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Is the CDM fulfilling its environmental and sustainable development objectives? An evaluation of the CDM and options for improvement

Report prepared for WWF

Berlin, 5 November 2007

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Disclaimer

The views expressed in this study represent only the views of Öko-Institut and the author and not those of WWF or any other organization.

Acknowledgements

The author would like to thank Michael Herold for support in the evaluation of CDM projects and Hernan Carlino, Jane Ellis, Susanne Haefeli-Hestvik, Ralph Harthan, Michael Lazarus, Holger Liptow, Jan-Willem Martens, Axel Michaelowa, Gertraud Wollansky, WWF and others for their critical and helpful review.

Content

Summary

The Clean Development Mechanism (CDM) is an offset mechanism under the Kyoto Protocol that allows the crediting of emission reductions from greenhouse gas (GHG) abatement projects in developing countries. The CDM has two purposes: it should assist developing countries in achieving sustainable development and help industrialised countries to reduce the costs of greenhouse gas abatement.

Ten years after the adoption of the Kyoto Protocol, the CDM has become an immense global market, having more than 800 registered projects and a value of several billion Euros. In this regard, the CDM has been a great success in developing a new market for GHG emission reduction projects. However, the CDM has also recently been heavily criticised for not delivering on its environmental and sustainable development objectives.

This report assesses the contribution of the CDM to meeting its environmental and sustainable development objectives and provides recommendations for improving the mechanism. The report's findings are based on a systematic evaluation of 93 randomly chosen registered CDM projects as well as interviews and a literature survey. The report discusses selected areas which are deemed particularly important for achieving its environmental and sustainable development objectives, including: the role and performance of designated operational entities (DOEs) which are responsible for the validation of proposed CDM project activities and the verification of emission reductions; the demonstration of additionality (i.e. the demonstration that the project would not be implemented without the CDM); the contribution of CDM projects to sustainable development; the role of HFC-23 and N_2O destruction projects; the participation of stakeholders in the process; the environmental integrity of "policy CDM" and "sectoral CDM"; and options for limiting the use of CDM and JI by Annex I countries and in emissions trading schemes.

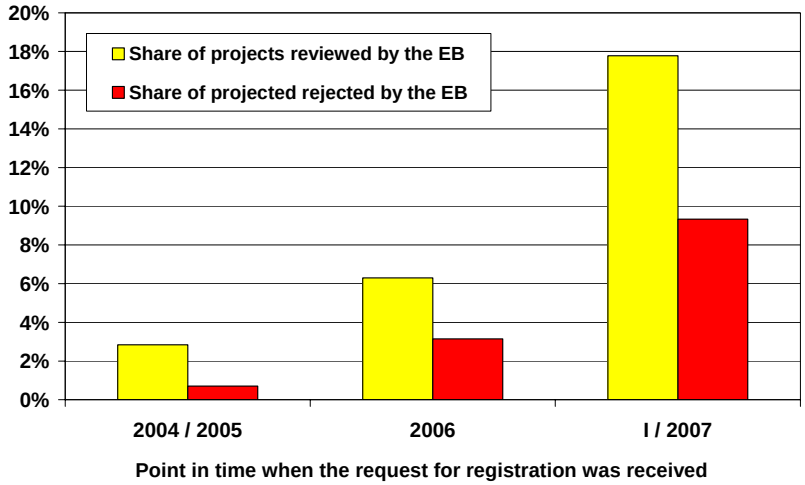
Role and performance of DOEs

DOEs are regarded as the "extended arm" of the CDM Executive Board. They are responsible for ensuring that all rules established by the COP/MOP and the CDM Executive Board are followed by project participants. The market environment for DOEs is currently characterised by three features:

1. The market for validation and verification services has recently become highly competitive. Prices are dropping and are allowing DOEs to only work for a very limited amount of time on each project.
2. Detailed standards and instructions as to what exactly should be assessed by DOEs as part of the validation and verification process are currently not yet available.
3. The threat of sanctions for DOEs appears to be weak.

This market environment could result in a “race to the bottom” regarding the quality of the validation and verification process, because those DOEs that spend less time on validation and verification can offer lower prices and will thereby gain a larger market share.

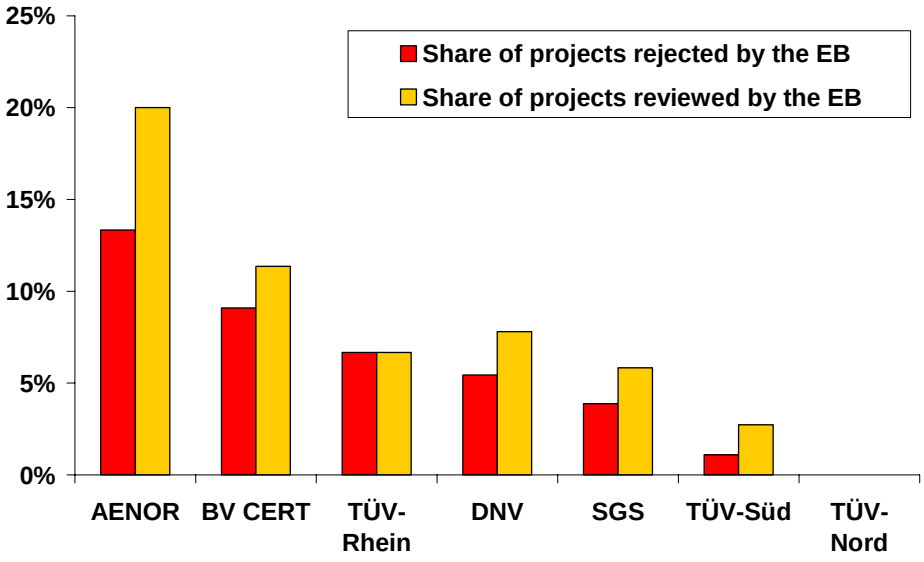
The CDM Executive Board has considerably strengthened its assessment of proposed CDM projects over time. While projects were assessed by individual Board members in 2004 and 2005, a Registration and Issuance Team (RIT) was established in 2006 which assesses the documentation of each registration request. Next to the RIT, the UNFCCC secretariat started to assess each project in 2007. The figure below illustrates that the fraction of projects that are being reviewed and rejected by the CDM Executive Board has increased notably with each phase.



The increasing number of projects rejected and reviewed by the CDM Executive Board questions the quality and functioning of the validation process. Indeed, there are serious concerns about the performance of some DOEs. The Board has undertaken spot checks at three DOEs which revealed serious shortcomings, such as non-conformities of the DOEs with regard to “competencies to perform validation and verification functions” and “compliance with CDM requirements”. Some validation reports hardly contain any information on whether and how issues have been examined. In some cases, DOEs have failed to check whether very simple requirements of the CDM are met, such as that the project started after 1 January 2000. Interestingly, the share of projects that were validated positively by the DOE but reviewed or rejected by the CDM Executive Board varies considerably among the DOEs, as shown in the figure overleaf.

Putting in place strong incentives for DOEs to carry out their work more thoroughly is therefore key to ensuring that the integrity of the CDM is improved. A number of important actions are already being considered by the CDM Executive Board, including:

- the development of guidance for DOEs on verification and validation, which could promote consistency, transparency and a high quality of validation and verification; and



- the development of a policy framework to address non-conformities and non-compliance in a systematic manner, which could include criteria for suspension or withdrawal of the accreditation as well as other sanctions.

In addition, the following revisions to the modalities and procedures for the CDM could strengthen the role of DOEs:

- The independency of DOEs can be strengthened if the CDM Executive Board, through the UNFCCC secretariat, selected and paid the DOEs from the share of proceeds to cover administrative expenses. The financing of the service of DOEs through the share of proceeds could also encourage the development of more small-scale project activities, since the costs for project development would be reduced for such projects.
- The liability of DOEs could be strengthened by requiring DOEs to replace CERs issued which proved excessive in the case of non-conformities, without the current prerequisite that the accreditation has to be withdrawn or suspended beforehand. A similar approach has been adopted by the Board for programmes of activities.

Demonstration of additionality

A proper demonstration of additionality is key to ensuring the environmental integrity of the CDM. If a CDM project is not additional but nevertheless registered as a CDM project, the issuance of Certified Emission Reduction Units (CERs) results in an increase in global GHG emissions. The demonstration of additionality has been discussed controversially since the establishment of the CDM. The fundamental challenge is that the question as to whether a project would also be implemented without the CDM is hypothetical and counter-factual – it can never be proven with absolute certainty.

The current approaches for demonstrating additionality mostly use three elements: a barrier analysis to demonstrate that barriers exist which would prevent the proposed project, an investment analysis to demonstrate that the proposed project activity is economically less attractive than another alternative, and a common practice analysis which requires an assessment of the extent to which the proposed project type has already been deployed.

The current approach has been criticised for being "intention-based" and subjective, because it is based on the motivation of the project developer. Indeed, investment decisions are complex and the choices, chances, risks, barriers and motivations for investments are difficult to compare and balance in an objective manner. Since no approach for determining additionality is perfect, it needs to be accepted that some projects are not additional. Approaches for demonstrating additionality are always a policy balance between the level of "free-riders" and lost opportunities for CDM projects.

Our analysis of 93 registered projects reveals serious deficiencies in the way in which additionality has been assessed over the past three years:

- **Use of the barrier analysis.** The barriers used to demonstrate additionality are often not very credible. Many projects use general financial or policy risks, such as, for example, the "risk of currency exchange rate" or the "risk of possible future decrease of feed-in tariff". Often barriers are very subjective: In some projects the management itself is declared unable to manage a project; others just state that the "project would go bankrupt without CERs". Many projects use "costs" as a barrier, sometimes without indicating the magnitude of the costs or ignoring revenues from the project. For other barriers it is rather unclear why they are considered barriers at all (e.g. "the region is underdeveloped and needs high investments").

  Nearly half of the analysed projects claim that either the project is the "first of its kind" (14%) or that "prevailing practice" (30%) is a barrier. However, sometimes the project technology is defined so narrowly that the project is declared to be the "first of its kind" although many similar plants have already been constructed. Similar problems can be observed with regard to the common practice analysis for which only a few methodologies specify when a project should be considered common practice. Another problem with the barrier analysis is the lack of evidence: 43% of the analysed projects which apply the barrier analysis do not provide or mention evidence for the existence of the key barriers. Overall, this makes the barrier analysis highly subjective, vague and difficult to validate in an objective and transparent manner. Many barriers are faced by practically all investments and are thus not suited to distinguishing additional from non-additional projects.

- **Use of the investment analysis.** The quality of the application of the investment analysis is also varied. While some projects provide a transparent and detailed calculation, about 30% of the projects use a black-box approach where key information is lacking and only the result of the calculation is provided in the

PDD. It has also been reported that figures used in the investment analysis are not always correct.

- **Retroactive crediting.** For projects that seek retroactive crediting (the crediting period begins prior to validation), the CDM Executive Board requires that evidence should be provided in the PDD "that the incentive from the CDM was seriously considered in the decision to proceed with the project activity". Despite this requirement, only 36% of the analysed projects which have sought retroactive crediting have provided such information in practice.

Overall these findings suggest that there are serious problems in the way in which additionality has been assessed over the past three years. The additionality of a significant number of projects seems unlikely or questionable. Several other sources support this conclusion. For example, in a Delphi survey, 71% of the participants agreed with the statement that "many CDM projects would also be implemented without registration under the CDM" and even 86% of the participants affirmed that "in many cases, carbon revenues are the icing on the cake, but are not decisive for the investment decision".

Based on an assessment of the likelihood of additionality for different project categories, we estimate that additionality is unlikely or questionable for roughly 40% of the registered projects. These projects are expected to generate about 20% of the CERs. However, it should be noted that the analysis is based on the *average* situation of the past three years. Recently, the CDM Executive Board has strengthened its procedures to assess projects. It is likely that the recent share of projects where additionality is unlikely or questionable is lower while it may have been higher at the very beginning of the registration process. On the other hand, the share of projects for which the demonstration of additionality is more challenging is increasing. Hence, there is a risk that the share of emission reductions from projects for which additionality is unlikely or questionable could increase further in the future if additionality were assessed in the same manner as was the case in the past three years. This underlines the importance of improving the assessment of additionality.

Improving the assessment of additionality is particularly important if the CDM is to continue to grow and to play an important role beyond 2012. An up-scaling of the CDM without a parallel strengthening of its environmental integrity could seriously endanger global efforts to mitigate climate change. The following measures are proposed:

- Ambitious dynamic benchmarks could replace the assessment of additionality in some industries if the necessary data is available. The performance of the top 20% plants in the industry could be used as the basis for establishing the benchmarks.
- The guidance on demonstrating additionality of small-scale projects is very general and should be made more explicit while keeping transaction costs low.
- Barriers that are highly subjective or company-specific should not be used to demonstrate additionality since an objective validation is very difficult. The "first of its kind" barrier should be further specified.

- Using the barrier analysis for large-scale investments, such as the construction of large power plants, is not very credible. The investment analysis should be mandatory for such project types. In addition, the investment analysis should be further specified and clarified, e.g. with respect to the derivation of the hurdle rate and the application of the sensitivity analysis.
- In order to make the common practice analysis more objective, quantitative thresholds could be introduced for some sectors.
- For some projects, the impact of the CDM is very small. For example, the IRR of a project may only be increased from 2% to 3% as a result of CER revenues, while the IRR required to make the project feasible is 10%. To make the assessment of additionality more credible, it should be shown that the CDM has a meaningful impact on the economic attractiveness or on the identified barriers.
- Currently projects can be registered many years after they started operation. However, it is not very convincing if a project that started in 2001 claims that the CDM was considered in the investment decision, but begins the preparation of a PDD only years later. It is suggested that projects can only request registration if the project started no earlier than one year before.

Sustainable development impact

Whether a CDM project assists in achieving sustainable development is assessed by the host country governments. Many countries have established and published criteria to assess this. Some host countries have very ambitious criteria. Nevertheless, it can not be observed that host countries prioritise projects with high sustainable development impacts by rejecting projects which have little or no sustainable development impact. In most countries, projects do not need to comply with all or the majority of the criteria for sustainable development, but rather only with one of them (e.g. creating some employment).

This has resulted in a situation in which the CDM project portfolio is mainly determined by the economic attractiveness and potential and risk of the mitigation options. Several publications have evaluated the contribution of the CDM to sustainable development. They all arrive at a similar conclusion: the CDM does not sufficiently fulfil its objective of assisting host countries in achieving sustainable development. CDM programmes of activities could potentially help towards improvement of the contribution of the CDM to achieving sustainable development.

Under the current CDM, a monetary value is only given for GHG emission reductions, and not for the contribution of CDM projects to sustainable development. Premium markets, in particular the Gold Standard (GS), could help in giving a value to the objective of the CDM to assist in achieving sustainable development.

A more radical approach could be to reduce the quantity of CERs issued from projects which have little or no impact on sustainable development. This could include the introduction of ambitious benchmarks for HFC-23 and N_2O mitigation or discounting emis-

sion reductions from projects that are less important for sustainable development. This would lend projects with higher benefits for sustainable development a higher market value, change the project portfolio due to reduced supply from less sustainable projects, while at the same time continuing to credit all types of projects. However, this option would require that Parties agree on which projects have high benefits for sustainable development and which have less benefits. As a similar option, all or several Annex I countries could commit themselves to purchasing a minimum quota of projects with high sustainable development benefits.

HFC-23 and N_2O destruction

The destruction of HFC-23 in HCFC-22 facilities and the destruction of N_2O from adipic or nitric acid production are CDM project activities that have very low GHG abatement costs of less than 1 US$/t$CO_2$e. Their market share in the CDM is significant. At the same time, these projects types appear to have very little or no benefits for sustainable development. In addition they create considerable windfall profits for the plant operators or, in the case of China, the government, which taxes 65% of the CERs of these project types. The taxation of CERs is expected to generate 1.5 billion EUR for the Chinese government by 2012. If the revenue is directed to a special fund to assist in achieving sustainable development, these projects might provide some indirect benefits.

HFC-23 is an unwanted by-product in the production of HCFC-22. If credited under the CDM, the revenues from CERs may be considerably higher than the market price for HCFC-22 and thus also higher than production costs. This could be a significant incentive to increase HCFC-22 production. However, as a result of this perverse incentive, the crediting of HFC-23 destruction projects is limited to historical HCFC-22 production levels before 2005. Whether and how increased production under the CDM is credited is currently being debated by COP/MOP.

The concerns with regard to HFC-23 and N_2O projects could be addressed by excluding these projects from crediting after 2012 or by crediting emission reductions based on ambitious benchmarks. Such benchmarks would result in a real climate mitigation benefit, because the emission reductions would be larger than the number of CERs issued. They would also reduce the supply of CERs from HFC-23 and N_2O destruction projects to the market, while still providing sufficient financial incentives to implement the mitigation technologies.

