

Enhancing the clean development mechanism through sectoral approaches: definitions, applications and ways forward

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Abstract Grave concerns with the Clean Development Mechanism (CDM) have increasingly surfaced in the international climate policy arena. The sectoral approaches described in this paper may be a way to address some of the shortcomings of this Kyoto mechanism. The paper outlines the criticisms that have been raised against the CDM as well as the conflicting interpretations of a sectoral approach and examines in how far it might resolve the mechanism's perceived shortcomings. Furthermore, it outlines issues that need to be resolved when implementing a sectoral approach: distributing costs and benefits, defining the sector and its baseline, ensuring additionality and tackling procedural issues. A sectoral approach can enable countries to guide their structural development but it also opens up a gap between public and private investment that needs to be addressed before conflicts arise. Sectoral CDM activities may be able to lower transaction costs for projects that otherwise cannot compete in the CDM market and might even pave the way to sectoral greenhouse gas limitation targets in developing countries by establishing the necessary infrastructure for data collection. However, a sectoral CDM cannot be mistaken for a panacea. Some of the mechanism's problems remain, which highlights the need to establish additional instruments to support Southern countries in furthering sustainable development and embarking on a low-emission trajectory.

Keywords Kyoto Protocol · Clean Development Mechanism · CDM reform · Sectoral CDM

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Abbreviations

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| CDM | Clean Development Mechanism |
| CER | Certified Emission Reduction |
| COP | Conference of the Parties to the United Nations Framework Convention on Climate Change |
| COP\MOP | Conference of the Parties Serving as Meeting of the Parties to the Kyoto Protocol |
| CO ₂ | Carbon Dioxide |
| CO ₂ e | CO ₂ equivalent |
| DNA | Designated National Authority |
| DOE | Designated Operational Entity |
| GHG | Greenhouse Gas |
| HFC | Hydrofluorocarbons |
| N ₂ O | Nitrogen Dioxide |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WWF | Worldwide Fund for Nature |
| USD | US Dollar |

1 Introduction

The Clean Development Mechanism (CDM) is a project-based mechanism established under the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC). It has a two-fold objective:

- To assist countries not included in Annex I to the UNFCCC (“developing countries”) in achieving sustainable development, and
- To allow countries that are included in Annex I to the UNFCCC and have inscribed specified greenhouse gas (GHG) emission targets in Annex B to the Kyoto Protocol (the traditional ‘industrialised countries’) to acquire Certified Emission Reductions (CERs) from CDM project activities undertaken in Non-Annex I Parties and count them towards their Kyoto targets.¹

Although the procedures underlying the CDM have evolved slowly but steadily, there is an increasing number of voices in the international climate policy arena that are calling for improvements to the way the mechanism functions. Critics claim that the process leading to the registration of a project activity and the issuance of CERs has become too complex and costly. Furthermore, there have been complaints that project activities that are most likely to enable host countries’ sustainable development, such as renewable energy, energy efficiency and transport project activities, are not competitive in the CDM market and are becoming marginalised. Others criticise that many host countries’ criteria for assessing whether a project activity contributes to sustainable development are too weak and that local stakeholders

¹ Throughout this paper, Annex I Party means a Party to the UNFCCC included in Annex I, UNFCCC, which has ratified the Kyoto Protocol and which has a commitment inscribed in Annex B, Kyoto Protocol. The term Non-Annex I Party refers to a Party that has ratified the UNFCCC as well as the Kyoto Protocol but is not included in these Annexes. The usage of these terms is largely consistent with the Marrakesh Accords.

often cannot participate meaningfully in the project approval process. Many are also disappointed because CDM project activities have so far concentrated in relatively few countries and regions while, for example, most of Africa has so far been bypassed. Due to its design as a project-based mechanism, some also see the CDM as fundamentally incapable of achieving essential structural changes desired by host countries. Some even fear that the CDM may actually have a negative impact by producing a perverse incentive for host countries to refrain from introducing ambitious climate protection policies as this could render project activities ‘non-additional’ and thus ineligible for the CDM.

In the context of this discussion, the concept of a ‘sectoral CDM’ has been rapidly gaining prominence as one potential means to address some of these problems. Different people have defined this concept in different ways, but the fundamental idea is to transcend the single-site approach that has so far characterised most CDM project activities. These discussions culminated at the first Conference of the Parties to the UNFCCC serving as Meeting of the Parties to the Kyoto Protocol (COP/MOP 1). The Parties decided that “project activities under a programme of activities” as well as bundles of large-scale project activities may be registered as single CDM project activities whereas policies or standards cannot (FCCC/KP/CMP/2005/L.7).

However, it can be expected that the issue of policies and standards has not been wiped off the agenda for good but will resurface in the negotiations on the Kyoto Protocol’s second commitment period. Moreover, sectoral project activities pose a number of methodological challenges which need to be examined. To give one example, the decision offers neither a definition of what constitutes a “programme” nor guidance for their implementation as CDM project activities.

