Net Mitigation through the CDM

A report for the Swedish Energy Agency

Christiaan Vrolijk
with Gareth Phillips

Client contract reference: 2013-5174

Contractor:
Christiaan Vrolijk
Tel +44 7919 385 107
Email c.vrolijk@btinternet.com
Web http://uk.linkedin.com/in/christiaanvrolijk/

Contractor reference: SJ32

Final report
30 September 2013

Executive Summary

The Clean Development Mechanism (CDM) was originally designed as an offsetting mechanism within the Kyoto Protocol, under which industrialised countries committed to limit their greenhouse gas emissions. Parties to the Protocol can meet part of their commitments with emission reductions achieved through CDM projects in developing countries that do not have targets. Only the agreed industrialised country targets determine the level of mitigation, whereas the CDM offers flexibility of where mitigation takes place. The CDM has proven to be successful at achieving emission reductions globally, and mobilized investments of USD 215 billion for emission reduction activities[1].

With negotiations on a new climate regime underway, there is growing demand for increased contribution to climate change mitigation by all Parties, and calls for carbon market mechanisms, including the CDM, to deliver net mitigation beyond offsetting. With a review of the existing mechanisms underway, new approaches being developed under the UN Framework Convention on Climate Change (UNFCCC), and negotiations ongoing on a global climate regime from 2020 onwards, the contribution of the CDM to net mitigation has been topic of lively – and timely – debate. The High-Level Panel on the CDM Policy Dialogue (the Policy Dialogue) recommended to "develop and test approaches to achieve a net mitigation impact, on both buyer and seller sides" under the CDM.[2]

While the CDM creates Certified Emission Reductions (CERs), not offsets, it is the way in which a CER is used that determines whether it becomes an offset or contributes to net mitigation. In this report, we consider 'net mitigation' to mean that part of the reductions achieved by CDM projects are not used for offsetting Annex I emissions.

A variety of options is available for delivering net mitigation via the CDM. This report explores a total of thirteen, assessed against six criteria, such as ease of implementation, wide applicability and transparent and accurate accounting. The options can be applied at different stages of the project cycle as follows:

At registration:

1. Reduce baseline emission levels
   - (a) Apply more conservative parameters in the baseline
   - (b) Apply conservative standardized baselines
   - (c) Include existing CDM projects in the baseline
2. Reduce baseline validity periods
   - (d) Limit the time for excluding E- policies
   - (e) Shorten crediting periods
   - (f) Update the baseline more frequently
3. Change project type eligibility
   - (g) Implement policy or sector-based crediting
   - (h) Apply positive lists for project types that are deemed to have greater net mitigation impacts
   - (i) Apply negative lists for project types with no/less net mitigation impact or where additionality is difficult to demonstrate

[1] 'Benefits of the CDM up to 2012', UNFCCC (2012), see http://cdm.unfccc.int/about/dev_ben/ABC_2012.pdf. The UNEP Risoe CDM Pipeline (August 2013) suggests that investments related to registered projects alone amount to over USD 400 bn.

[2] (Recommendation 2.3) *Climate Change, Carbon Markets and the CDM: A Call to Action*, High-Level Panel on the CDM Policy Dialogue, 11 Sep 2012, http://www.cdmpolicydialogue.org/report/rpt110912.pdf.

Upon issuance:

4. Introduce a 'net mitigation levy'
   (j) Earmark a share of CERs at issuance to prevent their use for offsetting

At the point of use of CERs:

5. Apply a discount
   (k) Buyer's own discount (or net mitigation fund)
   (l) UN regulator's discount when converting one credit into another within the UN registry system
   (m) National regulator's discount when surrendering a credit within a national regulatory system

Accurate quantification and accounting of achieved net mitigation is necessary for avoiding double-counting, especially in cases where the host country has a commitment in the sector in question. Double-counting occurs if the same emission reduction is used for offsetting and claimed as net mitigation. Under many of the options implemented at registration, accurate quantification of the net mitigation achieved is challenging and would require additional efforts beyond the current CDM requirements for monitoring, reporting and verification (MRV) of emission reductions. Incorporating host country policies through the use of standardizes baselines, accounting for E- policies and sectoral approaches can limit the extent of double-counting, but the challenge of accurate quantification of the net mitigation impact remains. By contrast, options implemented at issuance or at the point of CER use apply to emission reductions that have been monitored, reported, verified and issued in accordance with the current CDM requirements, thus enabling accurate and transparent accounting of the net mitigation achieved and avoiding double-counting.

Adjusting the baseline at registration by using standardized baselines, accounting for E- policies, and sectoral approaches may be aligned with host country action. These options, therefore, may encourage some host countries to increase their ambition and implement climate policies. However, they all suffer from the problems regarding quantification and accounting mentioned above. By contrast, the mitigation levy would allow for a quantification of the host country's own effort, including E- policies and other Nationally Appropriate Mitigation Actions (NAMAs), thus addressing double-counting.

Of the options considered, discounting, net mitigation levy and shorter crediting periods are estimated to have the highest potential to deliver significant volumes of net mitigation through CDM.

The costs associated with most net mitigation options are generally borne by the project investors, as reduced volumes of CERs are available for revenue generation, unless they also receive payment for the net mitigation volume from either the host country or the CER buyer. Some options allow for the net mitigation element to be back-loaded, which may reduce the cost to project investors.

The original CDM modalities and procedures state that a baseline shall be established "in a transparent and conservative manner regarding the choice of approaches, assumptions, methodologies, parameters, data sources, key factors and additionality, and taking into account uncertainty".[3] Accordingly, conservative parameters are widely applied to baseline determination

[3] Annex Para 45(b), Decision 3/CMP.1, http://cdm.unfccc.int/Reference/COPMOP/08a01.pdf#page=6.

under CDM. However, they are primarily intended for addressing uncertainty regarding the exact value of a parameter rather than intentionally introducing a difference between the applied and actual parameter value. Artificially changing the parameter to create net mitigation would mean that the calculated baseline no longer resembles the most likely baseline situation. Availability of increasingly accurate data over time reduces the uncertainty of parameter values, and consequently the need to apply conservative parameter values. Therefore, the application of conservative parameter values is likely to have a limited net mitigation impact.

In response to a request by Kyoto parties and following the decision by CMP in 2010, standardized baselines are currently being developed under CDM, albeit slowly. The concept was introduced (among others) to reduce transaction costs and enhance transparency, and can also be seen as a stepping stone towards some of the new approaches[4]. However, the costs of developing and updating standardized baselines can be high, and striking a balance between accuracy and standardization can be challenging. If made too conservative, standardized baselines would become unattractive compared to project-specific baselines[5], and reduced transaction costs would not make up for lost revenue. Therefore, the application of standardised baselines is likely to have a limited net mitigation impact. Similarly, sector-based crediting could become unattractive unless based on the host country's own commitment, in which case the achieved net mitigation needs to be counted towards the host country's pledge.

Shorter crediting periods could deliver significant net mitigation in some sectors, if it could be applied to existing projects (immediately or upon renewal of their crediting period). The cost of implementation would be low, including in terms of lost revenue to project investors by being back-loaded. However, project types that rely solely on carbon revenue (e.g. landfill gas flaring and many cook stove projects) would cease to operate, thus counteracting the net mitigation impact. Also, reductions would no longer be monitored after the end of the crediting period, so accurate quantification of the net mitigation impact is unlikely to be possible.

The introduction of a net mitigation levy, earmarking a share of CERs upon issuance for net mitigation, allows for accurate quantification and accounting of the net mitigation contribution of a CDM project or programme, and addresses double-counting of these CERs by preventing their use for offsetting. The levy can be applied evenly across the board or be varied over time and adjusted to host country policies or own effort, reflecting gradually greater commitments – and less reliance on CDM revenues. It would be a flexible tool that can easily be applied outside the CDM, becoming a standard building block in the carbon market architecture.[6]

The easiest option to implement in technical terms is the application of a discount at the point of CER use. This is also the only option that could have an almost immediate effect on all not yet issued or used CERs. Any significantly large buyer or group of buyers, for example all EU countries, could affect a resulting net mitigation. Similarly, regulators of significant sources of demand, e.g. regional emissions trading schemes (ETS) in the EU[7] and elsewhere, could apply a discount to offsets upon use. However, the application of a discount would result in the loss of the fundamental basis of emissions trading of "a tonne is a tonne".

[4] 'New approaches' refers to both the new market-based mechanism (NMM) and any approach under the framework for various approaches (FVA).

[5] Unless standardised baselines, where available, are made mandatory, in which case DNAs may be less likely to propose them.

[6] Both NMM and FVA already include in their design the requirement of net mitigation.

[7] However, without changes to the current EU ETS rules, this is in fact no longer a source of significant demand. The aggregate import limit is about 1.7 billion tonnes, whereas issuance of eligible credits, for CDM and JI together, already exceeds this.

Other options such as including CDM projects in the baseline, allowing the application of the E-policy rule for a limited time only, positive and negative lists, and more frequently updated baselines are unlikely to deliver significant net mitigation, and the accurate quantification of their net mitigation impact is challenging and/or would require significant efforts beyond the conventional CDM cycle. They could, however, be implemented for other reasons, for example to reduce transaction costs or to reflect new realities in baseline determination.

Three options for increased net mitigation through the CDM are worth considering in more detail. First, shorter crediting periods may work for project types that do not rely solely on carbon revenues. However, project types that do rely on CER revenues may be decommissioned, leading to an increase in emissions. The exact net mitigation impact of shorter crediting periods would be difficult to quantify accurately, as the net mitigation would occur after the end of the crediting period, and thus after the end of MRV. Second, discounts may be applied by regulators or willing buyers, which may include a dedicated net mitigation fund. If these entities represented a significant demand centre, then the impact may be substantial. Also, a discount is probably technically the easiest-to-implement, and could even affect already-issued CERs. Third, the introduction of a net mitigation levy, whereby a share of issued CERs is earmarked for net mitigation, preventing their use for offsetting, may also be relatively quick to implement. Both discounting and levy are introduced after monitoring, reporting, verification and issuance of CERs, enabling accurate quantification and transparent accounting of the net mitigation impact, and the avoidance of double-counting. Both these options could also be applied to new approaches.

This report is commissioned by the Swedish Energy Agency. The views expressed in this report are the author's own and do not represent any formal position of the Swedish Energy Agency.

Contents

Introduction

The Clean Development Mechanism (CDM) was designed as an offsetting mechanism within the Kyoto Protocol, and indeed has at its origins – at least partially – in a proposed compensation scheme for non-compliance with the targets.[8] Certified Emission Reductions (CERs) achieved by CDM projects can be used by developed countries (Annex I Parties) for compliance with their agreed targets under the Protocol, thus allowing offsetting of greenhouse gas (GHG) emissions in developed countries through emission reductions relative to an approved baseline level in developing countries (non-Annex I Parties). Within the original Kyoto architecture, mitigation ambition is determined by the agreed targets. The CDM and other Kyoto Mechanisms increase the flexibility and allow the agreed reductions to be achieved more cost-effectively, in accordance with modalities and procedures approved by the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP) and further standards, procedures and guidelines adopted by the CDM Executive Board (EB).

As we enter the second commitment period of the Kyoto Protocol and the negotiations for the period beyond 2020 intensify, demands on the carbon market architecture are changing. Alongside expectations of emission reductions from all Parties, there is also a growing expectation of increased mitigation, going beyond offsetting, from existing mechanisms, the potential introduction of new approaches[9] and a review of the experience from the existing mechanisms.

The contribution of the CDM to net mitigation, as a result, has been the topic of lively debate among various stakeholders. Annex I Parties want greater efforts by non-Annex I to achieve reductions. non-Annex I Parties want their efforts to be recognised. Environmental NGOs, many of whom were never completely at ease with the zero-sum game that is emissions trading, want to increase the mitigation effect. And the private sector both acknowledges the other stakeholders' desire for greater mitigation and looks for a consistent approach between existing mechanisms and new approaches.

At a time when scientists and governments are becoming increasingly aware of the impacts of climate change and the need for urgent action, it makes sense to seek out and utilize as many forms of mitigation as possible. The CDM has demonstrated its ability to identify a wide variety of low-cost abatement opportunities which could be utilized to contribute towards net mitigation. After extensive consultations with stakeholders in the CDM, the High-Level Panel on the CDM Policy Dialogue (the Policy Dialogue) concluded that 'measures should be taken to move beyond pure offsetting and to enable the CDM to have a net mitigation impact'[10]. Keeping with the traditional learning-by-doing approach of the CDM, according to the Policy Dialogue such measures should be explored within the CDM, and 'if successful, be applied in the decades to come', in particular within

[8] *The Kyoto Protocol: A Guide and Assessment*, Michael Grubb with Christiaan Vrolijk and Duncan Brack, RIIA/Earthscan, 1999.

[9] Bali introduced "various approaches, including opportunities for using markets" (Decision 1/CP.13), Cancun then considered "the establishment, at the seventeenth session of the Conference of the Parties, of one or more market-based mechanisms to enhance the cost-effectiveness of, and to promote, mitigation actions" (Decision 1/CP.16), and Durban defined "new market-based mechanism" and noted that Parties are implementing "various approaches, including opportunities for using markets" (Decision 2/CP.17). Therefore, currently one new market-based mechanism (NMM) has been defined, but various more approaches may be used under the framework for various approaches (FVA). 'New approaches' refers to both NMM and any approach under the FVA.

[10] (Recommendation 2.3) *Climate Change, Carbon Markets and the CDM: A Call to Action*, High-Level Panel on the CDM Policy Dialogue, 11 Sep 2012, http://www.cdmpolicydialogue.org/report/rpt110912.pdf.

the new (sectoral) approaches such as the New Market-based Mechanism (NMM) and Framework for Various Approaches (FVA) currently under negotiation under the UN Framework Convention on Climate Change (UNFCCC).

While the CDM, guided by the principle of conservativeness, has always included an element of net mitigation[11], this paper aims to explore in more detail the issue of achieving net mitigation within the CDM, i.e. achieving mitigation beyond offsetting against Annex I targets, including strengths and weaknesses of various options to do so. It explores the deeper implications of some of the options and discusses how net mitigation in the existing mechanisms could be used as a bridge to the new approaches and new mitigation policies in non-Annex I Parties such as Nationally Appropriate Mitigation Actions (NAMAs).

This report is commissioned by the Swedish Energy Agency.

Zero sum game

From the perspective of global climate change, there is no difference between reducing emissions in Amsterdam or Accra, Bonn or Beijing. The concept of emission trading uses this principle by allowing reductions to be made in one place to offset emissions elsewhere. Therefore, emission trading allows for emission limitations to be achieved in the more cost-effective manner, but there is no direct emissions benefit from using emission trading.

