

**Climate Change Expert Group  
Paper No. 2009(5)**

# **Sectoral Market Mechanisms – Issues for Negotiation and Domestic Implementation**

A. Aasrud, R. Baron, B. Buchner  
and K. McCall (IEA)

**October 2009**

## OECD/IEA CLIMATE CHANGE EXPERT GROUP PAPERS

This series is designed to make available to a wider readership selected papers on climate change issues that have been prepared for the OECD/IEA Climate Change Expert Group (CCXG). The CCXG (formerly called the Annex I Expert Group) is a group of government delegates from OECD and other industrialised countries. The aim of the group is to promote dialogue and enhance understanding on technical issues in the international climate change negotiations. CCXG papers are developed in consultation with experts from a wide range of developed and developing countries, including those participating in CCXG Global Forums.

The full papers are generally available only in English.

The opinions expressed in these papers are the sole responsibility of the author(s) and do not necessarily reflect the views of the OECD, the IEA or their member countries, or the endorsement of any approach described herein.

Comments on the series are welcome, and should be sent to [env.contact@oecd.org](mailto:env.contact@oecd.org) or the Environment Directorate, 2 rue André Pascal, 75775 PARIS CEDEX 16, France.

-----  
OECD/IEA Climate Change Expert Group Papers are published on  
[www.oecd.org/env/cc/ccxg.htm](http://www.oecd.org/env/cc/ccxg.htm)  
-----

Applications for permission to reproduce or translate all or part of this material should be made to: OECD Publishing, [rights@oecd.org](mailto:rights@oecd.org) or fax 33 1 45 24 99 30.

This document has been produced with the financial assistance of the European Union. The views expressed herein can in no way be taken to reflect the official opinion of the European Union.

Copyright OECD/IEA, 2009

Applications for permission to reproduce or translate all or part of this material should be addressed to:  
Head of Publications Service, OECD/IEA  
2 rue André Pascal, 75775 Paris Cedex 16, France  
or  
9 rue de la Fédération, 75739 Paris Cedex 15, France

## ABSTRACT

This paper reviews proposals for the design of sectoral and related market mechanisms that are being debated both in the UNFCCC negotiations and in different domestic legislative contexts. Decisions on the design and scope of the mechanisms in the UNFCCC negotiations would affect the future supply of credits, while developed countries' legislations could influence demand. National actions to establish carbon markets may also constrain or enable international developments and options, as domestic policies may establish conditions or restrictions on the import of "international" offset credits or linkages with other national or regional carbon markets.

The paper also addresses the possible principles and technical requirements that Parties may wish to consider, as the foundations for further elaboration of the mechanisms. Beyond principles, a number of elements of a more technical nature need to be sorted out to set up new market mechanisms, such as: eligibility for participation by developed countries, as buyers; technical definition of baselines, including guidance on a process to agree to baseline levels, and possible revisions; length of the crediting period and frequency of issuance of credits; new trading units and registries; and national authorities for the new mechanisms. In the case of trading, a compliance reserve and liability rules may be topics for discussion as well.

The third issue explored by this paper is domestic implementation of sectoral market mechanisms by host countries, and how the transition between current and future mechanisms could be managed. Transition issues including the situation of existing CDM projects vis-à-vis broader crediting mechanisms and also sectoral trading must be clarified. Domestic policy implementation in developing countries is of paramount importance to ensure the effectiveness of possible new international market mechanisms. Several illustrations are offered to show how a mix of policies could be used to outperform a baseline to generate credits, and how credit revenues could be used to further support domestic policy implementation. Among the options discussed are subsidies to low-carbon technologies (e.g. feed-in tariffs), mandated performance standards, and an entity level baseline-and-crediting system.

**JEL Classification:** F53, Q54, Q56, Q58

**Keywords:** Climate change; mitigation; greenhouse gas; carbon market, sectoral approach

## RÉSUMÉ

Ce document passe en revue les propositions concernant la conception de mécanismes de marché sectoriels et apparentés dont il est actuellement débattu aussi bien dans les négociations de la CCNUCC que dans différentes instances législatives nationales. Les décisions qui seront prises lors des négociations de la CCNUCC à propos de l'agencement et du champ d'application de ces mécanismes devraient influencer sur les quantités de crédits disponibles à l'avenir, tandis que les législations des pays développés pourraient influencer la demande. Les actions engagées au niveau national pour mettre en place des marchés du carbone peuvent elles aussi limiter ou faciliter les évolutions et les possibilités au niveau international, dans la mesure où les politiques nationales peuvent imposer des conditions ou des restrictions à l'importation de crédits de compensation "internationaux", ou établir des liaisons avec d'autres marchés du carbone nationaux ou régionaux.

Ce document traite également des principes et des exigences techniques que les Parties pourraient juger souhaitable d'examiner, et qui serviront de bases pour affiner encore les mécanismes. Pour mettre en place de nouveaux mécanismes de marché, il faudra clarifier non seulement les principes, mais aussi un certain nombre d'éléments de nature plus technique, notamment : l'admissibilité des pays développés en tant qu'acheteurs ; la définition technique des niveaux de référence, y compris les directives à suivre pour les approuver et les révisions possibles ; la durée de la période de comptabilisation des crédits et la fréquence de la délivrance de crédits ; les nouvelles unités et les nouveaux registres utilisés pour les échanges ; ainsi que les autorités nationales compétentes à l'égard des nouveaux mécanismes. En ce qui concerne les échanges, la notion de réserve de quantités attribuées pour la période d'engagement et les règles en matière de responsabilité mériteraient également discussion.

Le troisième aspect étudié dans ce document concerne la mise en œuvre par les pays hôtes sur leur territoire de mécanismes de marché sectoriels, et les solutions possibles pour gérer la transition entre les mécanismes actuels et ceux de demain. Cette transition soulève des questions qu'il faut éclaircir, notamment la situation des projets existants qui relèvent du MDP au regard des mécanismes d'attribution de crédits de plus vaste portée, ainsi que les échanges sectoriels. La mise en œuvre des politiques à l'échelon national dans les pays en développement revêt une importance primordiale pour assurer l'efficacité des nouveaux mécanismes de marché internationaux qui pourraient voir le jour. Ce document propose plusieurs exemples qui mettent en lumière comment une panoplie de mesures pourrait être utile pour dépasser les niveaux de référence afin de générer des crédits, et comment les revenus associés aux crédits pourraient servir à étayer encore plus la mise en œuvre des politiques nationales. Parmi les mesures envisageables analysées figurent les subventions aux technologies à faible émission de carbone (par exemple les tarifs de rachat), les normes obligatoires de résultats et un système applicable au niveau des entités d'attribution de crédits par rapport à un niveau de référence.

**Classification JEL:** F53, Q54, Q56, Q58

**Mots-clés:** Changement climatique; atténuation; gaz à effet de serre; marchés du carbone; approche sectorielle

## FOREWORD

This document was prepared by the OECD and IEA Secretariats in Autumn 2009 in response to the Annex I Expert Group on the United Nations Framework Convention on Climate Change (UNFCCC). The Annex I Expert Group oversees development of analytical papers for the purpose of providing useful and timely input to the climate change negotiations. These papers may also be useful to national policy-makers and other decision-makers. In a collaborative effort, authors work with the Annex I Expert Group to develop these papers. However, the papers do not necessarily represent the views of the OECD or the IEA, nor are they intended to prejudge the views of countries participating in the Annex I Expert Group. Rather, they are Secretariat information papers intended to inform Member countries, as well as the UNFCCC audience.

The Annex I Parties or countries referred to in this document are those listed in Annex I of the UNFCCC (as amended at the 3rd Conference of the Parties in December 1997): Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, the European Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, and United States of America. Korea and Mexico, as OECD member countries, also participate in the Annex I Expert Group. Where this document refers to “countries” or “governments”, it is also intended to include “regional economic organisations”, if appropriate.

## ACKNOWLEDGEMENTS

This paper was prepared by André Aasrud, Richard Baron, Barbara Buchner and Kevin McCall (IEA). The authors would like to thank Helen Mountford, Jane Ellis, Katia Karousakis (OECD) and Philippine de T'Serclaes (IEA), as well as Georg Børsting, Peter Zapfel, and delegates from the OECD/IEA Annex I Expert Group for the information, comments and ideas they provided.

### **Questions and comments should be sent to:**

Christina Hood  
IEA  
9 rue de la Fédération  
75739 Paris Cedex 16  
France  
Email: [christina.hood@iea.org](mailto:christina.hood@iea.org)

All OECD and IEA information papers for the Annex I Expert Group on the UNFCCC can be downloaded from: [www.oecd.org/env/cc/ccxg.htm](http://www.oecd.org/env/cc/ccxg.htm)

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	8
<b>1. INTRODUCTION</b> .....	10
<b>2. SECTORAL MARKET MECHANISMS: SUMMARISING OPTIONS</b> .....	10
2.1. Options on the negotiation table: sectoral market mechanisms in the context of NAMAs .....	11
2.1.1. New market mechanisms .....	11
2.1.2. Evolution of the Clean Development Mechanism and other Kyoto Protocol mechanisms...	12
2.1.3. Institutions and technical requirements .....	13
2.1.4. Towards a scaled-up market mechanism.....	14
2.2. Domestic policy proposals: possible requirements on the demand-side .....	15
2.2.1 Australia: restrictions on quality.....	15
2.2.2 Canada: Domestic and International Offsets .....	16
2.2.3 European Union: beyond the limits on use of CDM and JI units .....	16
2.2.4 New Zealand: importing Kyoto units, with restrictions .....	17
2.2.5 United States: quantity and quality of offsets in the Waxman-Markey bill .....	17
2.3. Where domestic design options meet international negotiation issues .....	18
<b>3. PRINCIPLES, RULES AND REQUIREMENTS</b> .....	18
3.1 Possible principles for the establishment of sectoral market mechanisms.....	18
3.2 Possible rules and technical requirements.....	20
3.3 Institutional requirements: looking beyond mechanisms .....	23
<b>4. TRANSITION ISSUES AND DOMESTIC IMPLEMENTATION</b> .....	23
4.1 Transition issues.....	24
4.1.1 From CDM to NAMA/sectors: what are the incentives? .....	24
4.1.2 Scale of existing CDM projects in relation to a SCM .....	25
4.1.3 Different scenarios for interaction between existing CDM projects and SCM .....	25
4.1.4 Transition from CDM crediting and frequency of crediting.....	30
4.1.5 Transition issues from intensity-based SCM to absolute targets and/or sectoral trading .....	31
4.1.6 Supporting the establishment of sectoral market mechanisms .....	31
4.2 Domestic implementation: how to get the carbon money to flow?.....	33
4.2.1 Illustrating policy packages to reward performance at entity level.....	34
4.2.2 From sectoral crediting to trading .....	39
4.3 Getting the right mix of incentives and policy instruments .....	41
<b>5. AREAS FOR FUTURE WORK</b> .....	41
<b>GLOSSARY</b> .....	43
<b>REFERENCES</b> .....	44

## LIST OF FIGURES

Figure 1: An illustrative profile of emissions and credits .....	22
Figure 2: No crediting of CDM projects after start of SCM.....	26
Figure 3: CDM offsets credited, but CDM baseline adjusted to SCM baseline.....	27
Figure 4: CDM offsets fully credited and deducted from SCM overall credits .....	28
Figure 5: CDM offsets fully credited, and carved out of the SCM .....	29
Figure 6: Transitioning from intensity-based to absolute-targets.....	40

## Executive Summary

At this stage of the UNFCCC negotiations, much uncertainty remains on the acceptability, but also on the precise definitions and roles of possible sectoral market mechanisms under the Kyoto Protocol and/or another post-2012 agreement. Parties are also discussing the option of crediting greenhouse gas (GHG) reductions based on nationally appropriate mitigation actions (NAMA crediting) in developing countries. The aim of any new sectoral or other market mechanism would be to support emission reductions on a large scale in developing countries, through the sale of credits on the international carbon market.

This paper first reviews proposals for the design of sectoral and related market mechanisms that are currently being debated, both in the UNFCCC negotiations, and in different domestic legislative contexts. Decisions on the design and scope of the mechanisms in the UNFCCC negotiations would affect the future supply of credits, while developed countries' legislations could influence demand. National actions to establish carbon markets may also constrain or enable international developments and options, as domestic policies may establish conditions or restrictions on the import of "international" offset credits or linkages with other national or regional carbon markets..

Country submissions for sectoral mechanisms in the UNFCCC negotiations stress the need to move from pure offset mechanisms (in which all reductions in developing countries are credited) to mechanisms whereby mitigation in developing countries would also contribute to global mitigation, for example through environmentally ambitious emission baselines. Whether or not new mechanisms are binding is another prominent feature of the possible new mechanisms (*e.g.* "no-lose" crediting *vs.* a legally-binding sectoral trading mechanism). The issue of sectoral targets (absolute or intensity-based) remains controversial as crediting based on "nationally appropriate mitigation actions" (NAMA) may be more appealing to some Parties than the idea of quantified sectoral goals. Interestingly, there is also a suggestion, under the Kyoto Protocol negotiation track, to encourage multi-project standardised baselines, *e.g.* default baseline values for a certain technology in a certain country, for the Clean Development Mechanism. This could secure broader access to the carbon market, and can be seen as a move towards sectoral approaches. There may be space for a political agreement on a scaled-up market mechanism for developing countries, based on these different options.

Given that a scaled-up market mechanism could require environmentally-ambitious baselines, it is important to identify incentives for developing countries to adhere to such an approach. Scaling up and standardising baselines could potentially reduce transaction costs and lead to a larger volume of credits and carbon market revenues from today's situation with CDM. Further, sectoral mechanisms could lead to technology transfer on a larger scale, as well as direct support to build lasting domestic policy frameworks. Finally, the responsibility that would come with a sector-wide, performance-based goal could be accompanied by more freedom on technology choices or technology neutrality, whereas CDM currently excludes some technologies (*e.g.* carbon capture and storage, and nuclear).

Much remains to be done at the international level to define and then implement any new market mechanisms – including their interaction with the existing carbon market. Decisions that could impact such mechanisms may actually be taken in separate strands of the negotiations, notably under the Bali Action Plan (*e.g.* under "Shared Vision"), as well as under the Kyoto Protocol. These decisions would set the tone for the institutional requirements of the new mechanisms, especially when it comes to defining the environmental ambition of emission baselines.

This paper also addresses the possible principles and technical requirements that Parties may wish to consider, as the foundations for further elaboration of the mechanisms. Principles could cover the following issues:



- Definitions of the various mechanisms (crediting vs. trading);
- Participation of developing country Parties in the different mechanisms;
- Environmental ambition of baselines;
- Similarity of efforts across relevant Parties;
- Technology transfer;
- Relation between market support for mitigation and other forms of financial support;
- Limits on the use of credits;
- Evolution of the mechanisms.