This article has a two-fold aim. First, it tries to assess in how far a sectoral approach to the CDM could address the concerns that have been raised. Second, it aims to highlight the design and methodological issues that arise when introducing sectoral projects and discuss how they might be resolved. The article is based on synthesising and discussing the findings of the relevant literature.

We begin with a brief overview of the commonly held concerns with the CDM, followed by an outline of the different definitions that have been put forward for a sectoral CDM and a discussion of how it might help to address these perceived shortcomings. This is followed by a discussion of the problems that would need to be addressed when implementing a sectoral CDM and the means that have been proposed to resolve them. The article concludes with an overall assessment of the viability of a sectoral CDM and its capacity to enhance the mechanism to make it better fulfil its twofold objective.

2 Perceived weaknesses in the current CDM

2.1 Procedural barriers to implementation

One crucial feature of the CDM is that it generates new certificates (based on GHG emission reductions or biomass carbon sequestration) which are added to the overall GHG ‘budget’ established by the Kyoto Protocol for all Annex I Parties. This necessitates the requirement to ensure that each CER is in fact backed up by a genuine tonne of CO₂ equivalent (CO₂e) of emissions reduced or removed from the atmosphere and sequestered. In the parlance of the climate regime, the emission

reduction or carbon sequestration needs to be ‘additional’ to what would have happened in the absence of the project activity. If CERs were awarded in error, emissions in the Annex I Parties would be ‘offset’ by non-existent emission reductions or carbon sequestration, which means that global emissions would rise because of the CDM project activity.

The Marrakesh Accords, named after the seventh Conference of the Parties (COP) to the UNFCCC that took place in Marrakesh, have therefore established an elaborate system for safeguarding the actual climate benefit of CDM project activities (see Box 1) (FCCC/CP/2001/13/Add.2). This system is often criticised for being very complex and costly to the project developer.

Box 1 The CDM project cycle

A CDM project needs to undergo a project cycle consisting of the following steps:

1. Preparation of the Project Design Document (PDD) by the project proponents. For the purpose of calculating the emission abatement or carbon sequestration achieved by the project, the PDD has to establish a so-called baseline, i.e. a projection of the emissions or carbon sequestration that would have been generated in the absence of the project. Moreover, the PDD needs to demonstrate that the project is ‘additional’. The PDD also has to contain a plan for monitoring the project’s emissions / carbon sequestration.
2. Approval of new methodologies: Baseline and Monitoring Plan either need to be designed according to methodologies that have already been approved by the CDM Executive Board, or the project proponents need to develop their own methodology and submit it to the CDM Executive Board for approval.
3. Approval by the countries involved, including confirmation by the host country that the project supports it in achieving sustainable development.
4. Validation of the PDD, i.e. an examination whether the PDD meets all requirements, by an independent consultant accredited with the CDM Executive Board, called Designated Operational Entity (DOE).
5. Registration of the project activity with the CDM Executive Board.
5. Implementation of the project and monitoring of all relevant emissions/carbon sequestration by the project developer.
6. Verification and certification of the emission reductions / carbon sequestration by another DOE.
7. Issuance of the CERs by the CDM Executive Board.

For instance, the definition of additionality laid down in the Marrakesh Accords is rather vague and the actual implementation of this concept has therefore continued to stir controversy. The CDM Executive Board has adopted a relatively strict approach and developed a multi-step tool for the demonstration of additionality (CDM Executive Board, 2005a). Having a specific additionality test next to the establishment of the baseline is in many cases necessary. For example, in the case of projects that provide electricity to the power grid and take the grid’s emission average as the baseline there is no direct link between the investment considerations of the investor and the baseline so an additionality test is necessary.

However, business representatives claim that this approach is out of line with business realities and stifles their engagement (IETA, 2004, pp. 12–14). By contrast, environmental organisations have been anxious to ensure that a strict definition of additionality is used. This was also one of the reasons why the Worldwide Fund for Nature (WWF) initiated the development of the CDM Gold Standard, a set of criteria that go beyond those laid down in the Marrakesh Accords. The CDM Gold Standard is a voluntary system that is supposed to enable project developers to demonstrate that their project activities are of a particularly high quality and thus attain higher prices for the CERs they generate (Langrock & Sterk, 2003, p. 2).

Moreover, project approval is often a very *lengthy process*. The bottom-up approach to developing baseline and monitoring methodologies takes a long time and rejection rates are very high, at about 50% (Michaelowa, 2005, p. 14). There are also problems related to *lack of capacity* in that many countries have yet to establish their Designated National Authorities (DNAs), i.e. the national bodies responsible for approving projects, and even if they have, the DNAs are not always well-staffed, nor is the approval process always well-defined. The result is further delays (Cosbey et al., 2005, p. 40). Finally, there are substantial payouts to be made, such as the fees for the DOEs and for project registration with the CDM Executive Board.