The CDM was designed as an emission reduction mechanism with a sustainable development goal, whereby emission reductions achieved in developing countries, which are not capped under Kyoto, can be used by Annex I Parties to offset emissions in order to achieve compliance with their agreed targets. Within the original Kyoto architecture, only the agreed targets of the Annex I Parties determine the emission reduction ambition; the Kyoto Mechanisms are a tool to deliver the agreed reductions in a cost effective manner, giving capped Parties flexibility in how they achieve their targets in the process.

The emissions trading concept works where both volumes of emissions can be quantified; the emissions exceeding the target on the one hand and the reductions achieved on the other. Where both sides are capped, this would be an easy sum, determining the difference between actual emissions and the target level; the aggregate cap of both sides does not change (as is seen in Joint Implementation (JI)).

However, if one side of the trade is not subject to a cap, the aggregate cap does change as a result of the trade. Therefore, the achieved reductions need to be quantified relative to a baseline representing emissions in the absence of the Kyoto Protocol. The CDM was established as a mechanism to ensure that the emission reductions are real, permanent and additional, and it achieved this by defining baseline (and monitoring) methodologies to quantify the reductions delivered by the underlying projects, and tests of additionality to prove that the project would not have gone ahead without the Kyoto Protocol.

[11] Albeit one that is difficult to quantify, see p29, *Climate Change, Carbon Markets and the CDM: A Call to Action*, High-Level Panel on the CDM Policy Dialogue, 11 Sep 2012, http://www.cdmpolicydialogue.org/report/rpt110912.pdf.

To avoid aggregate emissions increasing as a result of a trade, the CDM has applied the concept of additionality and conservative baselines. Additionality is 'the effect of the CDM project activity to reduce anthropogenic GHG emissions below the level that would have occurred in the absence of the CDM project activity'[12]. Therefore, additional projects achieve actual emission reductions relative to the baseline. A conservative baseline ensures that 'in case of uncertainty regarding values of variables and parameters … the resulting projection of the baseline does not lead to an over-estimation of GHG emission reductions attributable to the CDM project activity'[13]. Additionally, crediting periods are limited in time, even when the project activity continues.

By design, therefore, the CDM aims to quantify the achieved emission reductions conservatively. Where projects are not additional, no reductions are created; where there are uncertainties, the additionality test errs on side of caution to ensure that projects are incorrectly rejected rather than incorrectly registered and calculation methodologies ensure that reductions are not over-estimated. The CDM, therefore, while ensuring that aggregate (global) emissions do not increase as a result of the transaction, tends to act as an offsetting mechanism. The extent to which the emission reductions are created conservatively is not quantified and so whilst it may be claimed that the CDM generates more emission reductions than are issued, and hence does contribute to some extent to mitigation, it is currently difficult to accurately quantify or account for such impacts. This leads observers to the generally accepted statement that the CDM does not contribute to net mitigation, but acts as an offset mechanism.

However, it should be noted that the principle product of the CDM is a Certified Emission Reduction, not an offset. It is the way that a CER is used which determines whether it becomes an offset or contributes to net mitigation.

Additional mitigation from CDM inclusion in the Kyoto Protocol

It is argued by some stakeholders that the agreement of the Kyoto Mechanisms, including the CDM, did help Parties agree and/or ratify their respective targets, and thus contributed to the mitigation levels of the Protocol.[14] However, any such contribution is probably unquantifiable: "the lack of information on the potential of the CDM meant that the negotiators did not make quantitative links between the availability of the CDM and the emission reduction targets in the final agreement"[15].

Prior to and during the Kyoto conference, experts assisted several government negotiators by running an emissions trading model, incorporating the CDM, simulating with and without trading scenarios.[16] Thus, the potential impact of including trading was understood by a small number of expert negotiators, even if results from this model were primarily qualitative rather than quantitative. But there was no apparent impact of increasing flexibility on the targets that Annex I

[12] Glossary of CDM Terms, version 07.0, http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf.

[13] Glossary of CDM Terms, version 07.0, http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf.

[14] For example, the PD Forum input into the CDM Policy Dialogue, 2 Apr 2012, http://www.pd-forum.net/files/d90beb2d8703b6df988c3f0bf4b8ad4c.pdf and http://cdm.unfccc.int/public_inputs/2011/eb64_02/cfi/1RXPBW5VTM45X2BXHW1BUE8D52TQ7H.

[15] Page 6, *Assessing the Impact of the Clean Development Mechanism*, Report Commissioned by the High-Level Panel on the CDM Policy Dialogue, 15 Jul 2012, http://www.cdmpolicydialogue.org/research/1030_impact.pdf.

[16] *The Kyoto Protocol: A Guide and Assessment*, Michael Grubb with Christiaan Vrolijk and Duncan Brack, RIIA/Earthscan, 1999.

Parties agreed to.[17] And, while emissions trading was a crucial demand of some Annex I Parties for agreement, the reason for eventual ratification was more political.[18]

While the Kyoto targets may not have been directly affected, 'the current negotiations on the future of the climate change regime, however, are very much informed by the quantitative analysis of various flexibility mechanisms and that analysis will be very likely to influence any future emission reduction targets.'[19]

What is net mitigation?

As described above, the principle product of the CDM is a Certified Emission Reduction, not an offset. A CER is defined as "a unit issued for emission reductions from CDM project activities in accordance with the CDM rules and requirements, which is equal to one metric tonne of carbon dioxide equivalent".[20]

It is the way in which a CER is used that determines whether it becomes an offset or contributes to net mitigation. In this report, we consider 'net mitigation' to mean that part of the reductions achieved by CDM projects are not used for offsetting Annex I emissions.[21]

With neither legally binding commitments nor detailed and accurate inventories available for non-Annex I Parties, it is not currently meaningful to use a stricter definition that net mitigation must go beyond commitments of any involved Parties. However, as the Annex I/non-Annex I division is becoming less pronounced with increasing commitments from all Parties, and net mitigation becoming a requirement under the UNFCCC for the new approaches, the concept of net mitigation will require transparent accounting. Without transparent accounting, the net mitigation effect may be lost and the emission reductions double-counted.

Options described in this paper include situations where less than 100% of the CERs are used for offsetting and/or every CER in itself represents net mitigation and/or where no CERs are issued for part of the reductions.[22]

---

[17] An interesting description of how the Kyoto Mechanisms were incorporated into an Annex I Party's target is given in *Japan and the Kyoto Protocol: Conditions for Ratification*, Hiroshi Matsumura, RIIA, 2000. This review of the Japanese target setting shows that there was indeed no apparent impact of increasing flexibility on the targets that it could agree to, but that all trading was simply *assumed* to meet the 1.8% gap between the accurately calculated achievable reductions, backed-up with detailed policies, for Japan, a 4.2% reduction, and the number it needed to accept politically in the final hours of COP3, a 6% reduction.

[18] For example, even the potentially greatest beneficiary of the concept of emissions trading, Russia, is reported to have agreed to ratification when the EU promised to support its bid to join the World Trade Organisation see http://news.bbc.co.uk/1/hi/world/europe/3943727.stm.

[19] Page 6, *Assessing the Impact of the Clean Development Mechanism*, Report Commissioned by the High-Level Panel on the CDM Policy Dialogue, 15 Jul 2012, http://www.cdmpolicydialogue.org/research/1030_impact.pdf.

[20] Glossary of CDM Terms, version 07.0, http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf.

[21] In the Policy Dialogue defines net mitigation as when emissions mitigated exceeds the emissions offset, which is similar to the definition used in this report; see p29, *Climate Change, Carbon Markets and the CDM: A Call to Action*, High-Level Panel on the CDM Policy Dialogue, 11 Sep 2012, http://www.cdmpolicydialogue.org/report/rpt110912.pdf.

[22] However, if each CER represents some net mitigation, the definition of a CER may need to be corrected. Transparent accounting would demand that CERs define the volume of reductions achieved, with less than 100% being used for offsetting.

Net mitigation is not about uncertainty

Baseline methodologies include a variety of parameters, some of which are estimated, or defaults used, and others are monitored or measured direct. Where there is uncertainty regarding the exact value of a parameter, conservative parameters or conservative discount factors are introduced into the baseline methodology. These more conservative parameters lead to lower baseline emissions or higher project emissions, and thus lower emission reductions are achieved by the project activity as a result.

The objective of the introduction of such conservative values is to ensure that emission reductions from CDM projects are generally (and on average) under-estimated, and thus ensure that aggregate emissions of the trading parties does not increase as a result of the transaction.

Examples of conservative parameters include the use of the IPCC default values at the lower limit of the uncertainty at a 95% confidence interval for the CO2 emission factor of specific fuels used in a power plant in the calculation of the grid emission factor and the IPCC default values at the upper limit of the uncertainty at a 95% confidence interval for the calculation of project emissions for potentially the same project, or the assumption of only 90% combustion factor for flares, or a 10% discount of a low-height enclosed flare.

The choice of conservative parameters introduced to counter this uncertainty will lead to net mitigation overall, but the impact of each project is unquantified. The uncertainty involved is only resolved with improved information, or improved monitoring, both of which may be too costly, or when the host country takes on targets and submits a detailed inventory. Only once the project sector is covered by the host's commitment or inventory, will the emissions or emission reductions be accounted for.

However, while conservativeness in the CDM undoubtedly delivers net mitigation overall in cases where uncertainty exists by ensuring reductions are under-estimated, this should be treated separately from the current desire for the mechanism's increased contribution to net mitigation. The authors believe it may be desirable for the treatment of conservativeness to be improved, made more explicit, transparent, and potentially aligned with the overall treatment of net mitigation, to improve the overall MRV of both the current mechanisms and new approaches.

The EB is currently exploring the possibility of moving in the direction of defining a single methodology-specific accuracy value to be achieved by the combined monitoring equipment. Whilst this is a statistical principle which, if achieved, will not result in an alteration to the number of CERs issued, the same approach could be applied in the form of a single conservativeness value to be applied at the point of issuance, which could be used to demonstrate that, irrespective of net mitigation, the CDM is quantifiably conservative.[23]

Net mitigation is not about non-additionality

Certain stakeholders continue to question the EB's decisions on project additionality, calling for additional mitigation to compensate for any non-additional projects that are registered. However, while some stakeholders see net mitigation as a way to address additionality concerns in CDM, this is

[23] The Project Developer Forum included this proposal in its suggestions for the review of the CDM Modalities and Procedures, see http://www.pd-forum.net/files/95ad91353ea4b144240534afb46a5ffb.pdf.

not the primary reason for the wider support for the concept of net mitigation among stakeholders. The Policy Dialogue accepted that there are some project types where additionality may be difficult to prove, but concluded that 'there is no conclusive evidence, as is sometimes claimed, that a large number of CDM projects are non-additional'.

Indeed, the EB has developed an additionality test, which has been improved over time in line with the mechanism's learning-by-doing approach, with its own conservative assumptions. Concerns over additionality trigger a review process, and the project's request for registration is rejected if additionality is not sufficiently demonstrated. While only a small percentage of projects are rejected by the EB, in aggregate nearly one in five projects in the pipeline fail to be registered with the majority being weeded out by DOEs.[24]

One of the options discussed below, a negative list has generally been contemplated for situations where there are concerns about the additionality of certain project types. This raises a possibility of reducing the willingness of the CDM to tackle difficult projects on a case-by-case basis, and only accept easy clear-cut additional projects. However, while broad sector-wide approaches may need a limitation to clear-cut projects, the project-specific approach under the CDM is in principle well suited to tackling more challenging technologies.

Non-additional projects would undermine the CDM's ability to deliver emission reductions, irrespective of their use, but additionality concerns are best addressed with the further development and improvement of tools and guidelines dedicated to the additionality assessment. This report focuses on options to deliver net mitigation through the CDM, based on the premises that registered CDM projects have been deemed additional.

Host country commitments

Originally, the CDM was designed to be implemented in non-Annex I Kyoto Parties with no quantified commitments. Any reductions achieved would curb their emissions pathway below what would have happened without the project. And any reductions not credited as CERs, or for whatever reason not subsequently used as offsets against an Annex I Party's target, would result in net mitigation. Conservativeness in the CDM emissions calculations, therefore, delivered net mitigation in aggregate.[25]

However, the world has changed since 1997, particularly in the last few years with some developing countries making pledges, and negotiations for the period beyond 2020 expecting contributions from all. Where a developing country takes on an economy-wide or a sector-specific target, in particular if this is a sector with CDM projects, the emission reductions from the CDM, including those resulting from conservativeness or explicit net mitigation, are likely to show up in the host Party's inventory unless it explicitly adjusts for CDM projects.[26] Taking these new developments into consideration, the CDM, and in particular the accounting of the resulting reductions, starts to look a lot more like JI.

[24] UNEP Risoe CDM/JI Pipeline Analysis and Database, see http://cdmpipeline.org/.

[25] However, as explained above, conservativeness is generally introduced when there is uncertainty, to ensure emission reductions are not over-estimated. Therefore, individual cases of using conservative parameters cannot claim to deliver net mitigation, but in aggregate conservativeness will deliver net mitigation.

[26] Country-wide and project-based emission inventories may use different methodologies and calculations, so it could be difficult to make such adjustment.

Therefore, either net mitigation needs to be quantified and the related emission reductions explicitly accounted for in the host's emissions inventory, or it must be accepted that any net mitigation will by default be credited to the host and used to meet its target; or – most likely – a combination of the two. Without addressing this issue of net mitigation and host country inventories it seems unlikely that we can resolve the accounting and avoiding of double-counting by any of the options.

Indeed, developing countries do not currently exclude the baseline emissions of implemented and registered CDM projects from their inventories, and therefore, arguably, reductions are double-counted because both the user of the CERs claims the offset, and the host Party reports the reduction (or reduced increase) of emissions.

Limited by demand

There is currently an existential lack of demand for emission reductions created through the CDM (or any other approach).[27] Without demand for its reductions, the CDM will not be able to deliver net mitigation, irrespective of the design option of net mitigation. The CDM can only deliver net mitigation if CDM projects are being implemented and are operating; and the larger the CDM, the larger the potential for it to deliver net mitigation.[28]

It is possible that the negotiations under the Durban Platform will result in additional mitigation commitments (pre and/or post-2020), and thus increased demand for emission reduction projects. Or maybe successful implementation of NMM (and CDM reform) will lead to a willingness to create more demand, by providing the basis for increased participation by developing countries through part-crediting and part own-effort. This, in turn, should provide the basis for a willingness by developed countries to increase their efforts beyond current levels. However, the balance between the additional supply created through the new approaches and the additional demand encouraged by these developments is important: markets need scarcity.

The responsibility for the creation of the carbon market and its fundamental driver, emission reduction targets, rests primarily with governments, even if the private sector has an important role as market actors – identifying, financing and implementing cost-effective mitigation action. Without ambitious commitments by Parties, it is unclear how or when meaningful demand for CDM, or any new market-based approach, could emerge.