Beyond principles, a number of elements of a more technical nature need to be sorted out to set up new market mechanisms, such as: eligibility for participation by developed countries, as buyers; technical definition of baselines, including guidance on a process to agree to baseline levels, and possible revisions; length of the crediting period and frequency of issuance of credits; new trading units and registries; and national authorities for the new mechanisms. In the case of trading, a compliance reserve and liability rules may be topics for discussion as well.

The third issue explored by this paper is domestic implementation of sectoral market mechanisms by host countries, and how the transition between current and future mechanisms could be managed. Transition issues including the situation of existing CDM projects vis-à-vis broader crediting mechanisms and also sectoral trading must be clarified. Various options for the accounting of existing CDM projects in a sector that is subject to a sectoral mechanism are discussed (from the integration of all existing CDM projects into the sectoral mechanism to a full independence of existing project from the new mechanism). With respect to CDM more generally, it is of important that clarity be brought on its interaction with any new market mechanism, to avoid adding to the policy uncertainty regarding the future of the CDM after first Kyoto Protocol commitment period.

Domestic policy implementation in developing countries is of paramount importance to ensure the effectiveness of possible new international market mechanisms. The challenge of getting carbon market revenues to actual investors under sector-based or policy-based mechanisms is now a topic of much debate. In other words, how will individual investors act to reduce emissions when crediting is based on the performance of the sector as a whole? Several illustrations are offered to show how a mix of policies could be used to outperform a baseline to generate credits, and how credit revenues could be used to further support domestic policy implementation. Among the options discussed are subsidies to low-carbon technologies (e.g. feed-in tariffs), mandated performance standards, and an entity level baseline-and-crediting system. An example of how different policies could be pulled together to support implementation of a sector-based mechanism is also assessed. In theory, domestic cap-and-trade may work more effectively and more cheaply to deliver GHG reductions, but it is not likely to be politically acceptable to many developing countries. While this critical barrier cannot be ignored, the paper also summarises some of the opportunities for transition from sector-based crediting to trading.

## 1. Introduction

International market mechanisms play an important role in the debate on mitigation commitments of developed countries, as their capacity to rely on imported emission offsets would partly determine the ambition of their emission goals. New market mechanisms – alongside existing ones – could open up additional potential for cost-effective mitigation, based on broader participation by developing countries. If successful, the new mechanisms could increase carbon market finance and revenues to developing countries, and mobilise domestic resources more effectively towards a lower greenhouse gas development path.

There is, of course, also an effort-sharing element to the discussion of emissions trading mechanisms. On this front, another debate has emerged in the run-up to Copenhagen on the contribution of developing countries to global mitigation. Some developed countries propose that a deviation from business-as-usual emission trends should be achieved unilaterally in developing countries, as contributions to global GHG mitigation.

The current climate change negotiations establish a distinction between mitigation actions that developing countries could implement unilaterally; actions for which they would need direct financial support; and finally, mitigation actions supported by carbon market finance. Some choices, implicit or explicit, will have to be made on the types of policies, sectors, and which countries, are granted support of one kind or another.

New market mechanisms such as sectoral crediting and trading, or crediting based on nationally-appropriate mitigation actions (NAMA) will be determined by the above considerations and other broad issues put forward by Parties. Other elements are also likely to play a role in how these mechanisms may develop, once agreed. These elements include domestic legislation that could set conditions on the use of international offsets or for linking with other trading systems, as well as questions related to domestic implementation in host-countries.

This paper explores three distinct aspects of possible sectoral market mechanisms:

- Section 2 presents the design options on the negotiation table, as well as domestic climate policy measures that could influence demand for credits from sectoral market mechanisms.
- Section 3 lays out the key elements needed for agreement in Copenhagen to allow further elaboration of sectoral mechanisms.
- Section 4 considers how host countries could implement such mechanisms, how changes could be triggered at the level of entities. Options for a transition from ongoing CDM projects to sectoral crediting are also presented. This section also discusses possible incentives to move from sectoral crediting to sectoral trading.

## 2 Sectoral market mechanisms: summarising options

This section first summarises the options for different market mechanisms currently on the negotiation table for an extended participation of developing countries in international market mechanisms, i.e. the supply side of the carbon market. It then summarises developed countries' legislations or ongoing policy discussions that could have an impact on the demand side of this market.

## 2.1 Options on the negotiation table: sectoral market mechanisms in the context of NAMAs

This section summarises the broad views on new market mechanisms and some proposed developments under the CDM and other Kyoto mechanisms. While general concepts for the typology of NAMAs (unilateral, supported, credited) exist, there is now a range of sometimes conflicting definitions of sectoral crediting, sectoral trading and NAMA-crediting, potentially all new market mechanisms to enhance mitigation in developing countries through the carbon market. The summary below suggests the following key dimensions in defining the new mechanisms, assuming agreement on the need to add a more encompassing mechanism to the existing project-based CDM:

- Legally-binding nature of the emission goal/target/threshold used as baseline;
- The stringency of the baseline (e.g. similarity or difference with the CDM practice);
- The timing of issuance of trading units.

### 2.1.1 *New market mechanisms*

The negotiating texts emerging from the UNFCCC Ad hoc Working Group on long-term cooperative action (AWG-LCA) and Ad hoc Working Group on the Kyoto Protocol (AWG-KP) contain numerous provisions regarding sectoral mechanisms to promote mitigation actions (UNFCCC 2009a; UNFCCC 2009b, UNFCCC 2009e, UNFCCC 2009f). These actions are to be achieved – in part – through the progressive implementation of improved carbon-market mechanisms in the form of existing KP mechanisms (Joint Implementation (JI), Clean Development Mechanism (CDM) and international emissions trading) alongside possible new mechanisms consisting of sectoral trading and crediting. Much is proposed about the use of these new mechanisms, with a range of options and alternatives on, e.g. sectoral applicability, the requirements of participation, or explicit criteria for eligibility.

Most country submissions (UNFCCC 2009c; UNFCCC 2009d) prior to the round of negotiations that took place in June 2009 in Bonn expressed preferences for one form of sectoral emissions mitigation or another, as well as to what sectors should be included. Sector-specific actions were opposed by some developing countries, notably with regard to certain sectors, e.g. agriculture and aviation, as well as opposition to transnational sectoral mitigation targets, or indeed outright opposition to sectoral approaches in setting targets altogether. In contrast, other developing countries are in favour of sectoral crediting mechanisms, as part of their nationally appropriate mitigation action (NAMA) strategies, with the notion that they would voluntarily undertake them, and be credited only if they outperform the emission baseline – the so-called “no-lose” approach.

The general typology on NAMAs emerging include:

1. unilateral efforts of the developing country alone (unilateral),
2. actions supported and funded by developed countries (supported), and
3. mitigation actions eligible for carbon credits (credited).<sup>1</sup>

Some Parties propose to include, in NAMAs,<sup>2</sup> sectoral or economy-wide quantified emission limitations or reductions, or emissions intensity commitments or actions. Alternatives put forward regarding national

---

<sup>1</sup> Paragraph 76, page 93 FCCC/AWGLCA/2009/INF.1

<sup>2</sup> Proposal 2, page 68 FCCC/AWGLCA/2009/INF.1

schedules – i.e. emission paths – look at applying a country-driven nationally appropriate mitigation strategy that may be project-based, sectoral or economy-wide, and differentiated in ambition.

With respect to the AWG-KP, Party submissions also exhibit divergent views towards sectoral approaches in the context of market mechanisms. In some, broad support exists for project-based mechanisms being applied on a sectoral basis, as well as sectoral crediting with “no-lose” targets. Developing country Parties are less favourable towards sectoral mechanisms, particularly sectoral trading. Some propose that non-Annex I countries may voluntarily undertake absolute emissions targets, while others posit that extension of trading beyond Annex I countries is outside the mandate of the Kyoto Protocol.

The topic of “cooperative sectoral approaches”, as per paragraph 1.b. (iv) of the Bali Action Plan, remains focused on technology transfer (see Box 1), although Parties have also introduced bunkers and agriculture in discussions under this agenda item (UNFCCC 2009f).

### **Box 1. Cooperative sectoral approaches**

Broad agreement exists for the use of cooperative sectoral approaches and sector-specific actions in meeting the ambitions set out in Article 4, paragraph 1 (c) of the UNFCCC.<sup>3</sup> This involves technology transfer to facilitate national mitigation actions. Proposals have been incorporated outlining how such sectoral approaches and actions can be designed by developing countries within their NAMAs in order to receive technology transfer and financial support to enhance mitigation. Such actions are not proposed to be eligible for crediting or participation in any market mechanism, but merely to facilitate capacity-building for mitigation and adaptation efforts – market mechanisms are mentioned, however, e.g. in the context of aviation and maritime bunkers.

Some Parties note that these sectoral actions should not be imposed by some Parties on others, nor should they be used to circumvent or undermine the differentiation made in the Convention between Annex I and non-Annex I Parties, nor to modify respective commitments and obligations. Sectoral approaches are therefore accepted in relation to technology transfer, but, at this stage, opposed if they impose obligations on developing countries based on those of developed countries.

### **2.1.2 Evolution of the Clean Development Mechanism and other Kyoto Protocol mechanisms**

With reference to the CDM, the LCA draft text (FCCC/AWGLCA/2009/INF.1) indicates developed country interest in extending the mechanism to support achievement of quantified emission reduction commitments while assisting developing countries achieve sustainable development. Transition issues are outlined subsequently and discuss the intention of the Parties, at a future date, to define the modalities and procedures that will ensure no double-counting occurs between the newer and the existing mechanism and that there is an orderly transition between mechanisms where an older mechanism is superseded by a newer one. The provision of guarantees for ensuring that credits from CDM projects continue to be issued may also be defined. A further issue requiring definition is how to exclude any new CDM projects that are planned within a sector for which absolute sectoral emission thresholds will apply.

It is also proposed to develop standardised, multi-project baselines – a development in the direction of sectoral crediting. A board, similar in composition to the one being discussed in the context of the NAMA crediting mechanism, would provide guidance on standardising baselines. When appropriate, it would

<sup>3</sup> Chapter III, Section (D), (Paragraph 129) page 130

establish benchmarks for specific project activity types and specific sectors or subsectors under the CDM. Measures would be taken to avoid double counting of emission reductions or removals for standardised, multi-project baselines. The Subsidiary Body for Scientific and Technological Advice (SBSTA) would be requested to recommend modalities and procedures for the development of such baselines.<sup>4</sup>

Another area of interest to a possible sectoral market mechanism is the possible application of multiplication and discount factors, mentioned in the context of CDM. Certain Parties suggest that certified emission reductions (CERs) generated shall equal the emission reductions certified for the project, subject to a discount factor, enhancing the contribution of CDM to global GHG mitigation (see Schneider, 2008, for a discussion). To this end, CERs issued shall not exceed the aggregate quantity of emission reductions (or removals) achieved.

These elements of the negotiation demonstrate an interest in relying on market mechanisms, including a reformed and enhanced CDM, to encourage mitigation actions in developing countries.

### **2.1.3 Institutions and technical requirements**

Multiple references are made to bodies that could be tasked with the guidance/governance of the new mechanisms, although details are left for future elaboration.

In this respect, in a discussion of options for improvement to emissions trading and possible approaches targeting sectoral emissions, the AWG-KP negotiation text (FCCC/KP/AWG/2009/10) includes, here again, setting up a NAMA crediting mechanism that shall be under the guidance of the COP/MOP or the CDM Executive Board. Along this idea, NAMA crediting would build on the current methodology for the CDM, with eligibility and measurement and verification criteria to be defined later.<sup>5</sup>

Some Parties are proposing that the guidance of the crediting mechanism be the responsibility of the Conferences of the Parties (COP), with additions outlining the establishment of an advisory body of stakeholders, including experts from the private sector and environmental organisations.<sup>6</sup> Several options are listed in the LCA negotiating text (FCCC/AWGLCA/2009/INF.1). No elaboration on regulatory, governance or issuance of credits is made. Modalities and procedures to be elaborated on in upcoming negotiations are outlined within the draft Convention text, some of which are discussed further in this paper.<sup>7</sup>

The notion of sectoral market-based mechanisms for a post-2012 climate change regime is clearly set out in the current negotiating text, with various options summarised and compared in FCCC/AWGLCA/2009/INF.2/Add.2. Many design elements/features, however, need to be elaborated “at the appropriate time” to determine how this mechanism would be implemented in practice. The following issues would require clarification:

- Relevant criteria for eligible countries and sectors;

---

<sup>4</sup> FCCC/KP/AWG/2009/10/Add.3 Page 6

<sup>5</sup> FCCC/KP/AWG/2009/10/Add.3 Page 4

<sup>6</sup> Proposed bodies include a “Trustee or Trustees”, the establishment of a “Financial and Technology Mechanism”, “an advisory group of all relevant stakeholders”, or other “Executive Bod[ies]”

<sup>7</sup> These include at a minimum: that absolute emissions deviate from BAU and baselines are established in conservative manner; independent verification of data; estimation and accounting of sectoral GHG emissions in a conservative manner; effective MRV; a definition of sectoral boundaries; a time limit for certification period; a time limit for review of thresholds; minimisation of leakage; the additionality of revenues from SA to other financial support for NAMAs.

- Nature of targets (absolute or intensity based);
- How baselines are established/approved;
- Possible guidelines for management of issued credits (including monitoring, reporting and verification of performance); and
- Relation with the CDM.

These aspects are reviewed in sections 3 and 4.

#### **2.1.4 Towards a scaled-up market mechanism**

Some common features emerge from proposals by Parties under the Kyoto Protocol and Long-Term Co-operative Action tracks to establish a market-based mechanism that would engage developing countries beyond the project-based Clean Development Mechanism. A scaled-up market mechanism, forming a hybrid of these proposals, could include the following:

- The scope of the mechanism would expand beyond projects, to address a larger mitigation potential in the host country. This could allow both sector-based and policy-based approaches.
- Crediting would imply the issuance of credits after verification of performance (whether it is absolute or intensity-based), whereas trading (based on an absolute emission target) would allow host countries to trade allowances at the outset.
- Some support may be given to establish the framework necessary to operate the new mechanism in host countries, including on the measurement, reporting and verification of the activities covered by the mechanism, or on access to certain technologies.

One point of disagreement remains on the environmental ambition of the baseline, with a proposal for NAMA crediting from Korea assuming no net overall decrease in emissions. In this case, crediting would purely shift emissions from the seller to the buyer's side.<sup>8</sup>

The creation of any new international market mechanism engaging developing countries begs the question of the integration with the existing CDM. Section 4 addresses the issue of projects undertaken in a country/sector that subsequently participates in a scaled-up market mechanism. Other transition questions must be answered, however:

- What is the lead-time before any scaled-up mechanism is operational, i.e. when a country starts receiving credits/allowances based on a sectoral or NAMA baseline?
- What will be the fate of CDM in a post-2012 climate policy framework?
  - Will the introduction of a scaled-up market mechanism affect the operations of the CDM as it exists today, and if so, how?
  - If CDM is to be affected, what is the cut-off date to implement the agreed changes?

---

<sup>8</sup> See page 14 of FCCC/AWGLCA/2009/INF.2/Add.2, a summary table of all new mechanisms.