As a result of all these factors, the *CDM-specific transaction costs*, most of which occur *at the front end of the project*, before any CERs have been received, are very high. Cost estimates for typical project activities vary from the upper five-digit well into the six-digit US dollar (USD) range. Michaelowa, Stronzik, Eckermann, and Hunt (2003, p. 273) have come to the conclusion that typical project activities need to yield at least 20,000 CERs per year in order to be able to bear these transaction costs. Project activities that generate fewer CERs generally face serious financial difficulties or need to be subsidised. Recognising this, the COP adopted simplified modalities for small-sale project activities to lower transaction costs, which are nevertheless still estimated at 8,000–80,000 USD per project (de Gouvello & Coto, 2003, 10f). Given the estimate that CDM-specific transaction costs need to stay below 1 USD per tonne CO_{2e} per year in order for the project activity to be economically viable (Michaelowa et al., 2003, p. 273), a small-scale project activity would still have to yield at least 8,000 CERs per year.

The complex and lengthy approval process is blamed for the allegedly *low number of projects and CERs* which are currently in the pipeline. Critics point to two consequences: Non-Annex I Parties do not get the number of project activities they would need for significantly supporting them in achieving sustainable development and Annex I Parties do not get the CERs they require to achieve Kyoto compliance (Cosbey et al., 2005, 24f).

Given the recent experience with the CDM project pipeline, the project lead time could be reduced by developing GHG accounting procedures that can be used by a multitude of projects, so that project-specific transaction costs can be reduced while still maintaining a sufficient environmental integrity level. The CDM Executive Board has made a start by consolidating approved methodologies so that they have a wider applicability. As outlined in the next section, a sectoral approach would be a further step towards encompassing a higher number of activities under one single procedure.

With regard to the criticisms raised one has to note, though, that at the moment the CDM is picking up substantial steam so that one might conclude that the concerns highlighted were perhaps only typical start-up problems rather than fundamental flaws. As of 14 September 2006, 1145 projects had either already been registered or were at the validation stage, expecting a cumulative 1.3 billion CERs by 2012 and the project pipeline is still growing (Fenhann, 2006). In particular, the bottleneck at the CDM Executive Board seems to have been the result of its lack of funding rather than overcomplicated procedures. Parties have in the meantime pledged and delivered substantial funds to support the CDM (Wittneben, Sterk, Ott, & Brouns, 2006, p. 11). The Executive Board has thus been able to significantly

increase its staff, which is apparently already making a significant impact in terms of quicker and more elaborate responses to submissions.²

2.2 Lacking sustainable development benefits

According to Art. 12 of the Kyoto Protocol, the first goal of the CDM is to advance sustainable development in the host countries. This is even more critical when considering that emission reductions or carbon sequestration achieved by CDM projects are not intended to globally lower GHG emissions but to offset emissions of Annex I Parties. Many critics claim that the CDM is failing to meet its sustainable development goal and give a variety of reasons.

Starting with the CDM regulations, the modalities and procedures adopted at Marrakesh establish that while the economic and technical data of the CDM projects will be examined in much detail internationally as outlined above, the *assessment of a project's impact on local environmental and social conditions* is entirely at the discretion of the host country government (FCCC/CP/2001/13/Add.2). Moreover, the process does not include a formal way to support host countries in the formulation, monitoring and enforcement of sustainable development criteria. Especially non-governmental organisations have voiced concerns that these criteria are in many cases very weak, if they exist at all. They also complain that in many cases there is next to no *possibility for local stakeholders to be meaningfully involved* in the approval process, leading to projects which disregard or actually violate their needs.³

Moreover, the *CDM only rewards a project's climate benefit* but not other positive environmental or social benefits it may deliver. Indeed, there is a strong focus on projects which generate a large amount of CERs by reducing gases with extremely high global warming potential. These have low abatement costs but produce few, if any, sustainable development benefits. When examining the 1145 projects that were either already registered or undergoing validation as of 14 September 2006, renewable energy projects clearly dominate in terms of numbers: 665 were in the renewable energy category (including large hydro projects). The picture changes, however, when looking at the number of CERs per project type as measure of how much 'carbon financing' flows into the respective project type. From this perspective, the market is clearly dominated by hydrofluorocarbons (HFC), N₂O and methane, which in aggregate account for three quarters of the expected annual CERs. As a matter of fact, the 22 HFC and N₂O projects combined account for 44% of expected annual CERs, whereas the 665 renewable energy projects in total account for only 22% (Fenhann, 2006).

