the survey to (re-)calculate the ex post performance.

Reporting would involve the preparation of a report detailing the survey results and these would be subject to verification as usual.

Interestingly, under a Single Technology Benchmark activity, it would be possible to apply a CDM style monitoring plan to a sub-sample of participants in order to gather information which would corroborate the overall result. This would have two benefits:

- 1) it would provide confidence in the overall project activity, underwriting the final results and
- 2) in the event that it was not possible to prove a statistical difference between the ex ante and ex post benchmarks, this approach could be used as a fall back to determine an the level of emission reductions – but this would come with a higher transaction burden similar to CDM.

Validation and verification could be carried out by accredited and designated entities, but it is important to distinguish between the approaches applied under CDM and those that would be valid for Single Technology Benchmark.

6.4.4 Potential funding mechanisms

The nature of this activity is such that a single entity may be willing to finance or subsidize the roll out of the technology in question, as well as administer the project and undertake the survey exercises to establish the ex ante and ex post performance. For example, technology or equipment providers may be willing to finance the program in return for sales and access to markets; the private sector or multilateral agencies may be willing to finance or subsidize the program in return for the resulting emission reductions. The traditional ERPA model may also be suitable although the scale of the program and the timing may make this difficult to manage.

Each recipient of the technology would most likely exchange their portion of the emission reductions in return for subsidized / free access to the technology, or for some other consideration.

6.4.5 Required institutional infrastructure

The required level of institutional infrastructure is somewhere above that required for PoA under the CDM. DNA involvement is required to help the Project Participants to organize the population and conduct surveys etc, but the task is somewhat simplified because the vast majority of the population can participate in and benefit from the implementation of the technology. As a result, this mechanism can deliver a transition from a single mature technology to a new technology which as a result of the project, becomes common practice throughout a defined population.

The Host Party Government must be aware that granting approval to a PP to implement a project in a region / sector can be seen as endorsement of a “landgrab”, whereby a private entity secures the rights to income / economic activities at the expense of their competitors. This is an important issue and host Parties may need support or guidance on how to deal with this. For example, PPs may be set performance targets to ensure that they make good on their commitments; consortiums of technology providers may be encouraged; or the Government may take the initiative and call for tenders to develop the projects. Plenty of precedents exist and this should not be seen as a barrier to the mechanism.

It is also worth noting that after the completion or during the implementation of the project activity, a STB could be advanced into a Multi-Technology Benchmark or, after the technical or operational lifetime of the equipment, it can be replaced with newer technology under a new STB, if such is available.

6.5 Level 2b Multi-Technology Benchmarks

6.5.1 Introduction

Multi Technology Benchmarks (MTB) are suitable for situations where technology penetration is heterogeneous and there is no single prevailing technology in service. Due to the likely variation in technologies amongst the incumbents, it is likely that different facilities will find a different range of measures to be particularly suitable or desirable. Hence an MTB offers entities within the defined population an open ended list of activities which can be implemented at any time or in any combination.

The word “multi” in the term Multi-Technology Benchmark relates to the fact that there are multiple measures that can be implemented en route to exceeding a benchmark. This should not be confused with the fact that it would also be possible to implement multiple benchmarks within a sector. For example, the cement sector could be divided into strata, each with its own benchmark (hence multiple benchmarks). Each of these ex ante benchmarks is then likely to be beaten by a range of measures (hence multi-technology interventions) which all contribute to the ex post performance.

MTB needs significantly more support from Government or a strong administrator such as an effective Trade Association to define and implement the stratification of the population, or to implement mechanisms to redistribute the benefits of the project so that early movers are not disadvantaged.

It should be noted that Emission Intensity targets of the type recently adopted by India and China are in effect economy-wide MTB, although whether the resulting emission reductions can be converted into a tradable commodity remains to be seen. Most likely the practical complexities in ensuring comparability from year to year would be too great. It is more likely that these countries can implement many other projects under new mechanisms which may or may not generate tradable emission reductions and simply report the overall performance of their economies.