[27] A lack of ambitious commitments under the Kyoto Protocol limits the demand from Parties. The limit on the use of offsets within the EU ETS means that private-sector demand, which has driven the CDM in the last decade, has dried up, because aggregate issuance from JI and CDM projects already exceeds the limit.

[28] Perversely, the collapse of the CDM may deliver greater net mitigation than any other approach, albeit with a resulting loss of confidence in any future Carbon market approach (and an inability to ensure the avoidance of double-counting). To date just over 1.3 billion CERs have been issued, which is only 7% of all expected emission reductions over the project lifetime of all the projects in the CDM Pipeline, 19.5 billion, have been issued. Therefore, if the remainder of the expected emission reductions fails to be issued as a result of the market conditions – assuming the projects have already been implemented and continue to be operating, which would not be unlikely for many renewable energy projects, for example – then the achieved net mitigation would be more than 10 times greater than the actual offsets used.

Options for net mitigation

There are many different options for achieving net mitigation, each with its own strengths and weaknesses. We aim to list the options here, including examples of a typical implementation of the options to clarify. The options are assessed against a set of detailed criteria in the next section.

Opportunities to introduce net mitigation can be proposed to be effected[29] at several different stages of the project cycle from design of the project activity to the use and surrender of the resulting CERs as follows[30]:

- At registration, by for example using a lower baseline (than currently applied) that leads to fewer emission reductions for the underlying project activity;
- Upon issuance, by for example introducing a mitigation levy requiring the surrender of a share of the CERs; and
- At the point of use, by for example applying a discount at surrender for compliance.

The majority of options that have been previously discussed to achieve net mitigation are at the stage of registration, implemented by the EB, ensuring equal treatment for all projects. Cancellation at issuance is a relatively unexplored option although preliminary discussions suggest that the accounting infrastructure to implement this option already exists. The options at purchase or surrender may be outside the realms of the UN, and may be applied unilaterally; these options could probably be applied quickly and easily by those Parties who would wish to do so. However, unilateral decisions in general present barriers to future linkage and can cause market distortions in other ETS.

Generally, where net mitigation is established at registration, the volume of mitigation is unlikely to be quantified: the reductions are not counted, and CERs are never created. Where net mitigation is achieved through a levy on issuance, by definition the CERs are created, and the exact volumes are known. If net mitigation is only achieved after issuance, the emission reductions are created and do exist and net mitigation is dependent on exactly how and where a discount is applied. Interestingly, at least one fund to promote Programmes of Activities (PoAs) is reported to be purchasing and cancelling CERs without declaring them as either offsets or mitigation (but as the metric of achievement in their result-based finance model).

Although there may be small variations to the options listed below, which some would classify as different options, the options for increased net mitigation include at least the following (note these are not necessarily mutually exclusive):

Net mitigation options at registration

Introducing net mitigation at registration is a top-down approach which would need to be approved by the Parties and implemented by the CDM EB. Depending on the specific approach, it would require updating of procedures, methodologies, guidance etc. and would be applied to all projects from a point in time moving forwards. Generally speaking it would be difficult to apply such changes to existing registered projects because of the principle of not applying rule changes retroactively. However, changes would apply from any renewal of the crediting period, or projects could volunteer

[29] While the options may be effected at different stages, the application may need to be agreed in advance (at or prior to registration) to avoid retroactive application of rules to projects.

[30] This categorisation is not meant to be completely exclusive – overlap is possible, and multiple options are possible.

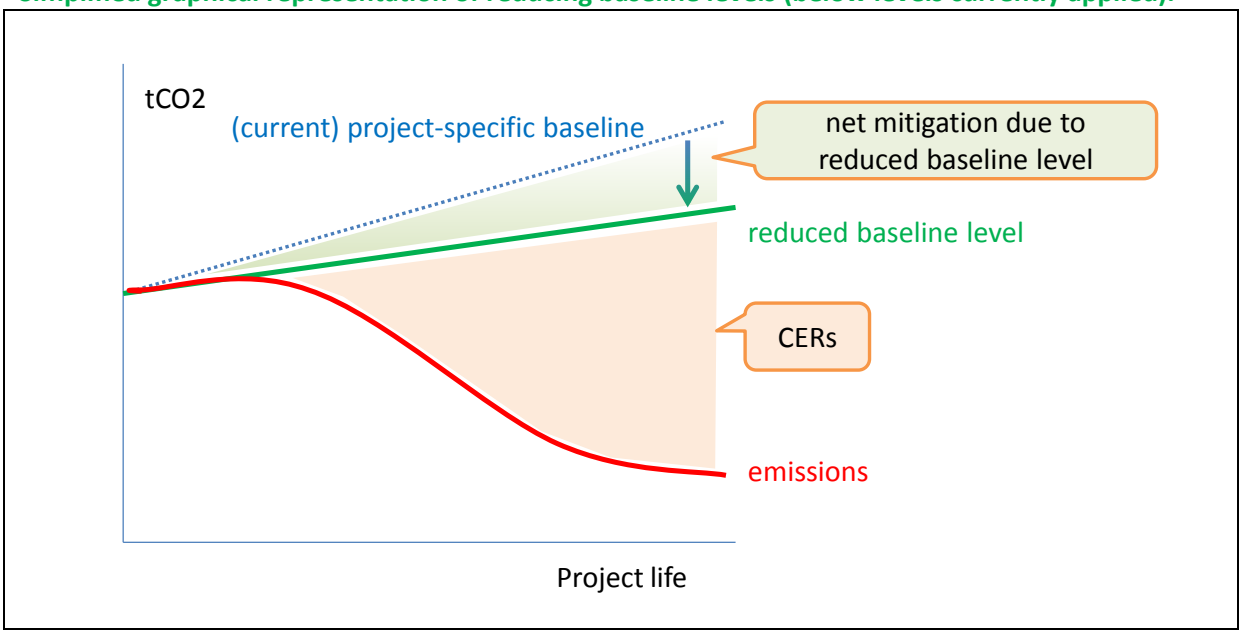
to adopt the changes.[31] The changes could be applied evenly across the board or they could recognise different conditions in host countries, however, this would introduce further layers of complexity to the CDM process. Depending on the approach taken, transparently quantifying the mitigation benefit could require additional work for project developers, DOEs and the Secretariat, which may or may not be significant. Specific measures include:

1. **Reduce baseline levels (below the levels currently applied).**
   - (a) Apply more conservative parameters in the baseline.
     Almost all methodologies include conservative parameters or explicit discounts, for example by choosing the lower default at 95% confidence interval, in case of uncertainty in the exact parameter value in the project, technology, or MRV methodology. This conservativeness ensures that the resulting emission reductions are not over-estimated. More conservative parameters could be used, going beyond accounting for uncertainty, with the explicit (or less explicit) intension of creating net mitigation.
   - (b) Apply more standardized baselines.
     Standardized baselines generally has to include more conservative parameters, to ensure general applicability without the possibility of over-crediting, and without the need for establishing certain project-specific data. A standardized baseline offers project developers simplicity in return for fewer credited reductions. The (mandatory) application of standardized baselines, therefore, would lead to fewer tradable reductions than the conventional project-specific baseline.
   - (c) Include CDM projects in the baseline.
     Because registered CDM projects are deemed additional, they are generally excluded from the baseline determination.[32] As CDM projects will have lower emissions, including such projects in the baseline determination would lower the baseline emission levels, and thus lead to fewer credited emission reductions.

[31] Despite the reduction in the volume of reductions achieved, this may be attractive to project participants if it gave them better access to markets.

[32] CDM projects are included in a small number of methodologies, for example ACM0013 “Construction and operation of new grid connected fossil fuel fired power plants using a less GHG intensive technology (Version 5.0.0)”.

Simplified graphical representation of reducing baseline levels (below levels currently applied).



2. Reduce baseline validity periods (from current times).

(d) Limit the time for excluding E- policies.[33]

National and/or sectoral policies and circumstances are to be taken into account in the establishment of a baseline scenario, without creating perverse incentives that may impact host Parties' contributions to the ultimate objective of the Convention. The current rules allow for some of the policies to be excluded from the baseline. Introducing a time limit during which support policies may be excluded from the baseline would increase the mitigation effect of projects over time and from future projects by reducing the baseline emissions after the exclusion period.[34] If a project continues to operate beyond the permitted period for excluding the specific policy, then reductions are no longer credited as the baseline is adjusted to include this policy.

(e) Apply shorter crediting periods (than project lifetime and/or current crediting periods).

Currently project participants may chose a fixed 10 year crediting period, or a renewable crediting period of 7 years, which may be renewed twice.[35] However, many projects will continue to operate beyond their crediting periods, and thus continue to generate emission reductions which will not be credited. For example, most hydro projects are likely to be operational for at least 40 years, and wind projects may operate for as long as 25 years. By limiting the crediting period further, for example to the fixed

[33] First proposed in the submission of Perspectives to the Policy Dialogue on 15 Jan 2012, http://cdm.unfccc.int/public_inputs/2011/eb64_02/cfi/LMTMSDIEFAGFUP6V6AUZXI23Y1STOR, but currently under discussion by the EB, see Annotated agenda of EB74 Annex 8, http://cdm.unfccc.int/UserManagement/FileStorage/MV71R5SIWEPLDQ9U0ANYZCJHX8KGF3. The existing rules, including the definition of E+ and E-, are laid out in CDM Project Standard para 43-45, http://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20130412165420186/pp_stan01.pdf.

[34] The existing rules are laid out in CDM Project Standard para 43-45, http://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20130412165420186/pp_stan01.pdf, currently under discussion again by the EB, see Annotated agenda of EB74 Annex 8, http://cdm.unfccc.int/UserManagement/FileStorage/MV71R5SIWEPLDQ9U0ANYZCJHX8KGF3.

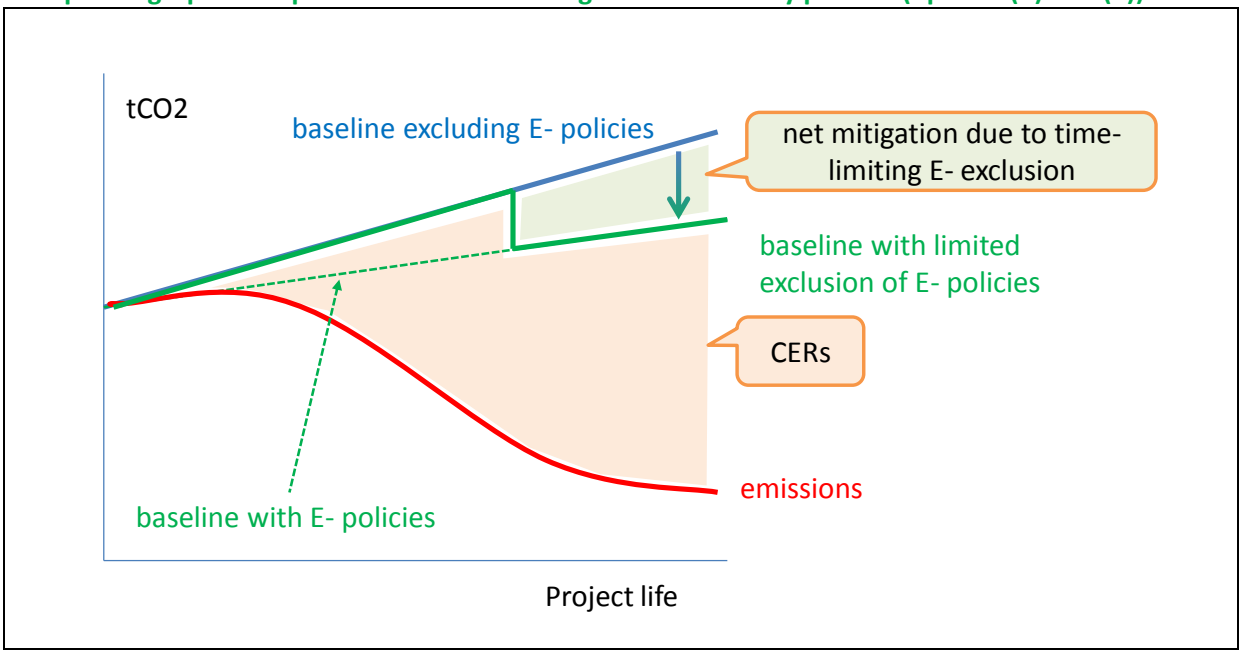
[35] For simplicity only crediting periods are for non-AR projects are given here.

10 years crediting period only, projects may deliver significantly greater reductions over their lifetime than that are credited.[36]

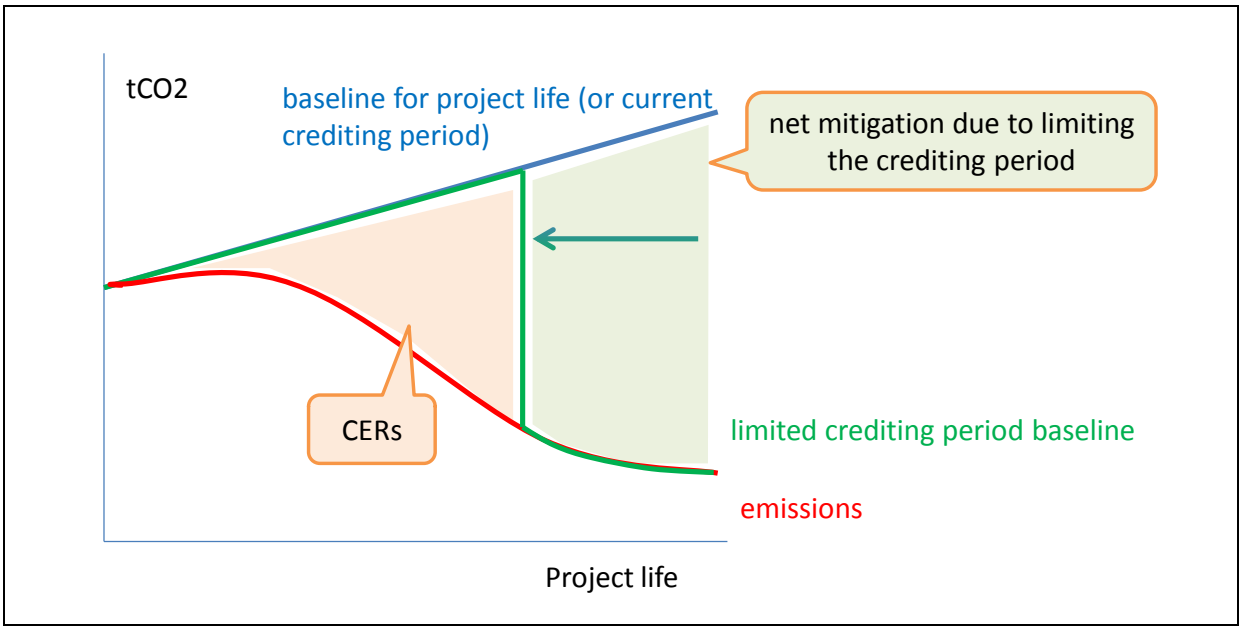
(f) Update the baseline more frequently.