Stakeholder consultation

An appropriate stakeholder consultation on the project is a prerequisite for validation. To ensure a meaningful stakeholder consultation, it is important that all individuals, groups or communities that are likely to be affected by the project have the opportunity to provide comments. However, in about one quarter of the analysed projects, comments are only invited from selected stakeholders. In Indian projects, it appears common practice to invite comments from one stakeholder only, the Panchayat, which is

the local administration. In some cases, negative comments are apparently ignored or not mentioned in the summary of the comments that is provided in the PDD.

To improve the stakeholder consultation process, the CDM Executive Board should clarify how stakeholder comments should be invited and how due account should be taken of the comments that are received. To increase the transparency of the process, all stakeholder comments should be made publicly available on a website.

Future options: policy CDM and sectoral CDM

Under “policy CDM”, the adoption and implementation of policies and measures is credited. Policy CDM allows for the crediting of government action and is likely to reduce transaction costs. However, it raises serious concerns regarding the assessment of additionality. Developing countries already adopt many policies and measures that lower GHG emissions, often with several motivations. Therefore, assessing the additionality of policies and measures would be very difficult, if not impossible. Policy CDM, as such, should therefore not be considered for a post-2012 climate regime, but policies and measures could be credited indirectly in sectoral approaches.

Under the sectoral CDM, a baseline is established for a whole sector and emission reductions below the baseline are credited. In most cases, it has been suggested that the government receives the credits and provides incentives or regulations for the private sector to achieve the emission reductions. Thus, in a similar way to the policy CDM, the emission reductions are achieved by implementing policies and measures. However, in contrast to the policy CDM, emission credits are not based on the policies and measures, but on the actual emission trends observed in the sector and the baseline.

The most important advantage of the sectoral CDM is that it avoids the counter-factual and hypothetical assessment of the motivation of private entities to demonstrate additionality. The key challenge regarding environmental integrity is the uncertainty of the emissions projection. Other challenges are the limited data availability and the lack of capacity to effectively implement such approaches in some countries. Further exploration is needed regarding how sectoral CDM could be made a feasible option to scale up the CDM, while achieving a high environmental integrity.

Options for limiting the use of the CDM by Annex I countries and in emissions trading schemes

All Annex I countries and all existing and emerging emission trading schemes limit the use of offset mechanisms to a certain extent.

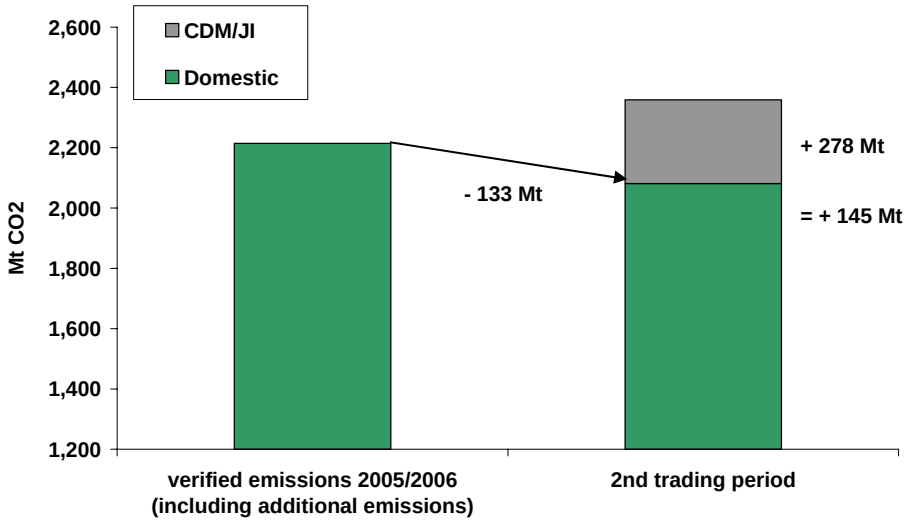
Positive or negative lists have been proposed to promote projects that have large benefits for sustainable development or for which additionality is more likely. In considering the exclusion of some CDM project categories, there is a clear trade-off between additionality and benefits for sustainable development: Project activities which are likely to be additional often have few benefits for sustainable development, whereas addi-

tionality is often questionable for projects which have high benefits for sustainable development. Therefore, excluding projects that have few benefits for sustainable development only makes sense if the way additionality is assessed is improved.

Governmental purchase programmes or regional emissions trading schemes could also introduce further qualitative requirements for *all* projects, for example, relating to the demonstration of additionality or the contribution to sustainable development. However, the development of such requirements is not straightforward, as the debate on additionality has shown.

The difference in the nature of cap-and-trade-systems and baseline-project crediting systems could also be reflected by discounting CERs against cap-and-trade allowances. For example, two CERs may be exchanged for one EU ETS allowance. Implicitly, this option would work in a similar way to a total cap on the use of CDM and JI. In contrast to a fixed cap on the use of CDM and JI, the discounting of CERs would have greater environmental benefits because the cancellation of a fraction of the CERs either reduces the amount of "hot air" in the CDM or – if no "hot air" were in the CDM – results in a global mitigation benefit. However, discounting CERs against EU allowances would result in less demand for CDM and JI credits. The lower demand could result in a lower price, thereby also punishing "good" projects that are clearly additional and have positive impacts on sustainable development.

All options pose particular challenges if emission trading schemes are linked. Another problem of all options is that CERs which are not eligible in one country or emissions trading scheme may instead increasingly be used in other schemes. This type of "leakage" would only be prevented if all or a large group of buyers have similar restrictions.



The overall extent to which offset mechanisms should be used is currently debated in many emissions trading schemes. In the EU ETS, the use of CDM and JI is currently capped at 278 million tons per year for the 2008 to 2012 period. The figure above compares the reduction effort and the use of CDM and JI for the second trading period. The

annual cap for emission allowances is about 133 million tons CO_2 lower than the verified emissions in 2005 and 2006. This enables installations to increase their 2005/2006 emissions by up to 145 million tons for the period of 2008 to 2012.

This raises concerns about the long-term emission trends in the ETS sector. Increasing emission trends can result in a long-term lock to technologies that will jeopardise the achievement of ambitious emission reductions in the next decades. To avoid such lock-ins, the EU should require that the use of CDM and JI should be supplementary to emission reduction efforts in the EU ETS. This means that the use of CDM and JI would be limited to a fraction of the additional reduction effort from one trading period to the next trading period. This would ensure that actual emissions in the EU ETS decrease over time.

Overall conclusions

The CDM has been very successful in creating a global market for GHG emissions but has – so far – not been very successful in achieving a high level of environmental integrity and assisting host countries in achieving sustainable development. There is certainly room for improvement. The performance of DOEs appears rather varied. For a significant number of projects that were registered in the past three years, additionality seems unlikely or questionable. The overall contribution of the CDM to assisting host countries in achieving sustainable development – in spite of being the prerogative of the host country – is rather small.

As the CDM will further grow and should play a role beyond 2012, addressing its deficiencies is a key prerequisite to making it a success. Several measures to address these deficiencies have already been taken, including the adoption of the Nairobi Framework to promote a better geographical distribution of CDM projects, a strengthened assessment of projects by the CDM Executive Board, the development of guidance for validation and verification, and the development of a policy framework to address non-conformities by DOEs. Further measures should be taken before 2012, including, inter alia, the revision of the tools to demonstrate additionality and the introduction of ambitious benchmarks for HFC-23 and N_2O destruction projects. Beyond 2012, whether the CDM can move away from a project based mechanism towards sectoral approaches should be evaluated.

Despite the problems that we currently face in the CDM regarding its environmental integrity and sustainable development objectives, the CDM has had a great impact on the thinking of business and policy makers in developing countries and the awareness and understanding about clean technologies, emission trading and future action on climate change both in the private and public sector. Moreover, the CDM has considerably changed GHG emissions in some sectors in developing countries. If the problems of the CDM regarding its environmental integrity and sustainable development objectives are properly addressed, the CDM will continue to be an important instrument in the fight against climate change.

1 Introduction

The Clean Development Mechanism (CDM) under the Kyoto Protocol is a flexible mechanism that allows the crediting of emission reductions from greenhouse gas (GHG) abatement projects in developing countries. The CDM has two purposes: it should assist developing countries (non-Annex I countries) in achieving sustainable development and help industrialised countries (Annex I countries) to reduce their costs of greenhouse gas abatement. Certified Emission Reduction Units (CERs) issued from CDM projects are used by Annex I countries to assist them in meeting their Kyoto reduction commitments, by companies covered under emissions trading schemes, such as the EU Emissions Trading Scheme (EU ETS), and by individuals, companies or public entities that want to offset their greenhouse gas (GHG) emissions.

Ten years after the adoption of the Kyoto Protocol and six years after the adoption of the modalities and procedures for the CDM at the 7th Conference of the Parties (COP) in Marrakech, the CDM has become an immense global market, with a value of several billion Euros. By 1 October 2007, 803 CDM projects had been registered which are supposed to deliver emission reductions of about 168 million tons of CO_2e per year (UNEP/RISOE 2007). About 2,500 projects are in the pipeline which could deliver emission reductions of about 400 million tons of CO_2e per year. In this regard, the CDM has been a big success in developing a new market for GHG emission reduction projects in developing countries. The CDM is widely acknowledged as a mechanism that has changed emission trends in some industries and enabled entities in developing countries to participate in the emerging global carbon market. It has also contributed tremendously to raising awareness of public and private entities for climate change.

However, recently, the CDM has also been heavily criticised in the media for not delivering its environmental and sustainable development objectives. The Guardian stated in an article that “the CDM (...) has been contaminated by gross incompetence, rule-breaking and possible fraud by companies in the developing world, according to UN paperwork, an unpublished expert report and alarming feedback from projects on the ground” (Davis 2007). The Herald Tribune carried the headline “Flaws in the UN anti-pollution program” (Bradsher 2007) and the Sunday Times criticised that “Indians make cool £300m in carbon farce”.[1] Various evaluations of the project portfolio have concluded that currently the CDM does not significantly contribute to sustainable development.[2]

This report aims to assess the extent to which the CDM contributes to its environmental and sustainable development objectives. In analysing the findings, it is important to bear in mind that the CDM had a prompt start directly after COP7 in Marrakech and has always been regarded as a learning process. The institutional structure to support

[1] Sunday Times Online, 22 April 2007

[2] For a literature review see Olsen (2007)

and implement the CDM, including the UNFCCC secretariat, panels and working groups under the CDM Executive Board, Designated Operational Entities (DOEs) and the market participants, have grown or emerged over time, as have the rules and requirements that have to be fulfilled from the project development to the issuance of CERs.

Based on the assessment of the contribution of the CDM to its environmental and sustainable development objectives, the report provides recommendations for improving the CDM to COP/MOP and the CDM Executive Board and discusses options for limiting the use of CDM and JI by Annex I countries and in emissions trading schemes. The report's findings are based on a systematic evaluation of 93 registered CDM project activities as well as several other sources. The report focuses on selected areas which are deemed particularly important for the CDM in achieving its environmental and sustainable development objectives and which have been discussed controversially in the media and in the research community: the role and performance of designated operational entities (DOEs), the demonstration of additionality, the contribution of CDM projects to sustainable development, the role of HFC-23 and N_2O destruction projects, and the participation of stakeholders in the process.

2 Environmental integrity and sustainable development objectives of the CDM – lessons learned

2.1 Scope and methodological approach of the evaluation

Article 12 of the Kyoto Protocol and the modalities and procedures for the CDM define several objectives for the mechanism. The CDM should assist developing countries in achieving sustainable development (**sustainable development objective**) and ensure that emission reductions are real, measurable and additional to any that would have occurred in the absence of the CDM project activity (in the following referred to **as environmental integrity objective**). This chapter evaluates to what extent the CDM has fulfilled these objectives. As the impact of CDM projects on sustainable development has already been analysed extensively in the literature, the focus of this study is largely on the environmental integrity objective.

The environmental integrity objective is crucial to ensure that global GHG emissions do not increase as a result of the CDM. CERs issued from CDM project activities are used by Annex I countries or companies under emissions trading schemes to assist them in fulfilling their emission reduction commitments. Thus, the CDM is an offset mechanism which enables Annex I countries or companies to emit more greenhouse gases. These increased emission levels are only offset if the emissions reductions from CDM projects would not have occurred anyhow in the absence of the CDM (demonstration of additionality) and if the quantity of emission reductions achieved by a project is quantified correctly by the application of appropriate baseline and monitoring methodologies.

Assessing whether the CDM fulfils the environmental integrity objective is difficult, for several reasons:

- The question whether a project would also be implemented without the CDM incentive is hypothetical and counter-factual – it can never be proven with absolute certainty. This makes the assessment of additionality difficult, subjective and uncertain.
- Similarly, the actual emission reductions achieved through a CDM project are difficult to determine and uncertain because the effects on GHG emissions are often indirect. For example, in the case of renewable power generation projects it is difficult to determine what type of existing or new power plants would actually be displaced by a CDM project.
- The CDM can create different incentives for policy makers in developing countries to adopt or not to adopt policies and measures that affect GHG emissions. For example, policy makers might be hesitant to introduce regulations to reduce GHG emissions if this would reduce the potential for the development of CDM projects in their country.
- CDM projects have a limited crediting period of up to 21 years, while they may affect GHG emission well beyond the crediting period.

- Some CDM projects can induce technological innovation, resulting in positive spill-over effects and further emission reductions in the host countries. On the other hand, the use of the CDM may reduce the necessity and speed of technological innovation in Annex I countries or may result in a lock-in to GHG intensive technologies in these countries.

This report discusses some of these issues but only touches upon others. For the purpose of this report, environmental integrity is defined on a project level, and does not address the indirect positive or negative impacts of the CDM on GHG emission levels. Taking a project perspective is consistent with the modalities and procedures of the CDM which require that additionality, baseline emissions and project emissions are determined on a project level. Environmental integrity means that one CER issued from a project activity should correspond to a real, measurable, verifiable and additional emission reduction of (at least) one ton of CO_2 equivalent.

The assessment of the environmental integrity and sustainable development objectives of the CDM is based on a detailed analysis of registered CDM projects, an analysis of findings by the CDM Executive Board and its panels and working groups, information provided in the literature and interviews with different stakeholders. For the purpose of this evaluation, the documentation for 93 registered CDM projects was evaluated. These projects were randomly chosen from the 768 projects that had been registered by 18 July 2007. Random choice was ensured by sorting the projects by date of request for registration and choosing every 8^{th} project. This means that the projects are representative for the whole time frame from 18 November 2004 to 18 July 2007 during which the CDM Executive Board registered project activities. The analysis is based on all information available to the public on the UNFCCC website, in particular Project Design Documents (PDDs) and validation reports by DOEs.[3]

At COP7 in Marrakech, Parties decided that the CDM should have a prompt start and be a learning-by-doing process. As a result of this learning process, guidance issued from the CDM Executive Board has grown over time. Baseline and monitoring methodologies as well as tools to demonstrate additionality have been adopted and revised. Projects registered recently have provided documentation with a higher quality than projects developed during the first few years. The capacity of project developers, consultants and DOEs has grown and the assessment of projects by the CDM Executive Board has become more thorough over time (see section 2.2.3 below).

In assessing the results of this report, one should bear in mind that the most recent outcome of this learning process is not entirely reflected in the results which are based on a sample of all projects registered from 18 November 2004 to 18 July 2007. In other words, the evaluation in this report reflects the average outcome of the past three years but is not representative of the most recent developments. Nevertheless, recent deci-

[3] Upon request, a list of the analysed projects can be made available.

sions by COP/MOP and the CDM Executive Board are reflected and analysed in the report.

The evaluation focuses on selected areas which are deemed to be particularly important in achieving the environmental integrity and sustainable development objectives of the CDM. These include:

- **Role and performance of DOEs.** Designated Operational Entities (DOEs) are responsible for the validation of CDM projects and the verification of emission reductions. DOEs should ensure that all guidance established by the COP/MOP and the CDM Executive Board is applied correctly by project developers. The report assesses the market environment and performance of DOEs.
- **Demonstration of additionality.** A proper assessment of whether the project would also be implemented without the CDM incentive is a key prerequisite for the fulfilment the environmental integrity objective. The report assesses the practical experiences of the demonstration of additionality and reviews estimates on the additionality of CDM projects in the literature. We also provide our own rough estimate on the extent to which CDM projects are additional.
- **Sustainable development impact.** The report summarises findings from the literature on the contribution of CDM projects to assisting developing countries in achieving sustainable development.
- **HFC-23 and N_2O destruction.** These project types have been heavily criticised in some media. The report assesses to what extent they fulfil the environmental integrity and sustainable development objectives of the CDM.
- **Stakeholder consultation**. The proper participation of stakeholders in the process is important to ensure transparency, to identify any potential negative impacts of the project and to identify how these could be addressed. The report assesses the process of stakeholder consultation in registered project activities.