6.5.2 Description of the project methodology

As per STB, with one important distinction. It must be made clear at the outset whether the ex post performance is based on the performance of each individual facility or on the average of the defined population. Each approach has advantages and disadvantages and it may need the Government to step in to decide which approach is to be taken. It may prove very difficult to encourage widespread investment if the level of crediting depends on the overall performance of the sector, because the reward offered to each installation will depend on actions taken by others. On the other hand, if the entire sector is comprised of State Owned Enterprises, it may be significantly easier to roll up the overall performance of the population into one report and one issuance which goes to the state treasury!

NM0302, referred above, could be seen as a first attempt to establish an MTB methodology. It remains to be seen whether or not the CDM EB approve the methodology for implementation under the CDM. On the basis of this analysis, to do so would severely stretch the existing validation and verification procedures and present the CDM EB with a range of problems which they are not equipped to deal with.

6.5.3 Validation and monitoring requirements

As per STB although with MTB it is unlikely that the top down verification process can be systematically supported by the bottom up process. This is because facilities may implement a wide range of measures which may interact and may be impossible to verify. For example, multiple energy efficiency measures may compound energy savings in a way that is difficult to monitor and quantify bottom up. Or, if processing changes are combined with training and awareness raising amongst staff, it becomes impossible to attribute emission reductions to specific actions. Both of these situations are difficult to handle under CDM style monitoring and verification.

6.5.4 Potential funding mechanisms

Funding MTBs is more complicated because individual facilities may be willing to pay for their own improvement processes and benefit from energy or raw material savings and emission reductions. Specific technology providers are less likely to take on the financing of technology change within a whole sector, but they may be willing to work with specific installations. Project developers may work with individual facilities, companies with multiple facilities or particular strata within the sector to finance a range of measures in return for a share of cost savings and ERs. Governments could also finance a range of measures or seek loans to support such measures.

The ability to award ERs to individual facilities irrespective of the performance of their peers is important though not essential to the investment community. Commercial models will need to be developed to provide investors with certainty over access to the benefits.

6.5.5 Required institutional infrastructure

As indicated above, significantly more institutional infrastructure is required in this mechanism. For MTB to function, Government needs to know all about the sector in question (number, size, type of facilities²); the facilities need to have a culture of reporting and be capable of implementing long term or permanent changes in operations and so on. As a consequence, MTB may not be suitable for some sectors of the economy until adequate national institutional infrastructure exists. Helping these countries to develop this infrastructure is a key function of the UNFCCC and any future international convention.

² It is interesting to recall that during the preparation of the national allocation plans for the first phase of the EU ETS, some governments found they lacked complete lists of the capture facilities and only two countries undertook verification of baseline data however, by the second phase, monitoring and reporting systems were in place.

6.6 Level 3: Crediting Baseline Mechanism (CBM)

6.6.1 Introduction

Crediting Baseline Mechanism (CBM) is for sectors which are closer to being able to adopt binding target, but are not yet willing to take an economy wide target. They represent an opportunity to develop and implement the kinds of national institutional infrastructure necessary to support a full blown emission trading scheme without the threat of economic pressure on developing industries and sectors of the economy which are still in transition. CBM presents a means of financing technology improvements within a developing or growing economy.

Under a CBM, the Government approves the definition and boundaries of a sector or sub-sector of the economy. The Government works with them on the establishment of the following projections of absolute emissions, applying internationally agreed guidelines (ie methodologies):

- 1) Business-as-usual emissions (future emissions without any measures to reduce emissions)
- 2) With measures emissions (future emissions taking announced projects, programs and regulations into account) – taking account of own or supported appropriate mitigation actions.
- 3) Crediting baseline which is set below the “with measures emissions” level in order to enhance environmental integrity and ensure that credits are only issued after host country performance has exceeded the BAU and with measures level. This concept is referred to as the “crediting baseline discount”.

The Government oversees the verification of these projections, registers them with an international body and then works with the incumbents and the private sector to establish funding mechanisms. As part of this process, the Government, incumbents and investors agree on rules as to how resulting emission reductions are to be distributed and how to deal with a situation where the emissions exceed the crediting baseline (i.e. no offsets are generated) etc.

The CBM project itself does not define how the target will be met. The Government is free to define the scope of the program as long as it complies with UNFCCC agreed design principles. Specific requirements on transparency and guidelines may be established as part of the legal texts defining the mechanism. Alternatively, a Government may develop a CBM project unilaterally.