Most methodologies allow for the baseline to be fixed ex-ante for the crediting period. While conservative calculations are applied to avoid over-crediting, more frequent updating of the baseline may help ensure baseline estimates remain conservative throughout the crediting period. For example, most grid-connected renewable energy projects fix their baseline for 7 years on the basis of grid emissions data which is already several years old at the time of registration: by the end of a 10-year crediting period, the grid emissions data may be 15 years old. With increasing efficiencies and an increasing renewable energy share, it can be expected that the grid emissions factor of many grids declines over time. Therefore, by mandating more frequent updates of the baseline (or allowing ex-post calculations only), the baseline levels are likely to be lower.

Simplified graphical representation of reducing baseline validity periods (options (d) and (e))



[36] According to the UNEP Risoe CDM/JI Pipeline Analysis and Database (August 2013), see http://cdmpipeline.org/, nearly 60% of project participants chose a renewable crediting period, which may give up to 21 years crediting period.



3. Change project type eligibility.

(g) Move to policy or sector-based crediting.

The CDM was initially designed as a project-by-project approach. A more programmatic approach has been approved more recently with Programmes of Activities (PoAs). A further step may be taken to allow a wider policy or sector-basis. The baseline within such a policy or sector approach may be defined on the basis of a policy or target, applying a more conservative (standardised) baseline and/or include the host country's own effort, which would result in a baseline below the project-specific baseline (if it were calculated).

(h) Apply a positive list promoting some project types.

A positive list of project types that automatically qualify as additional will reduce the transaction costs for that project type, and therefore it can be expected that more of these projects will be implemented. If certain project types result in greater net mitigation, these could be added to the positive list, in order to increase the net mitigation achieved by the mechanism. For example, projects with a project life significantly exceeding the crediting period, such as most hydro projects, or projects where baselines are known to be conservative compared to the crediting baseline, for example associated gas projects where the gas is currently vented or flared, could be added to a positive list.

(i) Apply negative lists ruling out some project types.

A negative list rules out project types from being registered as CDM projects. Where the net mitigation effect of projects is insufficient or where additionality is difficult to accurately assess, project types could be added to a negative list, ruling out registration completely.

Net mitigation options upon issuance

The Parties could mandate the CDM EB to introduce a mitigation levy at issuance, or Host Parties could be mandated to define their own levies. CDM project activities would operate as normal, and monitor, report and verify (MRV) their emission reductions. Then upon issuance of the CERs, a share of the credits would be earmarked for net mitigation rather than be usable for offsetting Annex I emissions. Quantification of the achieved net mitigation would be simple and transparent as part of

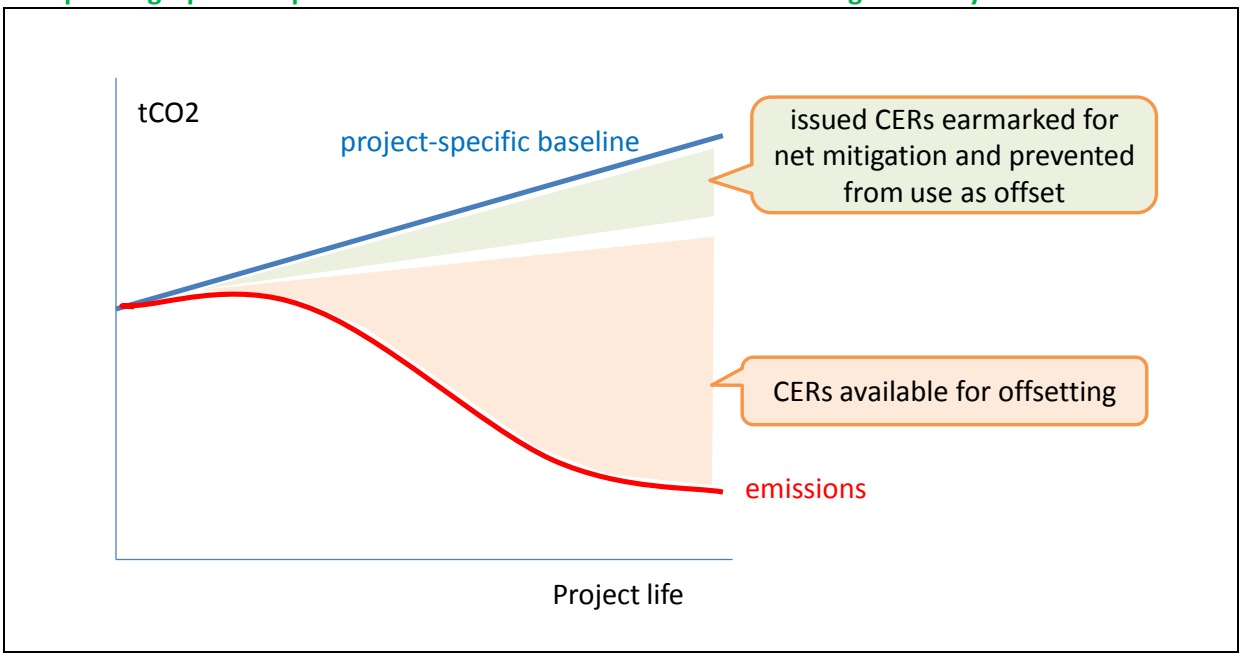
the issued CERs would automatically be cancelled or forwarded to a special account (for example for meeting host country pledges or commitments). The levy could be applied to all new projects and existing projects may wish to volunteer to pay the levy.[37]

4. Introduce a 'net mitigation levy'[38]

(j) Earmark a share of CERs for net mitigation.

At issuance, the EB already applies an issuance fee, which is a simple monetary fee to cover administrative costs, and the adaptation levy, whereby revenue from the sale of 2% of the issued CERs is credited to the Adaptation Fund. Upon issuance, a certain percentage of the issued CERs may also be earmarked as a 'net mitigation levy', and then cancelled or forwarded to a special account, preventing these emission reductions from being used for offsetting Annex I emissions. The level of the mitigation levy may be fixed or vary over time, for example accounting for policy developments in the host country, or follow any other calculation.

Simplified graphical representation of the introduction of a 'net mitigation levy'



Net mitigation options at the point of use of CERs

As long as an issued CER has not yet been surrendered for offsetting against Annex I emissions, it may still be possible to implement net mitigation options. As for the previous option, CDM project

[37] Despite the reduction in the volume of reduction units that could be sold, this may be attractive to project participants if it gave them better access to markets or host country support.

[38] First proposed in the submission of Perspectives to the Policy Dialogue on 15 Jan 2012 as an increase in the Share of Proceeds with CERs beyond the 2% Adaptation Levy retired, http://cdm.unfccc.int/public_inputs/2011/eb64_02/cfi/LMTMSDIEFAGFUP6V6AUZXI23Y1STOR, but proposed in more detail in the joint PD Forum and CMIA submissions to the SBI on the review of the CDM as a specified Mitigation Share of Proceeds (MSOP), a levy of a percentage of issued CERs, see http://www.pd-forum.net/files/b9e07bce16fcfd3ed86df6950c4c992b.pdf. The joint PD Forum and CMIA submissions to the SBI on the NMM and FVA proposed a more general Net Mitigation Share (NMS) equally applicable to all approaches without necessarily specifying the exact mechanism, see http://www.pd-forum.net/files/ac0b982677ee12d233b748b704d6ccef.pdf.

activities would operate as normal, and monitor, report and verify (MRV) their emission reductions. Then at the point of use of the CERs, a share of the credits could be earmarked for net mitigation rather than be used for offsetting Annex I emissions. This could be either a voluntary action by the 'end user' of the CER, or a discount by the regulator of the market in which the CER is used or converted. One of the key challenges with this approach is how to account for the cancelled CERs. Until common accounting provisions and infrastructure are in place, transparent accounting and avoidance of double-counting may be difficult to ensure.

5. Apply a discount.

(k) Buyer applies its own discount.

While the above options would be implemented globally, a buyer may also unilaterally decide to apply their own discount. Any such action would be voluntary. Voluntary commitments beyond the agreed Kyoto Protocol targets could be fulfilled using CERs. A dedicated net mitigation fund could be set up with the principal purpose to buy up CERs for cancellation. And households and entities may decide to voluntarily offset their emissions, for example greenhouse gas emissions related to flights are often voluntarily offset.

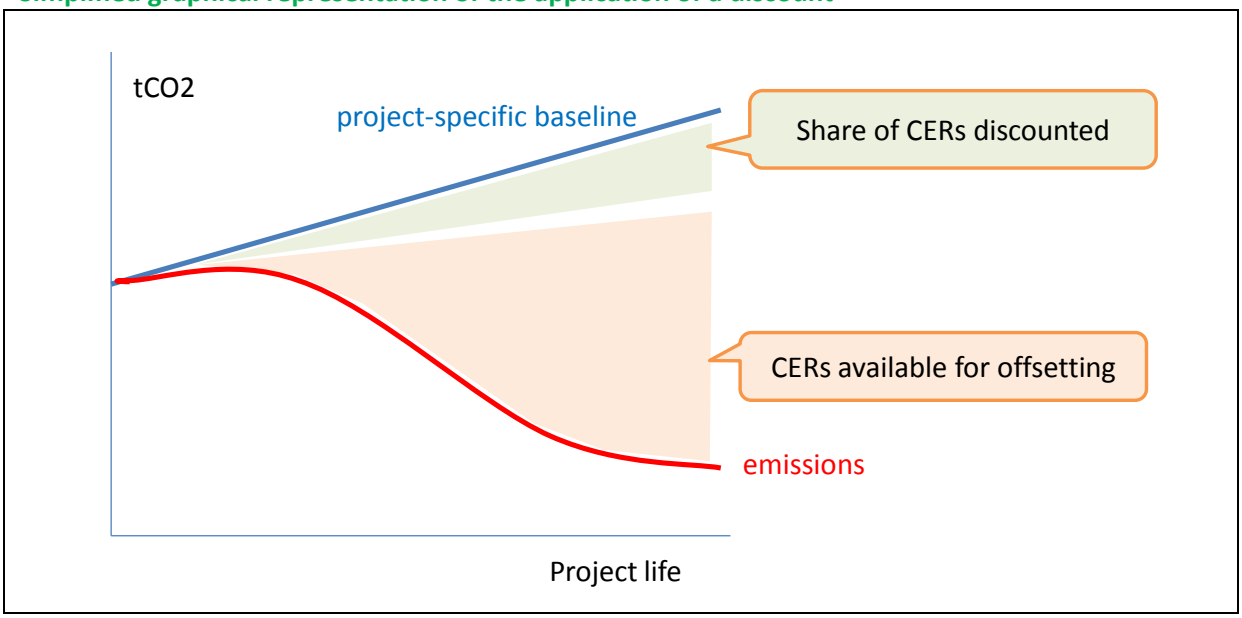
(l) UN regulator applies discount when converting one credit into another within the UN registry system.

If it were possible or necessary to convert CERs into a different unit, for example into NMM credits, or convert CDM projects to projects under NMM, then a discount could be applied to achieve greater mitigation. Indeed, the discount may be calculated to make the agreed/registered project baseline equivalent to the (expectedly) lower baseline under the NMM.

(m) National regulator applies discount when surrendering a credit within a national regulatory system.

A national regulator may apply a discount before accepting CERs. In phase 3 of the EU ETS, the regulator will convert CERs to EUAs before they can be used for compliance. It will therefore be technically possible to apply a discount upon conversion. However, if the regulator were to use the discounted CERs for compliance with its Kyoto targets, no net mitigation would be achieved.

Simplified graphical representation of the application of a discount



Options assessment

Criteria for assessing options to implement net mitigation

There are many different options for achieving net mitigation within the CDM. The key criteria for assessing these options, determining their strengths and weaknesses, and related questions, are listed below, acknowledging that different project types may be better served by different options.

- Implementation: How easily can the option be implemented? Is it already being applied in some form, or does it need significant new procedures? Who would set the rules? Are there any pre-conditions?
- Ambition: What is the potential size of net mitigation that can be achieved? How does it integrate the host country's climate policies and pledges? Can it deliver mitigation in the short term?
- Accounting: Can the net mitigation be accurately quantified and attributed to a mitigation activity? Does it require additional effort beyond standard CDM monitoring, reporting and verification? Can double-counting be avoided? Is the achievement of net mitigation transparent to stakeholders?
- Applicability: Is the option applicable to all project types or sectors, or is it better for some than other? Can the option be applied to old and new projects? Is the option sufficiently flexible to be applicable across different constituencies? Does it enable differentiation where needed, and can different options be combined, if necessary?
- Compatibility: Can it be applied beyond the limits of the CDM, for example to NMM?[39] Would there be a level playing field with regards net mitigation between approaches?
- Cost: What is the cost of implementation? Who pays and who "owns" the resulting net mitigation? (See Appendix 1 for a discussion of the potential market price impact of the introduction of net mitigation.)

Option-by-option assessment

1. Reduce the baseline levels

Lower baseline emissions result in fewer emission reductions being credited to the subject project activity. Three specific options to reduce the baseline levels at registration below the levels currently applied were given in the previous section:

(a) application of more conservative parameters – or explicit discounts – in the baseline setting,
(b) use of standardized baselines which also apply more conservative baselines, and
(c) inclusion of CDM projects in the baseline.