These questions are particularly pressing for actors in the CDM market where there is growing uncertainty on the value of credits issued after 2012, but also, and primarily, for countries that envisage using international offsets to comply with their domestic emission objectives. Answering these questions quickly is also important to ensure some continuity of the carbon market, while recognising that new goals post-2012 are likely to change its fundamentals. Some clarification will be needed, in any international agreement, on the circumstances under which existing mechanisms can be used in future, as well as on the interface between existing and new market mechanisms, so as to avoid unsettling the carbon market.

## **2.2 Domestic policy proposals: possible requirements on the demand-side**

Against this background of international negotiations on new market mechanisms, domestic legislation in developed countries would need to be elaborated or adjusted in order to allow the use of units from the new mechanisms as valid for compliance with domestic goals. The needed legislation may have some bearing on the demand side of these new mechanisms – not all countries may accept units from all sectors or regions, or there may be restrictions on the use of the sectoral emission units. Existing and emerging domestic legislations point to some interesting new trends, summarised here.

### **2.2.1 Australia: restrictions on quality**

In Australia, a draft bill has been issued to introduce a domestic emissions trading system, the so-called Carbon Pollution Reduction Scheme (CPRS).<sup>9</sup> The CPRS bill has been agreed in the House of Representatives and was rejected initially, but could be debated in the Senate for a second time before the end of 2009. The draft bill defines a number of international emissions units that entities will be able to use for compliance, including Kyoto units like certain CERs, emission reduction units, and removal units. However, not all Kyoto units are eligible in the system; for example, assigned amount units (AAUs) or temporary and long-term CERs (i.e. from afforestation and reforestation CDM projects) cannot be surrendered for compliance.

The bill also allows additional types of units if issued in accordance with the Kyoto rules.<sup>10</sup> The Government may add to the types of international units that are recognised for compliance under the Scheme, where:

- The addition does not compromise the environmental integrity of the Scheme;
- The addition is consistent with the objective of the Scheme, including Australia's international objectives;
- There has been consultation with stakeholders, analysis of the expected impact on the permit price by an independent review, and notification to the market.

In addition, the intention to pursue linking opportunities with other emissions trading schemes is shown by allowing the Government to prescribe non-Kyoto international emissions units,<sup>11</sup> which will then be eligible for surrender under the CPRS. Linking arrangements will be subject to review in the light of

---

<sup>9</sup> The exposure draft of this bill was issued by the Australian Government in March 2009. It is part of a legislative package that includes a bill setting out the consequential amendments to existing Acts (including the National Greenhouse and Energy Reporting Act 2007) and a bill establishing the scheme's governing body.

<sup>10</sup> Regardless of whether the unit has been issued within or outside Australia.

<sup>11</sup> Issued in accordance with an international agreement other than the Kyoto Protocol or issued outside Australia under a law of a foreign country.

ongoing international negotiations and market development. The Government's policy intent is to relax restrictions on linking with credible schemes and mechanisms as the Australian Scheme matures.

There is no limit in the current version of the bill on the number of international emissions units that can be used, which even under a base case scenario of a 5% emission reduction by 2020 could generate annual demand for CERs – or other acceptable units – of at least 50MtCO<sub>2</sub> over 2012-20 (Lewis and Curien, 2009). There are, however, indications that the Senate may ask for limits on the use of offsets.

### **2.2.2 Canada: Domestic and International Offsets**

In June 2009, the Government published new guidelines for Canada's Offset System for Greenhouse Gases. The domestic offset system is an important step in the creation of a carbon market in Canada, establishing tradable credits for GHG reductions and encouraging cost-effective domestic emission reductions in areas that will not be covered by planned federal regulations (e.g., forestry and agriculture).<sup>12</sup> Under the proposed regulations, firms will have several options to meet their compliance obligations including domestic offset credits and emissions trading as an important component of the government's market-driven approach to reducing GHG emissions. Limited access to certain types of credits from Kyoto Protocol's Clean Development Mechanism is also being considered for compliance with the regulations. Details are still not available regarding linking with other systems – the Government has indicated that it will continue to monitor and consider US developments – and the use, if any, of international offsets.

### **2.2.3 European Union: beyond the limits on use of CDM and JI units**

In December 2008, the European Council and the European Parliament agreed on the European Climate Change and Energy Package, which details the implementation of the EU commitment to reduce its GHG emissions by 20% by 2020, with some reliance on UN-based offset mechanisms.<sup>13</sup> The package sets a limit on the use of CDM and JI credits under the EU ETS, at approximately 6.5 % of the aggregate cap from 2008 to 2020. The Package also covers the quantity of credits that can be used to offset emissions in sectors not covered by the EU ETS. In total, the EU allows access to credits worth about 2.8 to 3.1 GtCO<sub>2</sub>e over the period 2008 to 2020.<sup>14</sup> In the event of an international agreement, and consistent with the resulting stricter EU-wide emission target (from -20% to -30%), additional credits up to 50% of the incremental reductions could be used.

In addition to these quantity restrictions, the EU introduces other limits on the use and origin of offsets: restrictions are imposed on the eligibility of project types; only credits from project types allowed during Phase II in the EU ETS will be accepted during Phase III, and the non-recognition of CERs from land use, land use change and forestry (LULUCF) projects is continued (assuming some other mechanism is established for supporting reductions in emissions from deforestation and forest degradation). New restrictions may be introduced starting January 2013. The revised Directive provides for a procedure to restrict the use of certain CDM categories for the post-2012 EU ETS,<sup>15</sup> including through non-recognition or discounts. From 2013, only credits from host countries that have signed an international or bilateral<sup>16</sup>

---

<sup>12</sup> The creation of a carbon market is part of the Government's commitment to reduce total GHG emissions by 20% below 2006 levels by 2020.

<sup>13</sup> A 30% reduction target is proposed if other Parties were to take equally ambitious mitigation objectives.

<sup>14</sup> These numbers are based on personal communications with Emmanuel Fages, orbeo, and a study by Deutsche Bank (Lewis and Curien, 2008).

<sup>15</sup> The exact amount of maximum allowed credit volumes, and the possible restrictions of specific project types will be determined through a consultation process ('comitology') led by the Commission. Such restrictions would enter into force, at the earliest, six months from the adoption of decision and, at the latest, three years from its adoption.

<sup>16</sup> If no international agreement will be reached in Copenhagen.



agreement can be used in the EU ETS. In this context, the door is also kept open for additional access to new types of credits, from new mechanisms or emission reducing activities, going beyond existing project-based mechanisms.<sup>17</sup> Also, credits may be accepted only if activities in host countries reduce emissions beyond a certain threshold that is set below business as usual emissions – this introduces the notion of "own contribution" to emission reductions by developing countries.

#### **2.2.4 New Zealand: importing Kyoto units, with restrictions**

New Zealand launched a mandatory emissions trading system in 2008. As of September 2009, the system is under review by the new government; the following details may change. The NZ ETS, which currently only covers the forestry sector, started on 1 January 2008 and is scheduled to be expanded to stationary energy sources and industrial facilities in January 2010, with other sectors gradually phased in by 2013. In the first commitment period to the Kyoto Protocol, the NZ ETS is fully linked to the Kyoto Protocol flexibility mechanisms. NZ ETS participants can buy Kyoto units to meet their domestic obligations, and can exchange NZUs for Kyoto units to sell internationally. Further, the system could allow direct linkages to other domestic trading schemes in the future. New Zealand imposes certain restrictions on credits; for example, long-term or temporary CERs and credits from nuclear projects are not eligible in the system, and NZUs are convertible to Kyoto units only with certain limits. The system also put conditions on the use of imported AAUs.

#### **2.2.5 United States: quantity and quality of offsets in the Waxman-Markey bill**

In the US, the Waxman-Markey bill<sup>18</sup> calls for medium-term reduction goals<sup>19</sup> and a cap-and-trade programme covering 85% of US GHG emissions. The current version (US Congress, 2009) includes some interesting features related to sectoral approaches and the use of international offsets.<sup>20</sup> A maximum of 2 GtCO<sub>2</sub>e can enter the cap-and-trade programme every year, with up to 1.5 GtCO<sub>2</sub>e from foreign sources. No offset standards are specified, and the US EPA would determine eligible offset types. In order to minimise potential leakage and encourage nationally appropriate mitigation actions the bill also requires the US EPA, in consultation with the Secretary of State as well as the US Agency for International Development (USAID), to identify sectors in specific countries where issuance of credits on a sectoral basis is appropriate. Once such a sector/country is identified, offsets can only be issued on a sectoral basis in that sector/country. This does not in principle, however, rule out the import of international units like certified emission reductions (CERs) in other sectors from these countries.<sup>21</sup> Remarkably, the "sectoral basis" is defined as a domestically enforceable baseline level of *absolute* emissions. In other words, the bill would not allow the import of emission allowances from sectoral mechanisms if these were based on an intensity baseline. The issuance of credits can only take place in a country that is party to a bilateral or multilateral agreement to which the US is also a Party. Further, from 2017 international offsets are discounted at 80% of an allowance.<sup>22</sup> Finally, the bill allows linkages with international trading systems:

---

<sup>17</sup> Again, some limits may be placed on the use of these new credits.

<sup>18</sup> In March 2009, the "American Clean Energy and Security Act of 2009 (ACES)" was released by the House Energy and Commerce Committee Chairman Rep. Henry Waxman and Global Warming Subcommittee Chairman Ed Markey. The House of Representatives passed the Waxman-Markey legislation on 26 June, 2009.

<sup>19</sup> Targets are set at 3% reduction from 2005 by 2012, 17% by 2020, 42% by 2030; and 83% by 2050.

<sup>20</sup> Drawing heavily from the climate provisions of this House bill, Senators John Kerry and Barbara Boxer introduced "The Clean Energy Jobs and American Power Act" in September 2009. The Kerry-Boxer draft bill includes similar features related to the use of offsets, but with a possibly stronger reliance on domestic offsets.

<sup>21</sup> The general criteria for appropriate sectors/countries are countries with high GHG emissions, or comparatively higher level of economic development.

<sup>22</sup> An entity would need 5 international offsets to be able to surrender 4 allowances for compliance domestically.

no limit is placed on the use of allowances deriving from international cap-and-trade systems, as long as they are deemed at least as stringent, including mandatory absolute GHG targets, comparable MRV, quality of offsets and restrictions on the use of offsets.

### **2.3 Where domestic design options meet international negotiation issues**

Any pre-COP15 conclusion on the type of sectoral or NAMA-based market mechanisms that Parties would choose would be premature. Interestingly, domestic policy choices in developed countries could also influence the role of these mechanisms. While the use of credits is now a common element in the climate policy packages of developed countries, some domestically-driven restrictions are likely to apply to the use of credits post-2012 – while some developing countries insist on the principle of supplementarity, which would restrict the use of credits by developed countries. The restrictions are either quantitative (absolute limits) or qualitative (*e.g.* country of origin, project types, technology, absolute baselines). In the absence of actual new market mechanisms, domestic legislation is largely silent about the use of credits and allowances coming from these mechanisms – with the exception of the Waxman-Markey bill. However, the general approach to imported credits from developing countries is likely to influence what is an acceptable design for the new mechanisms, from the buying countries' perspective, especially when it comes to the scope of the mechanisms (which sectors) and the environmental ambition of their baselines.

Some rules or restrictions adopted domestically could prevail over some design choices under the UNFCCC. The following issues are pertinent to both domestic and international discussions:

- Limits on the use of credits for compliance;
- Use of a discount factor for imported credits;
- Comparability of sector-level efforts;
- Nature of credits (target type, activities) allowed for domestic compliance.

Some of these elements are addressed further in Section 3. One important question is: to what extent decisions would be best taken at domestic level, thus removing technical discussions from the UNFCCC negotiation table?

## **3. Principles, rules and requirements**

This section discusses some of the possible elements needed to establish scaled-up market mechanisms (*i.e.* based on sectoral goals or NAMA) in the post-2012 framework, and the implications for other possible dimensions of that framework. First, Parties may wish to agree on general principles governing these new mechanisms; section 3.1 focuses on these elements of a more political nature, referred as “principles”. Other features, of a more technical nature, will be prerequisites for the creation of scaled-up market mechanisms.

### **3.1 Possible principles for the establishment of sectoral market mechanisms**

The following captures elements that have elicited interest, or rejections by developed and developing Parties, in their submissions prior to the UNFCCC meeting in Barcelona.

*Defining crediting and trading.* Crediting could be defined as a tool to achieve mitigation in developing countries and to assist compliance in developed countries, along the lines of CDM (Lambert and Cames, 2009). Trading could, like Article 17 of the Kyoto Protocol, allow participation in international emissions trading on the basis of a sectoral goal. The main distinction between these instruments, based on

submissions, relate to the compliance with the stated baseline (i.e., crediting could be based on a “no lose” approach). The definitions may also include aspects related to:

- Timing of issuance of trading units: with trading, emission allowances could be issued *ex ante*, while credits would only be issued *ex post* after measurement and verification of performance.
- Target types: trading may be based on absolute emission targets while crediting would also allow for intensity-based goals (emissions per unit of output), possibly derived from policy or technology objectives.<sup>23</sup>

*Participation of developing country Parties in the different mechanisms (crediting/trading).* Parties may wish to differentiate participation in one or the other mechanism on the basis of country categories or other circumstances. This issue may be considered together with that of the future of CDM.

*Requirements for participation.* A range of criteria can be envisaged to select sectors or policies eligible for participation in scaled-up market mechanisms. Several categories can be envisaged, based on existing proposals:

- *Environmental ambition, i.e. a net global mitigation benefit:* this may be addressed on a case by case basis, or addressed in a set of principles that can then be applied to each case in a straightforward fashion.
  - The Party could be required to submit a low-emission development strategy (LEDS), with a clear emissions goal allocated to the sector/NAMA to be covered by a scaled-up mechanism. Whether or not the sectoral objective would be deemed sufficient would also depend on the overall emission goal presented in the LEDS.
  - Alternatively, a principle could be that the baseline represents a significant departure from business-as-usual (BAU). The BAU trend and the crediting/trading baseline may still imply an increase in emissions from current levels, due to specific circumstances of the host Party.
  - Presentation of policy instruments supporting mitigation towards and beyond the baseline. Earlier work has shown that a sectoral crediting baseline alone is not likely to trigger changes at the level of individual emitters (Baron, Buchner and Ellis, 2009); a set of policy instruments would be needed for that purpose (this is addressed in section 4). These policy instruments may be included in the country’s LEDS.
- *Key sources.* Does the sector contribute an important share of the country’s overall greenhouse gas inventory? In the case of a NAMA-based approach, does the targeted action account for a sizeable contribution to mitigation?<sup>24</sup> Parties may decide to consider only those activities above a certain percentage (x% of the country’s total emissions in year y), in an attempt to streamline the process of review of sectoral/NAMA goals by Parties.
- *Similarity of effort.* Sector or activity-specific goals could be compared with those submitted by other countries in the same sector/activity. Such a principle may help to address some of the

---

<sup>23</sup> See Baron, Buchner and Ellis (2009).