Host Governments may take steps or follow guidance to enhance the environmental integrity of their CBM activities by increasing the gap between the with measures projection and the crediting baseline. For example, a CBM project in which the crediting baseline is a 10% discount on the with measures projection, and which contains a claw back mechanism in the event of a breach of the crediting baseline, might be seen by eventual buyers as more environmentally beneficial and hence more desirable.

Because CBMs can be very sector or even sub-sector specific, and could vary in emission reduction potential from small to large, they are also well suited to bilateral treaties or agreements.

In practice, CBM will most likely take the form of a cap and trade scheme whereby incumbents take on mandatory targets but the overall performance has no international obligations. The UK Emissions Trading Scheme would be an early example of such a mechanism. Under this economy wide, 6-gas ETS, the Government pre-purchased emission reductions from voluntary participants who were then required to deliver their verified emission reductions. The UK Government retired these emission reductions but under this architecture, the resulting ERs could be put up for sale to capped sectors or economies.

Finally, crediting baseline mechanisms in the form of voluntary cap and trade schemes could transition into binding cap and trade schemes after one or two phases.

6.6.2 Description of the project methodology

The Government can work with industry to define and select a group of participants for a CBM. The ideal selection would be an entire sector, and if this is a sector with export potential, then it will appeal more to buyers who are concerned about financing improvement in potential competitors (i.e. the incentives to improve are spread across the entire sector, good and bad performers alike as well as those producing for the domestic markets and the export market). But it may also be possible to define a sub-sector in, for example, the power sector where plants produce for national or regional power but do not export significant quantities of power, and where technologies have widely differing emissions profiles.

These entities need to have adequate monitoring and reporting infrastructure, and if this is not present, then a Benchmark Mechanism may be appropriate for first round of investment and technology uplift. The Government or program administrator should then oversee the preparation of baseline and with measures emission scenarios following agreed methodologies (for example, refer to the IPCC guidelines on national inventory as a starting point). They then define a crediting baseline. As stated above, the difference between the with-measure projection and the crediting baseline is optional or it could be mandated in the legal frameworks or methodologies, but it would be better if it were linked to the capacity for technological change.

Governments in countries which consider take on CBM may wish to link the crediting baseline discount with their international pledges.

After implementation of a range of measures as appropriate, the Government / administrator recalculates the absolute emissions for a given period and commissions verification of the report. The verified and audited report is submitted to the international regulator who reviews the report and issues credits accordingly.

6.6.3 Validation and monitoring requirements

International MRV requirements are linked to domestic reporting procedures which are already in place and gathering established econometric data. Furthermore, the entities themselves are required to monitor their own performance as part of the domestic emission trading scheme. Domestic and / international verification entities will provide verification of site specific emissions; the Government will regulate and enforce compliance with the targets. Thus, international MRV amounts to an annual report of overall performance of the cap and trade scheme with potential for samples of verification to check the application of the reporting principles. In this way, the Host Government is taking on a much more significant part of the monitoring and reporting responsibilities whilst the CMP has significantly less involvement.

6.6.4 Potential funding mechanisms

Raising finance for emission reducing investments is now considerably easier because entities are awarded allowances in advance and can use these to raise the capital required for the investments. Green Bonds, amongst other approaches, could provide access to capital.

One key factor is to be clear on who receives the resulting emission reductions and how these are marketed internationally. From an investor's perspective, there needs to be certainty that investments in a specific facility that generates emission reductions results in the award of emission reductions, irrespective of the performance of other facilities. Tying the award of emission reductions to the overall performance of the sector would present a significant barrier to investors. The private sector needs to be involved at an early stage to ensure the resulting mechanism can be financed.

6.6.5 Required institutional infrastructure

The required political commitment is significant in terms of the need to establish infrastructure and administer the scheme, with the possibility that some entities will need to be encouraged to participate, however, the benefits far outweigh these costs. The outcome of a 10 year CBM will include:

- 1) Issuance of allowances which significantly eases capital raising compared to BM and CDM activities where credits are issued after implementation
- 2) investment into and access to new technology, with extended benefits to the rest of the economy
- 3) reduced fuel costs, more efficient use of natural resources or reduced expenditure on imported fuel
- 4) development of internal infrastructure around monitoring, reporting and verification
- 5) preparation of the sector to enter a binding cap and trade initiative and link to other cap and trade regimes
- 6) opportunity to enter into bilateral or multilateral funding emission reduction sales agreements with other Governments or Agencies, providing increased certainty for the private sector investors.