2.2 Experiences with Designated Operational Entities (DOEs)

Designated Operational Entities (DOEs) are responsible for the validation of proposed CDM project activities and the verification and certification of emission reductions. Validation is the independent evaluation of a project activity by the DOE against the requirements established by COP/MOP and the CDM Executive Board. The information provided in the Project Design Documents (PDDs) forms the basis for the validation process. At the end of the validation project, the DOE either accepts the project if all requirements are met and outstanding issues are solved, or rejects the project. If accepted, the project is forwarded to the CDM Executive Board for registration. Verification is the assessment by the DOE that a CDM project activity has achieved the emission reductions claimed in monitoring reports. The CDM Executive Board automatically accepts requests for project registration or requests for issuance of CERs – unless at least three members of the CDM Executive Board request a review.

DOEs are regarded as the “extended arm” of the CDM Executive Board. They are responsible for ensuring that all rules established by the COP/MOP and the CDM Executive Board are followed by project participants. They are paid by the project participants for their validation and verification services. By July 2007, eighteen DOEs had been accredited by the CDM Executive Board, of which four are from developing countries. Den Norske Veritas (DNV) has, at 46%, by far the largest market share of the project validations, followed by TÜV-SÜD (25%) and SGS (12%). All other DOEs have a market share of less than 5% (UNEP/RISOE 2007). In the following sections different aspects of the validation and verification process are analysed.

2.2.1 DOEs are in a highly competitive market

The market for validation and verification services has recently become highly competitive and as a result the price for these services has dropped considerably. Validation prices are reported to be in the range of 6,000 to 15,000 EUR for large-scale project activities, depending on region and project type. Verification prices are reported to be even lower. As these prices include costs for site visits, they enable DOEs to work only a very limited amount of time on each project. Some validation reports even mention that only a few days have been spent on the validation process. As of 1 April 2007 CERs can only be issued for emission reductions achieved after the registration of the project activity. This has increased the pressure from project participants on DOEs to carry out validations and verifications as quickly as possible., as from 1 April 2007 onwards CERs can only be issued for emission reductions achieved after the registration of the project activity. Thus, the earlier a project is credited, the earlier the project developer will be able to reap the financial benefits from the sale of the CER’s.

In choosing a DOE, many project participants try to keep validation and verification costs low, want a fast validation or verification process and prefer a DOE who, in the past, has raised no or only a few issues, thereby minimising the risk that their project will not be validated positively. This has put considerable pressure on DOEs to spend less time on validation and verification, speed up the process and be more “flexible” in the interpretation of the requirements. In the worst case, this development could result in a “race to the bottom” regarding the quality of the validation and verification process because those DOEs that spend less time on validation and verification can offer lower prices and will thereby gain a large market share.

DOEs are also under considerable pressure to validate projects positively. GTZ (2007) has reported that a DOE complained at a workshop that “project developers whose project is not successfully validated and registered increasingly do not pay the agreed validation fee. A legal case to make developers pay the fees is costly and cumbersome in many host countries. This may further increase the pressure on DOEs to validate all projects they are contracting”. At least one DOE has made contracts in which the last payment by the client is due upon the successful registration of the project. Such success-related fees set direct financial incentives for the DOE to validate the project positively. This is problematic since the validation should be undertaken in an objective and independent manner.

Another difficulty of the current competitive nature of the market is that project developers can contact several DOEs before entering the formal validation process and assess, on the basis of that information, with which DOE they are most likely to achieve a positive validation. For example, a project developer has reported that he had tried two different DOEs which had concerns about the project and rejected the cooperation before a third DOE accepted the project and validated it positively.

It is also reported that project developers urge DOEs to accept issues that have been accepted in other registered projects but that are not in compliance with the requirements in the baseline and monitoring methodology.

2.2.2 Lack of detailed validation and verification instructions

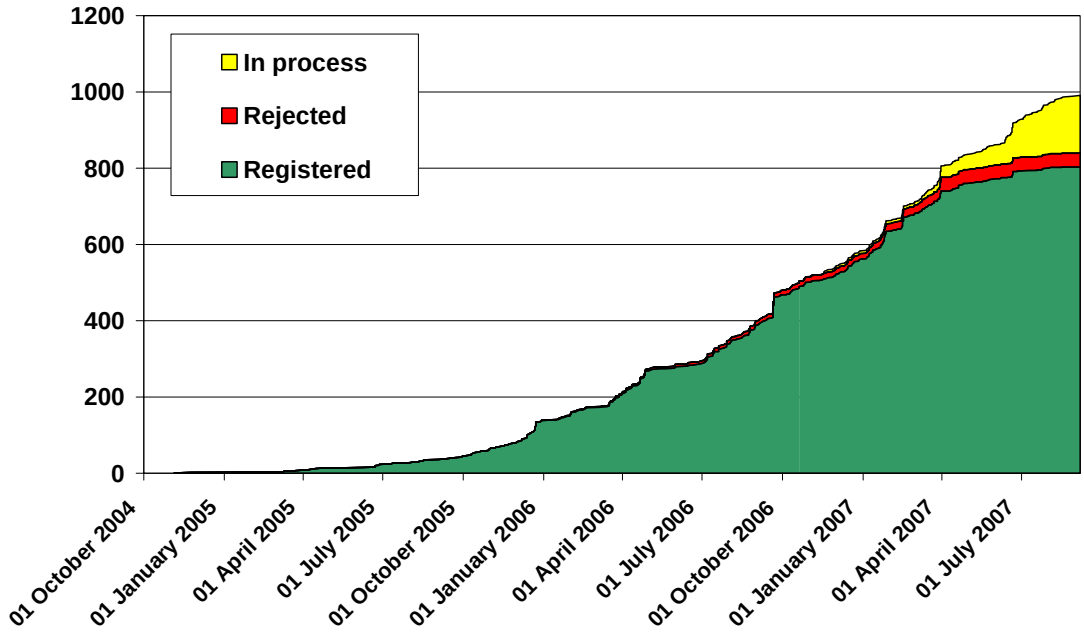
Detailed standards and instructions as to what exactly should be assessed by DOEs as part of the validation and verification process are currently not yet available. The guidance in the modalities and procedures for the CDM and the existing guidance by the CDM Executive Board on the way in which DOEs should validate and verify is rather general and vague. For example, the current voluntary Validation and Verification Manual (VVM), developed by a number of DOEs with support from the World Bank and IETA (IETA 2003), focuses on the documentation in the CDM-PDD, but there are only a few questions which require the DOE to actually assess whether implicit and explicit assumptions are appropriate, whether evidence for key assumptions is provided and whether the evidence is credible. Moreover, the current voluntary standard only requires the DOEs to signal that there is no issue; it does not require them to document what type of information was checked and how it was checked. Some baseline and methodologies already provide specific guidance to DOEs on the validation of key assumptions. For example, some methodologies require that a key measurement for the calculation of emission reductions is witnessed by the DOE.

COP/MOP2 in December 2006 has requested the CDM Executive Board “to develop guidance for designated operational entities on verification and validation in order to promote quality and consistency in verification and validation reports”. The Board has now started a process to develop such guidance.

2.2.3 Approval and rejection of projects by the CDM Executive Board

The first CDM project was registered in November 2004. By 1 October 2007, 3 years later, 803 CDM projects have been registered and 36 projects have been rejected, corresponding to 4.3% of the projects that have requested registration (UNEP/RISOE 2007). While the number of projects requesting registration was small in the beginning it has grown rapidly during the last two years (see Figure 1 below/overleaf).

Figure 1: Projects registered and rejected by the CDM Executive Board



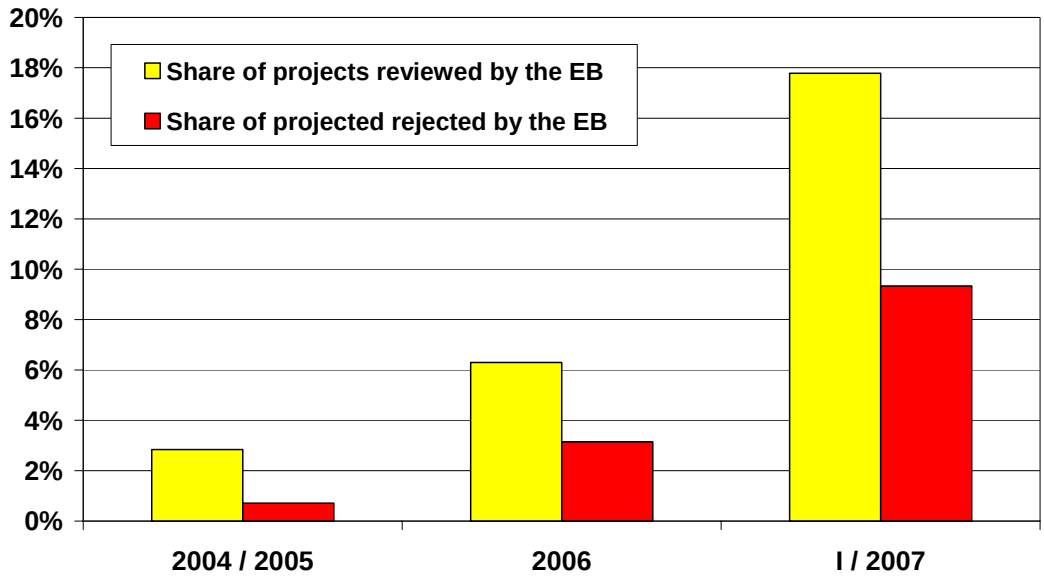
In understanding the registration process, it is helpful to differentiate three phases:

- **Phase I (until the end of 2005):** In the first years of the CDM, the CDM Executive Board was faced with severe budgetary constraints, with most revenues coming from voluntary contributions from Annex I Parties. The CDM Executive Board had no support structure to assess the projects and very few staff based at the UNFCCC secretariat. Each project had to be assessed individually by Board members.
- **Phase II (2006):** COP/MOP1 in 2005 enabled the CDM Executive Board to collect a share of proceeds to cover administrative expenses and committed all Annex I Parties that had ratified the Kyoto Protocol to provide additional funding. In March 2006, the CDM Executive Board established a Registration and Issuance Team (RIT) which assesses the documentation of each registration request and highlights potential issues to the Board. The registration request and any issues highlighted by the RIT are assessed by one Board member who informs other Board members if he/she believes that a review is necessary.
- **Phase III (from 2007):** Early in 2007, the CDM Executive Board made further changes to the procedure to assess registration requests. In addition to the RIT, the UNFCCC secretariat now assesses each project and makes a recommendation to the CDM Executive Board members who then decide whether to request a review or not.

Figure 2 illustrates that the fraction of projects that are being reviewed and rejected has increased notably with each phase. In Phase I, very few projects were reviewed or rejected. The assessment of projects is time-consuming and the Board members may not

have had sufficient time and capacity to assess each individual project. With the introduction of the RIT in Phase II, the share of projects that were reviewed doubled and the share of projects that were rejected quadrupled. A similar trend can be observed following the introduction of Phase III; so far in this phase, about 18% of the projects have been reviewed and half of them have been rejected.

Figure 2: Share of projects that have been reviewed or rejected by the CDM Executive Board



It is unlikely that the quality of the projects submitted for registration has decreased over time. The figure therefore shows that the scrutiny of the review of projects by the CDM Executive Board has increased considerably. The Board has increasingly delegated the technical assessment of projects and now mainly considers cases where the UNFCCC secretariat or the RIT have flagged up issues of concern.

However, some market participants have, in interviews, criticised the decision making process of the CDM Executive Board for not always being consistent. For example, several projects that increase the share of additives in producing cement have been registered in the past, while many recent cement projects have been rejected despite having a similar nature. Moreover, it has been criticised that the quality of the assessment by the individual RIT members is varied. This may result from the different qualifications and background of the team members but also from the fact that the team does not meet and has thus limited capacity to develop a coherent approach in assessing registration and issuance requests. It is possible that the assessment of projects by the UNFCCC secretariat in Phase III will result in a more homogenous and predictable assessment of projects by the Board.

2.2.4 Varied performance of DOEs

In 2006, the Methodological Panel under the CDM Executive Board along with several independent consultants assessed how the "tool to demonstrate and assess additionality" was applied in practice. This was done by analysing Project Design Documents (PDDs) and validation reports.[4] The analysis comes to the following conclusions: "From review of available documentation it appears that current methodological guidance from the Board is either not applied or, if applied, is not always documented. (...) Validation reports for some registered CDM projects indicate that efforts to corroborate additionality claims were undertaken, other cases with no such indications were found. (...) The available documentation provides little evidence of external validation by DOEs of key assumptions and data used for additionality assessment, though such evidence may exist elsewhere."

The CDM Executive Board has also been concerned about the performance of some DOEs. In 2006, the CDM Executive Board decided to undertake spot checks of three different DOEs. The findings from these spot checks are serious. The Board reported on several non-conformities of the DOEs[5] for several key requirements, including those with regard to:

- "competencies to perform validation and verification functions";
- "quality assurance and quality control mechanisms";
- "compliance with CDM requirements";
- "procedural and operational requirements, such as its management and operational structure, contract control, assurance of competencies to perform validation and verification functions and compliance with its own stipulated procedures".

The Board decided that all three of the DOEs should undertake corrective actions. After these had been undertaken the Board decided not to suspend the accreditation. In February 2007, the Board stated that "the experiences gathered recently in validation and verification work by DOEs as well as the accreditation process including spot-checks, re-emphasises the need for the DOEs to work towards the best practices of validation and verification".[6]

Our analysis of 93 projects reveals that the documentation of the validation process by DOEs is highly varied, which makes the reliability of the validation process questionable. Some validation and verification reports contain only little information on whether and how issues have been checked, whereas other reports are more explicit. In some cases, DOEs have failed to check whether very simple requirements of the CDM are

[4] Meeting report of the twenty-third meeting of the Methodological Panel

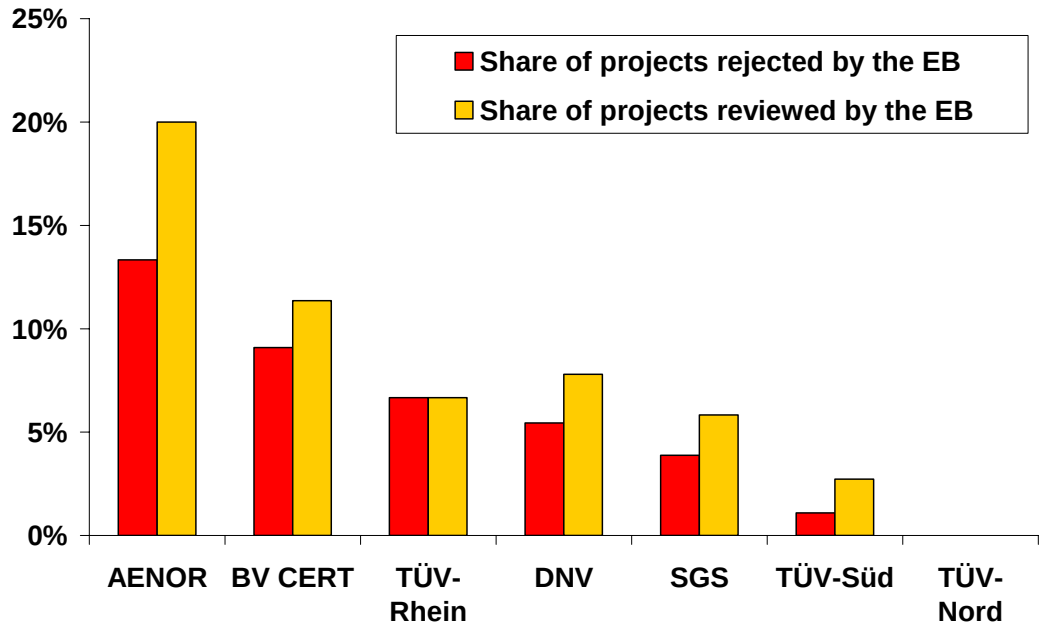
[5] Paragraphs 17 and 20 of the report of the twenty-ninth meeting of the CDM Executive Board

[6] Paragraph 12 of the report of the twenty-ninth meeting of the CDM Executive Board

met. For example, a basic requirement of the CDM is that projects should have started after 1 January 2000. However, a number of projects that have been validated positively by DOEs have been rejected by the CDM Executive Board because the project's start date was before 2000.

The failure of some DOEs to identify that this basic requirement has not been met calls into question their ability to assess more complex CDM requirements, such as the selection of an appropriate baseline scenario, the demonstration of additionality or the application of the procedure to calculate emission reductions. A DOE reported in an interview that there is a tendency by all DOEs to provide less information in validation reports than they could because mentioning issues that have been resolved with the client and that do not need to be raised may trigger questions and result in a review by the CDM Executive Board. Indeed, many validation reports only provide very general information. The high number of reviews and rejections since the establishment of Phase III in 2007 also suggests that the quality of the validation by DOEs is varied or that, at least, the expectations of the CDM Executive Board as to what they expect DOEs to provide differs.