<sup>24</sup> A policy to increase the use of renewable energy sources does not, as such, cover a percentage of a country’s emission inventory. If scale matters, the contribution to such a policy to mitigation could be a useful alternative criterion.

competitiveness concerns related to unilateral/uneven carbon constraints on globally-traded, GHG-intensive commodities.

- *Mitigation costs.* Parties may decide that activities and sectors with negative or low mitigation costs are not eligible for crediting. This could be in line with a possible typology of NAMAs (unilateral, supported, credited).<sup>25</sup>

*Technology transfer.* Parties may decide that discussions of sectoral goals ought to be accompanied with a discussion on technology needs, when relevant. They may also wish to prioritise sectors with a clear technology transfer component, or, to the contrary decide to exclude activities related to technology transfer from crediting.

*Finance.* Parties may agree on the possibility to provide support towards the implementation of a sectoral mitigation plan, or of a domestic trading mechanism, in addition to, or as a possible advance payment conditional on future carbon revenues (see Section 4 for some examples).<sup>26</sup>

*A limit on the use of credits.* Some Parties are interested in limiting the reliance of buyers on credits, with an aim of encouraging more mitigation in developed countries, along the lines of the complementarity principle featured in the Kyoto Protocol mechanisms. One alternative consists of putting a limit on the generation of credits (i.e. on the supply, not on demand, albeit with a similar outcome). This could be implemented at country, or global level (see BASIC, 2006). Once a country reaches its individual limit, it may be required to adopt either a binding limit at sectoral level (e.g. sectoral trading) or a country-wide emission threshold.

*Evolution/sunset clause.* Parties may wish to limit the eligibility to scaled-up crediting to a certain period of time (or quantity, as mentioned in the preceding paragraph), beyond which trading or nation-wide objectives would be required. One alternative would be to establish the principle of increased environmental ambition of the baseline over time, with a schedule for revisions.

### **3.2 Possible rules and technical requirements**

The following are elements that are essential before a scaled-up market mechanism can operate. These elements are briefly reviewed as they are rather well-known (see Bosi and Ellis, 2005, Baron and Ellis, 2006).

*Eligibility for participation.* Criteria ought to be set for granting access by developed countries to the supply of credits/allowances from the newly established market mechanisms.

*Sectoral/policy baseline.* This is the cornerstone of the crediting/trading mechanism as it determines the level of environmental ambition. Setting the baseline requires agreement on a number of technical elements and an international process to assess performance *ex ante* and to measure it *ex post*:

- *Sectoral/NAMA boundaries.* Any baseline must be based on a precise definition of entities to be covered, as well as a description of the process whereby new activities would be recorded and integrated in the reporting methodology on the sector's emissions or performance. This step could include some description of the methodology to measure or estimate GHG in the sector. International standards, if useful, may be developed to that effect (see, for instance the

---

<sup>25</sup> We note, however, that some proposals for NAMA-crediting would make all NAMA eligible for crediting.

<sup>26</sup> The need for support to capacity to launch sectoral market mechanisms is emphasised by the NGO community, in its proposal for a Copenhagen agreement (NGO, 2009).

WBCSD/WRI Protocol used by the Cement Sustainability Initiative to measure GHG at cement plants).

- *Data requirements.* Parties may wish to specify the minimum data necessary to define a baseline. The specification may include the number of years for which data is collected, a description of the methodology for measurement, and possible elements on verification.
- *Process to agree baselines.* This element is partly defined by possible principles on the environmental ambition of sectoral/NAMA baselines. Parties could first agree on a rate of departure from BAU. Or they could decide to discuss the ambition of the baseline together with a discussion on the sector's BAU trend, for every country/sector that wishes to access scaled-up crediting or trading.
  - An agreement on a systematic, quantified departure from BAU emissions (e.g.  $-x\%$  from BAU) would require a process to agree on BAU trends and a separate negotiation on the rate of departure – the value of “x” – from BAU. Some institution, presumably under the responsibility of the COP, would be needed to assess BAU trends. Sector-specific bodies may be needed to assist this institution on technical aspects of sectors.
  - An agreement to negotiate each sectoral/NAMA baseline on a case-by-case basis would imply a more political negotiation, as it is directly about the environmental ambition of the host country. This discussion may take place as Parties review low-emission development strategies (see, e.g., NGO, 2009). Sector-specific bodies would be needed in this case as well.
- *Baseline revisions.* Parties may also wish to revisit sectoral baselines on a regular basis to ensure their environmental ambition – the phase I and II of national allocation plans under EU ETS showed that getting emission objectives “right” is not straightforward. The evolution from a crediting, intensity-based baseline, to a sectoral trading objective would require a similar process, e.g. to translate an intensity-based crediting baseline into an absolute cap.

*Crediting period.* Several options are available for crediting periods,<sup>27</sup> which must be linked to decisions on what happens at the end of a period – e.g., a review of baselines, the evolution to sectoral trading. In principle, crediting periods should be long enough to provide some certainty and some time to implement changes; they should, nonetheless, be short enough to allow adjustments that may be needed in the level of ambition of environmental goals.

Frequency and modalities of credit issuance.

- Under a trading system (assuming a legally-binding emission goal expressed in absolute terms), allowances would be issued *ex ante*, either on an annual or multi-annual basis. Compliance would be established at the end of the commitment period, with annual reports on emissions, and all transactions registered via the mechanism's registry.
- A “no-lose” crediting mechanism allows for multiple options in how to generate credits, with varying degrees of environmental stringency. Three options can be envisaged (see Figure 1 for a simple quantitative illustration:

---

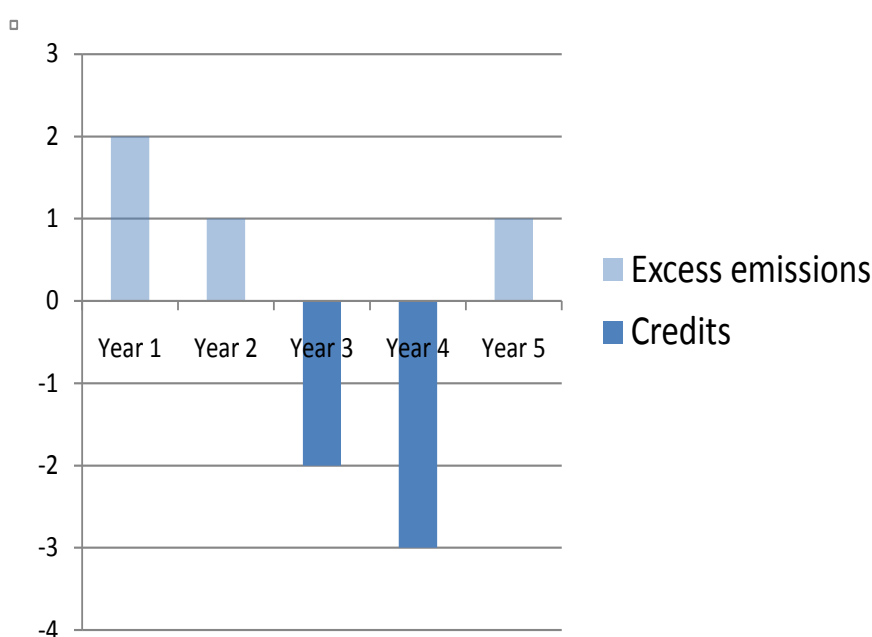
<sup>27</sup> These may equal commitment periods by developed countries, or be sub-set thereof. Extensions of the crediting periods may also be envisioned, as is the case under CDM or, to the contrary, be excluded...

1. Aggregate no-lose: Performance against the baseline is evaluated over the whole crediting period (here, 5 years). In Figure 1, the country would record a surplus of:  $-2 -1 +2 +3 -1 = 1$  MtCO<sub>2</sub>.

2. Year-by-year no-lose: Emissions below baseline lead to credits, emissions above are ignored. Total credits are then:  $2 + 3 = 5$  MtCO<sub>2</sub>.

3. No-lose until crediting starts: Starting year 3, if the country receives credits, the baseline becomes binding. Total credits issued are 5 MtCO<sub>2</sub> after Year 4, but the country is liable for 1 MtCO<sub>2</sub> emitted above baseline in Year 5, and the country is liable in case it sold more than 4 MtCO<sub>2</sub>.

Figure 1: An illustrative profile of emissions and credits



*Trading units and registries.* A sectoral/NAMA emission unit would be needed (like CDM relies on CERs, JI on ERUs and emissions trading on AAUs). It may distinguish sectoral credits from CERs, and units allocated under a sectoral trading mechanism. Host countries would, as is the case under CDM, need to have an account in a registry, or their own registry, in which they can store sectoral/NAMA units once issued, until they are transferred to other Parties. The question of fungibility with existing Kyoto units would need to be addressed in this context. The case for fungibility is strong from the view point of economic efficiency – any separation of market would lead to GHG price differences, reflecting departure from least-cost strategy to cut emissions.

*National authority for sectoral market mechanisms.* Countries agreeing to sectoral/NAMA crediting or trading should appoint an entity to, *inter alia*, measure, report and verify performance of the sector.

*Relation to CDM.* This relates to the treatment of existing projects in case a sectoral/NAMA market mechanism is established and covers existing CDM projects. This is addressed in detail in section 4.

*Compliance reserve for sectoral trading.* Parties may wish to establish a compliance reserve like the commitment period reserve of the Kyoto Protocol, with an aim to minimise the risk of overselling by

countries/sectors. This is not an issue for crediting, as credits are issued after verification of performance – note, however, that if Parties were to agree the third approach to credit issuance described above (*no-lose until crediting starts*), overselling could not be ruled out entirely.

*Liability rules/penalty.* The Kyoto Protocol mechanisms operate under seller liability: the seller carries the burden for having sold units and being in non-compliance with its emission goal. This principle facilitates trading, as buyers need not inquire about the originator of the units before purchasing them. Parties may agree to the same rule for sectoral trading. Similarly, some decision is needed on cases of non-compliance with sectoral trading objectives. Options include the 30% premium on emission surplus adopted by Kyoto Protocol Parties.

### **3.3 Institutional requirements: looking beyond mechanisms**

The principles and technical requirements to be agreed for the establishment of new market mechanisms will define processes whereby the mechanisms can come into effect. A central piece of the puzzle is the process to agree sectoral or NAMA emission baselines for individual countries/activities. It hinges on a political agreement on the participation of developing countries in curbing global emissions, e.g. a “substantial deviation from baseline”.<sup>28</sup> Any quantitative agreement on this point, e.g. under the “Shared Vision” of the Bali Action Plan, would set the tone for baseline discussions under possible crediting mechanism. Under another scenario, a requirement for low-emissions development strategies (LEDS), with a review by Parties, may be all that would be necessary to set sectoral or NAMA baselines. Both these scenarios would require some, but possibly limited, governance at the international level.

In case sectoral baselines were to be agreed on a case-by-case basis, without any guidance from a “deviation” factor or LEDS, strong international governance will be needed to ensure equal access by all eligible Parties and sectors, while maintaining the environmental ambition of baselines. One alternative scenario would be to grant broad access to crediting to sectors on the basis of agreed business-as-usual trends, following the example of CDM, and to leave it to the buyers to accept/reject the generated credits on the face of their environmental contribution. The discounting provisions under Waxman-Markey and the Climate Energy Package of the EU make this possible. This may, however, lead to differentiated treatment of credits in the international carbon market, and potential inefficiencies from market fragmentation, unless the demand side of the market adopts a unified approach (i.e. an identical discount rate to be applied to imported credits).

While there may be international settings that would work best to implement the new mechanisms, there is too much uncertainty on their acceptability and design at this stage to elaborate further on these.

## **4. Transition Issues and Domestic Implementation**

This section builds on the hypothesis that moving from a project basis to a sectoral basis would make it more difficult to create incentives for individual investors through the carbon market (see Baron, Buchner, Ellis, 2009). The reason for this is that a country/sectoral baseline has no immediate translation into an entity-by-entity emission goal – assuming that a sector is composed of multiple, independent entities. A straightforward way of generating such incentives would be to establish a cap-and-trade system in the sector/country. If a country is not ready to implement a cap-and-trade system the government would need to put in place an alternative domestic policy framework to transform any sectoral emissions baseline into a domestic policy goal – presumably aiming at outperforming the baseline, in order to obtain credits. In some cases, cap-and-trade may not be appropriate, or enough to trigger the necessary changes.

---

<sup>28</sup> FCCC/AWGLCA/2009/INF.1. Baseline here is meant as “business-as-usual”, not as crediting baseline.

This section will first discuss how to deal with, and support, the transition from the current flexibility mechanisms to a broader, more ambitious policy framework, i.e. from CDM to sectoral trading, via a sectoral crediting mechanism (SCM). The second part of the section will illustrate how a country could structure policies to reach an emissions goal and to generate credits on that basis.

## **4.1 Transition issues**

Moving ahead with sectoral market mechanisms will require clear rules on how existing CDM projects will be accounted for to avoid any double-counting or perverse incentives. How existing CDM projects are dealt with also has implications for the flow of carbon credits – whether CDM baselines are adjusted to reflect the SCM baseline and to what extent crediting of CDM offsets are deducted from credits issued from a SCM or accounted for separately.

### **4.1.1 From CDM to NAMA/sectors: what are the incentives?**

For some developing countries the project-based approach under CDM, with crediting typically against a business-as-usual baseline, has provided good incentives to implement mitigation activities in several sectors. Thus, there need to be clear incentives to make the move to new market mechanisms with more stringent baselines. Some of the incentives and advantages include:

- Scaling up from a project-by-project approach to sectoral mechanisms may lead to a larger overall volume of credits generated and transacted on the international carbon markets, and thus to higher revenues;
- With higher volumes and standardised baselines, transaction costs of bringing credits to the market are also likely to fall, at least once new market mechanisms and the necessary framework have been established;
- Sectoral mechanisms may open the carbon market to a broader set of mitigation technologies, assuming that if a country takes on sector-wide targets beyond business-as-usual it may utilise all technologies available to it in meeting this target;
- Under sectoral mechanisms there could also be room for increased and more structured technology transfer, as well as targeted support for putting in place domestic policy frameworks. This again could facilitate the implementation of more comprehensive policies which in addition to dealing with GHG mitigation may address other important issues – in the energy sector, these could include access, energy security and local air pollution.

In addition, limitations on the use of existing mechanisms could be put in place to incentivise a move towards sectoral mechanisms:

- One possibility would be to discount CERs from all projects registered after the modalities for sectoral market mechanisms have been agreed internationally;
- Another option would be to identify certain sectors and/or countries for which CDM projects would simply no longer be allowed – e.g. leaving CDM as a mechanism for least developed countries (LDCs).



#### **4.1.2 Scale of existing CDM projects in relation to a SCM**

Looking at the volume of potential CDM offsets alongside potential credits from a SCM in a sector that is a candidate for a sectoral approach gives a sense of the volume of credits from existing CDM projects in relation to a SCM.