Criterion	Common issues for all options	
	1(a)	Conservative parameters
	1(b)	Standardized baselines
	1(c)	Include CDM projects
Implementation	Each of the options is already being implemented and applied by the EB. Therefore, extended use for the purpose of creating greater net mitigation	

[39] As suggested by the Policy Dialogue, that approaches are tested in the CDM for longer term application in sectoral and policy schemes.

	may be relatively easy in technical terms. However, while current use is technical, to ensure that there is no over-crediting of emission reductions in view of existing uncertainties, application of explicit conservativeness beyond those uncertainties to create net mitigation would be political and may require a CMP mandate. At the time at which a host Party submits a national emissions inventory some of these parameters will have to be aligned to avoid inconsistencies between the project level and national level accounting.	
	1(a)	Conservative parameters or discounts are primarily being used in case of uncertainties. It is possible to extend their use or use more conservative values to create net mitigation in addition to the compensation for uncertainty. However, without losing the link to the reality that the baseline should reflect, this is limited to situations where parameters are not known, or explicit discount factors need to be used. Agreeing more conservative values, or explicit discount factors, may prove to be complex and could run the risk of unfairly penalising specific project types or technologies, such that they would carry a greater burden than others.
	1(b)	Standardized baselines are already being implemented. Experience is still very limited, but so far it has proven difficult to agree and implement standardized baselines. Being a relatively new procedure under the CDM, experience may accumulate in the next few years. Currently, standardized baselines are proposed by the host country Designated National Authority (DNA); the EB needs to approve any baseline. The use of standardized baselines could be made mandatory, where they exist, by national regulators rather than rely on PPs choice. The duration of the standardized baseline is limited in time, with the value likely to be recalculated periodically. Given the limited experience, the implementation of more conservative standardised baselines by DNAs (or others), to generate net mitigation, would likely be a lengthy and difficult process, particularly because of the limited resources with some DNAs.
	1(c)	CDM projects are generally excluded from baseline determinations, as they are deemed additional and thus not the baseline. While they are already included in a few methodologies, general inclusion of CDM projects would require almost all methodologies to be changed. However, as projects have been proven to be additional, it would be conceptually difficult.
Ambition	While it may be possible to slightly reduce the baseline, this can only achieve relatively marginal additional conservativeness without losing all sense of the baseline reflecting something resembling the reality of what would have happened without implementation of the project. Additional conservativeness can only be increased if explicit conservativeness discounts are introduced to achieve greater net mitigation, but even then such discounts may become indefensible once the host Party submits a detailed inventory where parameters are less conservative.	
	1(a)	The size of the net mitigation through more conservative parameters can only ever be a small percentage of the emission

		reductions achieved. For example, if we assume for simplicity's sake that the only net mitigation achieved for the most frequent project type, grid-connected renewable energy projects, is the difference between the lower default and standard default values (a change that did occur a few years ago at a revision of the grid emission factor tool), then net mitigation is likely to be around 5% of claimed emission reductions in the author's experience. There is no relation to any mitigation ambition of the host Party.
	1(b)	The potential for net mitigation through standardised baselines may be greater than through conservative parameters alone, as they need to account for uncertainty in parameters across projects. Additionally, by offering greater simplicity to project developers in their registration, it may be more acceptable to receive fewer credited reductions in return. And this approach may include some form of automatic additionality, which would further stimulate uptake. However, there are currently only few standardised baselines, and they are generally only suitable to some sectors, limiting any impact. Once Parties take on commitments, standardized baselines may become a useful tool to deliver (sectoral) commitments in some sectors. They are also likely to go hand in hand with specific government policies, and provide incentives for the covered project types. In both these ways, standardized baselines are a halfway house towards the new approaches, and may assist Parties to increase their ambition
	1(c)	If CDM projects are included in the baseline of new projects, the share of net mitigation achieved increases as the number of CDM projects increase. However, simultaneously, by gradually reducing the baseline, this option also reduces the incentive to implementation of new projects. There would only be a significant impact in terms of reduced baseline levels for sectors with a high penetration of CDM projects, thus limiting this options impact.
Accounting	In the current methodologies, the scale of the already built-in conservativeness is not quantified. While baseline methodologies are generally designed to be conservative, without making project-by-project calculations, it is difficult to estimate the scale as the data are not currently gathered. These options would change the baseline levels without quantifying the net mitigation, which therefore cannot be claimed under the CDM but is simply credited to the host country's inventory or – if the host has made a commitment – its target, assuming the inventory is sufficiently detailed to include the CDM project activities. By being implemented prior to the project's MRV process, accurate quantification is not likely to be part of this option. If the choices of reducing the baseline levels are transparent, it may be possible to introduce additional monitoring and emission reduction calculations requirements that would help provide an estimate of the net mitigation. For example, projects may be mandated to calculate both conventional baseline, and the reduced baseline levels.	
	1(a)	While under current regulations, the discount through conservative parameters is not quantified, it may be relatively

		straightforward for some project types – and may even be quite cheap – for PPs to calculate the scenarios with and without the application of conservative values. However, it requires explicit acknowledgement of the conservative choices.
	1(b)	Currently, where standardized baselines exist, no project-specific baseline is calculated. The benefit of standardized baselines for project participants is that no (or little) project-specific information is required, and it would be counter-productive to request them to provide this: if a project-specific baseline calculation is needed, and generates more reductions, participants would demand these additional reductions for themselves, no longer using the standardized values. Using this option, therefore, it is not possible to differentiate between the country's mitigation and the net mitigation achieved from CDM projects, at least not without significant extra effort.
	1(c)	If the rules are changed and CDM projects are included in the baseline calculations, it would be difficult to quantify the impact of the rule change as the baseline would no longer be calculated without CDM projects. Quantification of net mitigation would require PPs and DOEs to duplicate baseline calculations and verification activities. However, it is not likely to be possible to assess the impact of the effect of an increasing number of projects being included in the baseline on CDM implementation, as referred to under ambition above.
Applicability	These options are applicable across the board, but would likely have diverse implications, as some project types may include more (conservative) parameters, some sectors are more suitable for standardisation, and the share of CDM projects in sectors is diverse. The options can generally be combined with other net mitigation options, if deemed necessary, but this may obscure the net mitigation effect or make it more complex to quantify.	
	1(a)	Conservative parameters are already being applied within many, if not all, methodologies. It would be particularly suitable in sectors where not all emissions-related data is readily available or accurately reported, which is mostly where energy or the emitted gases are not an important part of the revenue stream, for example sectors with low energy intensity or where the project type involves a waste stream. However, there is significant difference in knowledge of parameter values between sectors, and countries, in particular countries that are taking on commitments and are reporting more accurate inventories. With increased focus on and knowledge of greenhouse gas emissions, there is likely to be declining scope for a reasonable application of conservativeness over time. As parameter values are generally fixed at registration, additional net mitigation may only be achieved by newly introduced conservative parameters for new projects, or at the renewal of the crediting period for existing projects. However, it would be possible to request already-registered projects to report the net mitigation effect of the existing conservative parameters on their emission reductions.

	1(b)	Standardized baselines are most suited to sectors with relatively homogenous and numerous projects, but depending on the variability between them, a single standardized baseline may be agreed for an entire sector or different values for different groups within a sector. Standardised baselines are currently proposed by the DNA who set national baselines; DNAs may also work together for broader regional baseline, e.g. the emission factor of the Southern African Power Pool, encompassing nine countries. Because they can reduce transaction costs, standardized baselines are most likely to be applied by new projects, but it may be possible for existing projects to change to standardized baselines upon renewal of the crediting period. However this still excludes significant sectors, countries and large numbers of projects until such time as a standardized baseline is developed.
	1(c)	Inclusion of CDM projects in the baseline would be applicable across the board, but have greatest impact in sectors with many CDM projects, i.e. those sectors that have been most successful in applying the CDM to help achieve emission reductions. In sectors with few CDM projects, the impact would be negligible. Because the impact of this option increases with the number of CDM projects in the sector, it has an element of being self-correcting: under-represented sectors would not be affected, while popular sectors would be.
Compatibility	With many if not all methodologies already applying conservative baselines, logically all new approaches that will borrow methodologies and other building blocks from the CDM (or JI) are likely to apply similar conservative baselines in their calculations. Indeed, if NMM and/or activities under the FVA were to apply very different baseline methodologies[40], the inconsistencies are likely to cause problems in accounting, and between the approaches.	
	1(a)	Conservative parameters will probably be applied in all approaches, as it is essential to avoid over-crediting in cases of uncertainty.
	1(b)	Standardized baselines are a useful tool in the delivery of sectoral commitments and specific government policies. Standardized baselines are a large step towards NMM (and FVA), and can assist Parties to increase their ambition. Standardisation could help provide a level playing field between approaches.
	1(c)	The inclusion or exclusion of existing CDM projects in the baseline needs to be standardised across approaches to ensure a relatively level playing field.
Cost	The administrative cost of implementation of the option to reduce baseline levels may be limited if combined with the normal schedule of revisions of methodologies and rules and guidelines. Unless project participants are requested to duplicate the baseline calculations to establish the scale of the introduced discount, direct costs to project participants are also limited. However, fewer CERs will be issued to projects under all options,	

[40] This does not exclude for example NMM to use the host Party's policy targets as the baseline level compared to the average of recent projects in the CDM.

	leading to a loss of revenue for project investors. While the cost is borne by project investors, any resulting net mitigation is likely to be claimed by the host country through their national inventory report, unless the achieved net mitigation is quantified and inventories adjusted accordingly.	
	1(a)	The cost of implementation may be limited if combined with the normal schedule of revisions of methodologies, but could be significant otherwise because of the sheer number of methodologies and parameters that would need to be adjusted. Agreeing on more conservative values, or explicit discount factors, may prove to be complex if trying to avoid the risk of unfairly penalising specific project types or technologies, such that they would carry a greater burden than others.
	1(b)	With the procedures still relatively new, the cost of a proposal of a standardized baseline is relatively high. Additionally, as the baseline would be applicable broadly, providing no exclusivity at all, individual project participants have little incentive to propose standardized baselines, and are more likely to choose a project-specific or programmatic approach. Therefore, few proposals have been prepared and agreed. However, if used hand-in-hand with a newly proposed government policy, DNAs should be interested in developing standardized baselines. An increased number of standardised baselines may help offset some of the development costs of each project.
	1(c)	The cost of implementing the inclusion of existing CDM projects in the baseline is likely to be low.

Conclusions

Expanding the use of conservative parameters from addressing uncertainty to delivering net mitigation would require extensive work, bringing political decisions to the level of individual methodologies. Spreading the mitigation burden evenly across all technologies would be complex. Transparent quantification of the resulting (likely limited) net mitigation would be complex and aligning conservative parameter values with national inventory data would become problematic.

Standardized baselines have recently started being applied within the CDM, and are a necessary step towards expansion of the mechanisms and development of new approaches, such as NMM, but very few have been proposed to date and significant work would be necessary to cover even a small proportion of the portfolio of project types and host countries. The size of the achieved net mitigation cannot reasonably be quantified, and is likely to be limited, as otherwise projects would chose a project-specific approach, and as standardised baselines are not suitable for all sectors. With increasing commitments by host Parties and the development of new approaches such as NMM, standardised baselines may become more important, but most likely as part of the host's commitments rather than net mitigation through the CDM.

CDM projects are deemed to be additional, and therefore should, by definition, be excluded from the baseline. Inclusion of CDM projects in the baselines could probably deliver only modest levels of net mitigation that may be difficult to quantify and attribute to specific activities.

2. Reduce baseline validity periods

Shorter baseline periods may reduce the emission reductions that can be credited to project activities. There are at least three different ways to reduce the baseline validity periods at registration:

(d) Limit the time for excluding E- policies,
(e) Apply shorter crediting periods, and
(f) More frequently update the baseline.

Criterion	Common issues for all options	
	2(d)	Limit the time for excluding E- policies
	2(e)	Apply shorter crediting periods
	2(f)	More frequently update the baseline
Implementation	In their simplest form, these options may require only minimal input from CMP, and implementation is probably quite simple and can be carried out by the EB. If the options are differentiated, discussions may become more politicised, requiring CMP involvement.	
	2(d)	The existing rules do not provide a time limit for excluding E- policies from the baseline scenario, but the EB is currently discussing such a limit. By limiting the valid exclusion period, the baseline would shift after the end of that period to include the E- policy, thus reducing the emission reductions a project can claim. However, there are a number of obstacles such as defining when a policy becomes effective, which may not be clear-cut, and there are concerns about how the ruling may impact upon projects. Also, once host countries have taken on commitments, policies implemented to comply with their commitments cannot necessarily be excluded. While it can be expected that the Least Developed Countries (LDCs) will continue to require carbon finance through the CDM to develop and implement E- policies, in more advanced economies and sectors this could be considered own effort, and thus to be included in the assessment.
	2(e)	A reduction in the crediting period from current levels would reduce the emission reductions that a project can claim, although many projects will already continue to operate beyond the crediting periods, and thus continue to generate emission reductions which will no longer be credited. Some methodologies already limit the choice of crediting period, and in all cases the crediting period is limited by the operating period of the project, or by the remaining life of the equipment replaced. While it may be possible to agree technical limits to crediting periods in some cases, the choice would most likely be political. Applying shorter crediting periods may require agreement on how to distinguish between long-term capital-intensive projects with low rates of return and shorter-term projects with higher rates of return. There have already been debates about the relevance of CDM in projects where CER revenues constitute a small proportion of overall income.
	2(f)	Some methodologies already mandate ex-post calculation of the baseline, for example AM0029, but most methodologies allow for

		the baseline to be fixed ex-ante for the crediting period. While conservative calculations are applied to avoid over-crediting, more frequent updating of the baseline may help ensure baseline estimates remain conservative throughout the crediting period. However, recent baseline data is not always readily available. Often data several years old has to be used in the calculations. In order for this option to be most valuable, up-to-date information is necessary.
Ambition	-	
	2(d)	Few CDM projects have used the E- policy rules, so any impact from limiting the exclusion period is likely to be limited. However, in principle this option could integrate well with host country policies. During the E- policy exemption, projects could be implemented and funded with the help of carbon revenue, whereas after expiry, the cost of implementation would be for the host country. Some EU accession countries used this principle to fund changes that were required as part of their joining the EU during the first Kyoto period. Greater clarity on the treatment of E- policies under CDM could help host countries implement more E- policies.
	2(e)	The size of net mitigation achieved through shorter crediting periods may be significant. For example, reducing the fixed ten-year crediting period to nine years, would (assuming constant reductions each year) provide 10% net mitigation. However, it may be limited if only applied to new projects, because there are few, or upon project's crediting period renewal, because only just over 60% of projects have chosen a renewable crediting period (and some have already renewed).[41]
	2(f)	The impact of updating the baseline more frequently is likely to be small, including given the conservative approach used when calculating. Indeed, it is possible that the baseline would increase when updating, thus allowing the project to claim greater emission reductions, rather than fewer. For example, for a grid-connected renewable energy project, the grid emission factor is perhaps up to 10% lower at renewal of the crediting period[42]; doubling the frequency of baseline updates, would only lead to a reduction of up to 2.5% over the whole period.[43] However, there are also project types where the impact may be much greater, particularly those with a relatively small difference between baseline and project emissions.[44]
Accounting	There is no incentive for project participants (PPs) to monitor and report the achieved net mitigation, but in each case the information is probably available to estimate it accurately. However, it may be difficult to continue	

[41] See UNEP Risoe CDM/JI Pipeline Analysis and Database, see http://cdmpipeline.org/.

[42] Author's rough estimate on the basis of experience with projects he's been involved in.

[43] During the first half of the period the baselines would be identical, during the second half the baseline would be updated (up to 5% lower). Therefore, overall the reduction is only 2.5%.