Figure 3: Share of CDM projects that have been validated positively by a DOE but reviewed or rejected by the CDM Executive Board, differentiated by DOE



Source: UNEP/RISOE (2007), status by 1 October 2007

Figure 3 shows the fraction of projects that have been validated positively but rejected or reviewed by the CDM Executive Board for those DOEs that had achieved registration for more than 10 projects by 1 October 2007. The figure shows that some DOEs have had significantly more reviews and rejections than others. For example, two out of 15 projects validated by AENOR and four out of 44 projects validated by BV CERT

have been rejected, whereas no project by TÜV-Nord has been rejected and only two out of 183 projects have been rejected in the case of TÜV-SÜD. However, it should be noted that this comparison has limits due to the different market share of the DOEs, the different host country focus of DOEs, few projects being registered for some DOEs, and since the rejection policy of the CDM Executive Board is not always consistent, as described above.

During validation, DOEs can request corrective action of project participants or seek further clarification if issues arise from the validation process. An evaluation of the number and type of Corrective Action Requests (CARs) and Clarification Requests (CLs) reveals that both the content and the number of requests vary considerably. On average, 35% of the analysed CARs refer to formal requirements, such as a missing host country approval letter or tables that have not been completed correctly. In some cases, minor formal issues, such as the format of a table, have been raised as a CAR. Many CARs refer to monitoring requirements and some to baseline emission calculations. Only a few CARs directly refer to the demonstration of additionality – which seems surprising as this step involves the greatest environmental risk and is more difficult to demonstrate than other steps.

The number of CARs that include substantive (and not formal) issues also varies among DOEs. The type and number of CARs were analysed for the same seven DOEs, based on a sample of 142 projects.[7] On average, 3.3 substantive CARs per project were raised, however this varied between DOEs from 1.7 to 5.2. This variance may partly result from different validation procedures. For example, some DOEs may have a more thorough pre-assessment procedure before entering the formal validation process. In addition, some DOEs may attract projects with more issues due to their sectoral scope, regional focus or reputation. However, to a certain extent, a correlation can be observed with the number of projects rejected. Those DOEs that have a low percentage of projects rejected by the EB have also requested more CARs per project relative to most other DOEs.

In conclusion, the findings overall raise serious concerns about the performance of some DOEs. In the negotiations leading up to Marrakech, DOEs were regarded as the backbone which ensures that emission reductions are real and additional. In practice, the CDM Executive Board has identified serious non-conformities and our analysis suggests that quality and thoroughness in the validation process is highly varied. This is supported by our findings with regard to the ways in which DOEs have assessed single steps of demonstrating additionality and in which they checked that stakeholders were consulted (see sections 2.3 and 2.6). Putting in place strong incentives for DOEs

[7] This analysis included a larger sample group to ensure a sufficient sample size for DOEs with few registered projects. The analysis includes a randomly chosen sample of the projects registered by 18 July 2007 for DNV, SGS, TÜV-Süd, TÜV-Nord and BV CERT, and all projects registered by 18 July 2007 for AENOR and TÜV-Rhein due to the limited number of registered projects.

to undertake validation more thoroughly is therefore key to ensuring that the integrity in the CDM is improved.

The current performance of some DOEs questions whether the existing threat of sanctions for DOEs is sufficient. So far, only spot checks have been undertaken and no accreditation has been suspended or withdrawn. A DOE that has not been affected by spot checks reported in an interview that this had sent a bad signal to the market since the non-conformities of the DOEs under spot checks had no visible consequence, such as the suspension of the accreditation.

However, spot checks are a sanction for DOEs – even if the names of the DOEs that undergo the spot checks are not published – for two reasons: DOEs may be questioned by their clients as to whether they are undergoing a spot check and, if so, clients may be more hesitant about entering into a validation or verification contract. Moreover, a DOE has to cover the costs of any spot checks that the Board is carrying out.

A number of actions to improve the performance of DOEs are currently being considered and developed by the CDM Executive Board. An important step, described in section 2.2.2 previously, is the development of guidance for DOEs on verification and validation. In addition, the CDM Executive Board has requested the accreditation panel to work on a policy framework to address non-compliance issues by DOEs in a systematic manner. “This policy should provide the framework for assessing non-compliance by a DOE on the basis of the risk it may pose to the system as well as assurance of its capability to perform CDM validation and verification functions. The policy framework should also cover, inter alia, grading of non-compliance and non-conformities according to the risk and determination of consequences of each non-compliance and non-conformities.”[8] Such a policy framework could include different types of automatically applied sanctions for different grades of non-compliance and non-conformities. This would provide the basis for a fair and consistent treatment of DOEs by the CDM Executive Board and could increase the pressure on DOEs to set-up internal procedures that ensure a high level of compliance and conformity with the rules established by COP/MOP and the CDM Executive Board. Further options to strengthen the consistent validation and verification functions by DOEs are discussed in section 3.1.1.

2.3 Demonstration of additionality

Article 12.5 of the Kyoto Protocol and the Marrakech Accords require that emission reductions are real and additional. A CDM project is additional if “anthropogenic GHG emissions are reduced below those that would have occurred in the absence of the registered CDM project activity”.[9] Without additionality, the environmental integrity objective cannot be assured. If a CDM project is not additional but nevertheless registered as a CDM project, the issuance of CERs results in an increase of global GHG

[8] Paragraph 12 of the meeting report of the thirty-thrid meeting of the CDM Executive Board.

[9] Paragraph 43 of decision 3/CMP.1

emissions because the CERs allow Annex I countries to increase their GHG emissions whereas the emission reductions from the project in the non-Annex I country would have occurred anyhow.

The demonstration of additionality is a controversial issue and has been discussed since the establishment of the CDM. The fundamental challenge is that the question as to whether a project would also be implemented without the CDM is hypothetical and counter-factual – it can never be proven with absolute certainty. This makes the assessment of additionality difficult, subjective and uncertain. The challenge is to find transparent and objective criteria that avoid a high number of non-additional projects and do not result in a high number of "lost opportunities" (projects that are additional but do not meet the criteria).

Several approaches to assess additionality have been submitted to the CDM Executive Board in the past five years. The following generic approaches or combinations of approaches have so far been used in baseline and monitoring methodologies to demonstrate additionality:

- **Positive lists.** A certain project category is assumed to be additional. Up to now, this rule has only been applied to the destruction of HFC-23 in HCFC-22 production facilities if regulatory requirements are exceeded (methodology AM0001).
- **Barrier analysis.** The barrier analysis requires the demonstration that barriers exist that would prevent the proposed project from being carried out if the project activity was not registered as a CDM activity.
- **Investment analysis.** The investment analysis requires the demonstration that the proposed project activity is economically or financially less attractive than at least one other credible alternative.
- **Common practice analysis.** The common practice analysis requires an assessment of the extent to which the proposed project type (e.g. technology or practice) has already been deployed in the relevant sector and region.

The CDM Executive Board has combined the barrier, investment and common practice analysis into two alternative tools which are used in most approved methodologies for large-scale CDM projects: the "Tool for the demonstration and assessment of additionality" and the "Combined tool to identify the baseline scenario and demonstrate additionality". In these tools, the barrier and investment analysis are alternative approaches to demonstrate additionality or they can be combined. The common practice analysis complements these as a credibility check. For small-scale CDM projects, the CDM Executive Board has approved a simple barrier test.

Essentially, the current approach to demonstrate additionality requires project participants to demonstrate under which conditions they would be able to proceed with the project activity. This approach has been criticised as "intention-based" and "highly subjective" by some stakeholders. For example, the International Emissions Trading Association (IETA) stated in a position paper for COP/MOP1: "Proving intent is an almost

impossible task that is clear-cut only in rare cases (...) Business perception is that in its current form the test for additionality (...) exposes every project to a highly subjective assessment of its CDM eligibility and allows for second-guessing by the EB." Industry representatives raised concerns that the current approach results in a situation where good story-tellers can get a project registered whereas bad story-tellers may fail even if the project is really additional. Financial organisations have raised concerns that procedures to demonstrate additionality "may not reflect the realities of how projects are developed and financed" and that the "economic attractiveness depends on the perspective of the company – and these perspectives vary widely among companies" (IFC 2003).

Based on a case study of registered projects in India, Michaelowa and Purohit (2007) come to the conclusion that "packaging" of information plays a decisive role to get a project registered: "The two case studies JSW Steel and Bajaj Auto show that "packaging" of information plays a decisive role in additionality assessment by the CDM Executive Board. While both projects are clearly non-additional, only the second one was rejected as the project developer himself praised the project's attractiveness in the absence of the CDM."

This illustrates that it is difficult to assess in an objective manner whether a project would be implemented in the absence of the CDM. The difficulty in proving the motivation of project developers has been widely recognised. Indeed, investment decisions are complex and the choices, chances, risks, barriers and motivations for investments are difficult to compare and balance in an objective manner. Therefore, it is impossible to know with absolute certainty whether a project is additional or not. The difficulty of assessing additionality can be further illustrated with the following examples:

- Some CDM projects are economically attractive and do not face any barriers but are only implemented because the company or a third entity searches for CDM options. For example, a CDM consultant may identify in a company an economically attractive energy efficiency improvement measure which the company would not have identified if it would not have searched for CDM options.
- In a pioneering market like wind power in developing countries, some project developers would do whatever it takes to finance their wind power project. If the project developers can get CERs they will use them, if not they will try to seek ODA funds. Whether the project developer would succeed in seeking ODA funds is a hypothetical question that is difficult to answer. If the motivation is used to demonstrate additionality, one could argue that this project is not additional – which would punish the project developer for his good motivation. If the economic attractiveness of the project is used to establish additionality, the project would be regarded as additional.
- A project developer of large-scale power plants may have a bad credit worthiness which makes access to capital more expensive and prevents him from building a new natural gas power plant, whereas, with the CDM, he can implement the project. However, given that the construction of natural gas power

plants in the market is generally economically attractive, in the absence of the project, another project developer might have constructed a natural gas power plant at the same site or nearby. In this case, the project is additional from the perspective of the project developer but not from a broader perspective, as the project might be implemented anyhow – if not by the project developer then by someone else.

These examples show that it is quite problematic and difficult to base the assessment of additionality on the actual motivation by the project developer. In response to these difficulties, some other approaches have been proposed with the aim of providing more objective eligibility criteria for CDM projects (see, for example, Kartha, Lazarus and LeFranc 2005). For example, benchmarks or penetration rates would provide simple and transparent criteria for CDM eligibility and avoid the subjective analysis of the specific investment circumstances of a project. However, none of the methodologies submitted for approval have proposed such approaches to date. In addition, defining appropriate thresholds is methodologically challenging and requires a careful balance between the number of free-riders and the lost opportunities. For example, positive lists or penetration rates may be difficult to define because it would be necessary to consider the specific circumstances of the technology, the country and the sector.

In the following, practical experiences with the current approaches are analysed.

2.3.1 Practical experiences with the barrier analysis

The barrier analysis is most frequently used to demonstrate additionality. Among the analysed projects, 74% use the barrier analysis to demonstrate additionality. The barrier analysis is a voluntary step in the widely used “Tool for the demonstration and assessment of additionality” (additionality tool) and is used to demonstrate additionality for small-scale project activities. It is also used in the more recent “Combined tool to identify the baseline scenario and demonstrate additionality” (combined tool). The demonstration of additionality with a barrier analysis includes three logical steps:

1. Demonstration that barriers exist that would prevent the implementation of the proposed project without the CDM;
2. Demonstration that these barriers would not prevent the implementation of at least one alternative (the baseline);
3. Demonstration that the CDM helps overcome or alleviate the identified barriers.

These three steps were included in some form in the additionality tool and the combined tool, whereas only the first step needs to be applied for small scale project activities. The analysis of 93 registered projects reveals a number of serious weaknesses in the barrier test itself, its application by project participants and the assessment by DOEs. These findings are described in the following.

2.3.1.1 Barriers presented are not always credible

A key requirement of the barrier analysis is that barriers should be credible and should prevent the project from occurring without registration as a CDM project. For many barriers used to demonstrate additionality, it seems rather doubtful that their existence will actually impede the project from being implemented. 43% of the projects assessed that apply the barrier analysis do not provide an explanation of why the identified barriers are prohibitive, i.e. why they would prevent the proposed project activity. In addition, in a number of cases the barriers are not credible, very subjective or have little relation to the project activity.

For example, the following types of barriers have been used in registered CDM project activities to demonstrate additionality:

- General **financial risks**, such as, for example, the "risk of currency exchange rate", the "risk of possible future decrease of feed-in tariff" or the fact that "different financial factors may change in the future" or that "the biomass price may change in the future" are used to demonstrate that the project would not be implemented. In most of these cases, no further substantiation is provided on how likely such risks are, how they would impact the project and why they would prevent the implementation of the proposed project activity. However, while these financial risks are probably real, they are faced by practically all investments in all countries and are thus not suited to distinguishing additional from non-additional projects. Such general risks could be used by any project to claim its additionality.
- Standard features of technologies are declared as prohibitive **technological risks**. However, in many cases, management practices to deal with these technological features are well established around the world. For example, it is claimed that the "storage of rice husks entails risks".
- General **policy risks** are used as barriers, such as general statements on the "tariff policy risk". Similar to the financial risks, nearly all projects face some policy risks which make it difficult to assess whether such policy risks are relevant and would prevent the project.
- Sometimes the **management itself** is declared unable to manage a project. For example, the "unwillingness of the management to invest" is sometimes declared as a main barrier. While such statements may be true, they are highly subjective and difficult to prove. As stated above, the demonstration of additionality should not rely on the particular situation of an individual company but rather on the market environment for the project type.

Sometimes project features are claimed to be barriers when it is rather unclear why they are barriers or how they could impede the project implementation, including, for example:

- "The project exceeds current regulations";
- "It is hard to calculate the IRR";

- "The region is undeveloped and needs high investments".

Sometimes, very general statements are claimed to be key barriers without evidence being provided, such as that the "project would go bankrupt without CERs". One project even states as the main barrier what the barrier analysis should actually demonstrate, namely that "the project would not occur without CERs".

2.3.1.2 Costs as barrier

The procedure to demonstrate additionality for small-scale projects allows the use of an "investment barrier" showing that "a financially more viable alternative to the project activity would have led to higher emissions". For large-scale project activities, the additionality tool and the combined tool include an investment analysis for this purpose. These tools limit "investment barriers" to lack of access to capital but explicitly exclude economic barriers, which should be assessed as part of an investment analysis.[10] This difference in the definition of "investment barriers" for small-scale and large-scale projects has caused a number of problems.

Using costs as a barrier is very popular. 78% of the analysed small-scale projects that use the barrier analysis claim costs or access to finance as a barrier; indeed it is often given as the main barrier to establish additionality. However, in many cases of small-scale projects, no quantitative information on the costs is provided or, in some cases, the revenues from implementing the project are ignored, making an assessment of the economical attractiveness of the project impossible. Sometimes, the actual existence of costs is claimed as a barrier even though the project generates revenues and even though no problems in access to financing are mentioned. This includes projects where only a general reference to "investment costs" is used as a barrier that prevents the project. This is particularly problematic for projects that have very short pay-back times even without the CDM.

Interestingly, also 61% of the analysed large-scale projects claim costs as a barrier although the additionality tool and the combined tool explicitly exclude this.[10] Apparently, in these cases, DOEs have not considered the guidance of the tools and accepted costs as a valid barrier for large-scale projects.

2.3.1.3 Prevailing practice as a barrier

Nearly half of the projects claim that either the project is the "first of its kind" (14%) or that "prevailing practice" (30%) is a barrier. While the additionality tool provides "first of its kind" as the only example for a "barrier due to prevailing practice", in many PDDs prevailing practice is interpreted much broader than the "first of its kind" – similar to the

[10] The additionality tool refers to "investment barriers, other than the economic/financial barriers in Step 2 (investment analysis) above". Furthermore, "costs" are explicitly not mentioned as a relevant in barrier in the examples of investment barriers but these are limited to problems with access to capital and funding.

common practice analysis. In some cases, the project type has been implemented frequently elsewhere and nevertheless prevailing practice of this project type is claimed as a main barrier.

For example, some projects claim that the technology (e.g. small hydro power, wind power) only contributes a small percentage to overall electricity generation and thus faces a barrier of prevailing practice. However, in a diverse power sector this can easily apply to all power generation technologies. In addition, small percentages of electricity generation may include many plants that may operate economically and without major barriers. In other words, often the control group to establish common practice is defined very broadly and the technology used under the project is defined very narrowly.

Another problem is that the tools are interpreted differently on the question of whether other CDM projects should be included in the analysis or not. In a longer term perspective, the exclusion of other CDM projects does not make sense if all new plants in a sector are registered as CDM projects.