Clearly, a project's local impact on sustainable development does not depend on the number of CERs it generates. Six hundred sixty-five renewable energy projects is a sizable number and these projects may be yielding substantial benefits for the local population. However, there may be a danger that projects with large sustainable development benefits but higher abatement costs may be crowded out of the market

² Presentation by Elnar Tilnes of Det Norske Veritas, head of the DOE/AE Forum, at the 23rd meeting of the CDM Executive Board, 22 February 2006.

³ Personal observation by Wolfgang Sterk at the conference "Renewable Solutions" in Montreal, 1/2 December 2005.

if the price for CERs is driven down by high-yielding projects that attract much of the investment. As a matter of fact, the potential for projects dealing with the highly potent GHGs seems far from exhausted. For example, the total potential for HFC projects is estimated to be more than 100 Mt CO₂ equivalent per year, with abatement costs of about 0.50 USD per tonne CO₂ equivalent (Cosbey et al., 2005, 20f).

The current form of the CDM is also being criticised for being ill-suited for renewable energy and energy efficiency projects because activities in these areas are allegedly often of a dispersed nature, have relatively high transaction costs and yield relatively low CER volumes. Their potential can therefore hardly be captured by a single-site approach (Figueres, Eenergy International Corp., & Margaree Consultants Inc., 2005, p. 4). This is even more true in the case of the transport sector (see Box 2).

Box 2 Transport and the CDM

The transport sector accounts for about 25% of global CO₂ emissions. Transport related greenhouse gas emissions are currently rising by 2.1% per year, in the Southern countries even by 3.5%. It is expected that the urban population in these countries will double by 2030, which can be expected to lead to a corresponding further increase of urban transport emissions (Browne, Sanhueza, Silsbe, Winkelman, & Zegras, 2005, p. 2).

Developing sustainable transport patterns in the Southern countries is therefore one of the most urgent challenges in tackling climate change. However, the CDM is currently hardly making any contribution in this regard. Among the 1145 projects that had been registered or were undergoing validation as of 14 September 2006, there were only two transport project (Fenhann, 2006).

It therefore appears that in its current form the CDM is particularly ill-suited to accommodate transport projects. Transport emissions usually stem from a large number of small mobile sources and traffic growth depends on a variety of external factors. Even if reliable data is available, which is doubtful for many Southern countries, establishing a project's baseline and accurately monitoring its emissions pose enormous challenges. Moreover, transport projects usually serve a variety of objectives, which makes it difficult to establish that a project would not have taken place without the CDM. Projects undertaking fuel switch or technological changes at specific vehicles are probably the most suitable under the current form of the CDM. In such cases the project can be clearly defined and it may therefore be possible to overcome the methodological problems. However, such projects usually yield only few emission reductions and have only little impact on long-term traffic trends. Demand-side projects may well be best suited for tackling the root causes of rising traffic emissions. However, such projects do not provide a good fit with the CDM in its current form (Browne et al., 2005, 74f).

Moreover, even if projects with clear sustainable development benefits are feasible, as the 665 renewable energy projects seem to demonstrate, with the hitherto prevailing single-site approach they nevertheless remain only *isolated local efforts with limited transformational effect* (Figueres, 2006). As a consequence, some critics claim that the CDM in its current design as a market-based mechanism, which primarily focuses on generating CERs within isolated local projects, is fundamentally incapable of making a substantial contribution to sustainable development (Pearson, 2004).

There have also been complaints that the CDM has a *geographical imbalance* since projects have so far been concentrated in a limited number of countries. For example, 411 of the 1145 projects, i.e. almost 36%, are situated in India. As for regions, Asia hosts to this date 687 and thus by far the highest number of these actual and potential projects, followed by Latin America with 415, whereas Sub-Saharan Africa only hosts 17 projects (Fenhann, 2006).

These imbalances have been noted with concern in the literature (e.g. Cosbey et al., 2005; Ellis, Corfee-Morlot, & Winkler, 2004) and were extensively discussed at

COP 10 in Buenos Aires in 2004 and COP/MOP 1 in Montreal in 2005. Many Non-Annex I Parties demanded that immediate action be taken to diversify the geographical distribution of projects and promote projects with strong sustainable development benefits. As a result, COP/MOP 1 asked the Parties to submit their views on what systemic and systematic factors might be preventing a more equitable distribution of CDM projects and what might be solutions and tasked the Executive Board to make recommendations to COP/MOP 2 (Ott, Brouns, Sterk, & Wittneben 2005, 87f; Wittneben et al., 2006, pp. 11–15).

In addition to the concerns over types and geographic distribution of projects, the CDM has been said to provide ‘*perverse incentives*’ for countries to neglect environmentally progressive policies. This line of argument states that the quest for additionality may actually discourage long-term sustainable development policy reform nationally, since an exemplary host country will necessarily attract fewer CDM projects. A country aiming for 100% renewable energy production may not be able to claim renewable energy projects as additional, for example, or a country mandating the flaring of HFC–23 during HFC-22 production cannot attract CDM-motivated investment to conduct this particular measure.