[44] The author has been involved in a project using AM0029, which mandated ex-post calculation of the baseline. Due to a dramatically lower baseline ex-post, the project only delivered about 10% of the expected reductions in its first year. A further drop in the baseline ex-post has ruled out any further reductions for the project.

	to track projects after the end of the total crediting period. Avoiding double-counting would require agreement on the definition of net mitigation in the context of CDM (i.e. can CDM's non-credited mitigation impact be counted towards host country pledges or not) as well as procedures to reflect this agreement accordingly in the national inventories of host countries that submit inventories and take on pledges.	
	2(d)	As the baseline both with and without the impact of the E- policies would need to be calculated (if the time limit is less than one crediting period) it would be possible to calculate the exact impact of both the E- policy exclusion and the time limitation. While accurate modelling of the financial impact of a certain policy on a specific project might be straightforward, the overall mitigation impact attributable to that policy can be difficult to reliably quantify.
	2(e)	As the baseline is established, and operational history through the crediting period is known, it would be possible to estimate the likely net mitigation after the end of the shorter crediting period. However, there can be no requirement on projects to continue to monitor projects or the validity of the baseline after the end of the crediting period, so neither the exact operating life of the project, nor the production level would be verified after the end of the crediting period.
	2(f)	As the baseline prior to the update is established, the impact of more frequent updates could be calculated, but there is no incentive for PPs to do so.
Applicability	In principle, each of these options is applicable to all project types and/or regions, but may be more effective for some. Therefore, options may need to be differentiated between project types and/or regions, which would add significant complexity. Also, they can be combined with other options, but this may obscure the net mitigation effect or make it more complex to quantify.	
	2(d)	Few CDM projects have applied the E- policy rules to date, but this is most likely due to different understanding of the E+/E- rules among the various stakeholders in the CDM project cycle, and therefore the difficulty of applying the rule and getting registered. A change to the E- rule may be applicable to new projects and at the point of renewing a project's crediting period.
	2(e)	Shorter crediting periods may be a more effective option for some project types than others. For example, projects with ongoing operating costs and relying solely on carbon revenue require a continuing crediting period, or they would be decommissioned at the end of the crediting period. Applying the CDM principle of not allowing retroactive application of rules, shorter crediting periods should only be mandated to new projects, and upon crediting period renewal; existing projects would have to opt in.
	2(f)	The relevance of frequent updates of the baseline would be greatest in rapidly changing sectors, whereas more mature sectors may need less frequent updates. If changed as part of a methodology, more frequent updates of the baseline may also be made mandatory to projects renewing their

		crediting period.
Compatibility	In principle, each of the options can be applied beyond the limits of the CDM, and their application across different approaches could be encouraged for the sake of consistency and comparability..	
	2(d)	The interaction between E- policies and NAMAs and new approaches is a subject that may need further work. In the authors' opinion an integration of the different funding concepts for policies that advantage lower-emission activities would be beneficial. Indeed, an E- policy could be considered the basis for a NAMA, NMM or FVA.
	2(e)	Crediting periods almost certainly should be aligned across the different approaches in the UNFCCC regime.
	2(f)	The timing of updates should be uniform but will only make a significant difference in sectors where the balance of technologies has changed, excluding CDM driven investment.
Cost	If options are to be differentiated between project types and/or regions, the costs could be significant due to the complexity.	
	2(d)	The transaction cost of limiting the time for excluding E- policies is unlikely to be significant. The cost of developing the counter-factual baseline with the exclusion of the E- policy is likely to be a costly element, which is why most projects have never applied this option and simply included the E- polices within the baseline.[45] The loss in terms of project IRR is probably limited, as such loss only occurs towards the end of the crediting period (taking into account the effect of discount rates on medium and long term revenues).
	2(e)	A shorter crediting period may be one of the least costly options to PPs for achieving net mitigation. While the loss of CER revenue may be significant, the impact of such loss at the end of the project crediting period on project IRR is likely to be relatively low, due to the effect of discount rates. However, for projects relying solely on carbon revenue, a shorter crediting period would lead to a shorter operating period, thus negating any net mitigation benefit.
	2(f)	Updating the baseline will introduce additional transaction costs for PPs, both for recalculating the baseline itself, and for the independent validation of the work. With a likely marginal impact in terms of mitigation in many sectors, this option may be expensive.

Conclusions

Limiting the time for excluding E- policies will have limited impact because it will only generate mitigation in instances where parties have implemented E- policies, and projects have applied the rule. However it is interesting because it introduces scope for host country variation in mitigation, helping those countries with E- policies progress towards greater mitigation targets.

Shortening the duration of the crediting period has a number of potential strengths. It leaves CER revenues untouched at the start of the project when revenues are most valuable to developers. It could be applied to all new projects and via methodology changes to existing projects at renewal of the crediting period. And the size of net mitigation achieved through shorter crediting periods may

[45] http://www.pd-forum.net/files/c5511e7a0cf371cbe8528a91cb7e226d.pdf.

be significant. However, projects with a fixed crediting period (nearly 40% of projects) are unlikely to be impacted, unless applied retroactively, and project types that rely solely on carbon revenue, such as landfill gas flaring and many cook stoves projects, would cease at the end of the shorter crediting period, negating any benefit.

More frequently updating the baseline may result in a more accurate reflection of the actual baseline, but does not guarantee that fewer CERs are generated, or net mitigation increased, while causing significant cost.

3. Change project type eligibility

Different project types are perceived to have different net mitigation effects. Therefore, by changing the project types in the CDM, it may be possible to affect the net mitigation impact of the mechanism. Project types with greater net mitigation effects are stimulated, while those with less effect are discouraged. Three specific options of affecting eligible project types are discussed:

(g) Move to policy or sector-based crediting,
(h) Apply a positive lists for projects that are deemed to have greater net mitigation potential
(i) Apply a negative lists for projects that are thought to have less net mitigation impact

Criterion	Common issues	
	3(g)	Policy or sector-based crediting
	3(h)	Positive lists
	3(i)	Negative lists
Implementation	These options require the existence of perceived or real existing net mitigation benefits by certain project types. These existing net mitigation benefits would be the result of the implementation of one of the other options, for example conservative baseline parameters, or a short crediting period compared to project life.	
	3(g)	Changing the CDM from a project-by-project mechanism to policy or sector-based crediting would significantly change the mechanism. Also, NMM, and new approaches under the FVA, will populate this space. Indeed, once these new approaches start in earnest, it may be expected that the CDM becomes more focused on niche projects rather than more standardized. Policy or sector-based crediting requires more standardized baselines and sectoral information, and may require sectoral or policy commitments in the host country. However, standardized baselines have proven to be difficult and few specific sectoral commitments exist to date, both requiring significant input from host country authorities.
	3(h)	The EB already applies a positive list, albeit for reasons other than greater net mitigation. CMP needs to approve the EB choice. The EB's positive list is revisited after a few years.
	3(i)	The current CDM does not apply negative lists. Any such list would need CMP approval to be implemented. Some regional schemes, such as the EU ETS, apply negative lists regarding which CERs can be used in the systems. Indeed, any national or regional regulator may restrict the project types, host countries and/or credit vintages it allows.

		Without encouraging alternative measures to implement the excluded mitigation actions, a negative list does not deliver net mitigation because project types are excluded.
Ambition	While each of the options can be transparently implemented, the effect on net mitigation is unlikely to be transparent.	
	3(g)	Over the long term, policy or sector-based crediting may have significant mitigation potential, if they sufficiently stimulate implementation of projects. However, with no experience to date, very little impact can be expected in the short term. Where the shift to policy or sector-based crediting is based on clear policy or sectoral commitments, it may stimulate greater ambition by host parties and help them eliminate leakage effects within these sectors. Indeed, the baselines applied are likely to include a greater share of own-effort than is usual in standard CDM projects.
	3(h)	Positive lists can reduce the transaction costs of projects, which is particularly important for small and micro-scale projects. However, unless positive lists are expanded to benefit also larger-scale projects or programmes, the overall size of the impact is likely to be small. A positive list may be differentiated by host country, and be used by the host to promote certain sectors that could be particularly successful.
	3(i)	Negative lists are unlikely to help ambition in any way, unless it would encourage parties to implement separate policies for excluded projects. As it reduces the overall pool of available projects, it will also reduce the total mitigation achieved through the mechanism.
Accounting	As each of these options only increases the net mitigation via the underlying approach that is being promoted, such as conservative baselines or short crediting periods, whether the net mitigation can be quantified depends on that other option. Even if the extent of project-specific net mitigation is known, the exact impact of the stimulus from either of these options is unlikely to be quantifiable.	
	3(g)	-
	3(h)	It would be difficult to establish to degree to which projects have been implemented due to the implementation of the positive list as opposed to the normal incentives available through the CDM.
	3(i)	-
Applicability	By definition, these options are not applicable across the board but can be differentiated by project type, location and/or sector.	
	3(g)	The application of policy or sector-based crediting is dependent on the existence of policies or sectoral baselines etc., which currently significantly restricts this option.
	3(h)	There is a degree of flexibility in the application of positive lists, for example by differentiating projects by size (e.g. installed capacity) or location (e.g. LDC).
	3(i)	A negative list can be applied with some flexibility. Individual buyers may restrict project types, as do some regulators.
Compatibility	-	

	3(g)	Policy or sector-based crediting is the basis of what we expect some of the new approaches under the UNFCCC to be.
	3(h)	Positive lists can be applicable to different approaches.
	3(i)	A negative list could be applied to the CDM, as well as new approaches. However, to have any net mitigation effect, the implementation of excluded mitigation actions would need to be encouraged outside the approach(es) in a way that avoids double-counting.
Cost	The cost burden depends on the policies that support and/or mandate the targeted action, while the price impact of supply changes would need to be considered in the context of higher demand.	
	3(g)	The cost impact of policy or sector-based crediting is not immediately clear. On the one hand, this is likely to increase supply from projects in the relevant sectors at reduced cost. On the other hand, this could reduce implementation of other project types not covered, thus reducing supply and raising prices (all other things being equal).
	3(h)	The application of a positive list would increase supply and thus reduce the market price, while delivering more aggregate reductions (offsets plus net mitigation). The intention is that project types on the positive list would have greater net mitigation, thus the share of net mitigation in the aggregate should increase. This fall in price would in theory be offset by reduced transaction costs for positive list projects. However, this could inadvertently penalize new and existing 'ordinary' projects which are not on the positive list.
	3(i)	The application of a negative list would reduce supply and thus increase the market price, while delivering fewer aggregate reductions (offsets plus net mitigation). At the same time, a ban on certain project types on the negative list may also lead to dumping of credits from such project, which would lead to a reduction in price.

Conclusions

Once standardized baselines are more common, it may be possible to expand the CDM to policy or sector-based crediting, applying these more conservative standardized baselines and incorporating policy commitments. This option would involve moving away from the CDM's project-by-project approach to a wider policy or sector-basis. It could reduce concerns of leakage effects within sectors, and may more clearly incorporate sector policies. Indeed, the baseline may be defined on the basis of a policy or target, below the project-specific baseline if it were calculated. However, the net mitigation effect will be limited in the short term, as the pre-conditions do not yet exist.

A positive list aims to incentivise the implementation of listed projects. However, the current incentive on large projects is limited and the incentives on small projects greater because positive lists reduce transaction costs, which are relatively less important for large scale projects. Therefore, the aggregate net mitigation effect is likely to be limited unless vast numbers of (small scale) projects could be implemented. This said, this option may be used as an easy measure for stimulating specific sectors and project types.

A negative list approach could exclude potentially additional projects that are deemed not to deliver net mitigation, and reduce the scope of the CDM itself. While both positive and negative lists have a role – and are being applied – in the arguments about additionality and desirability of some project types (primarily in terms of their sustainable development impact), this does not apply to projects' impact on net mitigation. Regional schemes in the EU and elsewhere currently apply negative lists on imported and/or domestic credits allowed for compliance, the Gold Standard only covers certain project categories, and many buyers on the voluntary market also restrict project types.

4. Introduce a net mitigation levy at issuance

The Parties could mandate the CDM EB to introduce a net mitigation levy at issuance, or Host Parties could be mandated to define their own levies:

(j) Earmark a proportion of CERs for net mitigation.

Criterion	4(j)	Net mitigation levy
Implementation	4(j)	The concept of a (mandatory) net mitigation levy works by deducting a proportion of CERs at issuance, earmarking it for net mitigation and preventing its use for offsetting Annex I emissions. Its implementation under CDM would require a CMP decision which could mandate the EB and/or host parties to set the levy. If the intention is to promote mitigation by host parties rather than global net mitigation, a process for transferring the "ownership" of the mitigation back to the host party would be required, for example through creating a host country mitigation account. Otherwise, the main pre-condition – the existence of a credible earmarking or cancellation procedure – already exists under the CDM. The levy could be determined centrally by the EB, or could be implemented by host countries themselves, possibly following guidance from the EB. The levy should be predictable, fair and transparent, and may be published on the UNFCCC website and inscribed in the host country Letter of Approval (LoA). While setting the levels of the levy would be the main challenge, and could be rather political, there is already experience within the CDM with levies on CDM projects. However, the introduction of this new concept would require new procedures.
Ambition	4(j)	The volume of mitigation depends on the level of the net mitigation levy that is being applied, and could be significant. While the levy could be implemented as a flat fee for all projects, it could also be differentiated by country and project type. Indeed, the net mitigation share could be expected to increase over time in sync with the development status of the host country and project sector. The net mitigation levy enables the integration of host country policies, by differentiating the levy. For example, host countries could take into account the level of support that the technology receives from the host government (e.g. feed-in tariffs or tax incentives), therefore aligning with and strengthening host country policies.[46] While the levy may be low or zero for least developed countries

[46] Where an economy (financially) supports a renewable energy project with a feed in tariff, it is not unreasonable that the economy should benefit from a share of the CERs.