2.3.1.4 Lack of evidence for barriers

Although required by the tools and the modalities and procedures for the CDM, 43% of the analysed projects that apply the barrier analysis do to not provide or mention evidence for the existence of the key barriers. This includes many large-scale projects, for which the additionality tool and the combined tool contain a detailed list of acceptable evidence. If evidence is provided, it is often internal company information which is difficult to assess in an objective manner (in 34% of the projects that have provided evidence for barriers the evidence is internal company information).

2.3.1.5 Lack of evidence on how the CDM helps to overcome or alleviate the barriers

71% of the small-scale projects and 39% of the large-scale projects that use the barrier analysis do not provide any explanation of how the CDM helps to overcome or alleviate the identified barriers. Many of the others just provide a rather general statement that the CER revenues help to overcome the barrier. Few projects provide a substantial explanation, e.g. on how a cooperation with a technology supplier has been enabled by means of the CDM.

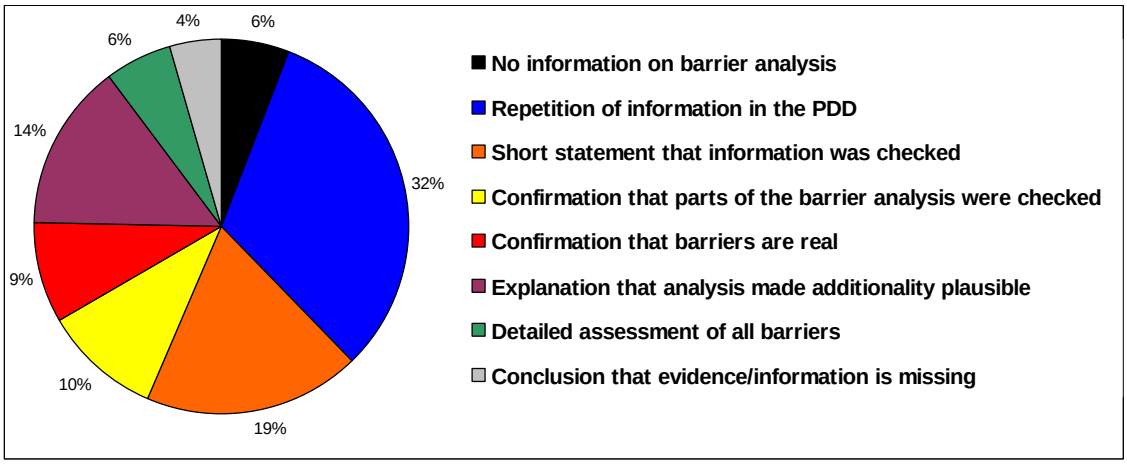
2.3.1.6 Assessment of barriers by DOEs

The information in validation reports on the assessment of the barrier analysis is varied. Figure 4 overleaf illustrates the type of information provided in the validation reports. Among the projects that have applied the barrier analysis, 38% of the validation reports do not provide a clear statement that the DOE has assessed and checked the credibility of the barriers: 6% of the validation reports do not say anything on the barrier analysis and 32% of the reports mainly repeat the information provided in the PDDs and do not clearly state whether the information in the PDD was checked and deemed plausible and credible by the DOE. About half of the validation reports (52%) provide some type of confirmation of the relevance of the barriers, e.g. that the information in

the PDD was checked, that the barriers are deemed real or that the analysis made additionality plausible. In these cases it is often not clear from the available documentation whether the DOE checked information was provided in the PDD or whether the DOE checked that the content of the information was correct, for example, by asking independent experts of the industry for an independent judgment.

Only 6% of the validation reports contain a detailed and transparent assessment of each barrier. This means that almost 95% of the validation reports do not explain in a transparent and detailed manner which barriers were assessed, how their relevance and prohibitive nature was checked, and which type of evidence was used for this purpose.

Figure 4: Information on the barrier analysis in validation reports of the analysed projects that have applied the barrier analysis



2.3.1.7 Conclusions on the barrier analysis

In conclusion, the way in which the barrier analysis is currently designed in the tools, implemented by project participants, and verified by DOEs is unlikely to result in a reasonable differentiation between additional and non-additional projects. The main problem is that the application of the barrier analysis is highly subjective, vague and difficult to validate in an objective and transparent manner. In many PDDs, the barriers provided are not credible, frequently no evidence for the barriers is provided and it is often often not clear whether and how the CDM had any affect on the barrier. The quality of the assessment by DOEs is unclear as most validation reports provide very little information on what was actually assessed by the DOE.

The barrier analysis and its application should therefore be reassessed thoroughly. Chapter 3 of this report provides some suggestions on improving and limiting the use of the barrier analysis.

2.3.2 Practical experiences with the investment analysis

The demonstration of additionality using the investment analysis requires demonstrating that the proposed project is economically less attractive than another credible alternative (the baseline). Using only an investment analysis for all project categories to demonstrate additionality was a controversial issue in the negotiations up to COP7 in Marrakech and was finally rejected. However, as the investment analysis was proposed in some new baseline methodologies submitted to the Board, it was included as an element in the additionality tool, the combined tool and a number of methodologies, some of which make the investment analysis a mandatory step.

The additionality tool and the combined tool as well as most baseline and monitoring methodologies that use the investment analysis require a sensitivity analysis to show that the conclusion regarding the economic attractiveness is robust and will stand up to reasonable variations in the critical assumptions. In the case of projects that do not generate economic benefits other than CER revenues, projects can apply a "simple costs analysis" and only need to demonstrate that the project generates additional costs. In the case of projects that generate other economic benefits (e.g. revenues from electricity sales or reduced cost), an investment comparison analysis or a benchmark analysis should be used. The investment comparison analysis compares the economic attractiveness of the proposed project with credible alternatives. The benchmark analysis compares the proposed project with a hurdle rate (e.g. a required internal rate of return), which should correspond to standard returns required by the market for the type of project activity.

Most projects use the barrier analysis rather than the investment analysis. One third of the analysed projects use the investment analysis; these are mostly large-scale projects. 61% of the analysed projects use the benchmark analysis, 26% the investment comparison analysis and 13% the simple cost analysis.

After the adoption of the Marrakech Accords, a controversial discussion arose as to whether project participants, in applying the investment analysis, only need to demonstrate that the project is economically unattractive or whether they also need to demonstrate that the project would become economically attractive with the CDM. In 2005, the CDM Executive Board clarified that it is sufficient to demonstrate that the project is economically unattractive.

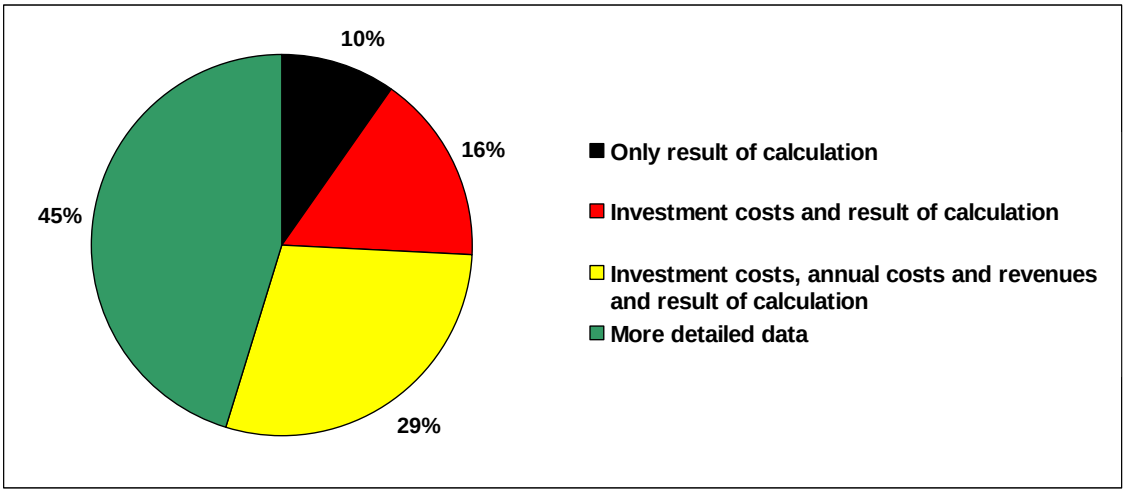
This decision has led to a strange situation for those projects in which the impact of the CER revenues on the economic attractiveness of the project is very small. In some cases, projects have claimed additionality on the basis of the investment analysis, although the internal rate of return was both with and without CER revenues far off the required hurdle rate. For example, the internal rate of return (IRR) of a wind power project in India is increased from 7.36% without CER revenues to 7.87% with the CDM, whereas the required hurdle rate to implement the project is given at 10.75%.[11] In such

[11] 125 MW Wind Power Project in Karnataka (Ref 0315)

cases, it appears difficult to claim that the CDM had an important role in the decision to proceed with the project activity.

Similarly as for the barrier analysis, the practical application of the investment analysis shows a number of weaknesses. In 29% of the analysed projects using the investment analysis the calculation of the project performance is not reproducible with the information provided. Some projects that were registered early used a "**black-box approach**" with regard to their assumptions and calculations, and did not provide all necessary information to reproduce the calculation. Figure 5 below illustrates that 10% of the analysed projects that used the investment analysis provide only the result of the calculation in the PDD. 16% provided information on the investment costs and the result of the calculation. On the other hand, there are many excellent examples: nearly half of the projects (45%) provided detailed data on all costs and revenues, most of them also providing information or justifications on key assumptions, as required by the tools.

Figure 5: Level of information provided in PDDs on the investment analysis



Another problem is that the required hurdle rate (the benchmark) is often not derived transparently. There is a very wide variation in the required hurdle rate. Among the analysed projects, the required internal rate of return (IRR) of the project ranges from 4% to 22%. Sometimes, the required hurdle rate varies between the same project types undertaken in the same country. This may be explained by the fact that 58% of the projects using the benchmark analysis do not derive the hurdle rate from external data but from company internal information. This is not consistent with the additionality tool which requires in most cases that the required hurdle rate "is to represent standard returns in the market, considering the specific risk of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer."

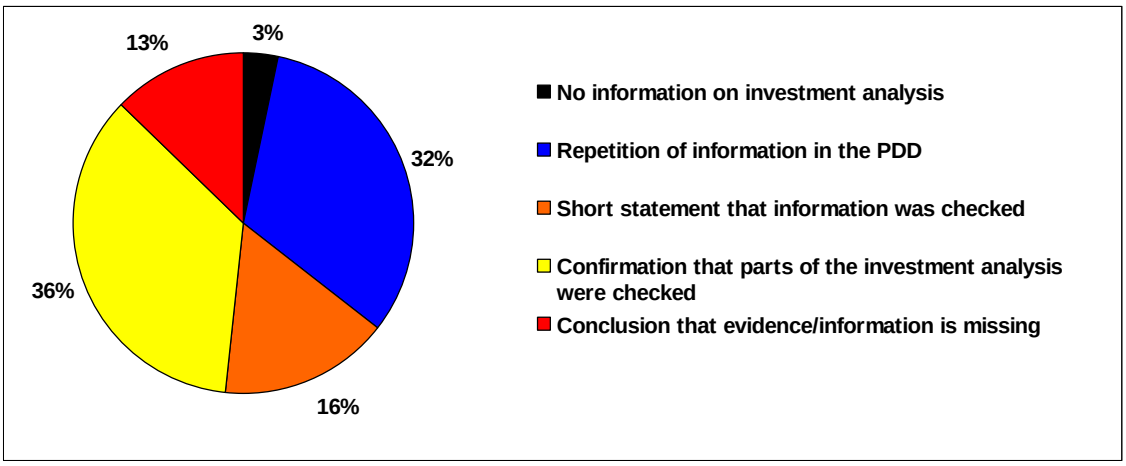
The additionality tool requires a sensitivity analysis to be carried out if the investment comparison analysis or the benchmark analysis is used. In one of the analysed projects that applies the additionality tool, no sensitivity analysis is provided at all. In other projects, the quality of the sensitivity analysis is rather varied. The number of scenarios ranges from one and eight, the number of parameters that are varied ranges from one

to seven and the range of these parameters is between 2% to 50% (many projects use a 10% variation). Indeed, the additionality and the combined tool do not provide clear guidance on which parameters should be varied and in which range.

It has also been stated that figures may not have been reported correctly in some PDDs. For example, Michaelowa (2007) reports that tax benefits for wind power plants in India appear to have been ignored systematically, resulting in a much lower IRR (Michaelowa 2007). Indeed, the additionality tool and the combined tool are not clear on how tax benefits should be considered. For some hydro power plants, differences between official project endorsement reports and PDDs have been identified (McCully 2005).

The level of information provided in validation reports on the assessment of the investment analysis is varied. Figure 4 illustrates that 35% of the validation reports do not provide a clear statement that the DOE has assessed and checked the figures and assumptions of the investment analysis. In 13% of the validation reports there is a statement that evidence or information is missing and that a clarification request has been made.

Figure 6: Information in validation reports on the investment analysis



In conclusion, the quality of the application of the investment analysis is highly varied. Whereas some projects provide a very transparent and detailed analysis, about 30% of the projects using the investment analysis use a black-box approach and do not provide the necessary information to repeat the calculation or understand the assumptions. The majority of projects that use the investment analysis derive the financial benchmarks from company internal information and not from external information, as required by the additionality tool for most cases. It has also been reported that figures used in the investment analysis are not always reported correctly. Although the investment analysis presents some deficiencies, chapter 3 indicates that it could be improved so that additionality can be demonstrated with reasonable certainty.

2.3.3 Practical experiences with the common practice analysis

The common practice analysis is an important credibility check to demonstrate that the project is not common practice in the region or country in which it is being implemented. In the additionality tool and the combined tool, the common practice analysis is a mandatory step that is applied in addition to the barrier or investment analysis. In the additionality tool and the combined tool, the common practice analysis does not specify a threshold and allows project participants to choose between a qualitative or quantitative assessment. In applying the common practice analysis, most projects (73%) use quantitative information. Only half of the projects (49%) use independent external documentation for their analysis. 15% of the projects are deemed common practice, but essential distinctions between the project and other similar projects are described.

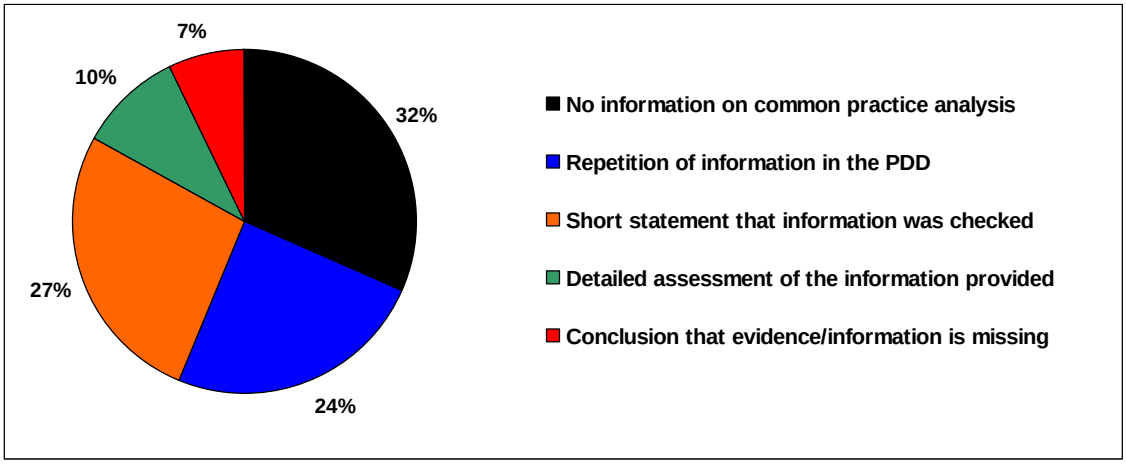
The strength of the common practice analysis is that it does not assess the motivation or intent of project developers but provides a more objective approach to assess additionality, based on an assessment to what extent the project activity is already being implemented in the host country or region. The main weakness is that the current tools do not clearly define when a project activity should be regarded as common practice, no threshold for common practice is provided in the tools. Only a few methodologies define common practice in the context of the type of project activity. For example, the methodology AM0011 defines that a project activity is not common practice if it occurs in less than 5% of similar cases. In methodologies AM0041 and AM0044, the project activity is regarded as common practice if 33% of the control group plants use a similar process to the project activity. Defining quantitative penetration rates that would allow an objective and clear threshold to differentiate between projects that are common practice (and thus regarded as additional) and projects that are not common practice is methodologically challenging (see, for example, Kartha, Lazarus and LeFranc 2005).

Another weakness of the current common practice analysis is that the baseline methodologies do not provide a clear definition of what a comparable technology is. In some cases, project participants have defined their technology so narrowly that practically no or only a few other similar projects have been implemented – although the technology type (e.g. biomass cogeneration with high pressure boilers) is quite common in the country. At the same time, they define the comparison group very broadly (e.g. all power generation in the country) such that the project activity will automatically have a low penetration rate – independent of the fact whether the project activity is frequently implemented in similar circumstances.