In the worst case, the group or sector fails to under-cut its crediting baseline and there are no revenues from emission reductions.

6.7 Level 4 Selective Cap Mechanism

6.7.1 Introduction

Under this mechanism, targets are defined for selected sectors of an economy which are mature and are not experiencing significant further expansion. This is a significant step because it indicates that economic growth can be decoupled from emissions growth. Decoupling can be achieved and enhanced in a number of ways including more efficient use of products, retrofit of existing facilities to operate more efficiently, transition to state of the art technology or a step change to a new technology. An internationally binding target can link participants in the sector to other sectors and economies.

This linkage brings a number of benefits including access to global markets for both carbon and technology; upfront issuance of compliance grade allowances which can be used to raise finance; and opportunities for the host government to raise finance via auctions.

As the target is a binding cap, entities must meet their obligations which may mean that they need to buy allowances. Such allowances can be purchased from projects registered under any of the preceding mechanisms. To the extent that these mechanisms are implemented in other less developed sectors in same economy, this scheme can drive inward investment.

6.7.2 Description of the project methodology

The project methodology, and the validation and monitoring requirements and potential funding mechanisms below, are basically the same as for the Crediting Baseline Mechanism above. The difference is that where the crediting baseline above was set voluntarily, under SCM, the targets are tied to long term goals and are binding. Typically the target is established through reference to macro-economic projections and/or capacity for technological change. These targets are allocated to facilities either through free allocation or auctions. Individual facilities are required to meet their targets and the aggregated performance of the whole sector must meet overall target.

6.7.3 Validation and monitoring requirements

As per crediting baseline section

6.7.4 Potential funding mechanisms

As per crediting baseline section

6.7.5 Required institutional infrastructure

Somewhat more advanced than under a crediting baseline mechanism, as there may be a need for auctioning, issues around leakage of domestic industry, imports from non-participating sectors etc. Any linking and banking rules can be established. In this respect the EU ETS almost constitutes a binding international cap on various sectors but it stops short of allowing full linkage between its participants and the international market. Only EUAs (European Union Allowances) are recognized and other units must be converted, by which means the administrators control issues such as environmental integrity, supplementary and banking.

6.8 Level 5 Economy wide caps

These are not detailed here as they are not a mechanism, but the rather the final stage in gaining control over GHG emissions. Under an economy wide cap, the entire economy is forced to decouple economic growth from emissions growth. If the majority of the world's economy can be captured under economy wide caps in line with what the latest science indicates, we will effectively have solved the GHG emission problem. Whether we can do that soon enough is another challenge.

7. Principles of the integrated flexibility mechanisms

There are a number of key principles that must be addressed in an effective emission management framework. Some of these are discussed below.

7.1 Environmental integrity

Environmental integrity is fundamental. If the monitoring reporting and verification process fails to ensure that emission reductions are real, then the resulting emissions reductions credits are insignificant and will not contribute towards achieving the ultimate objective of the UNFCCC. Environmental integrity is addressed in two ways:

- 1) by providing that project activities are additional to business as usual, i.e. that they would not have happened in the absence of this initiative and
- 2) by ensuring that MRV and accounting regimes are accurate, complete, consistent, comparable transparent. (ACCCT)

If actions are additional, then the emission reductions will represent real emission reductions. .
If accounting is ACCCT then a tonne of GHG in one location can be considered to be equal to a tonne of GHG in another location.

7.1.1 Additionality, baselines, benchmarks, crediting baselines and binding caps

The definition of additionality varies under each of these mechanisms as follows:

The CDM has a very tough definition of additionality. It applies a two stage approach as described above. This level of proof is appropriate because each individual CDM project operates in a virtual vacuum, with no links to host country policies and measures or even to other initiatives occurring on the same site. This leads to a mechanism that credits actions that are beyond BAU. The host country only issues a Letter of Approval and Authorization.