The CDM Executive Board has attended to this issue. It decided that policies or regulations that give advantages to less emissions-intensive technologies and have been implemented since the adoption of the CDM modalities and procedures at COP 7 in November 2001 must not be taken into account in developing the baseline (CDM Executive Board, 2005b). The impact of this decision hinges on how it will be implemented in practice.

3 Enhancing the CDM through a sectoral approach?

3.1 Defining a sectoral CDM

The sectoral approach has sometimes been used somewhat carelessly in the policy arena to mean anything that will miraculously reform the CDM to suit all its critics. Moreover, different people have been talking about different things when discussing a sectoral CDM:

- Samaniago and Figueres (2002) first introduced the term and suggested a government-driven mechanism that would enable Non-Annex I Parties to develop national or local *policy initiatives* that discernibly lower GHG emissions in a particular sector. In this approach the CERs are supposed to flow directly to the host government that will thus be compensated for its efforts and may choose to pass some of the benefits on to industry and households affected by the measures. As mentioned, policy-based projects have for now been excluded from the CDM by COP/MOP 1.
- By contrast, Cosbey et al. (2005, pp. 55–57) label this approach ‘policy-based’ and define the ‘sectoral CDM’ as a mechanism driven by private actors to combine similar projects within a country or local region along the lines of a sector. While such *bundling* has always been allowed for small-scale projects, COP/MOP 1 also permitted the bundling of large-scale projects.
- Bodansky, Diring, Pershing, and Wang (2004, p. 8) discuss a ‘programmatic crediting mechanism’ that might encompass both public and private actors. This

term is taken up by Figueres et al. (2005, p. 7) who define *programmatic project activities* as a multitude of actions that occur as the result of a deliberate programme, which can either be a voluntary or mandatory government measure or a private sector initiative and is coordinated by one enacting agent. This project type has also been permitted by the COP/MOP 1 decision.

- Finally, Bosi and Ellis (2005) propose the introduction of *sectoral baselines* where any emission mitigation below the baseline would be credited. Such a mechanism could be implemented at the government level or might be devolved to the private entities in the respective sector.

As for defining the sector, i.e. the CDM project boundary, a whole range of definitions has been suggested and is conceivable (e.g. Samaniego & Figueres, 2002, 92f). Among the possible approaches are

- using a traditional sectoral definition such as the energy sector;
- looking above or below the traditional sectors, for example, by defining the upgrading of all gas-fired power plants in a country to combined cycles as a project;
- defining a city or a local area as a sector;
- comprising all the emissions of one particular non-CO₂ gas in a country in one project;
- targeting the application of one particular technology;
- taking a combination of approaches, e.g. transport in a particular city.

3.2 Potential benefits and pitfalls of a sectoral CDM

A sectoral approach to the CDM has several features which could further its development mandate. It transcends the single-site approach which reduces even the best projects to isolated local efforts and thus contributes to achieving *sector-wide transformations* in the host countries. A sectoral approach might specifically give a major boost to renewable energy and energy efficiency projects. Activities in these areas are often decentralised and of a small scale. A sectoral approach would allow to *aggregate dispersed activities* to a scale where they can become viable for the CDM (Figueres et al., 2005, 4f). A sectoral approach might also be a way to include activities which have beneficial development aspects but are on their own not cost-effective enough for the CDM. The project boundary could be drawn in such a way that the project would contain components with both low and high abatement costs, so that the overall price of the CERs would be competitive. It might even be a way to finally *make transport projects feasible* under the CDM. Browne et al. (2005, pp. 64–66) argue that a sectoral approach would make it possible to implement, for example, fuel efficiency standards or comprehensive traffic management as CDM projects. Finally, a sectoral CDM that includes policy-based projects would *resolve the perverse incentives issue*. A policy-based sectoral CDM would turn this debate on its head because governments would actually be rewarded for initiating ambitious climate policies (Cosbey et al., 2005, p. 56).

Through economies of scale a sectoral approach might also entail *lower transaction costs* per tonne of CO₂ equivalent than the single-site approach and thus help to address the procedural barriers inhibiting the current CDM. However, as will be outlined further below, it is not guaranteed that a sectoral CDM would generally be

less complex than the current one. Especially baseline setting and the determination of additionality are going to pose further challenges. The mechanism's complexity would also depend on factors such as the regulations concerning project boundaries and double counting and the management of the approval process.