Taking the power sector as an example, the maximum cumulative volume of certified emission reductions (CERs) from power projects in the current CDM pipeline is approximately 1 400 MtCO<sub>2</sub> by 2012. For China alone this number would be about 840 MtCO<sub>2</sub>, and for India close to 300 MtCO<sub>2</sub> by 2012.<sup>29</sup> These numbers are an overestimate of total CERs to be issued by 2012, as some of the projects could under-deliver or not be registered; a more recent UNEP/Risø analysis projects a total quantity of CERs (electricity and all other sectors/gases) near 1.2 GtCO<sub>2</sub>.<sup>30</sup> A rough calculation indicates that CERs from power generation could be in the order of 600 MtCO<sub>2</sub> by the end of the 1<sup>st</sup> commitment period.

The volume of potential credits generated under a SCM is even more difficult to estimate as it depends *inter alia* on the stringency of the baseline and the sector boundary. Nonetheless, IEA (2009) estimates the potential credits from a SCM in the power sector in China and India based on a dynamic baseline methodology, and applied to new plants only. The results show a range of 1 117 MtCO<sub>2</sub> to 3 963 MtCO<sub>2</sub> in the power sector in China cumulatively for the period 2010-2020. The range reflects differences in the stringency of the sectoral baseline. For India the corresponding estimates are 169 MtCO<sub>2</sub> to 705 MtCO<sub>2</sub>.

It is clear from the comparison of possible CERs in the power sector (600 MtCO<sub>2</sub>) with projected supply in the two largest emitters among developing countries under a hypothetical sectoral mechanism (1.28 to 4.7 GtCO<sub>2</sub>) that the volume of CERs is not insignificant, and that the relation between existing CDM projects and a SCM requires further scrutiny. This is just one example, and there are other sectors, like for instance the transport sector where there have been very few CDM projects to date. However, it is of course critical that *any* double counting is avoided between CDM projects and a SCM in the same sector.

#### **4.1.3 Different scenarios for interaction between existing CDM projects and SCM**

As outlined in section 2.1.2, the negotiation texts include some basic principles on the transition between CDM projects and a future SCM. This section explores these aspects in more detail.

To illustrate the implications of different options for accounting for existing CDM projects once a SCM is introduced we present a series of figures demonstrating the flow of emission reduction credits under different scenarios

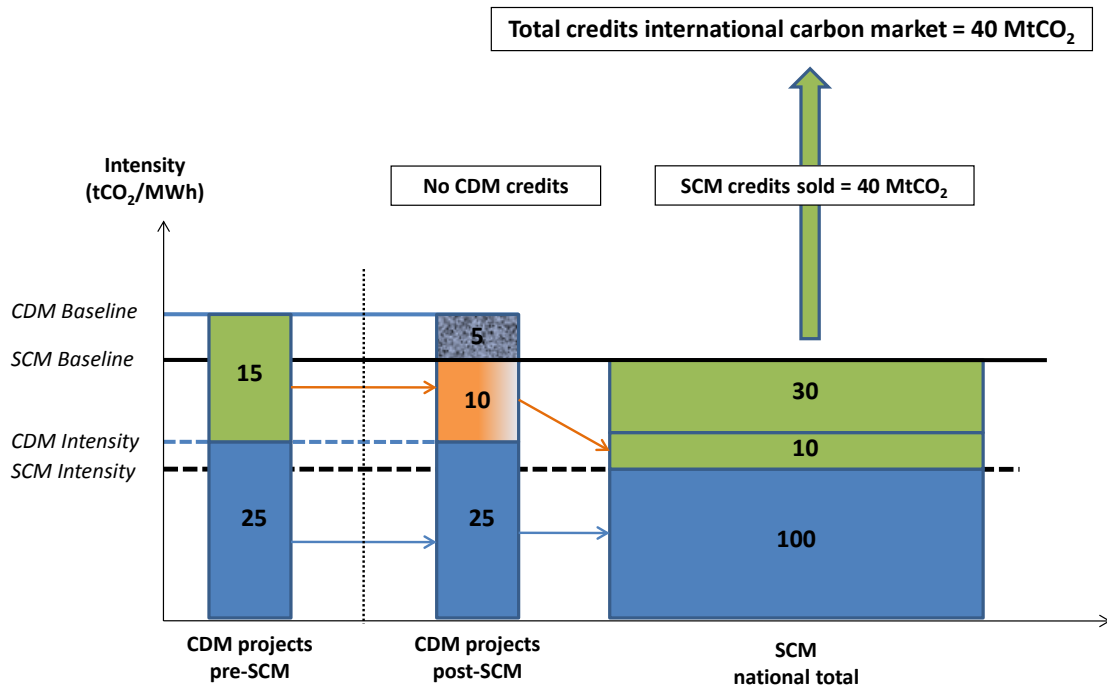
---

<sup>29</sup> UNEP/Risø database as of July 1, 2009. The power sector includes the following sub-sectors (as categorised in the UNEP/Risø CDM database): Fossil fuel switch, renewables (hydro, solar, wind, geothermal, tidal), energy efficiency (households, industry, own generation, service, supply side, energy distribution), and biomass energy.

<sup>30</sup> UNEP/Risø, website (<http://cdmpipeline.org/>), consulted on October 22, 2009.

*Existing CDM projects fully included in SCM*

Figure 2: No crediting of CDM projects after start of SCM



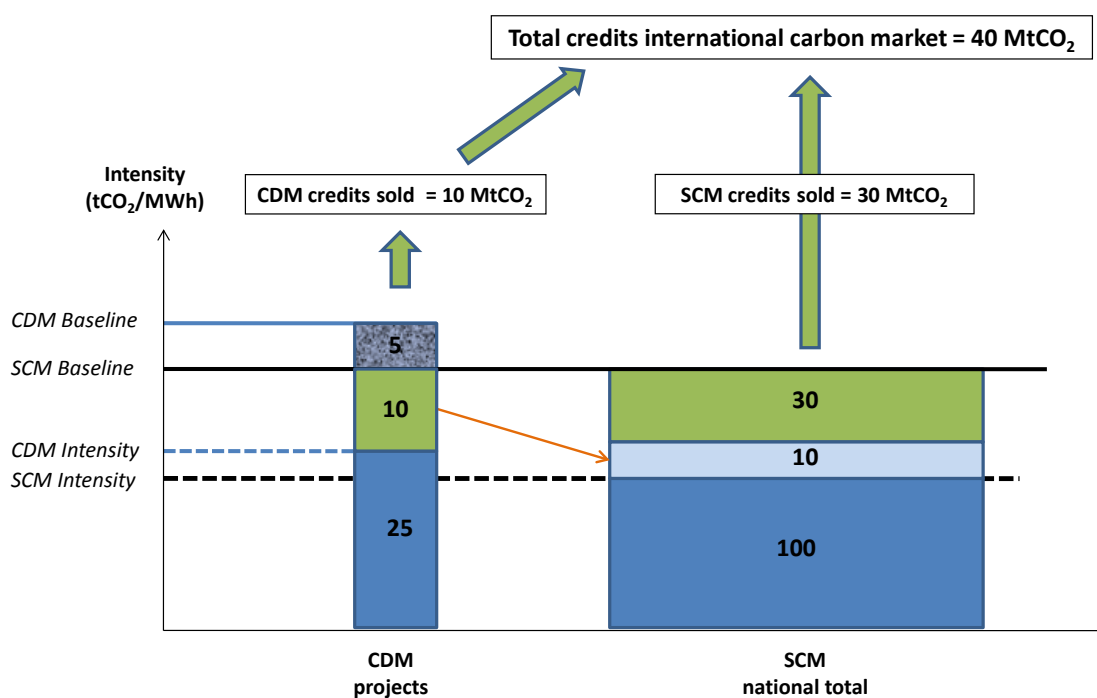
Note: The left-hand column illustrates the situation before any SCM is established. CDM projects are credited for the volume of emissions mitigated below the CDM baseline. In the figure, 15 MtCO<sub>2</sub> are mitigated and credited, while CDM installations are still emitting 25 MtCO<sub>2</sub>. All CDM projects in the relevant sector are grouped together, but in reality there may be a range of existing CDM projects within a particular sector which may have differing baselines, e.g. as a result of applying different CDM methodologies, and different emission intensity levels. However, in this and the following illustrations, we assume one baseline and one intensity level across all existing CDM projects in a sector, representing the overall mitigation effect of CDM projects in a particular sector. The middle column illustrates the integration of existing CDM projects into the SCM. The 25 MtCO<sub>2</sub> below the CDM intensity level are part of the sectors total emissions of 100 MtCO<sub>2</sub> (the area below the SCM intensity level in the right-hand column). Only CDM emission reductions below the SCM baseline contribute to lowering the SCM intensity. This is represented by the 10 MtCO<sub>2</sub> from the middle column being part of the sector's overall emission reductions, represented by the two areas above the SCM baseline and below the SCM baseline in the right-hand column (10 MtCO<sub>2</sub> from existing CDM projects plus 30 MtCO<sub>2</sub> from the rest of the sector). The CDM emission reductions below the CDM baseline, but above the SCM baseline (the 5 MtCO<sub>2</sub> on top of the middle column) are not credited at all. Total credits issued are 40 MtCO<sub>2</sub>, all through the SCM.

The scenario illustrated in Figure 2 assumes that no CDM credits would be issued after a SCM is operational. The existing CDM projects are fully integrated into the SCM, and contribute to reaching the SCM target, assuming they reduce emissions below the SCM baseline. This scenario may not be politically feasible given the expectations from CDM project owners to be credited at least to the end of the current

crediting period. For that reason, the incentives for a country to transition swiftly to a SCM may also be limited under this scenario.

*CDM baselines adjusted to reflect the SCM baseline*

Figure 3: CDM offsets credited, but CDM baseline adjusted to SCM baseline



Note: Under this scenario existing CDM projects are still integrated into the SCM (the left-hand column from Figure 2 has been removed to simplify the illustration). CDM projects are now credited, but based on the SCM baseline and not the original CDM baseline. This means 10 MtCO<sub>2</sub> (the area of the left-hand column below SCM baseline and above the CDM intensity level). The emission reductions credited to CDM projects need to be deducted from the overall SCM credits (otherwise there would be a double-counting of emission reductions). Total credits issued are 40 MtCO<sub>2</sub> with 10 MtCO<sub>2</sub> issued for CDM projects and 30 MtCO<sub>2</sub> through the SCM. The CDM emission reductions below the CDM baseline, but above the SCM baseline (5 MtCO<sub>2</sub>) are not credited at all.

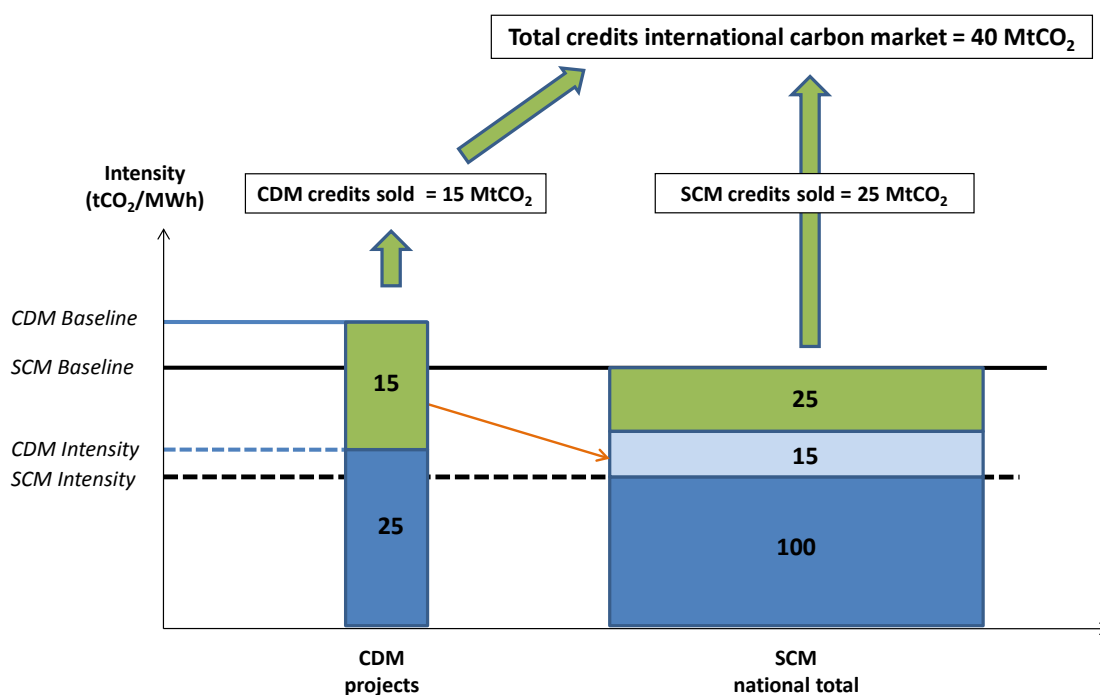
Under the second scenario (see Figure 3), CDM projects continue being credited, but the CDM baseline is revised to reflect the agreed SCM (intensity) baseline. The same quantity of credits would be issued as in the first scenario, but some of these credits are now issued directly to the CDM project owners. The issued CDM credits would be deducted from the future SCM credits to avoid double counting. Since the CDM baseline in this case is adjusted to match the SCM baseline, CDM projects proponents will not receive any more credits than if their installations were covered by the SCM in the first place. This scenario may be more acceptable to CDM project owners than to disallow CDM crediting entirely as their projects would continue to be credited. The revision of agreed CDM baselines to a more stringent SCM baseline may nonetheless be problematic to many CDM project entities or Governments with a large portfolio of existing

CDM projects. The assumption that the SCM baseline would be more stringent is plausible since CDM baselines typically reflect a “business-as-usual”, while a SCM baseline could go beyond a BAU scenario.

Adjusting the CDM baselines may be complicated, although this concept is an integral part of existing CDM rules where projects with renewable crediting periods (e.g. 3x7 years) can have their baseline revised at the time of renewal of the crediting period.<sup>31</sup> It may, however, be difficult to revise any baselines before the end of the projects’ crediting period.

*CERs remain but are deducted from SCM overall credits*

Figure 4: CDM offsets fully credited and deducted from SCM overall credits



Note: Under this scenario existing CDM projects are fully credited with no adjustment to their baseline (15 MtCO<sub>2</sub>). The emission reductions credited to CDM projects are deducted from the overall SCM. Total credits issued would be 40 MtCO<sub>2</sub> with 15 MtCO<sub>2</sub> for CDM projects and 25 MtCO<sub>2</sub> through the SCM.

A third scenario (Figure 4) assumes full crediting of CDM projects without any adjustment of their baseline to align with the SCM baseline. The overall number of credits issued to the international market would still remain the same as in the two previous scenarios. However, the volume of CDM credits is

<sup>31</sup> CDM projects can also have a fixed crediting period of 10 years, without the possibility to adjust the baseline within the crediting period. LULUCF CDM projects have a renewable crediting period of 3x20 years or fixed crediting period of 30 years.