Under a Benchmark Mechanism, the benchmark is set below the level of performance of the population ("below" referring to fact that improved performance reduces emissions per unit output). The population must be as homogenous as possible to ensure that a representative benchmark can be defined. It could be 1 or 2 standard deviations below the average performance calculated from 1, 2 or 3 years of historic data or reflect best commercially available technology or state of the art technology. Proposed guidance on benchmarks is provided in the annexes. As such the benchmark represents a level of performance which has not been achieved by the population in the past. Hence, it is assumed that any plant which takes actions to meet the benchmark is making an effort which is additional to the business as usual and is further incentivised to exceed (beat) the benchmark by having the possibility to earn emission reduction credits. Consequently any performance which exceeds the benchmark (ie has an emission intensity which is lower than the benchmark) generates real emission reductions.

There is an important distinction between CDM and BM – under CDM additionality is a two stage process based on the definition of the baseline and proof that the project activity is additional. Under BM, it is a one stage process based on simply exceeding a performance standard.

Furthermore, the difference between current performance and the benchmark, which may be difficult to accurately quantify, does NOT generate offsets. This component of performance constitutes the host country contribution or "own-action". Only performance which exceeds the benchmark generates emission reduction credits.

Under a Crediting Baseline Mechanism, the host entity sets a target or a crediting baseline based on projections of economic activity over the next 5 to 10 years, discounted for (a) already planned measures and (b) domestic own action.. Again, this mechanism incorporates a significant component of "own action" which must be delivered before credits are generated and this component could be counted as the host Party's contribution towards their international mitigation commitment if one has been made. Any activities which result in emissions which are lower than the cap or crediting baseline are considered to be additional and generate real emission reduction credits.

Under a Selective Cap Mechanism and an Economy Wide Cap, the concept of additionality is unnecessary, assuming of course that the cap is set at a level which represents an ambitions or appropriate effort.

7.1.2 ACCCT accounting

Confidence that a tonne equals a tonne is delivered by ensuring that MRV and accounting protocols fulfill the following criteria:

- 1) Accuracy standards should be set so as to ensure that reported data are reliable. This is a statistical issue and simply requires consistent rules on the expected levels of accuracy of metering devices. The EU ETS Monitoring and Reporting Guidelines specify accepted levels of accuracy based on tiers of overall size of emissions.

- 2) Consistent means that calculations are performed consistently from year to year or from baseline to project enabling one to be meaningfully subtracted from the other.
- 3) Complete means that all relevant sources are included – in some instances, de minimis thresholds have been introduced to remove the need to monitor insignificant or immaterial sources.
- 4) Comparable means that reports from different facilities or projects can be compared, having applied a common methodology and reported in a common format.
- 5) Transparent means that all assumptions and calculations are laid out such that they can be reproduced.

These principles are generally applied through approved accounting, monitoring and reporting protocols which must be adopted by all parties and supported via appropriate resources and technical and institutional capacity. .

7.2 Host country contribution

One of the underlying criticisms of the CDM is that all of the actions result in certified emission reductions (CERs), such that the buyers are funding 100% of the emission reduction effort whilst the host country is not supporting the effort at all. For least developed countries and sectors this arrangement might be considered suitable, however, this currently applies to all sectors in Non-Annex 1 countries. In addition, some countries have expressed their own voluntary actions in relation to the Cancun Agreement and may want to preserve cost effective emission reduction to count towards their own effort.

At present, all of the emission reduction effort from CDM projects are used as offsets. One of the very positive aspects of the benchmark and crediting baseline approach is that these provide a clear opportunity for distinguishing host country contribution or own actions. In both BM and CBM designs, the concept of additionality is ensured by setting the point at which offsets start being created below the performance of the population. In this way, not only is it ensured that all credits are additional, but also that proportion of effort which brings participants up the benchmark or crediting baseline may be counted as the host country contribution.

As described in the guidelines on the setting of benchmarks, the exact difference between mean performance of the defined population and the benchmark or crediting baseline may not be known with a high degree of accuracy. This is relevant for 2 reasons:

- 1) it removes the need for detailed data on current performance. Best commercially available technology may be defined by reference to theoretical text, operational manuals, design specifications etc.
- 2) It means that the host country contribution is estimated by subtracting BCAT from average performance. If average performance is not known to a high degree of accuracy, it follows that the host country contribution is not known to a high level of accuracy. Whilst this would not be acceptable for generating offsets for sale in the international market, it may be acceptable for estimating voluntary host country contribution.