Especially in the case of a policy-based mechanism or sectoral baselines as proposed by Bosi and Ellis (2005), the sectoral CDM ties in with the concept of unilateral CDM projects, i.e. projects without Annex I participation where host countries take the initiative to generate CERs themselves and sell them on the international market. Some see this approach as a useful tool to *lower the CDM-specific transaction costs and broaden non-Annex I participation* in the mechanism (Jahn, Michaelowa, Raubenheimer, & Liptow, 2003; van der Gaast & Laseur, 2004). A sector or policy approach might serve well to further enhance this approach.

From a strategic perspective, one positive aspect of a sectoral CDM might be to further evolve the Kyoto regime as a whole. It would reinforce the regime's basic premise that Annex I Parties are to take the lead in climate protection. Considering that their emission targets would be driving the demand for sectoral CDM projects, the ambitions of Non-Annex I Parties to abate or sequester GHG emissions would follow the ambitions of Annex I Parties (Samaniego & Figueres, 2002, 97f). Then again, a failure of Annex I Parties to undertake domestic efforts also leads to a high demand for CERs, as can currently be seen. Nevertheless, a regime with a sectoral CDM may be politically more acceptable than a regime where the Annex I Parties are required to directly finance mitigation efforts of Non-Annex I Parties.

A related aspect that needs to be handled with care is the general expectation that a sectoral CDM would be able to generate significantly more CERs than in its current form (Cosbey et al., 2005, 55f). This might be used in a positive way provided it encourages Annex I Parties to adopt emission targets for the second commitment period that are stricter than expected. In this way a sectoral CDM could actually achieve a net positive climate benefit. However, if Annex I Parties do not adopt ambitious targets after 2012, a sectoral CDM delivering large volumes of CERs could easily extinguish any domestic efforts by Annex I Parties.

In the medium term, a sectoral CDM may also be a way for Southern countries to gradually move towards emission limitation commitments in the framework of the climate regime. It would stimulate the establishment of the necessary technical capacity and infrastructure such as detailed emission inventories and projections, and let governments gain experience with large-scale climate protection policies. Moreover, this could be achieved without having to make substantial changes to the current structure of the Kyoto Protocol.

Going back to the list of criticisms that have been levelled at the CDM one also has to note, though, that a sectoral approach is not a panacea for all of these shortcomings. In particular, a sectoral approach cannot address the problems that have been noted with regard to the *assessment of a project's impact on local environmental and social conditions* and the *limited possibilities for local stakeholders to be meaningfully involved* in the approval process. These issues are independent of the types of projects that are proposed but have to be addressed by other means such as capacity-building or the elaboration of international guidelines.

A sectoral approach would also not change the fundamental design of the CDM which *rewards only projects' climate benefit* but not the positive impact it may have on sustainable development. This problem could only be ameliorated if there was a wider recognition on the buyer side that projects with multiple sustainable

development benefits are of a higher quality than projects whose only impact is to reduce emissions and a corresponding willingness to pay premium prices for CERs from such projects. The intention behind the CDM Gold Standard was exactly to establish such a premium segment in the market, but so far it has not been taken up widely. The Gold Standard's online database lists only six CDM Gold Standard projects that are currently under development, of which only four are at least at the validation stage.⁴

Moreover, in order to be able to establish a credible baseline the sectoral approach would necessitate having reliable emission inventories and projections for the host countries or at least for the respective sectors. The reliability of the emissions monitoring would also need to be ensured. At the moment, probably only a few, if any, Non-Annex I Parties dispose of the necessary technical capacity. Introducing a sectoral CDM therefore raises the prospect of *exacerbating the current geographical imbalance* of CDM projects even further. This effect could only be countered by substantial capacity building measures by the Annex I Parties. One option might be to introduce sectoral policies as a joint effort of a Non-Annex I and an Annex I Party, where the Annex I Party supports the establishment of the necessary infrastructure and in return receives (part of) the generated CERs.

4 Design and methodological issues in establishing a sectoral CDM

4.1 Distribution of costs and benefits

Especially in the case of a policy-based mechanism or sectoral baselines as proposed by Bosi and Ellis (2005), the sectoral CDM has the potential to turn an instrument that was originally targeted at private investment into a tool for governments to finance climate-friendly policy measures. Governments can choose to pass on the benefits accrued from the value of the CERs to investors or those affected, which may be industry or other private actors, in the form of tax incentives, subsidy or the direct pay-out of CERs. Paying out CERs directly would transfer the risk inherent to the publicly traded CERs to industry or the end consumer. It will probably be difficult to ascertain exactly how the CER rewards will be distributed between public and private actors. How much can a government charge for the preparation of a sectoral CDM project? On the one hand, if the part of the total CERs that a government claims for its work was too high, market participants would be reluctant to follow the new policy or investors would hesitate to take advantage of the CDM opportunity. On the other hand, if the CERs were passed on directly to private investors in the sectoral CDM scheme, taxpayers would be left with the burden of the much-debated transaction costs of setting up such a project but without the financial benefit of the CDM. The balance in this distribution has to be struck early in the process of setting up a sectoral CDM project to avoid conflict or disappointment later.