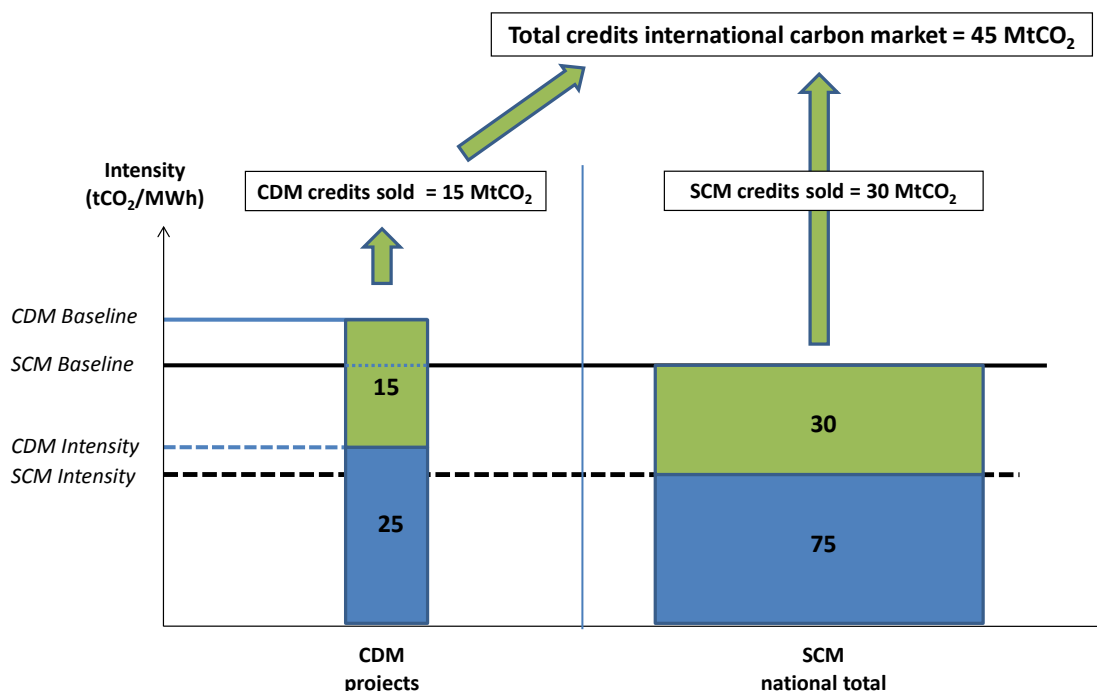
higher, while the volume of SCM credits is lower due to a higher deduction for issued CDM credits from the SCM.

This scenario would probably be more acceptable politically and easier to negotiate than the two preceding ones as it would contain the expected CDM revenue stream (at least for as long as CDM projects are deemed eligible for crediting). Comparing this scenario with the first scenario above - no CDM projects allowed after the start of a SCM - it is clear that the first scenario is essentially reallocating resources (credits) from CDM projects to a SCM. Such a reallocation of credits from CDM project entities (typically private sector) to a Government-operated SCM could be detrimental to those investors that have identified and implemented these CDM projects.

If the sector overall emits more than the SCM baseline there would not be any liability at the national level for any CDM credits issued. In other words, the crediting of existing CDM projects is guaranteed regardless of the sectors' overall performance until the date where CDM crediting is no longer eligible.

*CDM projects fully credited and carved out of the SCM*

Figure 5: CDM offsets fully credited, and carved out of the SCM



Note: Under this scenario CDM offsets are carved out from the SCM. The CDM projects credited (15 MtCO<sub>2</sub>) are not deducted from the overall SCM credits. However, since CDM projects are kept separate, the total volume of both emissions and emission reductions under the SCM is smaller. This is illustrated in the figure by subtracting the CDM projects emissions (25 MtCO<sub>2</sub>) and CDM emissions reductions below the SCM baseline (10 MtCO<sub>2</sub>) from the SCM national total. Importantly, under this scenario total credits issued are 45 MtCO<sub>2</sub>, with 15 MtCO<sub>2</sub> for the CDM

projects and 30 MtCO<sub>2</sub> through the SCM. This total is higher than the three previous scenarios as a result of the separation of the two crediting mechanisms.

A fourth option (see Figure 5) would be to “carve out” CDM offsets from SCM crediting. Under this scenario CDM credits would not be deducted from SCM credits. The CDM projects would not be formally part of the sector, as accounted for under the SCM. The total volume of credits issued under this scenario would be higher than under the other three scenarios, which would mean that the global environmental benefit would be lower than in the other scenarios. This scenario could be the simplest to implement from an accounting and MRV perspective. On the other hand, existing CDM projects will presumably have to be accounted for at the time CDM projects are no longer eligible for crediting in the relevant sector (see section 4.1.4 below for a discussion on phase-out of CDM projects). As a result the option of keeping the CDM projects completely separate from a SCM may just postpone the integration of these projects into the sectors and the SCM baseline.

The different options outlined may create different incentives for moving from CDM to scaled-up market mechanisms. In countries with a large amount of expected CERs from existing CDM projects, the last option presented would be the most attractive, as it would treat CDM projects and crediting separately, and as such result in a higher overall volume of credits. However, as mentioned, this would possibly be at the cost of global environmental effectiveness.

Another element to consider in this context is the extent to which each option creates disincentives for adopting an ambitious sectoral baseline. The most problematic scenario appears to be the second option (see Figure 3) – with CDM projects credited but the CDM baseline adjusted to match the SCM baseline. Under this scenario there may be strong pressure from CDM project proponents on Government to adopt a less ambitious sectoral baseline as this would maximize the credits from CDM projects. In all the other scenarios the ambition of the sectoral baseline does not impact the volume of credits issued for CDM projects.

In addition, it may be that Parties agree to rules governing the continuation of CDM projects if a country does not move towards a scaled-up market mechanism, which would obviously affect the above discussion. This is addressed in more detail in section 4.2.2.

Other circumstances could somewhat change the picture illustrated in the examples above. For example, the SCM may not deliver emission reductions below the SCM baseline, even if the CDM projects independently continue to reduce emissions below their baseline. However, this would not necessarily impact the four main approaches for dealing with CDM projects depicted above, and would only affect the total volume of credits issued as well as the potential deductions of CDM credits issued from a SCM.

As discussed there are several options when it comes to the treatment and accounting of existing CDM projects in a sector where a SCM has been introduced. Considering CDM project developers expectations of a certain revenue stream from their projects it may make sense to fully credit existing CDM projects, and to do so until the end of the crediting period valid at the end of 2012. From an accounting and monitoring point of view the simplest way, at least in the near-term, may be to carve out existing CDM projects from a SCM until the end of their crediting period. However, this option may lead to lower overall environmental integrity.

#### **4.1.4 Transition from CDM crediting and frequency of crediting**

Regardless of how existing CDM projects are accounted for in relation to a SCM there also needs to be an international agreement on how long existing CDM projects will be credited for, as well as how long new CDM projects can be registered in sectors covered by a SCM. This decision again may depend on the length of the crediting period and/or commitment period for a SCM. A recent study discussed this question

and proposed several options (Schneider and Cames, 2009). One of the alternatives outlined would let any CDM project registered before the end of 2012 continue to be credited until the end of the crediting period valid at the end of 2012. No new projects can be registered from 2013 onwards for any sector/country for which a sectoral crediting mechanism has been established. This option seems a reasonable balance between satisfying CDM investors and facilitating and incentivising a transition to a SCM. If there is no agreement on a sectoral approach in place by the end of 2012, it may make sense to adjust the cut-off date to reflect the date when agreement is reached. However, it is important to make sure there are sufficient incentives for moving towards a SCM rather than delaying implementation in order to maximise CDM crediting.

Section 3.2 showed how crediting under a SCM could take place at different intervals. The choice made in this regard may have some implications for the different options for transitioning CDM projects illustrated above. Given that issuance of CERs from CDM projects could take place at any time during the year, or even more frequently in some cases, it is likely that this would be out of sync with the SCM credit issuance on an annual basis. The accounting between the two mechanisms if operated in parallel could therefore be somewhat complicated, but potentially simpler if sectoral credits are only issued once at the end of the SCM crediting period.

#### **4.1.5 Transition issues from intensity-based SCM to absolute targets and/or sectoral trading**

The possible transition from CDM to a SCM is only one step towards a more cost-effective international climate change policy regime. To achieve mitigation to the extent needed, an intermediate step could be sectoral crediting with fixed (as opposed to intensity) targets and then ultimately, a move to sectoral trading. In designing a SCM in line with this longer-term transition to sectoral trading the following issues should be considered:

- Length of SCM crediting period. If the SCM crediting period is aligned with a post-2012 commitment period it may be easier to transition to sectoral trading/binding sectoral targets as a renegotiation of targets would be expected in any case at the end of the commitment period. Yet, given the new and untested nature of SCMs a shorter crediting period may be preferred by regulators. An option would therefore be to have the crediting period correspond to a certain number of years from the establishment of a SCM (Schneider and Cames, 2009). If a longer crediting period for SCM is adopted, aligned with the post-2012 commitment period, there could be provisions for revising the SCM baseline before the end of the crediting period. An alternative may be two or more shorter crediting periods adding up to the length of the commitment period, with the assumption that there will be sectoral crediting over these periods, but with the possibility to revise the baseline from one period to the next.
- Boundary of a SCM (e.g. new vs. old plants). If for example only new plants are included in a SCM (which may make it easier to implement and monitor<sup>32</sup>), transitioning to absolute/fixed targets or trading could require a significant policy and administrative effort to include existing installations. SCM offers the opportunity to monitor emissions at plant level – any exclusion from an SCM would require gathering data on excluded entities when broader sectoral trading is envisioned.

#### **4.1.6 Supporting the establishment of sectoral market mechanisms**

The implementation of a sectoral mechanism puts many requirements on developing and emerging economies. Emission reduction programmes need to be prepared, including the regulatory frameworks and

---

<sup>32</sup> See IEA (2009) for a discussion of this approach in the power generation sector.

monitoring and verification capacity. Given that a sectoral market mechanism, if based on intensity targets, would only issue credits *ex post* there may be a financing gap between the establishment of the domestic policy framework, the implementation of sector-wide emission reduction programmes, and the revenues from potential credits.

New multilateral funds offer ideas on how to address this issue. For example, through new initiatives the World Bank promotes both grants and technical assistance to establish the domestic policy framework needed to facilitate carbon finance programmes on a larger scale (see Box 2). Similar support in the form of technical assistance and funding could be helpful to support the establishment of a sectoral market mechanism.

### Box 2. World Bank's Carbon Partnership Facility

Through its new Carbon Partnership Facility (CPF) the World Bank is aiming to move away from the current project-by-project approach under CDM towards larger-scale and longer-term programs intending to generate transformation of emission-intensive sectors in developing and emerging economies. The CPF will scale up carbon finance to the sector level and integrate carbon finance into investment programs and sector development strategies.

- In addition to a carbon fund which will buy emission reduction credits, the CPF will include a **preparation fund**, the **Carbon Asset Development Fund**. This fund, based on grants, will assist developing countries in preparing emission reduction programmes, including the regulatory framework and monitoring and verification capacity. Essentially the fund is helping put in place the domestic policy framework needed to facilitate carbon finance programmes covering entire sectors or sub-sectors and credit these based on a sector-based benchmark.
- Along the same lines the World Bank's **Forest Carbon Partnership Facility**, which aims to use carbon finance to reducing emissions from deforestation and degradation (REDD), includes a so-called **readiness mechanism**. This mechanism currently offers technical assistance to 37 developing countries in establishing a reference scenario for emissions from deforestation, setting up a monitoring system, and designing a national REDD strategy.

Both these mechanisms are seen as necessary prerequisites for scaling up carbon finance to a programme or sector level.

Source: World Bank website accessed July 2009 ([www.carbonfinance.org](http://www.carbonfinance.org))

To get a sectoral mechanism started, financial and other support is also needed to overcome initial funding barriers for low-carbon investments. Some interesting proposals put forward in the context of a post-2012 climate regime address this issue through mechanisms providing up-front financing (see Box 3 for an overview of selected proposals). Developing countries that decide to participate in a sectoral mechanism could be allocated emission allowances or the proceeds from these allowances to overcome initial funding barriers.



### Box 3. Selected systems for up-front financing of low-carbon investments<sup>33</sup>

- **Environmental Defense Fund proposal.** This proposal suggests allocating emission allowances to emerging economies in excess of their current emission levels (a so-called Clean Investment Budget). In return the recipient countries would take voluntary GHG mitigation targets below their business-as-usual level. The excess allowances could be used to leverage financing for low-carbon investments up-front (Environmental Defense Fund 2009).
- **Norwegian proposal.** Norway has proposed that 2% of AAUs are held back at the international level rather than being assigned to countries and are auctioned to raise money for an international fund to support low-carbon investments in developing countries.

**Green investment schemes (GIS)** were established as a mechanism for assuring that proceeds from intergovernmental trading AAUs will finance bilaterally agreed environmental projects and programs through and beyond 2012. GIS provide for flexible financing mechanisms and offer up-front payments since the AAUs sold can be used immediately by the buyers for their compliance needs, while the implementation of the “greening” programmes can take place over time. Both the above two proposals have some similarities with GIS.

Both technical and financial assistance aimed at the establishment of the domestic framework as well as mechanisms to overcome initial funding barriers for low-carbon investments are likely to be important in reaching agreement on and commitment to sectoral approaches in emerging economies.

#### 4.2 Domestic implementation: how to get the carbon money to flow?

Domestic implementation of sectoral market mechanisms is key to their success and their contribution to global GHG mitigation. Two distinct, but related, challenges require solutions:

- First, how to implement such a mechanism in a country, e.g. which types of policies could be used to transform the country/sectoral baseline into a domestic policy goal, ensuring that the baseline gets outperformed;
- Second, how to ensure that individual entities have an incentive to improve their performance beyond the baseline or in other words, how to ensure that the carbon money gets to individual entities.

To get to grips with these issues, this section draws on experiences from different policy instruments.

To ensure that entities have an incentive to improve their performance beyond the baseline, a more stringent domestic policy framework is necessary. A range of policy tools could be adopted by governments to implement sectoral goals, with more or less direct access to the carbon market.

---

<sup>33</sup> Some transition-related proposals have been incorporated in the draft negotiation text, outlining how to assist developing countries move towards cap-and-trade systems (and carbon taxes), via new market based mechanisms. Some propose that Parties to this mechanism eligible for allowances up front shall be entitled to emission allowances under the Convention agreement from a set-aside reserve. These allowances, along with the necessary capacity-building requirements for facilitating transition to trading schemes, would be scaled up in correlation with sector scope, price of carbon and early implementation, and would be scaled down correlated with higher GDP per capita. Without prejudging the usefulness of such an approach, it is one attempt at explicitly scaling support according to the recipient country’s capacities – in this case, GDP per capita.