		(LDCs), it could progress towards 100% before the end of the crediting period in advanced developing countries, reflecting their own commitments under the UNFCCC. If implemented by forwarding CERs to a host country mitigation account, host countries would be rewarded in this way for the implementation of climate policies.
Accounting	4(j)	Because the levy is applied after emission reductions are monitored, reported, verified and issued, the net mitigation is accounted for in a transparent manner. The CERs are quantified using the approved methodologies and issuance process with the net mitigation effort being deducted at issuance. Double-counting can be avoided by ensuring that CDM projects are reported and either discounted from national inventories completely[47], whilst the net mitigation benefits are counted. The same approach was applied to JI projects in sectors covered in the EU ETS in EU accession states. At the point where a levy reaches 100% of CERs, a CDM project would no longer receive tradable CERs that can be used for offsetting Annex I emissions, as all of the project's CERs would count towards host country action. In case a domestic ETS has been established, the host country may wish to recognise the CDM project's reductions within the ETS or otherwise compensate for any contributions towards achievement of national targets.
Applicability	4(j)	The EB could set universal levels across all project types and/or host countries. Alternatively, the net mitigation levy could be differentiated according to agreed principles, for example taking into account the regions where projects are implemented, the technology, the level of support that the technology receives from the host government (e.g. feed-in tariffs or tax incentives) and the age of the project – reflecting the country's progression towards its own adoption of targets. The levy could be applied automatically to all new projects going forward. Existing projects could volunteer to pay the levy by applying for a new host country LoA in the expectation that they would get access to new markets seeking to purchase high quality "post mitigation" CERs.
Compatibility	4(j)	The net mitigation levy is applicable also beyond CDM and could be applied to other approaches that generate tradeable reductions. The option also enables the CDM to integrate with other policies, for example, providing a means of using the CDM to promote early action and to pilot and kick-start the deployment of a particular technology before introducing domestic policies and measures for their wide-scale implementation.
Cost	4(j)	Unless project owners are compensated for the net mitigation levy, they carry the costs of the net mitigation which contributes towards host country (or global) mitigation efforts. The levies could be set to be low at the outset of the project and climb to 100% over, for example, 10 or 20 years. In financing terms, early cash flow is much more important than later cash flow and at the cost of capital which CDM projects cite (typically 10% or higher), revenues after 10 to 15 years are immaterial to the original investment decision. So project

[47] Alternatively, the 'exported CERs' may be added as emissions to the inventory to avoid double counting.

		developers may be willing to give up future (uncertain) cash flow for higher and more certain cash flows in the early years of the project. In countries which develop domestic emission trading schemes, the regulator could allocate domestic offsets or allowances against "mitigation CERs" for the project owner. This could provide an additional source of revenue for the CDM projects for the duration of the crediting period.

Conclusion

The net mitigation levy is a strong option for quantifying and transparently accounting for net mitigation through the CDM. The levy might be universal or customised by each host country, reflecting implemented policies, and the fact that conditions in and expected commitments from advanced and least developed countries are very different. It can also be applied in a flexible way so that it captures some of the best features of the other options, while differentiating between different sectors of the economy. While technically simple to implement, agreeing on principles for setting, and actual levels of the levy could prove to be a challenging and political process. If made mandatory, the levy may have the potential to deliver significant quantities of mitigation, while managing the cost to project investors by backloading the net mitigation.

5. Apply a discount upon use

A discount could be applied at the point of use of CERs for compliance. This means that more than one CER would be surrendered for every one CER used or converted. The discounted volume of CERs would need to be cancelled. It would be possible for such action to be voluntary by the buyer or mandatory by the relevant regulator.

Three specific options to apply the discount are discussed:

(k) Buyer's own voluntary discount (or dedicated net mitigation fund or voluntary offsets),
(l) UN regulator's discount when converting one unit type into another unit type within the UN registry system, and
(m) National regulator's discount when surrendering a credit within a national regulatory system.

Criterion	Common issues	
	5(k)	Buyer's own discount
	5(l)	UN regulator discount
	5(m)	National regulator discount
Implementation	Being end-of-pipe solutions, these options may be the easiest 'retrofits' to the CDM to enhance its net mitigation impact. The main pre-condition is the existence of a credible cancellation or retirement procedure. As the CDM registry has already introduced a transparent such procedure, this condition is partially satisfied. If the intention is to promote mitigation by host parties rather than global net mitigation, it would still need to add a means whereby the "ownership" of the mitigation can be transferred back to the host party, for example through creating a host country mitigation account.	
	5(k)	A buyer may voluntarily decide to apply its own discount. Being a voluntary measure, this will not need new procedures – the current procedures for voluntary cancellations within the CDM registry would be sufficient, and similar procedures exist within other

		registries too. Ownership of the net mitigation would be clearly in the hands of the party discounting the credits. However, relying on voluntary actions means that there is no guarantee of any specific desired outcome for anyone except the buyer. An interesting variation would be the establishment of a dedicated net mitigation fund earmarking all purchased CERs as net mitigation. Offset providers, using CERs to help companies, households and travellers voluntarily offset their emissions or carbon footprints, act in the same manner, as they retire the CERs preventing their use for compliance purposes.
	5(l)	For a discount to be introduced at UNFCC level, a CMP decision would be required. The current UN system, including the CDM, does not apply discounts; it is built on the premise that 'a tonne is a tonne' and units are broadly interchangeable.[48] But if different approaches, such as NMM and FVA, begin to intersect with CDM project activities, it is conceivable that CERs could be converted to credits from new approaches, if sectors are overlapping, and that such conversion would include a discount to effectively equalise the baselines between CDM and the new approach.
	5(m)	A regulator of a national or regional emissions trading scheme may, unilaterally upon their own discretion, introduce mandatory discounts at the point of use on any units, including those imported from outside its own system. Qualitative and quantitative restrictions are already applied by regulators, so a mandatory discount could be foreseen for targeted project types. Indeed, regulators around the world already restrict imported units, albeit not through discounts. In this case, the ownership of the discount and the net mitigation would be with the regulator. Linked trading systems may need to implement similar discounts if they want to avoid arbitrage opportunities.
Ambition	In theory, applying a discount has the potential to deliver the most net mitigation of the options discussed, because it can also be applied to already-issued units which are beyond the reach of the other options, and thus also could deliver this mitigation in the shortest term. The volume of mitigation depends on the discount applied, and on the elasticity of supply and demand for reductions. If discounts are varied across project types and/or host regions, it is possible that the more heavily discounted reductions would become less popular, whereas they may have been low cost offsets that could have satisfied demand in a different market, or that host country policies helping to achieve such reductions would become less attractive for their governments. While this effect would probably be limited, it may offset some of the gains.	
	5(k)	Voluntary discounts, whether applied by an Annex I Party or non-governmental buyer, can increase the global ambition, provided that the buyer does not use the discount-induced net mitigation element for compliance purposes (i.e. the reductions are cancelled or earmarked rather than counted towards targets). Alternatively,

[48] Land-use derived units are not necessarily fully fungible, due to permanency issues.

		the buyer could use discounting to achieve a pledged voluntary target exceeding their compliance target, thereby contributing to increased ambition.[49]
	5(l)	Discounts applied centrally would reduce the possibility of free riders and maintain a level playing field. Discounting will increase prices of offsets which, if not agreed to voluntarily, could have a negative impact on the willingness of countries to commit to greater ambition (beyond the additional net mitigation achieved).
	5(m)	Unilateral discounting may help to level the playing field for some specific sectors in non-CDM countries which face global competition from CDM activities, by reducing a (perceived) competitive advantage gained through the CDM by their competitors. Additionally, while maintaining the flexibility of trading, it may raise the effective price of offsets to make domestic action more competitive.
Accounting	Because discounting is applied after emission reductions are monitored, reported, verified and issued, discounting allows for the exact net mitigation to be quantified, and the respective number of CERs are (transparently) earmarked, cancelled or retired in the relevant registry. However, where host countries (or sectors) take on commitments, accounting of the CERs (including the discounted ones) needs to be regulated to avoid double-counting. These themes are currently being discussed under in the context of the FVA.	
	5(k)	Being a voluntary action, a user's claim of having applied a voluntary discount is only likely to be accepted if it is transparently reported. The CDM registry already allows for cancellations and attestations, but it is also possible to use third party verifiers or reputable offset providers to create more credibility.
	5(l)	If the discount were to be applied at UN level, existing structures could be utilised to ensure a robust accounting system.
	5(m)	If the regulator applies discounting at national level, the cancellation and/or use for compliance of the discount-induced share of CERs would need to be transparently accounted for to ensure credibility of the net mitigation impact.
Applicability	As an end-of-pipe solution, this option can be retrofitted to all project types, existing and new projects, or even already-issued CERs from historic reductions. While a single discount factor would be the simplest solution, discount rates may be differentiated by project type, host country, abatement cost, or any other metric chosen, types depending on the preferences of the entity applying the discount. Discounts may be applied in addition to any other options, although this will impact the transparency of the overall net mitigation.	
	5(k)	A buyer's own discount helps it to guarantee a minimum net mitigation in accordance with its own requirements, with no dependency on other actors or any other options being applied throughout the production chain.
	5(l)	Discounting at UN level would likely be implemented in the context

[49] For example, some Annex I Parties committed to voluntary (domestic) targets exceeding their official targets under the Kyoto Protocol. Discounting could be used to meet such a target.

		of aligning the volume of available offsets under CDM with those that would be achieved using different agreed approaches (such as the NMM and FVA); a separate (global) agreement on discount factors would thus not seem necessary.
	5(m)	While regulators already use qualitative and/or quantitative restrictions, discounting may be introduced as a compromise solution – it can add shades of grey to the black-and-white, in-or-out options currently applied in restrictions. A regulator's discount helps it to guarantee a minimum net mitigation in accordance with its own requirements, and perceptions regarding the desirability of projects, with no dependency on other actors, options being applied throughout the production chain, or wider (global) agreement on net mitigation.
Compatibility	Discounting may be applied to any approach, but losing fungibility between reductions achieved through different approaches is not desirable.	
	5(k)	While variation in users' own discounts complicates linking and comparability, national discounts may be compatible with international approaches such as the NMM and FVA if they meet relevant (yet-to-be-agreed) criteria regarding e.g. transparent accounting.
	5(l)	Rather than create differences, UN-level discounting may be used as the method to align the volume of available offsets with those that would be achieved using different agreed approaches (such as NMM and FVA), in order to promote fungibility and a level playing field between approaches.
	5(m)	Discounting may be used by a regulator to promote some approaches over others. As with 5(k), compatibility with other (international) approaches would depend on the outcome of the negotiations.
Cost	While the cost of the other options at registration and upon issuance are generally for the project investor, the cost of discounting at the point of use are more likely to be for the buyer (user) of the CERs, although there is likely to be an impact on the sales price to the project investor, in particular if discounts are differentiated. The result of applying a discount is both an increased cost of the achieved offsets, and a reduction in volume of achieved offsets, which means increased mitigation 'at home'. However, while the increased price per offset reduces the volume of offsets through the CDM, the aggregate reductions (offset plus net mitigation) would increase.	
	5(k)	A buyer's own discount will cause a self-imposed increase in cost, which needs to be balanced against the net mitigation gain. However, even with a discount, CERs may still be significantly cheaper to the buyer than reducing emissions at home.
	5(l)	Unless discounts are varied in different ways, and the discount rates justified accurately, the cost of applying a discount rate by the UN regulator is not likely to be significant.
	5(m)	As 5(l) above. The benefit of linking national or regional schemes with the CDM or other approaches is increased flexibility and reduced cost. By applying discounts, regulators artificially increase

		costs, and thus economic benefits of linking are reduced.

Conclusion

Irrespective of any other measures being implemented, a buyer may unilaterally (and voluntarily) decide to apply its own discount. This is likely to be the easiest option to implement, can have almost immediate impact, and could be applied even to already-issued CERs. However, being implemented unilaterally, the achieved mitigation may be small, unless implemented by a large buyer, or a specific well-endowed net mitigation fund. While the discounted CERs will need to be transparently earmarked, the ownership of the resulting net mitigation is with the buyer. However, being a voluntary action, it cannot guarantee any level of net mitigation.

Within the current UN-regulated carbon market mechanisms, all units represent the same 1 tCO2 equivalent[50] when used for compliance. However, a discount could be applied to achieve net mitigation from the use of the Kyoto mechanism, or with the development of multiple approaches to align the results under these different approaches.

While it may be unlikely to see a discount within the UN system, it would be relatively simple for a (national) regulator to apply a discount before accepting CERs. In phase 3 of the EU ETS, the regulator will already convert any eligible CERs to EUAs before they can be used for compliance. It will therefore be easily possible to apply a discount upon conversion, indeed varying discounts may be applied depending on the desirability of the specific project types to this regulator. As this is not a universal measure, it may fail in terms of scale, and create a disadvantage for PPs operating within this regulator's market compared to other markets.

Options matrix

The assessment of the 13 options above are summarised in the options matrix below.

Option	+ / – Assessment
1. Reduce baseline levels	
(a) Apply more conservative parameters in the baseline	+ Already being applied. + Easy to implement, although it would need CMP approval to go beyond conservative. – Most suitable where parameter values are unknown (conservativeness). – Unlikely to deliver any significant mitigation, unless parameters are so far discounted that they no longer reflect anything resembling reality. – Difficult to apply to existing registered projects (unless voluntarily), until a renewal of the crediting period. – Net mitigation is unquantified and unattributed, and therefore by default 'owned' by the host country if they report an inventory.
(b) Apply standardized baselines which are more conservative	+ Already being developed. + May be aligned with host country policies, and new approaches such as NMM and FVA.

[50] The exception is land use-related emission reductions under the CDM, as both lCERs and tCERs need to replaced by other Kyoto units on their expiry, whereas other units are permanent.

	– Proven to be difficult to develop. – Few standardised baselines currently exist. – Unlikely to deliver any significant mitigation, unless standardized baselines are made too conservative to be attractive (over normal baselines) to use. – Difficult to apply to existing registered projects (unless voluntarily), until a renewal of the crediting period. – Net mitigation is 'owned' by the host country, not the CDM. Volume is unknown.
(c) Include existing CDM projects in the baseline	– CDM projects are deemed to be additional, so should be excluded from the baseline.
2. Reduce baseline validity periods	
(d) Limit the time for excluding E- policies	+ Already being discussed by the EB. + E+/E- policy guidance needs updating. – Unlikely to deliver any significant mitigation, as E- is hardly applied by PPs. – Cannot be applied to existing registered projects (unless voluntarily), until a renewal of the crediting period. – Net mitigation is 'owned' by the host country, not the CDM. Volume is unknown.
(e) Shorten crediting periods	+ Easy, although would need CMP approval. + Could deliver significant volumes of reductions from the later years. + The cost to PPs is backloaded, so the impact on project IRR minimised. – Project types that rely on carbon revenue will cease and emissions increase as a result. – Difficult to apply to existing registered projects (unless voluntarily). – Net mitigation is 'owned' by the host country, not the CDM. Volume is unknown.
(f) Update the baseline more frequently	+ Procedures already exist for updating every crediting period. – Unlikely to deliver any significant mitigation, but increased transaction cost. – Would deliver more accurate calculation of reductions rather than necessarily greater net mitigation. – Difficult to apply to existing registered projects (unless voluntarily), until a renewal of the crediting period. – Net mitigation is 'owned' by the host country, not the CDM. Volume is unknown.
3. Change project type eligibility	
(g) Move to policy or sector-based crediting	+ There is a desire to move towards such crediting systems, including in NMM and FVA. – Relies on either standardized baselines (see above), or host country/sectoral targets/commitments. Volume of reductions relies on the agreed targets. – Difficult to apply to existing registered projects (unless voluntarily), until a renewal of the crediting period. – Likely to be difficult to agree, even more so than standardized baselines.