7.3 E+ / E- : national policies affecting emissions development

Dealing with E+ and E- policies has become a headache for the CDM EB. Under the proposed architecture, this would largely cease to be an issue. Any sector which is sufficiently well developed to implement E+ or E- policies is not a likely candidate for CDM. If they can implement such policies, it indicates that the institutional infrastructure is in place to support a wider variety of measures and therefore the sector should be looking at BM or CBM initiatives.

For example, the power sector in many countries is not in need of CDM support. Yes, many projects can be shown to be unattractive without CDM support, but in practice, many countries could dramatically increase the production of renewable energy by introducing a green tariff under a BM or CBM. If a regional grid has a grid emission factor, it means that there is sufficient information to define sub-populations and applicable benchmarks or crediting baselines. Entities that can beat their benchmark can receive a higher tariff financed by the sale of the emission reductions generated by beating the benchmark. Similarly, renewable and nuclear energy plants can be financed using revenues generated from the sale of emission reductions created by the lowering of the grid emission factor (a relative target under a BM project) or by a reduction in absolute emissions under a CBM project.

E+/E- policies implemented prior to the adoption of these new mechanisms would impact eligible activities but emission reductions could be generated for activities which exceed regulatory requirements.

7.4 Absolute and relative emissions measurement

CDM, CBM and SCM deal with absolute emissions whilst BM deals with relative emissions targets. The two different approaches are entirely compatible. They simply require the recognition that they are generated from different sectors of the economy, using different mechanisms. The environmental integrity of the emission reductions is the same.

CDM is based on absolute emissions from specific projects because the methodologies have been developed that way. It is theoretically feasible for CDM to utilize relative targets; however this has not been applied in practice because the additionality analysis requires assumptions about the levels of output. These are defined in the baseline and project scenarios and if the project deviates from these, approval for the changes must be sought. The reasoning behind this is that a project activity may be financially unattractive (and therefore additional) at a certain level of activity, but above (or below) that level, it may be non-additional (for example economies of scale or supply constraints may act to make a project activity non-additional at different levels of output). Nevertheless, most CDM methodologies rely on relative emissions factors to calculate the project-specific baselines.

BM are relative targets because a benchmark project is not constrained to apply one defined technology. Benchmark projects can apply as many technologies as they wish and hence it is not necessary to restrict the level of activities to an additionality assessment. This enables benchmarking technology to be applied to sectors which are growing and where it is not possible to break the link between GHG emission growth and economic growth. BM projects do not constrain growth in an economic sector and they do not limit emission growth either, but they do encourage change in the emission intensity and hence, real emission reductions. These emission reductions are equally environmentally beneficial as emission reductions from other mechanisms.

CBM deals in absolute emissions. The difference between CBM and CDM is that the former is applied to a population or sector rather than an individual plant, and like BM, multiple technologies can be implemented. The total emissions can still grow, like under BM, but unlike BM they grow in a controlled manner and they will grow less than in the absence of the project activity. They should also grow more slowly than growth in economic output from the sector.

7.5 Economic growth and GHG emission management

The ultimate objective of GHG emission management is to enable the link between increases in GHG emissions and economic output to be broken whilst promoting sustainable development. The former goal can best be achieved in sectors which are “well developed” or “mature” where new capacity is added by replacing existing facilities, through efficiency improvements in production and more efficient use of products. For example, fewer power plants or steel mills are opened in Europe. This link cannot be broken in sectors which are growing fast and no rational Government would accept caps on this basis.

The different mechanisms enable different sectors of an economy to engage in different kinds of emission reduction activities which reflect their status of development and maturity.

For example, nuclear power which is excluded from the CDM, could be an acceptable project activity under a Crediting Baseline Mechanism. This would take place in a country which has a well developed power sector, with strong institutional infrastructure and presumably the capacity to implement such a program.