The adoption of domestic emission trading systems could solve several problems at once. The *ex ante* allocation of allowances, which have a clear market value, would directly relay the price signal to the single entities. Even in the case where the country agreed to a sectoral crediting baseline, with uncertainty on the quantities of credits, domestic entities would be exposed to the domestic price for carbon and act accordingly. Yet, a cap-and-trade system requires significant capacity and political will to be implemented and only a few developing countries are considering this option. If governments are not willing to adopt a cap-and-trade policy, or if sectoral targets are intensity-based, then it is more challenging to reach the emission goals and ensure that entities receive the carbon price signal.

Beyond cap-and-trade, government policy options to achieve emissions reductions in a sector covered by a SCM include fiscal policies, policies that reform subsidies or provide specific incentives, voluntary agreements or regulatory instruments such as mandated performance for new plants (i.e., minimum performance standards) and plant-by-plant performance objectives.

To date, several developing countries published national action plans on climate change based on a mix of policies - e.g. in June 2008 the Government of India released its *National Action Plan on Climate Change*, (NAPCC). In addition, both developing and developed countries have implemented a vast range of policies and measures. The following discussion draws upon selected experiences and illustrates how a policy setting could be designed that addresses the above issues.

#### **4.2.1 Illustrating policy packages to reward performance at entity level**

When structuring the policy framework, it is essential to minimise the steps through which the carbon revenues have to go before reaching investors. As shown by the current practice for JI forestry projects, entities may not be willing to invest at the project level if they have to rely on the Government for achieving national level targets, and/or wait for the accounting at the national level, before being credited (see Box 4). This problem with private sector incentives may also surface related to a sectoral market mechanism where accounting and crediting is done entirely at the Government or national level. While it seems to be particularly pronounced in sectors like forestry, where monitoring is cumbersome, safeguards are needed to ensure that entities make the appropriate investments.

#### **Box 4. Joint Implementation (JI) Emission Removal Units**

In the land-use, land-use change, and forestry (LULUCF) sector there are a limited number of CDM projects registered but a fair number under validation to date, while there are no JI forestry projects registered or in the pipeline.<sup>34</sup> This is despite the fact that JI forestry projects in theory should be more attractive than CDM forestry projects because they would actually generate permanent credits and not temporary ones as for CDM forestry projects.

Although there could be several reasons for the lack of JI forestry projects some of the restrictions put on JI forestry credits help explain the low uptake of these projects. Under current rules, JI removal units can only be transferred once the LULUCF emission inventory for the country has been accounted for and only if the GHG accounting of LULUCF sector in a country overall is positive (Schlamadinger and O'Sullivan 2007). Since reporting on the forestry emission inventory for a country is not a trivial task most countries have opted to do this only at the end of the current Kyoto commitment period. This has two implications for JI forestry projects:

- No JI forestry credits can be issued until the end of the commitment period making them less attractive to Parties trying to plan how they can reach their compliance needs.
- JI forestry credits for individual projects will only be issued if the country as a whole has reduced their emissions from, or increased its sequestration, in the LULUCF sector.

This again means that private sector developers may not be willing to invest in JI forestry projects if the issuance of credits is dependent on accounting and performance at the national level. There is a risk of similar private sector inertia in the context of sectoral market mechanisms where crediting only takes place at the Government level.

#### *From sectoral baselines to baseline-and-crediting at entity level*

In contrast to this example other market-based instruments have proven to create incentives for abatement, as shown by experiences in Europe (*e.g.* Ellerman and Buchner, 2008). Beyond cap-and-trade, they could also be designed as a baseline-and-credit approach. In a baseline and credit system entities are under no aggregate fixed cap, but can create credits by reducing their emissions below a baseline level of emissions. This approach is the basis of CDM. Recent policy proposals in developing countries are also based on such a system *e.g.* the tradable energy savings certificate scheme, Perform Achieve and Trade, recently announced by the Indian government (BEE, 2009).

Baseline-and-credit policies create incentives for entities to improve their performance, as beating their baseline generates credits. An extensive baseline-and-credit system could prove helpful in setting up the infrastructure for trading and a database of performance on an installation-basis. However, to effectively trigger change at plant level, the sectoral baseline would have to be translated into a series of plant-specific baselines. The administration of such a system may be burdensome, in terms of setting baselines, data requirements, and monitoring and verification. Given the intensity basis of the systems, it is also uncertain whether the policy framework would in fact be stringent enough to outperform the baseline for the sector as a whole. With proper performance, the government could raise revenues to replenish the funds used to reward domestic credits. If the country as a whole falls short, the domestic credits could be funded through

---

<sup>34</sup> UNEP/Risø JI database as of July 1, 2009

the general budget. Without such provision, a baseline-and-crediting system would not provide investors with the certainty needed to trigger investment.<sup>35</sup>

*Other policy approaches: subsidies to low-carbon technologies*

There is a wealth of experience with other policy approaches to trigger changes in technology choices and behaviours to reduce GHG. In the power sector, a range of policies from feed-in tariffs to performance targets at installation level could be adopted to encourage or mandate changes and to outperform the baseline or target. Some of these policies are already being used in developing countries to implement environmental and energy targets. The question is whether these policy approaches would allow the carbon money to flow back to the good performers.

We explore this question briefly in the case of feed-in tariffs for renewable energy. Feed-in tariffs have to date been introduced in 61 jurisdictions (REN21, 2009). They have proven to be effective incentives for private sector investment in grid-connected renewable energy, *e.g.* in Germany (see Box 5). The legal obligation on the grid-system operators to purchase this electricity as well as the predictable payment rates has translated into high investor security for plant operators.

In a developing country, such policy could be supported by carbon revenues under a sectoral approach. A policy adopted in Pakistan offered to guarantee an internal rate of return for renewable energy investors by mandating power companies to acquire electricity from renewables at a premium (Government of Pakistan, 2006; Puhl, 2006). It also registered renewable projects under the CDM. The revenues from CERs would first be used to cover the premium paid by power companies, and, to reward investors with the possible excess revenues. It may be possible to combine the equivalent of a feed-in-tariff to achieve sectoral performance over a baseline, and to use potential credit revenues to alleviate the cost on liable entities domestically. This arrangement would not directly send the carbon price signal to investors, but it would support the policy by lowering its overall cost.

**Box 5. Germany's Feed-in Tariffs**

In Germany feed-in tariffs (FiT) have existed since 1991, being updated in 2000, 2004 and most recently on January 1, 2009. Germany's Renewable Energy Sources Act (Erneuerbare Energien Gesetz - EEG) provides for the enhanced application of FiT to increase the share of renewable energy sources in the electricity sector. The EEG's stated objective is to facilitate sustainable development within the energy sector, and this is to be accomplished by prioritising connection to the electricity grid of energy derived from renewable energy as well as prioritising purchase, transmission and payment of such electricity by grid-system operators.

The price for the electricity is regulated by the EEG and is generally valid for 20 years. It is applicable to power generated from wind, solar PV, geothermal, hydro, biomass and biogas sources, with price variance depending on the energy source, plant size and location. The 2009 version of the EEG amends some of the pricing provisions. In addition to higher pricing for renewable energy sources across the board and provisions for the expansion and optimisation of grid capacity, the 2009 law increases the repowering bonus to support the replacement of old infrastructure by newer technology.

Since 1991, Germany has undergone a large-scale expansion of its renewable energy sector, equivalent to a 500% increase in electricity generated from renewable sources (87 TWh).<sup>36</sup>

<sup>35</sup> Amatayakul et al. (2009) propose a project-based crediting mechanism based on a national emissions intensity standard combined with taxes on power plants with a carbon intensity above the standard. In case the country did not outperform the sectoral baseline, the tax revenues could be used to reward good performance by other installations.

### *Mandated performance*

Regulatory instruments such as mandated performance or mandatory minimum performance standards for new plants could also help putting a sector's emissions below the baseline, although, again, without sending a direct carbon price signal to entities. China has a wide range of minimum energy performance standards (MEPS) for domestic, commercial and selected industrial equipment. These MEPS and other voluntary endorsement labeling specifications have had an important impact in reducing energy consumption of appliances in China (Zhou, 2008), indicating that these instruments can be effective in improving performance. However, China's example also highlights the need for significant administrative capacity in terms of monitoring and enforcement to notably improve the performance, in line with available savings potentials. Indeed, China has primarily focused on the technical requirements for efficiency performance, which makes market compliance with the programmes and thus achievement of energy savings questionable. The possibility to register such policy for crediting could help to generate financing for this kind of policy, and secure performance. Other types of support may also be envisioned, however.

### *Operating a project-based mechanism within a sector: an example in REDD*

Another proposal for creating incentives at the installation level is to continue operating a project-level crediting mechanism within a country in parallel with a sectoral approach at the national level. Although there are still numerous uncertainties on whether and how a sectoral market mechanism for REDD may operate, the nested approach for REDD represents an interesting proposal for dual-level crediting (see Box 6). Looking at the four scenarios for accounting for existing CDM projects described in section 4.1.2 it is clear that such a hybrid approach would be closest to the second option of crediting CDM offsets from a baseline set at the same level as the SCM baseline, and deducting these credits from the SCM. One unresolved issue under the hybrid approach, however, seems to be the mechanism for guaranteeing crediting at the project level in the case of underperformance of the sector as a whole. The forestry sector may lend itself better to such a dual crediting system than other sectors. For instance, for REDD it is quite possible that the funding mechanisms will originate from a combination of sources including both private markets as well as multilateral funds. It may be easier in this context to guarantee the parallel crediting of project-level activities (even if the national-level target is not met) if multilateral funds are involved in the financing mix.

---

<sup>36</sup> More information is available at:

[http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Content/Publikationen/STATmagazin/Energie/2008\\_2/2008\\_2Energietraeger.templateId=renderPrint.psml#Link1](http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Content/Publikationen/STATmagazin/Energie/2008_2/2008_2Energietraeger.templateId=renderPrint.psml#Link1)

### **Box 6. Nested approaches for reduced emission from deforestation and degradation (REDD)**

REDD now looks likely to be included in some form in a post-2012 international climate regime. To date REDD is perhaps the most developed example of a sectoral approach and one of the key questions in this respect relates to the level at which accounting and crediting for emission reductions will be done.

In order to go beyond the CDM project-based approach,<sup>37</sup> some observers have proposed a *hybrid (or nested) approach* that allows accounting and crediting for GHG reductions from REDD projects operating within both a national or sub-national accounting system. The idea is that REDD activities could begin at the project level with project-level crediting, but the transition to a national approach and accounting would be mandatory within a certain time-frame. Although transitioning to a national approach is required under this proposed scheme, continued direct crediting at the project level could be possible also after a national approach and accounting is adopted. Any crediting at the project-level will be deducted from the national performance (Angelsen et al. 2008).

A nested approach would combine some of the strengths of the project and national (or sectoral) approaches, in that it could facilitate early action before any national level governance structure is in place, attract private sector investors and lead to broad policy interventions at the Government level which may be needed to change the deforestation trends at a country level. Yet, the challenge is to harmonize accounting at the project and national level, which is crucial in order to minimize leakage. This again may lead to higher MRV costs (Angelsen et al. 2008).

#### *Devolving commitments to entities: illustration from the UK Climate Change Agreements*

Various policies and measures can thus help relay the carbon price incentive to the single entities. Yet, unless cap-and-trade is applied, a mix of policies seems necessary. An example of how different policies could be pulled together to support the implementation of a sectoral mechanism is provided by the UK Climate Change Agreements (CCAs). These public, voluntary agreements indeed resemble some of the characteristics faced during the establishment of a sectoral mechanism. For a brief discussion see Box 7.

A number of features distinguish the UK CCAs from other instruments, and show their relevance to sectoral market approaches. They are part of a sophisticated policy mix in which instruments at a government level and a sector level are combined to ensure incentives at an installation level. In particular, specific sectors have the possibility to negotiate a rebate on the so-called Climate Change Levy with the Government. These negotiations lead to CO<sub>2</sub> targets at a sector level, which are then further broken down to the installation level, as well as to carefully established BAU trends. Thus, clear final and interim targets are set. The exemption from the levy provides the incentive for sectors and companies to participate in the CCA, whose target can also be reached by purchasing allowances through the EU-wide emissions trading scheme (EU ETS). Monitoring and enforcement provisions are specified very carefully; e.g. the CCAs are enforceable contracts which allow penalising non compliant companies. Tight monitoring and enforcement of policies put in place to create incentives at the entity level is important in ensuring overall effectiveness of the domestic policy framework.

---

<sup>37</sup> REDD is currently not eligible under CDM so a pure project-level crediting along the lines of CDM is also an option considered.

### **Box 7. The UK Climate Change Agreements**

As part of the national strategy to meet Kyoto obligations, the UK Government introduced in April 2001 a tax on the use of energy in industry, commerce and the public sector, the so-called Climate Change Levy (CCL). To deal with competitiveness concerns of energy intensive industries, the Government launched in parallel 48 Climate Change Agreements (CCAs) on additional CO<sub>2</sub> reduction targets negotiated with trade associations representing these industries. In return, companies meeting these targets receive an 80% discount from the CCL. There are ten major energy intensive sectors (aluminium, cement, ceramics, chemicals, food and drink, foundries, glass, non-ferrous metals, paper, and steel) and over thirty smaller sectors with agreements to-date.

CCAs have a two-tier structure:

- A sector-level agreement between the Government and the sector or trade association (known as an umbrella agreement), specifying sector targets, the obligations on the sector and the Government, and the procedures for administering the agreements.
- Individual agreements between the Government and the operator of the facility (known as underlying agreements), specifying the targets to be met at an installation level, the obligations on the operator and the Government, and the procedures for administering the agreements.