In private sector initiatives, which may constitute project bundles and programmatic project activities, the host country government would not play as dominant a role, but, as in the current CDM, it would have to provide an enabling political

⁴ Gold Standard: <http://www.cdmgoldstandard.org/projects.php> (18 September 2006).

framework that allows projects to be conceived and implemented. This includes clear political support for the mechanism as such, a competent and well-staffed approval body and a clear and speedy approval procedure.

Since participation in private sector initiatives would be voluntary, there should not be any situations where costs are imposed top-down without receiving a corresponding share of the benefits. However, governments and the international community would have to ensure that the individual actions are indeed additional and would not have happened without the CDM.

4.2 Baseline and additionality

Sectoral projects have two levels, the level of the overall project and the level of the individual actions on the ground the project induces. In the case of project bundling and programmatic project activities, baseline setting and the determination of additionality therefore need to utilise a two-level approach, setting baseline and demonstrating additionality for both the whole project and for each of the induced activities. If a project comprises different types of activities, different methodologies for baseline setting would need to be used for each type. Baseline setting and the demonstration of additionality would thus be more complex than in the case of single-site projects but should not be fundamentally impossible (Figueres et al., 2005, pp. 16–21).

By contrast, due to their large scope, baselines and additionality for policy-based projects and sectoral baselines as proposed by Bosi and Ellis (2005) may only be established at the level of the overall project. The situation is particularly complex with regard to policy-based project activities. In line with the Executive Board's decision to address perverse incentives, the baseline might be defined as the situation without the policy, but what should additionality mean for such projects? Would a government have to prove that it is adopting this policy solely because of climate change considerations? Would such an approach be attractive to Non-Annex I Parties considering that their development needs are their top priority? Should a sectoral CDM therefore rather be modelled along the lines of the 'sustainable development policies and measures' approach? This approach seeks to make Non-Annex I Parties adopt commitments in the area of policies and measures that are geared towards development but also entail climate benefits (Winkler, Spalding-Fecher, Mwakasonda, & Davidson, 2002). Modelling a policy-based CDM on this approach would mean to focus on policies and measures with development benefits that also have climate benefits and using the CERs as an added incentive. In practice, this could mean defining a shortlist of policies that would a priori be considered additional without further testing. The establishment of this list would need to be based on stringent criteria and involve a process to continuously monitor it, add policies and delete or upgrade policies which are currently on the list (Figueres, 2006).

Furthermore, it may well be impossible to establish a direct link between individual actions induced by such a project and the climate benefit achieved. This gives rise to the question whether CERs should be attributed to the entire climate benefit achieved below the baseline or whether the project should be evaluated as to its actual impact and the CERs be issued accordingly. The second option would be more accurate in ensuring that only the additional climate benefit is credited.

However, this would require a complex procedure. When looking at sectoral developments, typically a myriad of factors come into play. If a government, for example, introduces fuel efficiency standards and consequently a drop in transport emissions is measured, how can it be determined to what extent this drop has been a result of the government policy or due to other factors such as rising fuel prices? The simpler solution to credit everything that is below the baseline would therefore be more practical. It might be acceptable, if the sectoral baseline is set low enough to ensure that no business-as-usual emission abatement is credited (Bosi & Ellis, 2005, pp. 19–21).

Having said that, policy makers do not necessary need to choose only one of these options but can instead implement a detailed examination for projects where this is possible and to set a stricter baseline or discount the claimed emission reduction where it is not.

4.3 Double counting

A sectoral CDM should in principle be able to complement rather than supplant the current CDM. Nevertheless, there are some issues that have to be resolved: what happens if an already existing local CDM project is encompassed in or connected to a new sectoral CDM project or, alternatively, if a project developer intends to develop a local project that is directly or indirectly connected to an already existing sectoral project? The most important issue here is the so-called double counting: if the local project receives CERs for the climate benefit it has achieved and the sectoral project also receives CERs for the contribution made by the local project, one and the same climate benefit is in effect counted twice.

One solution would be to deduct the number of CERs issued to the local project from the amount of CERs issued to the sectoral project. Another option would be to prohibit the implementation of such local projects, which seems unduly restrictive. In any case, a solution would then still need to be found for the local projects that are already in place when a sectoral project is launched. Regarding individual cases it might also be possible to merge an already existing local CDM project into the new sectoral project and the CER distribution system that has been established there.

In addition, since most economic segments are interlinked, the double counting problem might also arise if there was more than one sectoral project in a country. One hypothetical example would be to conduct one sectoral project that introduces energy efficient appliances in households and another project addressing the energy sector. These two sectoral projects are clearly linked and it might be difficult to ascertain which one should be awarded the CERs earned. This could mean that a country that stages an ambitious sectoral CDM project may thus close itself off to other CDM project approvals. The linkages between projects would therefore need to be examined for each particular case.