7.6 Transition from one mechanism to the next

Sectors move from one mechanism to the next over periods of decades. If a crediting period for a BM is set at 10 years, then after this period a new project can be designed, either against a new benchmark or by moving to a crediting baseline mechanism project. The key point is that with each new project, a new wave of technology can be introduced and financed using carbon.

7.7 Redefinition of objectives of the flexibility mechanisms

As agreed in Cancun any new mechanisms must take into account the following:

Ensuring voluntary participation; be complementary to other means of support for NAMAs; stimulating broad segments of the economy; safeguard environmental integrity; ensuring a net decrease and /or avoidance of global GHG emissions; assist developed countries to meet their mitigation targets; and ensuring good governance and market functioning and regulation.

Annexes

Annex 1: Guiding Principles for setting Benchmarks

All benchmark methodologies must be applied using the following guiding principles. DOEs will be required to ensure that these principles have been applied.

Accurate: Benchmark methodologies make use of mean values and confidence intervals. All sampling should be designed to deliver a standard error which is less than or equal to 10% of the mean. If this result can be delivered by a survey, then the mean and associated confidence intervals can be applied in the PDD.

Complete: All sources and sinks of GHG emissions shall be included and accounted for except for minor sources of non-CO₂ gases which in aggregate amount to less than 5% of total benchmark emissions

Consistent: PDDs and Monitoring Plans shall demonstrate consistency between versions and over time such that like is compared with like.

Comparable: PPs shall ensure comparability between different benchmark projects. Where deviations occur, these shall be justified.

Transparent: All assumptions and calculations shall be laid out in full such that a third party can reproduce the same results by working in parallel.

Annex 2: Guidance on benchmark determination

The following guidance relates to choice of the benchmark. It may be necessary to apply the benchmark to a relatively homogenous population. For example, if [any] [x%] of the population have a current level of performance which beats the benchmark, the one of the following steps may be taken:

- 1) Analyze and understand why they are performing better (The answers to these questions may help to decide whether or not to include them.
 - a) do they have different technology (in which case they should not be in this population)?
 - b) were the results correct or are they dubious?
 - c) Were the results a one off and not reproducible?
- 2) Remove that facility from the project (since they are already better than the benchmark)
- 3) Include them and reward them
- 4) Include them but do not reward them
- 5) Set a new benchmark for them

The choice of which benchmark is related to the nature of the project activity:

- 1) If the project is to deploy a completely new approach such as a step change in technology, the benchmark is Best Commercially Available Technology (BCAT). A technology can only be described as a step change technology for a period of 10 years after its first deployment in a commercial setting. Thereafter it becomes state of the art.
- 2) If the project is to deploy state of the art (SOTA) technology, benchmark is BCAT. A technology can be described as state of the art technology for a period of 10 years after it is deployed in a host country. Thereafter it becomes Best Available Commercial Technology.
- 3) If the project is to successfully deploy BCAT, then the benchmark is lower 95% Confidence Interval of current performance.

Definitions

- 1) Step change technologies are new technologies which radically alter the status quo, changing resource requirements, equipment, mass flows and infrastructure etc.
- 2) BCAT is a practical level of resource use associated with the best commercially available technology, correctly applied. This is a technology which may be present in the host country already with or without good management, but is established in other countries. Host country contribution equates to the difference between actual performance and correctly applied best available technology.
- 3) Lower 95% confidence interval of actual resource use – this is based on actual measured or historic data of resource use. Poor quality data will result in wider confidence intervals and hence a lower benchmark. Exclusion of data points from data set must be justified. If data is collected specifically to define the benchmark, it must be collected using a clearly defined sampling design and the standard error must be less than 10% of the mean. Host country contribution is difference between the mean and lower 95% CI.

4) Other approaches may be proposed.

Examples:

Biomass stoves from coal a step change in technology (from coal to biomass). Benchmark is BCAT
Near Zero methane emissions from coal mining is a SOTA refinement of existing technologies. Benchmark is BCAT

WHR is BCAT

EE in industrial facilities; benchmark is BCAT

EE in buildings; benchmark might be SOTA

Wind, hydro, geothermal; benchmark is BCAT

Solar, tidal - SOTA

Nuclear - BCAT

CCS is step change so benchmark is BCAT

Abatement of industrial gases is BCAT

Where project activities include the deployment of multiple technologies, then the benchmark is based on the dominant technology or, to be conservative, it can be BCAT

This guidance would be applied by PPs in proposing benchmark projects and its application would be validated by DOEs and approved by host country authorities and the Benchmark Executive Committee.