The assessment of the common practice analysis by DOEs appears particularly weak. Figure 7 illustrates that in 32% of the projects that use the common practice analysis the validation report does not provide any information on it at all. In another 24% of the projects the information in the PDD is predominantly repeated without a clear statement that the information was checked and deemed plausible and credible by the DOE. A detailed assessment of the information provided in the PDD is only provided in 10% of the projects. So, in more than half of the projects examined that applied the common practice analysis, the projects were registered even though independent information to

support the analysis had not been presented or it was not clear if the information presented had been checked by the DOE. To avoid such cases in the future, chapter 3 proposes concrete steps to improve the common practice analysis.

Figure 7: Information in validation reports on the common practice analysis



2.3.4 Other issues

2.3.4.1 Identification of baseline scenario candidates

As a first step to demonstrating additionality, most methodologies as well as the additionality tool and the combined tool require project participants to identify plausible and credible alternatives to the project activity. The procedure for small-scale projects does not include this step.

This step should ensure that the correct baseline scenario is included in the analysis and that alternatives that do not comply with relevant regulations are not considered. However, this step is not always implemented in practice. Only 57% of the projects systematically identify alternatives to the project activity that could be baseline scenario candidates. This applies particularly to small-scale projects for which the guidance given by the CDM Executive Board does not explicitly require such systematic identification of alternatives. However, some large projects also do not identify alternative baseline candidates although the underlying methodologies require them to do so.

2.3.4.2 Consideration of the CDM in the decision to proceed with the project

If projects seek retroactive crediting, i.e. if the starting date of the project activity is before the date of validation or registration, the guidelines provided by the CDM Executive Board for completing the PDD require that evidence is provided “that the incentive from the CDM was seriously considered in the decision to proceed with the project activity”. A similar provision was included in the first two versions of the additionality tool and was later integrated in the guidelines for completing the PDD.

About one third of the analysed registered projects have sought retroactive crediting. Yet, despite the clear guidance by the EB, only 55% of these projects provided information in the PDD that the CDM was considered when proceeding with the project. Of those that have given such information, two thirds of the projects provided evidence. In summary, only 36% of the projects adhered to this requirement. It has also been reported that documentation to show that the CDM was considered in the decision to proceed with the project has been backdated.

2.3.5 How additional are CDM projects?

The complexities and difficulties of assessing additionality of CDM projects have been described extensively above. In practice, investment decisions are complex – risks and chances of different options are usually assessed in an overall balance by the management. In addition, a fundamental difficulty in assessing additionality is that the answer to what would have occurred without the CDM is hypothetical and counterfactual and can not be answered with absolute certainty. Therefore, also any estimates of how many projects are not additional are associated with a significant uncertainty.

The analysis of 93 registered CDM projects has shown a number of serious weaknesses in the way in which additionality is assessed in practice. In addition, several other sources in the literature indicate that there could be considerable amount of projects which are unlikely to be additional. Based on these assessments, a rough estimate of the likelihood of additionality of different project types is provided. This estimate is derived from an analysis of the impact of CER revenues on the economic attractiveness of CDM projects.

2.3.5.1 Assessment of additionality of CDM projects in the literature

In their analysis of 52 Indian registered CDM projects, Michaelowa and Purohit (2007) came to the conclusion that at least two registered projects were clearly not additional. 19 projects were assessed in more detail and five out of these “provide doubtful arguments that should have triggered rejection by the validators”. In an article by The Guardian (Davis 2007), “one senior figure suggested there may be faults with up to 20% of the carbon credits already sold.” At a public workshop in 2003 in India to promote CDM projects, a DOE stated: “To be honest there are virtually no really additional CDM projects around at the moment. There are only a few exceptions” (Sutter 2003).

Several questions on additionality were included in a Delphi survey on the long-term prospects of CDM and JI in which individuals from business, research, governments, as well as multilateral and non-governmental organisations participated, including project developers and DOEs (Cames et al. 2007). In this survey, 71% of the participants agreed with the statement that “many CDM projects would also be implemented without registration under the CDM” and even 86% of the participants affirmed that “in many cases, carbon revenues are the icing on the cake, but are not decisive for the investment decision”, whereas only 57% of the participants agreed that “carbon revenues significantly increase the profitability of CDM and JI projects”.

Similarly, based on a comparison of investment costs and revenues from CERs, a recent OECD/IEA paper (Ellis and Kamel 2007) comes to the conclusion that "for many project types, CER revenue is more likely to be the 'icing on the cake' than the reason for undertaking the CDM project in the first place. This means that the underlying project may need to be economically attractive enough even in the absence of the CDM in order to attract sufficient investment capital."

In fact, the impact of carbon revenues on the economic attractiveness of projects differs heavily between projects types. In the analysed PDDs that use the investment analysis, the impact of CER revenues on the IRR is reported to be between 0.5% in the case of a wind power project and 29% for a coal mine methane recovery project.

Table 1 on page 42 differentiates project types according to the typical impact of CERs on their economic attractiveness, using the following three categories:[12]

A. **Projects without economic benefits other than CERs.** These project types do not save costs or generate revenue beyond the CER revenue. An impact of CER revenues on the IRR cannot be calculated because the project only causes costs without the CDM. Such projects include the destruction of N_2O from adipic or nitric acid production, the destruction of HFC-23 from HCFC-22 production or the flaring of CH_4 emissions. This can also apply to some projects in the energy sector, such as, for example, the free distribution of efficient light bulbs. The demonstration of additionality for these projects types is straightforward, since project participants do not have any other financial incentives than CER revenue to undertake the project, except where regulations require the implementation or where subsidies make it attractive.

B. **Projects with economic benefits other than CERs and considerable CER impact.** These project types generate other revenues than those generated through the sale of CERs (e.g. revenues from sale of electricity) but the CER revenue has considerable impact on the IRR, typically increasing the IRR by more than 10 percentage points. This typically applies to projects that recover and utilise CH_4 or avoid CH_4 emissions, such as the avoidance of CH_4 emissions from anaerobic decay of waste or biomass residues or from fossil fuel operations (coal mine methane, oil and gas industry). In addition, this can apply to some projects that reduce CO_2 emissions, such as the sale of efficient light bulbs at a reduced price.

C. **Projects with other economic benefits than CERs and small CER impact.** For these project types, the impact of CER revenue on the IRR is typically less

[12] This categorisation has been derived from different sources: The impact of CER revenue has been calculated for all analysed projects which have applied an investment analysis and which have provided data on investment costs, annual revenues and annual operation and maintenance costs. In doing so, a CER price of EUR 10 was used consistently for all project types. Moreover, values provided in the literature and expert judgements from project developers have been used.

than 10%. For some projects in this category, the impact of CER revenue on the IRR can be very low, ranging from 0.5% to 2% (e.g. wind power), whereas for others it can be more significant (e.g. hydro power). This project category includes energy generation from renewable sources, the construction of new natural gas power plants, improvement of energy efficiency in industry, use of alternative fuels in cement plants and switch from fuel oil to natural gas.

Table 1: Categorization of CDM project types according to the impact of CER revenues on the internal rate of return

	REGISTERED PROJECTS			PROJECTS IN THE PIPELINE		
Project type	**No of projects**	**CERs/yr (1000)**	**Share of CERs**	**No of projects**	**CERs/yr (1000)**	**Share of CERs**
A. Projects without revenue other than CERs	**157**	**111,319**	**66.3%**	**325**	**151,880**	**41.9%**
HFC-23 destruction in HCFC-22 facilities	16	69,869	41.6%	18	81,328	22.4%
N2O destruction from adipic/nitric acid production	13	24,915	14.8%	41	42,235	11.6%
Flaring of landfill gas	31	7,498	4.5%	63	10,694	2.9%
Flaring of methane from manure, waste water treatment, etc	94	4,363	2.6%	185	6,977	1.9%
Flaring in the oil&gas industry	3	4,674	2.8%	18	10,647	2.9%
B. Projects with considerable CER impact	**92**	**15,864**	**9.5%**	**320**	**50,905**	**14.0%**
Coal bed/mine methane	4	3,523	2.1%	39	19,256	5.3%
Power generation from landfill gas	26	8,144	4.9%	63	15,842	4.4%
Use of methane from manure, waste water treatment, etc	41	1,110	0.7%	104	5,865	1.6%
Energy generation from biomass with avoidance of CH4 emissions	21	3,086	1.8%	114	9,942	2.7%
C. Projects with small CER impact	**546**	**39,996**	**23.8%**	**1,564**	**152,029**	**41.9%**
Renewable energy generation (except biomass)	267	19,908	11.9%	774	62,277	17.2%
Recovery of industrial waste gases for energy generation	37	6,142	3.7%	225	39,463	10.9%
New natural gas power plants	2	3,371	2.0%	23	22,094	6.1%
Energy efficiency in industry	50	1,344	0.8%	135	5,934	1.6%
Use of alternative fuels in cement plants	14	2,014	1.2%	28	3,827	1.1%
Switch from fuel oil to natural gas	16	510	0.3%	44	2,887	0.8%
Energy generation from biomass without avoidance of CH4 emissions	160	6,707	4.0%	335	15,547	4.3%
Projects not covered by the analysis	**8**	**619**	**0.4%**	**58**	**7,980**	**2.2%**
TOTAL	**803**	**167,798**	**100.0%**	**2,266**	**362,794**	**100.0%**

Sources: Project pipeline by 1 October 2007 according to UNEP/RISOE (2007); The categorization is based on calculations of the internal rate of return based on information provided in PDDs, our own estimates, Michaelowa (2007), Winkel (2006) and Sutter and Parreño (2007)

2.3.5.2 Assessment of the likelihood of additionality for different project types

Based on an approach introduced by Sutter and Parreño (2007), the impact of CER revenues on the economic attractiveness of the project activity is used to judge the likelihood of whether a project is additional. The change of the internal rate of return (IRR) of the project due to CER revenues is used as an indicator.[13]

[13] This indicator expresses how much impact CER revenues have on the economic performance of the project. The indicator has limits when applied to a project which is already clearly economically attractive without the CDM. Other indicators have also been suggested in the literature, such as, for example, the CER revenues per investment costs (Ellis and Kamel 2007), which may better reflect the role of the CDM in getting financing but which do not consider the relation of CER revenues to other non-CDM related revenues (e.g. from sales of electricity).

Although the tools allow for demonstration of additionality with a barrier analysis, most projects argue in the conclusion of the barrier analysis that the CDM revenue helps to overcome the barriers and not the registration as a CDM project as such. Often barriers can be expressed as economic risks and revenue from the CDM may help to address these barriers. In this regard, the amount of CER revenue is also an important factor for projects that are prevented by barriers. Projects that have large CER revenues in relation to investment costs and annual revenues and costs are more likely to overcome the identified barriers than projects where the impact of CER revenues is marginal. Similarly, Winkel (2006) comes to the conclusion that "a large difference between the IRR with and without the sale of CERs will make it easy to prove additionality" while noting that "many other factors also play a role in the issue of additionality, such as the existence of barriers, impact of CDM on the diversity of cash flow, and impact of CDM on improved debt service ratio."

The likelihood of additionality of registered CDM projects is estimated for the three project categories A, B and C, reflecting the different role of CER revenue, as follows:

- For project category A, the demonstration of additionality is straightforward. Projects in this category are very likely to be additional. Nevertheless, in a few cases, these project types would also be implemented without the CDM, in particular at later stages during the crediting periods, when governments may adopt respective regulations for environmental or safety reasons. International companies sometimes also have internal policies to abate GHGs with a very high global warming potential. For example, according to Cames et al (2007), out of six adipic acid plants in developing countries one had already installed a N_2O mitigation technology prior to 2000. We estimate that about 95% of the projects in this category are very likely to be additional and that for the remainder additionality is questionable.
- For project category B, CER revenues play a rather important role and can bring the project far above the required financial hurdle rate or help to address barriers that would prevent the project. However, in a number of cases, these projects may already be economically quite attractive without the incentive the CDM offers. This is supported by the fact that 62% of the analysed projects in this category use the barrier analysis to demonstrate additionality. Among the analysed projects in this category, four have applied the investment analysis and provided all necessary data to reproduce it. In three of them CER revenues impact the internal rate of return of the project considerably and bring the project above the required hurdle rate. In the case of one project, the CER revenues are not sufficient to make the project economically attractive. For this project category, we estimate that for about 70% of the projects additionality is likely and that for roughly 30% of the projects additionality is unlikely or questionable.
- For project category C, CER revenues play a less important role. Most projects in this category create other revenues that by far outweigh the CER revenue. For about 50% of the analysed projects that use the barrier analysis, the main

barrier is either rather subjective or not very credible. This includes, for example, general policy risks, general financial risks, or the unwillingness of the management to invest, as described in section 2.3.1. About one third of the projects do not provide any evidence for the barriers. Among the projects that use the investment analysis and that provided the necessary data to reproduce it, for about one third of the projects the CDM revenues do not make the investment economically attractive. For about another third the impact of the CDM is with an increase of the IRR of about 2% points very small, making it less likely that the CDM was decisive. For about one third, the CDM has a considerable impact on the economic attractiveness and brings the project above the required hurdle rate. For this project category, we estimate that for about 50% of the projects additionality is unlikely or at least questionable.

These rough estimates are applied to the portfolio of projects registered by 18 July 2007. In total, it is estimated that for about 40% of the registered CDM projects additionality is unlikely or questionable. These projects are expected to generate about 20% of the CERs. This latter figure is lower because about two thirds of the projects registered to date belong to category A, for which the demonstration of additionality is straightforward. On the other hand, the current project portfolio in Table 1 on page 42 shows that the share of projects for which the demonstration of additionality is more challenging (category C) will grow in the future, as the “low hanging fruits” projects (mostly category A) have already been picked to a large extent. Hence, there is a risk that the share of emission reductions from projects for which additionality is unlikely or questionable could increase further in the future if additionality were assessed in the same manner as was the case in the past three years. This underlines the importance of improving the assessment of additionality.

Our analysis is based on the *average* situation for the past three years. Recently, the CDM Executive Board has strengthened its procedures to assess requests for reviews. As a result, the share of projects that is rejected by the Board has increased recently (see Figure 2 on page 23). In many cases, additionality was a key reason for rejection. In this regard, it is likely that the recent share of projects where additionality is unlikely or questionable is lower while it may have been higher at the very beginning of the registration process. Finally, one should also bear in mind that the numbers derived above are rough estimates, for the reasons highlighted above. Nevertheless, the magnitude is supported by other estimates in the literature, such as the results of the Delphi survey (Cames et al. 2007).

2.3.6 Conclusions on the demonstration of additionality

Our analysis on the way in which additionality has been assessed in the past three years under the CDM suggests that a high level of environmental integrity could not yet be achieved. It is very likely that a significant amount of registered projects are not additional. There are several reasons for this:

1. Some of the tools currently used are not very well suited to assessing whether a project is additional or not. This is mainly related to their ambiguity and the lack of objective and transparent criteria. For example, concepts, such as “first-of-its-kind” or “common practice” are not clearly defined.
2. The practical experiences show that in many cases guidance in the tools to demonstrate additionality has not been applied correctly. Often, no clear rationale and convincing argumentation to demonstrate additionality is provided. In particular, the application of the barriers analysis in PDDs is subjective, not transparent and rarely convincing.
3. It is unclear to what extent Designated Operational Entities (DOEs) questioned key assumptions on the demonstration of additionality given the level of information that is provided in validation reports, the few corrective action and clarification requests put forward by some DOEs, and taking into account that they operate in a highly competitive market. Spot checks undertaken at three DOEs have revealed serious non-conformities.
4. Surveys and estimates in the literature as well as interviews with stakeholders suggest that most market participants believe that many projects would also be implemented without the CDM.
5. For some project types, the impact of carbon revenues on the economic attractiveness of the project is marginal or small and thus unlikely to be decisive in making the project economically attractive or overcoming key barriers that prevent the investment decision.

Any approach to assess additionality will not be perfect. It will need to be accepted that there are some free-riding projects taking part in the CDM if the requirements should remain reasonable and if this market should grow further. In defining the requirements on additionality, a balance between the number of acceptable free-riders and the lost opportunities of CDM projects needs to be found. Free-riders result in increased global GHG emissions because the CDM is an offset mechanism. On the other hand, lost opportunities for CDM projects result in higher global GHG mitigation costs and – if the projects significantly contribute to sustainable development – to less benefits for sustainable development in the host countries. In this regard, the acceptable level of free-riding in the CDM is a policy decision which needs to balance the amount of “hot air” in the CDM against lost opportunities for CDM projects.

The recent strengthening of the assessment of projects by the CDM Executive Board is an important step to ensure that the CDM meets its environmental integrity objective. However, additional efforts are needed, in particular the development of more objective procedures to assess additionality and more guidance and sanctions to DOEs to improve the transparency and consistency of their assessment of additionality. This is particularly important if the CDM is to continue to grow and to play an important role beyond 2012. An up-scaling of the CDM without a parallel strengthening of its environmental integrity could seriously endanger global efforts to mitigate climate change. Proposals to improve the assessment of additionality are provided in chapter 3.1.2.