	– This is more likely to fall under FVA or NMM. – It may be difficult to avoid double-counting. Net mitigation is 'owned' by the host country. Volume is unknown.
(h) Apply positive lists for projects that have greater net mitigation	+ Easy to implement, but difficult to agree. – Relies on another option to achieve net mitigation. – Unlikely to deliver any significant mitigation, because if implementation of project types is affected by a positive list they are likely to be relatively small scale. – No effect at all on already-registered projects.
(i) Apply negative lists for projects with less net mitigation or where additionality is difficult to demonstrate	+ Easy to implement, but difficult to agree. – Based on the un-proven premise that many projects are not additional. – Would reduce the scope of the CDM. – Additional projects should not be refused registration. – Should not be applied to existing registered projects (unless voluntarily), at least until a renewal of the crediting period.
4. Introduce a 'net mitigation levy'	
(j) Earmark a proportion of CERs at issuance	+ Easy to implement as the concept of levies already exist in the CDM. + Exact mitigation volume is monitored, reported and verified. The mitigation is prevented from being used for offsetting Annex I commitments. The accounting principle of "a tonne is a tonne" holds. + Flexible application can be used to minimise the negative impact on PPs, or incorporate host country's own action or own contributions (e.g. feed in tariff). + Significant volumes are possible. – Difficult to apply to existing registered projects (unless voluntarily), until a renewal of the crediting period. – If voluntary, may be difficult to achieve net mitigation of significant volume – Difficult (political) to agree on levels
5. Apply a discount	
(k) Buyer's own voluntary discount	+ Easy to implement, as it needs no-one else's agreement. + Can be effected even on already-issued CERs. – Unlikely to deliver any significant mitigation, as this is voluntary. – Unclear who 'owns' the net mitigation. – Unless cancelled into a central registry, the volume of achieved net mitigation would probably be unknown.
(l) UN regulator's discount when converting one credit into another within the UN registry system	+ Universal application. + Can be effected even on already-issued CERs. + Exact volume of net mitigation would be monitored, reported, verified and cancelled, thus avoiding double-counting. – Unlikely to happen and it would undermine the a-tonne-is-a-tonne rule that is the foundation of emissions trading.
(m) National regulator's discount when surrendering a credit within a national regulatory system	+ Easy to implement, as it can be a unilateral action. + Can be effected even on already-issued CERs, although market participants should be given some notice. + Exact volume of net mitigation would be monitored, reported,

	verified and cancelled, thus avoiding double-counting. – Unlikely to deliver any significant mitigation, unless implemented by the largest (multiple) regulator(s).

Conclusions

The Clean Development Mechanism was originally designed as an offsetting mechanism, helping to achieve agreed emission targets more cost-effectively. It has proven to be very successful at achieving emission reductions globally. However, there is growing demand for increased mitigation, beyond offsetting from the existing mechanisms.

A variety of options is available to achieve increased net mitigation. In total thirteen options are explored in this report. They are assessed against six criteria, such as implementation, ambition, applicability and accounting. The options can be applied at different stages of the project cycle as follows:

- At registration, baseline levels may be reduced or crediting periods shortened, resulting in fewer reductions being issued for the same projects, or projects types that achieve greater net mitigation may be promoted;
- Upon issuance, a mitigation fee, earmarking CERs for net mitigation, could be introduced; and
- At the point of use, a discount could be applied by either the buyer or regulator.

Many of the options available at registration, including using more conservative parameters or shorter crediting periods, fail to be able to accurately quantify the net mitigation achieved. As a result, these options would also struggle to avoid double-counting, in particular once host Parties take on some commitments as the 'net mitigation' would simply be included in the country's inventory. On the other hand, both the mitigation levy and discounting options make use of monitored, reported, verified and issued emission reductions, allowing accurate accounting, full transparency and avoiding double-counting.

The use of standardized baselines, accounting for E- policies, and sectoral approaches may be aligned with host country action, and thus help to increase ambition. However, they all suffer from the problems mentioned above. However, the mitigation levy would allow for accurate accounting of the host country's own effort, including E- policies and NAMAs, thus avoiding double-counting.

Conservative parameters are already applied within baseline development, but are primarily suited where there is uncertainty regarding the exact value of a parameter. Standardized baselines are currently being developed, proving to be difficult and slow, but they are introduced to reduce transaction costs. Neither option is very well suited to increasing net mitigation.

Shorter crediting periods may work relatively well for some project types, if it could be applied to existing projects (upon renewal of their crediting period). The cost of implementation would be reduced by being back-loaded, but projects that rely solely on carbon revenue would cease, diminishing the returns.

The introduction of a net mitigation levy is the option that can fulfil most of the needs. Net mitigation is accurately monitored, reported and verified, and cancelled transparently, avoiding double-counting. The levels of the levy can be varied over time and adjusted to host country policies or own effort. Indeed, where the levy reflects the host's own effort, it would reward the host for that effort by cancelling the achieved reductions in its name. It would also be a flexible tool that can

be applied within the new approaches, becoming a standard building block in the Carbon market architecture.[51]

The easiest-to-implement option is the application of a discount. This is also the only option that could have an almost immediate effect on all not yet issued or used CERs. Any significantly large buyer, or group of buyers, or a well-resourced specific net mitigation fund, could affect a resulting net mitigation. Similarly, a regulator of a significant source of demand, e.g. the EU ETS[52], could apply a discount to all offsets upon use. However, the application of any discount to any unit would result in the loss of the fundamental basis of emissions trading: a tonne is a tonne.

Other options such as including CDM projects in the baseline, allowing the application of the E-policy rule for a limited time only, positive and negative lists, and more frequently updated baselines cannot deliver significant volumes, or be accurately accounted for.

Significant volumes of mitigation may only be achieved by discounting, applying a mitigation levy, and shorter crediting periods. All other options are unlikely to result in significant volumes.

Three options for increasing net mitigation through the CDM are worth considering in more detail. First, shorter crediting periods may be possible for some project types that do not rely solely on carbon revenues (but unsuitable for those that do). The loss of revenue near the end of the project life is least painful for project investors in terms of project returns. Second, discounts may be applied by willing buyers, a specific fund, or interested regulators. If these entities represented a significant demand centre, then the impact may be substantial. A discount is probably the easiest-to-implement, and can affect even already-issued CERs, thus most likely to be able to address the existing over-supply in the market. Third, the introduction of a net mitigation levy, earmarking a proportion of CERs for net mitigation and preventing their use as offsets. While new procedures would be necessary, it could be implemented quickly as experience with levies exists. The levy can be applied to the new approaches too, and could provide transparent accounting and avoid double-counting.

[51] This would also satisfy the Policy Dialogue's suggestion that net mitigation be implemented in the CDM now, so that it can be applied in the new approaches: both NMM and FVA already include in their design the requirement of net mitigation.

[52] However, without changes to the current EU ETS rules, this is in fact no longer a source of significant demand. The aggregate import limit is about 1.7 billion tonnes, whereas issuance of eligible credits, for CDM and JI together, already exceeds this.

Appendix 1

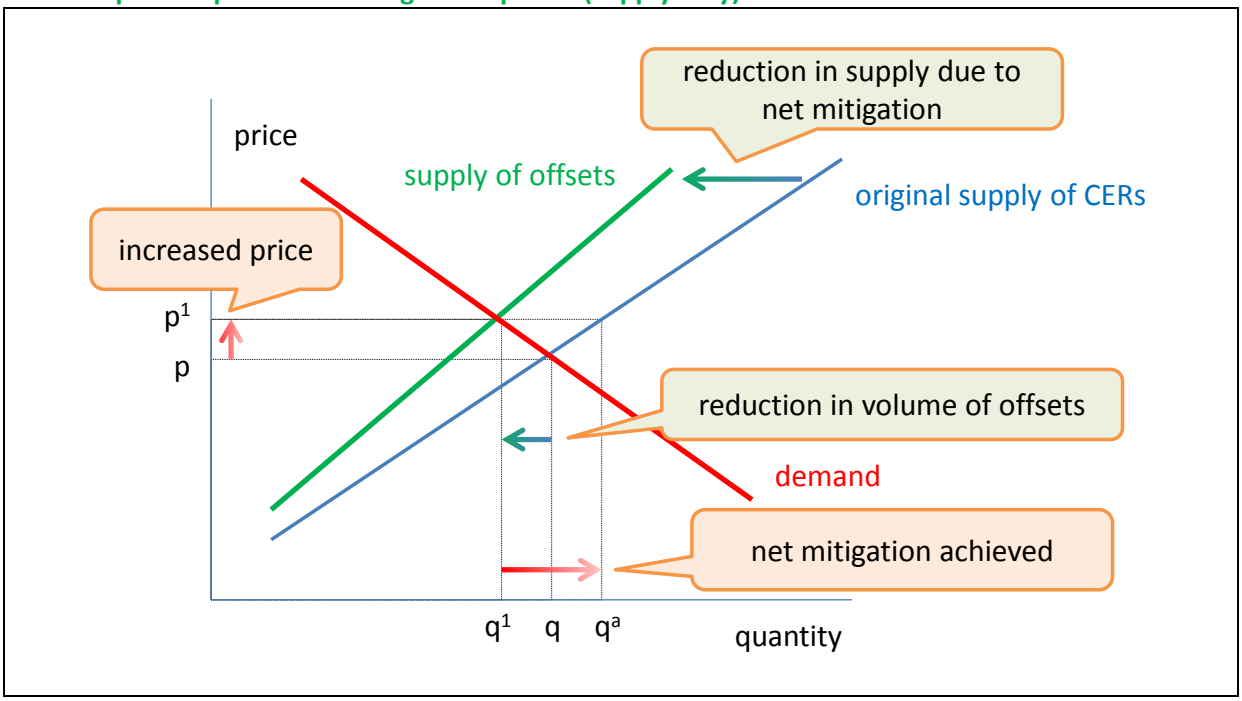
Market price impact of net mitigation

Any reduction that is no longer available to project developers to sell in the carbon market, because it is considered the net mitigation component of the project activity, will reduce revenues to project investors, and thus reduce the financial attractiveness of CDM projects to them. However, all other things being equal, a reduction in supply will result in an increase in price. This is shown in the simplified diagram below.

Most net mitigation options will result in a shift (rotation) of the supply curve to the left, by taking out a proportion of the reductions. This would increase the price from p to p^1 in the figure below. It would also reduce the number of available offsets from q to q^1. However, if the underlying projects are not affected[53], with the higher price, the aggregate mitigation would increase to q^a (using the original supply curve).

Not all options have the same effect on the supply curve. A negative list simply takes supply out of the market, which raises the price but doesn't increase net mitigation from remaining projects. A positive list could increase the supply (shift to the right), lowering the price.

Market price impact of net mitigation options (supply only)

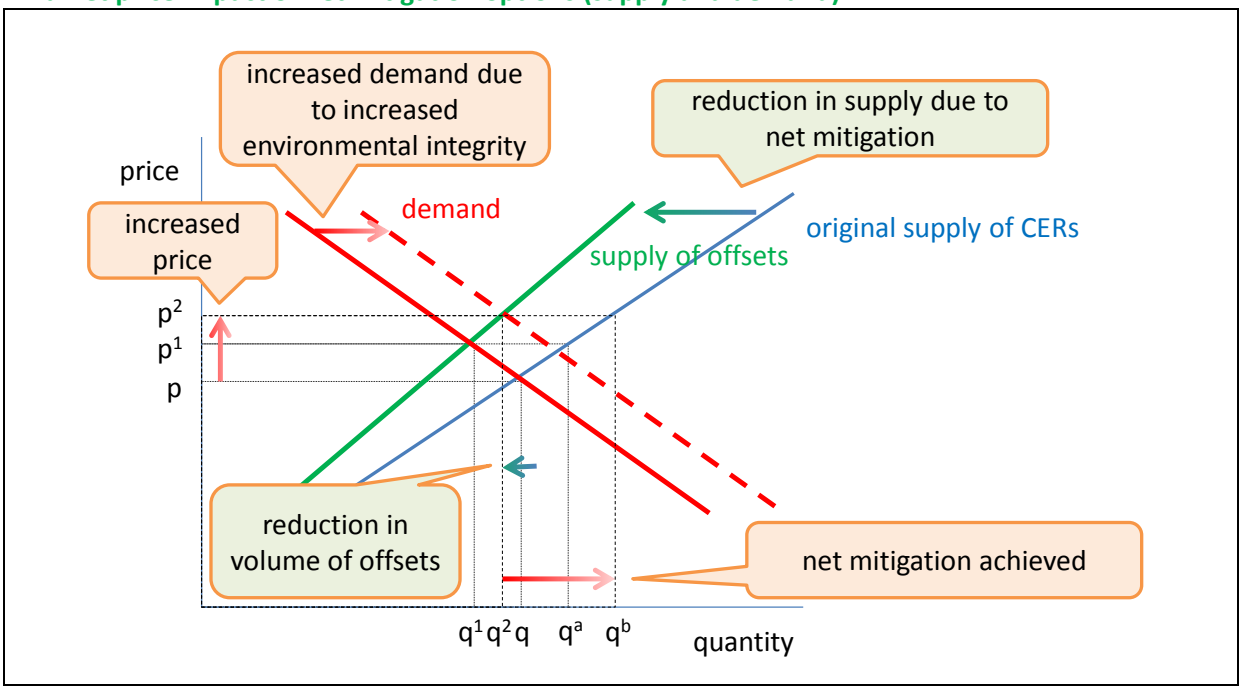


However, there may be a secondary effect of additional demand as a result of the perceived increased attractiveness of the mechanisms. A shift of the demand curve to the right would increase the price further from p^1 to p^2 in the figure below. It would also increase the number of available offsets from q^1 to q^2. Again, if the actual underlying projects are not affected, the aggregate mitigation would be q^b, so net mitigation is q^b-q^2. The relative price and volume effects are

[53] This is quite a big assumption, but simplifies the example. Some project types may not be able to continue with the 'penalty' of net mitigation reducing their revenues, depending on the price elasticities of supply and demand.

dependent on the price elasticities of supply and demand, so it is not possible to say whether q^2 is smaller or larger than q.

Market price impact of net mitigation options (supply and demand)



About the authors

Christiaan Vrolijk

Christiaan Vrolijk is an independent climate change and energy consultant. He works with public and private sector clients and NGOs on climate policy and project implementation, and serves on the CDM's Methodologies Panel. Previously he was Principal Advisor and one of the founders at Carbon Resource Management, one of the largest and most successful CDM and JI project developers. At CRM he managed the development and registration of more than 220 projects. Before CRM he worked at IT Power, the sustainable energy consultants, Natsource, the pioneering brokerage company in the environmental markets, and Chatham House, the top global thank tank.

Gareth Phillips

Gareth Phillips is currently a Partner at Climate and Sustainability Partners, offering advisory services, training and capacity building to private sector and government clients in the fields of climate change policy and sustainability. He was previously chief climate change officer at Sindicatum and global product manager of the SGS Climate Change Programme. He is currently chairman of the Project Developer Forum and board member at CMIA.