Graphical representation of benchmark guidance

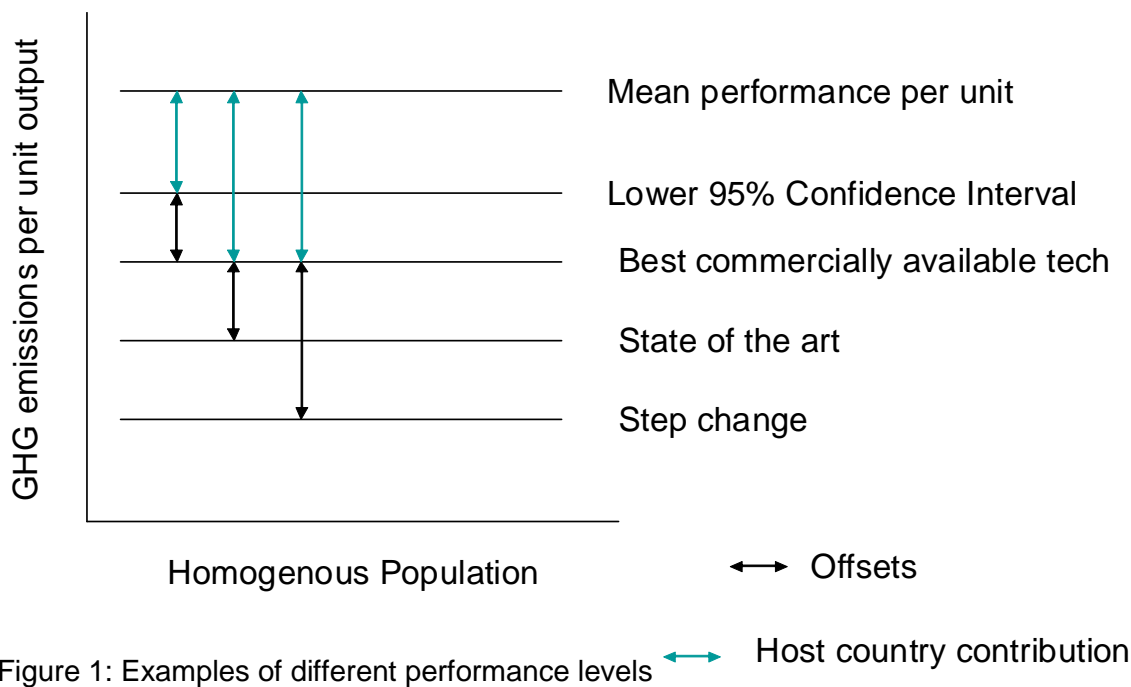


Figure 1: Examples of different performance levels

The key benefits of this approach are that only in the situation where the project activity is to install best currently available technology (BCAT) does the PP actually need to come up with a benchmark based on real data. Other project activities can use BCAT as their benchmark. BCAT is defined via desk based exercise / review of technical specifications. CDM projects in the sector in question could be used as a basis for collecting performance data to help define the existing performance.

The host country contribution is important but since it is not creating offsets for sale into the international market, it is sufficient that the mean performance level is estimated; better if its accurately quantified but not essential.

The magnitude of emission reductions due to the project activity is commensurate with risks.

Lower 95% CI to BCAT is a low risk project and therefore generates good host country contribution and modest offsets

BCAT to SOTA is higher risk and generates a greater host country contribution and better offsets.

BCAT to step change is significantly higher risk and therefore generates the same host country contribution but higher offsets.

CMIA is an international trade association representing more than 50 companies that finance, invest in, and provide enabling support to activities that reduce emissions. CMIA's membership accounts for an estimated 75 per cent of the global carbon market, valued at USD 130 billion in 2009. Solely representing organizations that provide services to and invest in the environmental sector, membership does not include any entities with compliance obligations under cap-and-trade schemes. This results in a unique advocacy platform with emphasis on the environmental integrity of market mechanisms and climate change policies.

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