2.4 Sustainable development impact

One of the two objectives of the CDM is to assist developing countries in achieving sustainable development. In the modalities and procedures agreed in Marrakech in 2001, Parties agreed that host countries have to confirm that a proposed project assists in achieving sustainable development. In the years thereafter, the CDM Executive Board has clarified several times that it is not the task of the Board but that of the host country governments to assess whether CDM projects assist in achieving sustainable development.

The actual impact of CDM projects on sustainable development is difficult to assess because it depends on the definition of sustainable development which is defined by most countries in very broad terms. Many countries have established and published criteria to assess whether a project contributes to sustainable development. However, they are often very general and comprise many different aspects, including environmental, social, economic and technological criteria. Most projects comply with some of the criteria but only a few comply with criteria that are related to the achievement of the Millennium Development Goals. For example, many CDM projects, directly or indirectly, reduce air pollution or contribute to the diffusion of environmentally sound technologies, whereas only very few projects directly contribute to poverty alleviation.

Some host countries have very ambitious sustainable development criteria. Nevertheless, a clear prioritisation of project types which would have larger benefits for sustainable development can not be observed. An illustrative example is India. India's sustainable development criteria include:

- poverty alleviation, including generating additional employment, removal of social disparities and contribution to provision of basic amenities to the people;
- additional investment consistent with the needs of the people;
- environmental criteria, including the impact of the project activity on resource sustainability and resource degradation, bio-diversity friendliness, impact on human health, reduction of levels of pollution in general; and
- the development, deployment, diffusion and/or transfer of environmentally safe and sound technologies.

However, apparently projects do not need to comply to all or the majority of the criteria, but only to one of them. So far all types of project, including the destruction of HFC-23 and N_2O, are approved by the host country. Point Carbon (2006) reported that the quality of some Indian CDM projects had been called into question by potential investors and project participants, arguing that host country approval had been given to projects which clearly did not contribute to sustainable development. Sirohi (2007) highlights that "poverty alleviation lies at the core of the country's development priorities" but her study of Indian CDM projects reveals that the "CDM is not contributing to rural poverty alleviation to any notable extent".

Generally, it can not be observed that host countries prioritize projects with high sustainable development impacts by rejecting projects with little or no sustainable devel-

opment impact. This has resulted in a situation in which the CDM project portfolio is mainly determined by the economic attractiveness and potential and risk of the mitigation options. In a global CER market, host countries may indeed be reluctant to reject projects with little or no positive impact for the sustainable development due to a strategic dilemma. If all host countries would reject projects with few benefits for sustainable development, the global CDM portfolio would be impacted, as investors and project developers would have to focus on projects with high benefits for sustainable development. If only one or few countries have more ambitious criteria for sustainable development, this will lower their overall CDM market share, as the investors and project developers could still develop projects with low benefits for sustainable development in other countries.

Several publications have criticised that the CDM does not sufficiently fulfil its objective of assisting host countries in achieving sustainable development. Olsen (2007) has evaluated the contribution of the CDM by reviewing close to 200 studies and comes to the conclusion that "left to market forces, the CDM does not significantly contribute to sustainable development". Sutter and Parreño (2007) have evaluated quantitatively the sustainable development impact of 16 projects registered by August 2005, using the contribution to employment, the distribution of the CER returns and the improvement of local air quality as criteria for achieving sustainable development. They come to the conclusion that only 1-2% of the CERs come from projects that are likely to have a contribution to sustainable development. Similarly, Michaelowa and Michaelowa (2007) conclude that "projects addressing the poor directly are very rare and that even small renewable energy projects in rural areas tend to benefit rich farmers and the urban population". However, a number of projects have indirect benefits for the overall economy, as many projects create employment, indirectly improve the infrastructure or at least provide CER revenues to the economy.

In conclusion, the current contribution of the CDM to sustainable development appears to be low. Recently, projects with a potentially larger contribution to sustainable development, such as energy efficiency improvements in rural households or rural renewable electricity generation are gaining some importance. CDM programmes of activities[14] could potentially help towards achieving this objective. Nevertheless, within the overall project portfolio the contribution of the CDM to some sustainable development objectives, such as poverty alleviation, will likely remain low.

[14] Under a programme of activity (PoA), a coordinating entity implements many disperse CDM programme activities (CPAs). In contrast to single project activities, PoAs are particularly suitable for projects which are dispersed, have high individual transaction costs, small generated amounts of emission reductions and a medium- to long-term perspective of implementation, such as energy efficiency projects in households. Small countries that have not yet benefited from the CDM because they do not own large emitting facilities could implement PoAs which involve many small users.

2.5 HFC-23 and N_2O destruction

The destruction of HFC-23 in HCFC-22 facilities and the destruction of N_2O from adipic or nitric acid production are CDM project activities that have very low GHG abatement costs of less than 1 US$/t$CO_2$e. Their market share in the CDM is significant. Based on the current project portfolio, HFC-23 destruction projects are projected to make up 22.4% of the CERs, and N_2O projects 11.6%. These projects have been criticised for:

- not contributing to sustainable development in the host countries;
- not contributing to the necessary long-term transition of economies to renewable energies and a highly efficient use of energy;
- providing large windfall profits for few companies; and,
- in the case of HFC-23, providing perverse incentives to expand HCFC-22 production.

These aspects are briefly discussed in the following sections.

2.5.1 Impacts on sustainable development, long-term transition of economies and windfall profits

Most host countries that have established criteria to assess whether a project contributes to sustainable development differentiate between environmental, social, economic and technological criteria (see section 2.4). When applying these criteria to the destruction of HFC-23 and N_2O, these projects types appear to have very few or no benefits for sustainable development. As HFC-23 and N_2O are not local air pollutants, it is clear that their destruction does not provide local environmental benefits for the host country. Social benefits are also not expected. In addition the destruction facilities do not result in any significant additional employment or increase the competitiveness of the industry. A new technology is applied; however, the type of technology (e.g. thermal oxidation) is in most cases not innovative and already available in the host countries. Moreover, HFC-23 and N_2O destruction projects do not induce a long-term transition of energy consumption patterns, but largely apply end-of-pipe technologies.

In most countries, the plant operators benefit from the windfall profits. The overall windfall profits from such projects are considerable: Cames et al. (2007) estimate the cumulative windfall profits from HFC-23 destruction under the CDM at about 3 billion EUR up to 2012 with CER prices of 5 EUR.

About 80% of HFC-23 destruction under the CDM is taking place in China. In China, the government levies a tax of 65% on CERs from HFC-23 and N_2O CDM projects. This will generate considerable additional funds for the government. Indeed, the Chinese government is expected to earn 1.5 billion EUR from these project types by 2012 (Ellis and Kamel 2007, page 33). It is planned that this revenue will be directed to a special fund which could potentially be used for additional climate mitigation and adaptation or for other purposes with the aim of achieving sustainable development. In this way, these projects might indirectly provide benefits for sustainable development. An

early HFC-23 project also allocated a proportion of the revenues for community projects.[15]

2.5.2 Perverse incentives from HFC-23 destruction

HFC-23 is an unwanted by-product in the production of HCFC-22. HCFC-22 is an ozone-depleting substance (ODS) as well as a GHG with a global warming potential (GWP)[16] of 1,700[17] and it is controlled under the Montreal Protocol.[18] HCFC-22 is mainly used as refrigerant in air conditioning as well as commercial and industrial refrigeration systems. HCFCs have a lower ozone-depleting potential than chlorofluorocarbons (CFCs) and are therefore used as intermediate replacements for CFCs.[19] In addition, HCFC-22 is used as feedstock for the production of polytetrafluoroethylene (PTFE). The use of HCFC-22 as feedstock is not controlled under the Montreal Protocol, since emissions from feedstock use are estimated to be insignificant.

HFC-23, the unwanted by-product of HCFC-22 production, is not an ODS but a GHG and is controlled under the Kyoto Protocol. It has a very high GWP of 11,700 for the first commitment period from 2008 to 2012.[20] If the HFC-23 waste stream is mitigated under the CDM, plant operators gain significant revenues from CERs, due to the high GWP of HFC-23. Table 2 shows the impact of CER revenue on the HCFC-22 production costs for three different scenarios.

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15 For example, the project for GHG emission reduction by thermal oxidation of HFC 23 in Gujarat, India (Ref 0001) uses, according to Annex 12 of the PDD, a share of the CER revenues to sponsor activities for the local communities, such as the facilitation of improved management of cattle fodder. No information on the magnitude of the spending is provided.

16 The global warming potential (GWP) describes the global warming effect of a GHG over a time horizon of 100 years in mass relation to carbon dioxide.

17 IPCC 2001: Climate Change 2001: The Scientific Basis. Contribution of Working Group 1 to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom and New York, NY, USA

18 Under the Montreal Protocol, consumption of HCFCs for purposes other than feedstock-use is gradually phased out. Industrialised countries (non-Article 5.1 Parties) are committed to gradually reducing their consumption of HCFCs (e.g. by 90% up to 2015, 99.5% up to 2020 and 100% up to 2030 - compared to the base level in 1989). Developing countries (Article 5.1 Parties) are committed to stabilising production and consumptions levels from 2016 to the 2015 level. Consumption and production of HCFCs for purposes other than feedstock-use is phased out by 2040.

19 Under the Montreal Protocol, HCFC-22 has an ozone-depleting potential of 0.055 compared to the ozone-depleting potential of CFC-11.

20 Article 5.3 of the Kyoto Protocol and decision 2/CP.3 established that during the first commitment period the global warming potentials for a time horizon of 100 years reported in the Second Assessment Report by the IPCC should be used.

Table 2: Economic implications of HFC-23 destruction under the CDM

Scenario		Low Impact	Reference	High Impact
Assumptions				
HFC-23 / HCFC-22 ratio	-	1,5%	2,2%	3,0%
HFC-23 abatement costs	US$/$CO_2$e	1,0	0,6	0,2
Market price for CERs	US$/CER	5	10	15
Share of CERs allocated to plant operator	-	50%	75%	98%
Market price for HCFC-22	US$/kg HCFC22	2,4	1,7	1,1
Economic effects of CER revenues				
Net profit from CER revenues	US$/kg HCFC22	0,3	1,8	5,0
Potential reduction of HCFC-22 production costs	**-**	**11%**	**103%**	**458%**

Source: Schneider et al. (2005)

The table shows that the economic implications of the CDM are considerable for these project types. The revenues from CERs may be considerably higher than the market price for HCFC-22 and thus also higher than production costs. In this calculation, CER prices are the most sensitive parameter. In the reference scenario, with CER prices at 10 US$, CER revenues from the destruction of HFC-23 exceed HCFC-22 production costs. In the scenario with high impact, CER revenues are more than four times higher than HCFC-22 production costs. This could be a significant incentive to increase HCFC-22 production. However, as a result of this perverse incentive, the crediting of HFC-23 destruction projects is limited to historical HCFC-22 production levels before 2005. No CERs are issued for HFC-23 resulting from an increase in HCFC-22 production. In this regard, there are currently no perverse incentives from the CDM to increase HCFC-22 production beyond historic levels before 2005. Whether and how increased production under the CDM is credited is currently debated by COP/MOP.

The crediting of HFC-23 destruction for the historic HCFC-22 production level though may provide perverse incentives not to phase out HCFC-22 production. A decrease of HCFC-22 production below historical level used as reference for the definition of existing production capacity would result in considerably less revenue for the companies and, in the case of China, for the government. This results in a strong financial incentive to continuously rely on HCFC-22 rather than its substitutes.

Recently, Parties under the Montreal Protocol agreed on an accelerated phase-out of HCFCs. Developing countries will freeze their HCFC production by 2013 at the 2009/2010 level and already reduce HCFC production by 10% by 2015. Currently, HCFC-22 production levels are already well beyond historical levels before 2005 (TEAP 2007). According to different projections (IPCC/TEAP 2005; TEAP 2007; Cames et al. 2007), HCFC-22 production may still increase during the next few years until the freeze in 2013 comes into effect. When COP/MOP considers the crediting of new production under the CDM, the perverse incentives described above would still be an issue to be addressed, in order to avoid that production is increased until 2013 as a result of the CDM.

In conclusion, despite the public criticism, it is unlikely that there are any perverse incentives to increase HCFC-22 production under the current rules of the CDM. How-

ever, such incentives should be carefully taken into account in the context of discussions on crediting additional production capacity.

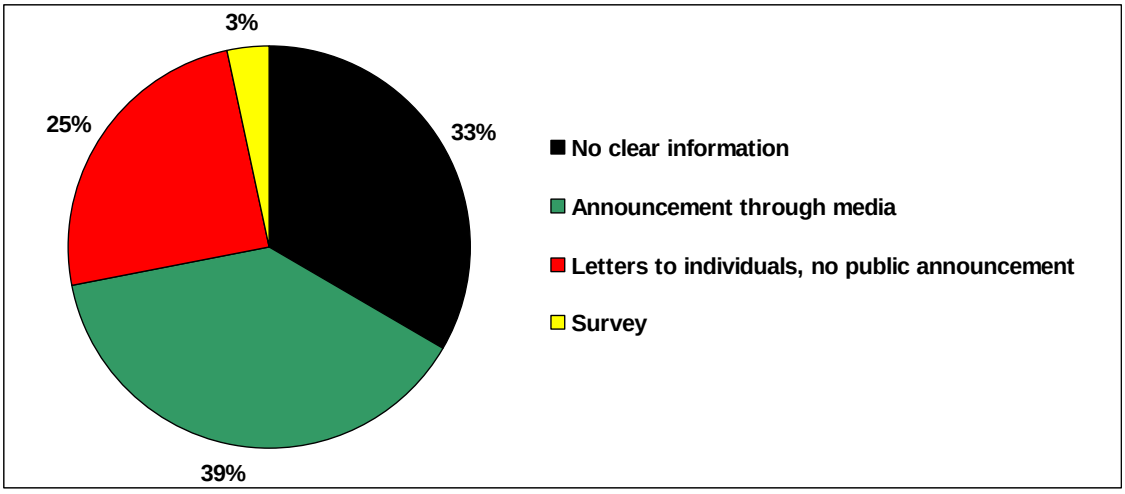
2.6 Stakeholder consultation

The modalities and procedures for the CDM require that “comments by local stakeholders have been invited, a summary of the comments received has been provided, and a report to the designated operational entity on how due account was taken of any comments has been received”. Stakeholders are defined as “the public, including individuals, groups or communities affected, or likely to be affected, by the proposed clean development mechanism project activity”. In the following, the practical application of these requirements is assessed for the 93 projects analysed.

2.6.1 Invitation of stakeholder comments

In order to ensure a meaningful stakeholder consultation, it is important that all stakeholders, i.e. individual, groups or communities that are likely to be affected by the project, are actually invited for comments. Correspondingly, a section of the PDD requests project participants to describe the way(s) in which stakeholders were invited. Nevertheless, one third of the analysed PDDs and validation reports do not clearly document this (see Figure 8). Announcements in different media or by similar methods, such as loudspeakers, are the most common practice and were made in 39% of the projects. In 25% of the projects, no public announcement was made; only individuals or representatives were contacted by letter, phone-call or interview. A public survey has been conducted in 3% of the projects; however, it was not always clear what this included.

Figure 8: Description of how stakeholder comments were invited



Inviting comments from selected individuals is clearly not sufficient, as other stakeholders may not agree with these comments or may be affected differently by the project activity. In some PDDs, the project participants argue that the project will not have negative impacts on the environment or that nobody will be negatively affected and that therefore a public stakeholder consultation is not necessary. For example:

- In many PDDs from India, apparently only the local village administration, the Panchayat, was invited to give stakeholder comments on the grounds that the Panchayat represented all stakeholders: "The village Panchayat/local elected body of representatives administering the local area is a true representative of the local population in a democracy like India."
- "As the project only involves the switch to natural gas in an existing facility, no stakeholders were significantly affected. In fact, the main stakeholder of the project is the gas supplier who is a project participant."[21]
- "Since the hydro power project is a small project with a minor impact in the area, and did not require a full Environmental Impact Assessment, there was no obligation to carry out a public consultation. Nevertheless, the project sponsors carried out direct consultations with all directly affected people or institutions." The PDD then elaborates that several relevant comments were made, e.g. on water needs for irrigation, and that these were later taken into account in the design of the project. This shows that a consultation of local stakeholders was clearly needed.[22]
- "As the project is at offshore location, so there are no local stakeholders apart from employees. The project participant has invited comments from its employees by putting up a notice at offshore platform and communicated orally with the employees."[23]

This limited invitation of comments from selected representatives is not consistent with the definition for stakeholders agreed by Parties in the modalities and procedures for the CDM. These not only require the consultation of representatives of the population (e.g. the host country government) but also make explicit reference that "individuals, groups or communities" that are likely to be affected by the project need to be consulted. This requirement has, in a number of cases, been ignored by project participants and DOEs. Indeed, different organisations have reported on cases in which local communities were affected by project activities and were not invited for comments. Only 40% of the projects clearly document that *all* stakeholders that are likely to be affected by the project activity were invited to comment. This result reveals that it is necessary to give additional guidance to project developers and DOEs with regard to which stakeholders should be invited and how such an invitation should be made.