Double counting also occurs when the individual actors in a project activity claim CERs for their respective actions in addition to the CERs claimed by the overall project. This possibility would need to be precluded either by agreement between the potential claimants, by the DNA not approving projects where there is a possibility of double counting or by specifying the baseline methodology in such a way that no double counting may occur (Figueres et al., 2005, pp. 24–26).

4.4 Project Approval Process

Two options for managing a sectoral CDM have been proposed:

- Samaniego and Figueres (2002, p. 93) suggest that a sectoral CDM follows the current CDM model: approval by a DNA, validation by a DOE, submission to the CDM Executive Board, monitoring by the project participants and verification and certification by another DOE.
- Bosi and Ellis (2005, 22f) suggest that the system could also be based on international negotiations. In such a mechanism, the countries which are interested in participating would make project proposals to the international community and the details would then be defined by multilateral agreement. Nevertheless, when using this option it may still also be useful to have an executive body to oversee the actual operation of the projects.

The former concept is less complex and to a large extent leaves the direction of the process to the project proponents. However, it might well be advisable to have an in-depth political examination considering the impact and volume of CERs large-scale sectoral projects may create as well as the fact that the requirement for host country approval loses its meaning when a project is proposed by the national government.

The issue of how to organise the approval process is especially pertinent with regard to the sustainable development requirement. Under the current CDM rules, it is the prerogative of the host country to check whether a project supports its sustainable development. In the case of a policy-based project this would mean that the government is asked to approve its own plans. Should it then just be assumed that the project will contribute to sustainable development, or is there a need to establish criteria or even to prescribe an examination procedure?

Looking at the different types of sectoral projects that have been proposed, it would seem sensible that policy-based projects and sectoral baselines as proposed by Bosi and Ellis (2005) undergo an intergovernmental approval process whereas bundled projects and programmatic project activities by private actors use the established CDM project cycle.

5 Conclusions

The CDM has been severely criticised from many sides for being too complex and costly, resulting in a low number of projects and CERs, and for failing to meet its sustainable development mandate. Considering that the project pipeline is currently booming with the number of CERs expected by 2012 already exceeding the annual emissions of Canada, the first set of concerns may have been overly pessimistic. Nonetheless, concerns about the CDM's contribution to sustainable development continue to be valid. Although national sovereignty has been protected in the way that host governments have been put into a position where they can decide independently on the fulfilment of the sustainable development requirement of the

CDM, it should not be neglected that a CDM project that does not foster sustainable development in effect contradicts the Kyoto Protocol.⁵

A sectoral approach to the CDM has been proposed specifically to enhance this contribution. Various definitions have been proposed, namely a policy-based approach, large-scale bundling of projects, programmatic project activities aggregating dispersed actions which are coordinated by one enacting agent, and sectoral baselines where everything that is below the baseline would be credited. Each one of them is an attempt to transcend the single-site approach that has hitherto prevailed. A sectoral CDM would by definition be better suited to achieving sector-wide transformations and might in particular give a boost to renewable energy, energy efficiency and transport projects which are difficult to fit into a single-site approach. It would also resolve the perverse incentives issue by rewarding governments for implementing ambitious policies.

These proposed sectoral approaches raise several issues, namely how to distribute a project's costs and benefits, where to set the boundary, how to establish the baseline and additionality, how to prevent double counting and how to design the project approval process. However, there are ways to address these concerns enabling a sectoral approach to the CDM to move forward. COP/MOP 1 has already included two of the four proposed project types, namely large-scale bundles and programmatic project activities. And while it excluded policies and standards one can expect that this issue will arise again in the negotiations on the Kyoto Protocol's second commitment period. A sectoral CDM may even be a way for Southern countries to gradually move towards emission limitation commitments in the framework of the climate regime.

A sectoral CDM cannot be mistaken for a panacea, however. The concerns raised about host countries' sustainable development criteria and the lack of possibilities for local stakeholders to be meaningfully involved in the approval process are independent of the types of projects proposed. More fundamentally, a sectoral approach is not capable of altering the CDM's basic flaw of rewarding only a projects' climate benefit, neglecting other sustainability benefits it might provide. Furthermore, it seems that only a few Southern countries dispose of the necessary capacity to host such complex projects, the current geographical imbalance of the CDM might therefore actually be exacerbated. Some of these shortcomings can be addressed by measures such as capacity building and by buyers giving a clear preference to projects with proven sustainable development benefits. Nevertheless, they highlight the need to establish additional instruments to support Southern countries in furthering sustainable development and embarking on a low-emission trajectory.

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⁵ We thank one of the anonymous reviewers for this concluding consideration.

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