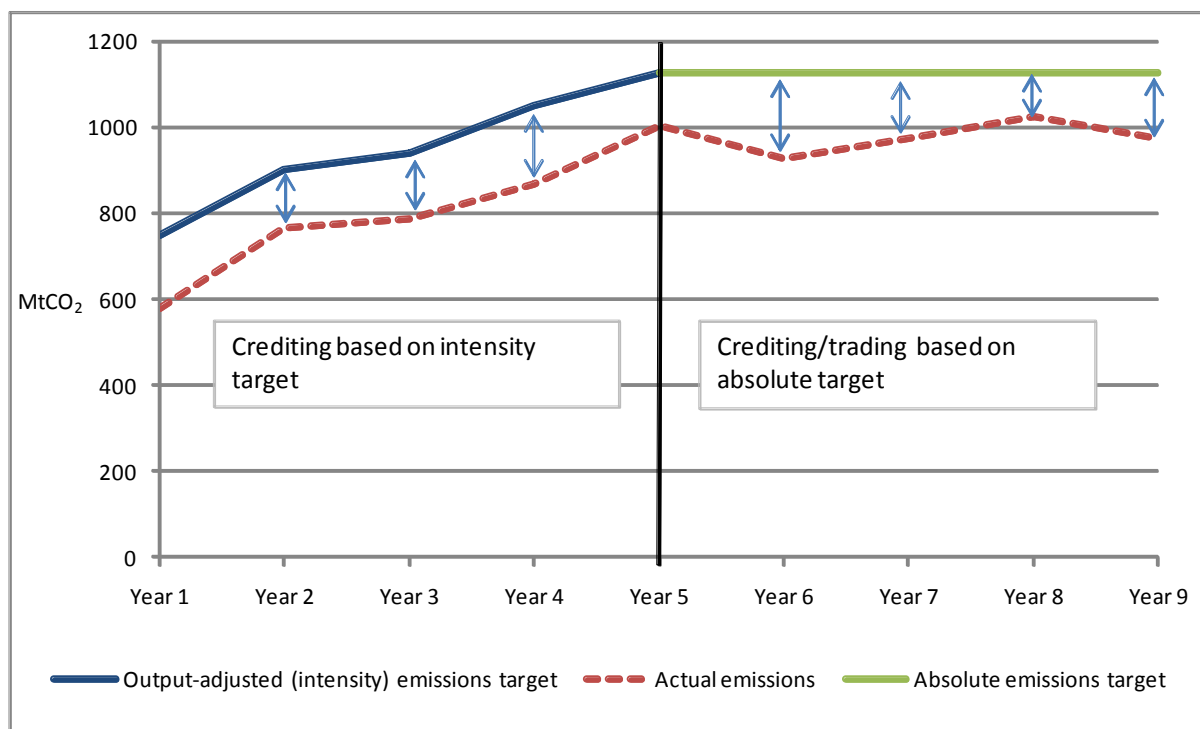
For a detailed analysis of the UK CCAs see Glachant and de Muizon (2007).

While allowances can be used in the UK CCAs to reach the targets, the structure in terms of the tax exemption does not directly provide lessons on how to get the carbon revenues to the entities. Nonetheless, the breakdown of obligations from the national level to the installation level illustrates how incentives could be set across all levels.

#### **4.2.2 From sectoral crediting to trading**

If sectoral crediting is based on intensity targets, moving to sectoral trading would require a transition to an absolute target. Sectoral crediting based on absolute targets may be an interim step in this context, or adoption of absolute targets may allow for moving directly to sectoral trading.

Figure 6: Transitioning from intensity-based to absolute-targets



Note: In this illustration, crediting based on intensity target takes place up until year 5, after which an absolute target is adopted. Credits issued are represented by the area/interval between the emissions target and absolute emissions. The intensity target is here expressed in MtCO<sub>2</sub> after multiplying the intensity target with the output index (e.g. TWh).

Figure 6 illustrates a hypothetical scenario of transitioning from an intensity-based to an absolute target. The figure shows that with an intensity target the level of absolute emissions and the output-adjusted (intensity) target follow each other fairly closely – as intended. Transitioning to an absolute target could result in larger fluctuations from year-to-year in terms of the interval between the emissions target and absolute emissions, and consequently credits issued. The volume of credits issued with absolute targets compared to an intensity target may be larger or smaller depending on the ambition of the baseline as well as the trend of absolute emissions.

While an absolute target may be more difficult to set, as there are potentially both larger up-sides and down-sides in terms of carbon revenues, an initial transition period with intensity-based targets may provide valuable sector information for making the transition to absolute targets. However, for some sectors, cap-and-trade appears as the policy of choice to trigger change at least cost, and there may be advantages in adopting absolute targets directly.

If sectoral crediting is a necessary step, more politically acceptable because of its less binding nature, there are some incentives to consider sectoral trading as the next step:

- If sectoral crediting is based on intensity-targets, moving to absolute emission performance, as required under sectoral trading, would reduce the monitoring burden on the government. An intensity baseline requires gathering information on emissions and on the sectoral output – or whichever indicator is used in the intensity baseline (tons of cement or steel, megawatt hours, etc.) Emissions cap require only emissions data to ensure compliance.



- Allowances can be issued *ex ante* to the country, with the possibility to devolve them to entities. Crediting requires waiting for issuance, then creating units to be placed in the registry for potential international transactions; the experience with the establishment of the CDM registry shows the importance of a smooth access. Uncertainty on the exact date of posting of credits in the registry may create unnecessary problems for smooth transactions, with repercussion on prices and revenues by host countries.
- The allowances represent an asset with an economic value that should trigger investment towards lower emissions, in line with the carbon price. Under sectoral crediting, entities may respond to policy incentives that are not related to the carbon price and therefore not implement all the mitigation options that they would, if they were directly exposed to the market price and the potential carbon market revenues. With a similarly ambitious emission baseline, sectoral trading may secure more economic benefits for entities in host countries, through enhanced mitigation.
- Last, sectoral trading could relieve governments from otherwise costly domestic policies – such as subsidies to reward good performance. Cap-and-trade systems also create a rent which can help raise government revenues further down the line, through auctioning.

### 4.3 Getting the right mix of incentives and policy instruments

The difficulty of providing a direct carbon price signal to individual investors under a sectoral crediting approach is well demonstrated, especially in the case of intensity baselines (see Baron, Buchner, Ellis, 2009). There is, however, a range of policies whose performance and effectiveness could be enhanced, e.g. with carbon revenues from sectoral or NAMA-based crediting mechanisms. From the above examples, securing investments that fully incorporate the price of carbon would require significant policy efforts (e.g. the translation of a sectoral baseline into entity-by-entity baseline and crediting), and some insurance by domestic governments that good performance will be rewarded even in cases of default at national level. When the implementation of a domestic market mechanism is not possible, other policy approaches, with less direct link between entities and the carbon market, will be needed. Domestic regulatory frameworks and sector specificities will be important components in this discussion, and one-size-fits-all policy recommendations should be considered with care.

It is also useful to acknowledge that certain policy instruments, not necessarily based on pricing emissions may be more practical and cost-effective for certain sectors and activities, due to market barriers (see IEA, 2009 for end-use efficiency). How to best use the limited carbon finance to trigger change in developing countries is an important question if other policy support must be brought to mitigation actions.

In all, the motivation for moving towards market mechanisms is, beyond the attractiveness of economic efficiency, to substitute public spending with private sector investment: emission trading systems, CDM and JI have shown how this can work in practice. Sectoral crediting offers a scope for larger participation in the international carbon market, but may require more government intervention and resources before carbon prices can effectively reach individual investors and project developers. The challenge, in moving towards more broadly-based market approaches at international level, is to avoid discouraging investors and carbon finance more generally, even if other forms of support are being envisioned already. One important question that would need resolving soon after any decision on new market mechanisms is taken is the relation to CDM, especially the treatment of expected CERs.

## 5. Areas for future work

This paper has provided an overview of new market mechanisms, at a stage where there is much uncertainty on their political attractiveness, as well as on the exact role that these mechanisms may play in the international climate policy framework coming out of Copenhagen. Their role in the domestic policies of potential buyers and sellers is also unclear, and could be adjusted after the international agreement is reached. The principles and technical requirements listed in section 3 should offer some guidance on decisions needed to enable the construction of a full-fledged regime for these mechanisms after the Copenhagen meeting.

Further work will be required on the governance of the new scaled-up mechanisms, starting from the following questions:

- How should participation (country/sectors) be determined?
- How to establish baselines and to secure environmental ambition?
- What institutions are needed under the UNFCCC to operate new market mechanisms?
- What could be the role of sectoral expertise and bodies in any new mechanisms?
- How to make sectoral mechanisms effective and minimise the institutional requirements for their operation?
- Interaction with other support mechanisms.

Further, there is the unresolved issue of the link between scaled-up market mechanisms and international carbon finance, for options other than domestic cap-and-trade. This may require more sector-specific analysis, along the lines of some of the energy-sector and forestry examples provided here.

## Glossary

AAU	An Assigned Amount Unit (AAU) is a tradable unit of 1 tCO <sub>2</sub> eq. The assigned amount is the total amount of GHG that each Annex B country is allowed to emit during the first commitment period of the Kyoto Protocol.
AWG-KP	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action under the Convention
CDM	Clean Development Mechanism
CER	A Certified Emission Reduction is the unit in which GHG emission reductions achieved by CDM are traded, and represents 1 tCO <sub>2</sub> eq.
CO <sub>2</sub>	Carbon dioxide
Crediting	Crediting implies that trading units are issued ex-post after verification of performance
EU ETS	European Union Emissions Trading Scheme
GDP	Gross domestic product
GHG	Greenhouse gas
GIS	Green Investment Schemes
JI	Joint Implementation
NAMAs	Nationally appropriate mitigation actions. Referred to in paragraph 1(b)(ii) of the Bali Action Plan, in relation to developing countries
NO <sub>x</sub>	Nitrogen oxides
REDD	Reducing emissions deforestation and forest degradation in developing countries
Trading	Trading implies that allowances are allocated ex-ante and can be traded at the beginning of the period
SCM	A Sectoral Crediting Mechanism credits emission reductions in a sector against a defined no-lose baseline
UNFCCC	United Nations Framework Convention on Climate Change
US EPA	United States Environmental Protection Agency

## References

- Angelsen A., C. Streck, L. Peskett, J. Brown, and C. Luttrell, C. (2008), "What is the right scale for REDD? The implications of national, subnational, and nested approaches". *CIFOR Infobrief*, No. 15, November 2008.
- Amatayakul W., G. Berndes and J. Fenhann (2009), "Electricity sector no-lose targets in developing countries for post-2012: Assessment of emissions reduction and reduction credits". *CD4CDM Working Paper No.7*, July 2009. UNEP Risoe centre.
- Amatayakul W., G. Berndes and J. Fenhann J. (2008), "Electricity sector no-lose targets in developing countries for post-2012: Assessment of emissions reduction and reduction credits". *CD4CDM Working Paper No.6*, December. UNEP Risoe centre.
- Baron R., B. Buchner and J. Ellis (2009), "Sectoral Approaches and the Carbon Market". *OECD/IEA Climate Change Expert Group Papers*, No. 2009/03, OECD Publishing.  
<http://dx.doi.org/10.1787/5k4559g5snzq-en>
- Baron, R. and Ellis, J. (2006), "Sectoral Crediting Mechanisms for Greenhouse Gas Mitigation: Institutional and Operational Issues". *OECD/IEA Information Paper*, OECD Publishing.  
<http://www.oecd.org/dataoecd/36/6/36737940.pdf>
- BASIC (2006): *The Sao Paolo Proposal for an Agreement on Future Climate Policy*, Discussion Paper for COP12 and COP/MOP2, [http://www.basic-project.net/data/SP\\_prop\\_rev\\_nairobi.pdf](http://www.basic-project.net/data/SP_prop_rev_nairobi.pdf)
- Bosi, M. and J. Ellis (2005), "Exploring options for Sectoral Crediting Mechanisms", *OECD/IEA Information Paper*, OECD Publishing. <http://www.oecd.org/dataoecd/55/61/34902644.pdf>
- BEE (2009), Bureau of Energy Efficiency. [www.energymanagertraining.com/NAPCC/main.htm](http://www.energymanagertraining.com/NAPCC/main.htm)
- Ellerman, A.D. and B.K. Buchner (2008), "Over-Allocation or Abatement? A Preliminary Analysis of the EU ETS Based on the 2005-06 Emissions Data", *Environmental and Resource Economics*, Vol. 41, N° 2, 267-287.
- Glachant, M., de Muizon, G. (2007), "Climate Change Agreements in the United Kingdom: A Successful policy Experience?" in Morgenstern, R.D. and W.A. Pizer, *Reality Check: the Nature and Performance of Voluntary Environmental Programs in the United States, Europe, and Japan*, pp. 64-85. Resources for the Future Press.
- IEA (2009), *Sectoral approaches in Electricity – Building bridges to a safe climate*. International Energy Agency, OECD Publishing. Paris. September. <http://dx.doi.org/10.1787/9789264068735-en>
- NGO (2009), *A Copenhagen Climate Treaty – Version 1.0. A proposal for an amended Kyoto Protocol and a new Copenhagen Protocol by members of the NGO community*. [www.panda.org/climate/treaty](http://www.panda.org/climate/treaty).
- Lewis, M.C. and I. Curien (2009), *Aussie Carbon Rules*, Deutsche Bank Global Markets Research, 13 August 2009.
- Lewis, M.C. and I. Curien (2008), *ETS Changes Approved by EU Parliament*, Deutsche Bank Global Markets Research, 19 December 2008.
- REN21 (2009), *Renewables Global Status Report 2009*. , Renewable Energy Policy Network for the 21<sup>st</sup> century downloadable at [http://www.ren21.net/pdf/RE\\_GSR\\_2009\\_Update.pdf](http://www.ren21.net/pdf/RE_GSR_2009_Update.pdf)
- Schlamadinger, B. and O'Sullivan, R. (2007), "LULUCF projects under JI: will they be possible?" 26<sup>th</sup> Session of the Subsidiary Bodies of the UNFCCC, Bonn, May 2007.
- Schneider, L. (2008), *A Clean Development Mechanism (CDM) with atmospheric benefits for a post-2012 climate regime*. Öko-Institut e.V. Discussion Paper, 25 September.

- Schneider, L. and M. Cames (2009), *A framework for a sectoral crediting mechanism in a post-2012 climate regime*. Report to the Global Wind Energy Council. Öko-Institut e.V., Berlin, 28 May.
- UNFCCC (2009a), FCCC/AWGLCA/2009/INF.1, June 22, 2009
- UNFCCC (2009b), FCCC/KP/AWG/2009/10/Add.3/Rev.1, August 28, 2009
- UNFCCC (2009c), FCCC/AWGLCA/2009/MISC.4 (Part I), 19 May 2009
- UNFCCC (2009d), FCCC/AWGLCA/2009/MISC.4 (Part II), 19 May 2009
- UNFCCC (2009e), AWGLCA, Non-paper No. 30, Contact Group on Mitigation, Subgroup on paragraph 1(b)(v) of the BAP (Various approaches to enhance the cost-effectiveness of, and to promote, mitigation actions), Revised annex III E to document FCCC/AWGLCA/2009/INF.1, 9 October 2009
- UNFCCC (2009f), AWGLCA, Non-paper No. 17, Contact Group on Enhances Action on Mitigation and its Associated Means of Implementation, Subgroup on paragraph 1(b)(iv) of the BAP (Cooperative sectoral approaches and sector-specific actions), Revised annex III D to document FCCC/AWGLCA/2009/INF.2, 8 October 2009
- US Congress (2009), American Clean Energy and Security Act - H.R. 2454. 111th Congress, First Session. Washington D.C.
- Wagner, G., Keohane, N., Peterson, A., and Wang, J. (2009), Docking into a global carbon market: Clean Investment Budgets to finance low-carbon economic development. Environmental Defense Fund, 17 March 2009.
- Zhou, N. (2008), *Status of China's Energy Efficiency Standards and Labels for Appliances and International Collaboration*. Lawrence Berkeley National Laboratory Report (LBNL-251E).

[www.oecd.org/env/cc/ccxg.htm](http://www.oecd.org/env/cc/ccxg.htm)

[www.iea.org](http://www.iea.org)



With the financial assistance  
of the European Union