2.6.2 Documentation of stakeholder comments

Despite the varied ways in which stakeholder comments were invited, comments have been provided in 86% of the analysed projects. Apparently, in many cases the com-

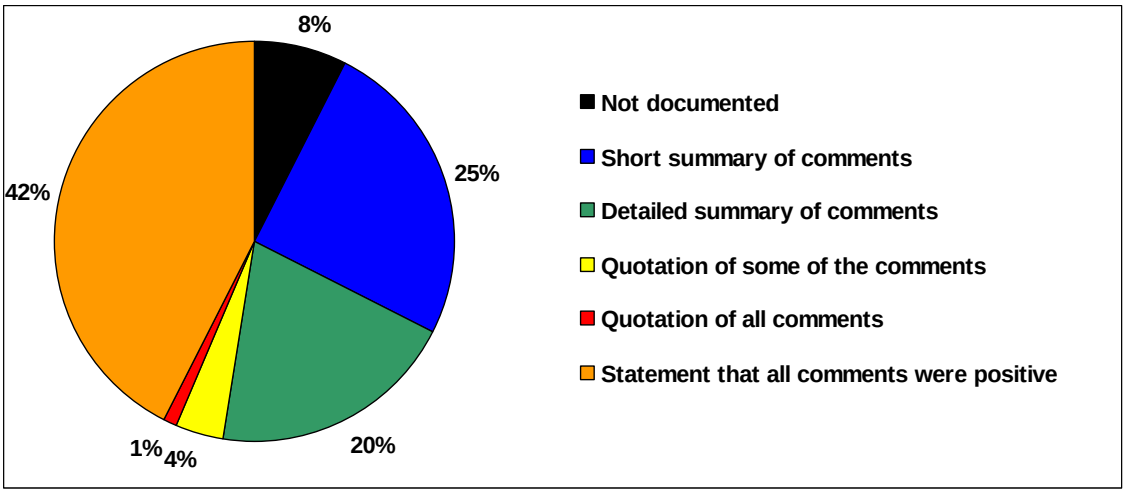
[21] Quimvale and Gas Natural Fuel Switch Project (Ref 0828)

[22] Chacabuquito Hydroelectric Power Project (Ref 1052)

[23] Waste heat recovery from Process Gas Compressors (PGCs), Mumbai high south (offshore platform) and using the recovered heat to heat process heating oil (Ref 0814)

ments were all positive. In these cases, project participants often provide a short statement in the PDD that all comments were positive (42% of the analysed projects for which stakeholder comments were received). In 45% of the PDDs, a summary of the content of the comments was provided, whereas 8% of the PDDs do not provide any information, however, some of these projects refer to other documentation (e.g. an expanded PDD) that is not publicly available.

Figure 9: Information on stakeholder comments in the PDD



2.6.3 Consideration of stakeholder comments

Most PDDs only provide a general statement that all comments were positive or that all comments were taken into account, without actually describing how they were taken into account. One third of the PDDs (32%) describe how comments were taken into account. In a number of cases, negative comments were apparently ignored in the PDD:

- In the summary of comments, one PDD explains that "the host communities welcomed the project" and quoted three positive letters that support the project. However, one of the letters mentions that "many frivolous and contemptuous letters of threat and protest" were received regarding the project. These negative comments were not mentioned in the PDD at all.[24]
- In a wind power project, 25% of the respondents believed that the project would have negative impacts on their livelihoods, inter alia during the construction period and due to nature and land-use. Nevertheless, in explaining the way in which due consideration was taken of comments, the PDD states that "the resi-

[24] Recovery of associated gas that would otherwise be flared at Kwale oil-gas processing plant, Nigeria (Ref 0553)

> dents and local government are all very supportive of the project, and therefore there has been no need to modify the project due to the comments received".[25]

The assessment by DOEs of the way in which due consideration was taken of stakeholder comments is rather unclear. By far the majority of validation reports (71%) only summarise how stakeholder comments have been collected, repeat information from the PDD or repeat the content of the comments but do not provide an assessment of whether the stakeholder comments were appropriately considered by the project participants.

The documentation in validation reports is in most cases also not fully clear on how the comments received by DOEs during the four week commenting period through the UNFCCC website are taken into account. For example, TÜV-SÜD publishes these comments in full length only if they are received from an accredited UNFCCC observer organization. The basis for differentiating between accredited and not accredited UNFCCC observer organizations is not clear.

[25] Inner Mongolia Huitengliang 49.5MW Wind Power Project (Ref 0589)

3 Options to improve the environmental integrity of the CDM within the UNFCCC

The problems with regard to the environmental integrity and sustainable development objectives of the CDM, as described in this report, could be addressed by a number of measures which are analysed in the following sections. These measures aim to enhance the environmental integrity of the CDM, improve its impact on sustainable development and provide incentives for a more balanced geographical distribution of projects, while ensuring that transaction costs remain reasonable and procedures are kept reasonably simple.

Many proposed measures could already be implemented during the first commitment period under the Kyoto Protocol. Some others would require amendments to the modalities and procedures of the CDM which could be undertaken as part of the review foreseen prior to the end of the first commitment period. Some of the proposed actions are also already being considered by the CDM Executive Board.

The analysis includes options to improve the current project-based or programmatic CDM as well as a short and preliminary analysis of the currently discussed options for scaling up the CDM beyond 2012, namely “policy CDM” and “sectoral CDM”.

3.1 Options for improving the current CDM

3.1.1 Revisiting the role of DOEs

As a result of increasing concerns about the performance of some DOEs, some action has already been taken by COP/MOP and the CDM Executive Board. These include:

- **Guidance to DOEs on validation and verification.** COP/MOP2 requested the Executive Board to develop guidance for DOEs on verification and validation in order to promote quality and consistency in verification and validation reports. A process to develop such guidance has started. Given the varying performance of DOEs observed to date and the highly competitive market, a more elaborated guidance would also help to ensure consistency, transparency and a high quality in the assessment of projects by DOEs. The guidance could address issues that are of particular risk, such as additionality and baseline selection, more specifically by referring to how typical elements, such as the barrier analysis or the investment analysis, should be evaluated. This could include information on which types of evidence can be regarded as credible, which type of independent data and judgments should be used, or which exact data should be checked as part of an investment analysis. Similarly, the manual could specify in more detail how key assumptions and choices of key parameters, such as emission factors, should be evaluated and assessed. This could also include methodology-specific components. The guidance could also clarify in which cases and how site visits should be undertaken. Finally, it would be useful to provide clearer guidance to DOEs on the documentation they have to provide regarding

how they carried out the validation and what type of information they considered.

- **Policy framework to address non-conformities and non-compliance.** In July 2007, the CDM Executive Board decided to develop such a policy framework to address non-conformities and non-compliance by DOEs in a systematic manner. Such a framework could include rigorous criteria for suspension or withdrawal of the accreditation. For example, a DOE could be suspended automatically if it failed three times to meet a key requirement of the CDM. A spot check at the DOE could be triggered automatically if one or more reviews have been requested by the Board. The CDM Executive Board could also introduce financial consequences for DOEs if they fail to meet requirements. The existence of such criteria alone may provide incentives for DOEs to create sufficient internal procedures and capacity building to ensure that all requirements by the Executive Board are checked. However, developing such a policy framework raises a number of legal questions that are not easy to address. For example, the way in which non-conformities that were not identified at the registration should be handled during verification would need to be clarified. In other cases, the lack of clarity as to what exactly DOEs are supposed to do during validation and verification may result in disputes between the Board and the DOEs.
- **The possibility of suspension or withdrawal of accreditation.** COP/MOP2 confirmed that the Executive Board may suspend/withdraw accreditation and reinstate/reaccredit a DOE between two sessions of the COP/MOP. This possibility could be used in cases in which there has been a serious breach of the rules by a DOE. Criteria for suspension and withdrawal could be developed as part of the policy framework mentioned above.

In addition to these measures, the COP/MOP and the CDM Executive Board could envisage measures that would require a change or amendment to the modalities and procedures for the CDM. These measures could, for example, be considered as part of the review of the modalities and procedures foreseen prior to the start of the second commitment period. The following measures are proposed:

- **Strengthening the independency of DOEs.** Under the current modalities and procedures for the CDM, project developers can deliberately choose a DOE and directly pay the DOE for the validation and verification services. This ensures competition among DOEs and, as a consequence, low prices for validation and verification services. On the other hand, the high competition among DOEs and the close commercial relationship between project participants and the DOEs has led to situations where DOEs can spend only very little time on the validation process and where DOEs that raise fewer questions may be preferred by project participants, resulting in race to the bottom. **The independency of DOEs could be strengthened if the CDM Executive Board, through the UNFCCC secretariat, selected and paid the DOEs.** The UNFCCC secretariat could select the DOEs based on their previous performance and a simpli-

fied bidding process. The necessary financial resources could be provided through the existing share of proceeds to cover administrative expenses, currently amounting to US$ 0.20 per CERs. The financing of the service of DOEs through the share of proceeds could also encourage the development of more small-scale project activities, as the costs for project development would be reduced for such projects. The issuance of CERs is increasing rapidly, whereas the costs for the operation of the CDM Executive Board are likely to decrease in the future. This could make it feasible for the UNFCCC Secretariat to pay DOEs while maintaining or only increasing moderately the current level of share of proceeds of US$ 0.20 per CER. This approach is a change to the modalities and procedures and would require COP/MOP approval. As an immediate action, the CDM Executive Board could clarify that DOEs are not allowed to make contracts with success-related payments (e.g. upon successful registration or issuance), as such contracts provide a direct financial incentive to the DOE to achieve a positive result of the validation or verification.

- **Stronger liability of DOEs.** Paragraph 22 of the modalities and procedures provides for a procedure in which DOEs have to replace CERs issued in excess if the CDM Executive Board has identified significant deficiencies in the validation or certification report and if the accreditation of the DOE has been suspended or withdrawn. In the case of programs of activities, a similar provision applies, however, the withdrawal or suspension of the accreditation is not a prerequisite for the replacement of CERs. Instead, the CDM Executive Board can directly decide to exclude an activity from the programme if an error has been identified that disqualifies the activity from inclusion in the programme. In this case, the DOE has an immediate obligation to replace the CERs.[26] A similar approach with a stronger liability for DOEs to replace CERs could be also envisaged for project-based CDM. For example, there could be a general requirement for DOEs to replace CERs issued in excess if non-conformities in the validation or verification process are detected after the registration of the project or after the issuance of CERs. As validation and verification is undertaken by different DOEs, this would require a clear identification whether the non-conformity is related to the validation or verification of emission reductions and instructions on how the verifying DOE should deal with requirements that were not met at validation.
- **Enhanced communication through the UNFCCC secretariat.** To avoid project participants approaching several DOEs to get their project validated, the DOEs, in cooperation with the UNFCCC secretariat, could establish an **informal database of projects where DOEs have refused a validation contract**

[26] Paragraphs 12, 13 and 14 of the „procedures for registration of a programme of activities as a single CDM project activity and issuance of certified emission reductions for a programme of activities“, included in Annex 39 of the thirty-second report of the CDM Executive Board.

due to concerns about the project fulfilling the requirements of the CDM. Similarly, DOEs should be able to send an informal communication to the UNFCCC secretariat to raise concerns about deficiencies in approved baseline and monitoring methodologies. Some baseline and monitoring methodologies contain simple errors and inconsistencies or are unclear regarding some requirements. Currently, DOEs hardly ever make any clarification or revision requests concerning such issues.

3.1.2 Additionality

The current way in which additionality is assessed can be improved by several means. The main aim should be to use more objective criteria to demonstrate additionality, whilst maintaining a high level of environmental integrity. This requires more objective cut-off criteria, such as thresholds or benchmarks. As a general principle, additionality criteria should avoid looking too much into the particular motivation of the project developer, as this is highly subjective, but rather assess the market environment and current practice regarding the proposed project type. Most of the measures proposed below could be taken immediately. Specifically, the following actions to improve the demonstration of additionality are recommended:

- **Ambitious benchmarks.** For several industries, such as cement, aluminium or steel, ambitious dynamic **benchmarks** could replace the assessment of additionality. The performance of the top 20% plants in the industry, as established in paragraph 48 (c) of the modalities and procedures, could be used as the basis to establish the benchmarks. In order to reflect the dynamic character of these industries in developing countries and to maintain incentives for improvement, the benchmarks should be dynamic and updated regularly. A challenge of using benchmarks is that they require detailed data from the relevant industry. Such data is often not publicly available, particularly in non-Annex I countries, and needs to be collected.
- **Revisiting the guidance on demonstrating additionality for small-scale projects.** The current guidance on demonstrating additionality of small-scale projects is very short and vague. Key steps, such as the identification of a list of plausible baseline scenarios, are lacking. The guidance does not require that barriers are credible or that documentation for the existence of the barrier needs to be provided. The guidance should be revised in a way that keeps transaction costs for demonstrating additionality low, but that makes the requirements against which DOEs should check additionality clear and transparent. All logical steps to demonstrate additionality should also apply to small-scale projects. A number of small-scale projects provide a type of investment analysis as an “investment barrier”. For projects that wish to use an investment analysis it should be made clear what information should be provided and what information is not necessary.

- **Exclusion of subjective or company-specific barriers.** Barriers that are highly subjective, such as general references to risks ("different financial factors may change in the future") or company-specific barriers ("the management is not willing to make the investment") should not be used to demonstrate additionality. Proving such barriers in an objective manner is very difficult in practice if not impossible. If additionality is established based on barriers, they should be objectively verifiable barriers in that market and should be well documented. The additionality tool and the combined tool should provide further guidance to clarify what type of barriers are acceptable and which ones are not acceptable.
- **Specify the barrier "first of its kind".** Our analysis of registered projects shows that many projects use this type of barrier in cases where a number of similar projects have already been implemented. Moreover, in some cases, the technology employed is narrowed down to an extent that the project becomes the first of its kind although a number of rather similar projects have been developed before. The guidance on "the first of its kind" as a barrier should therefore be specified with regard to which technologies the project should be compared with and how many similar projects (one or several) may already be implemented for the project to still be considered "the first of its kind".
- **Further guidance on the investment analysis.** Additional guidance on the application of the investment analysis would ensure a more consistent application by project participants. This includes a specification of what data should be provided, how the credibility of the data should be confirmed and assessed by the DOE, how benchmarks, such as the required hurdle rate, should be derived and how the sensitivity analysis should be undertaken, in particular regarding which parameters should be varied to what extent and how the results of the sensitivity analysis should be used.
- **Mandatory investment analysis for large-scale investments.** The use of barrier analysis for large-scale investments, such as the construction of large power plants, is not very credible. For large-scale investments which typically involve large banks, the economics of the project is the key feature in the investment decision. In practice, most risks and barriers can be expressed as costs. For example, the barrier that "personnel is not trained to operate the power plant" could be reflected by adding costs for training courses or hiring international experts that would be able to operate the plant. Currently, in some baseline and monitoring methodologies for these project types the investment analysis is mandatory to demonstrate additionality (e.g. AM0029 for new natural gas power plants), whereas it is not mandatory in other cases (e.g. ACM0013 for the construction of more efficient power plants). In 2007, the CDM Executive Board decided that "limiting the use of additionality tool to investment analysis is

done in exceptional cases only and for very strong reasons, which need to be substantiated".[27]

- **Quantitative thresholds for the common practice analysis.** In a number of sectors, it would be possible to introduce quantitative thresholds to determine when a project activity is common practice. The lack of quantitative thresholds in most methodologies makes the current assessment of common practice very arbitrary. Projects that are frequently implemented in a similar environment should not be credited under the CDM. For some sectors, the lack of data availability could make it difficult to introduce quantitative thresholds.
- **Inclusion of CDM projects in the common practice analysis.** Currently, other CDM project activities are excluded from the common practice analysis. This approach is problematic where all new facilities in a sector use the CDM. For example, in China nearly all recently constructed natural gas power plants claim CDM credits. If these are excluded from the common practice test, natural gas may never become common practice even if it is a major power generation technology in the respective country. Therefore, CDM projects should be included in the common practice analysis after a certain period or after a number of CDM projects having been implemented.
- **Demonstration that the CDM has a meaningful impact.** Currently, it is not necessary to demonstrate that the CDM has a meaningful impact on the economic attractiveness of the project or on the barriers identified as prohibitive. For example, additionality can be established on the basis of barriers that cannot be affected by the CDM at all or a project can clearly be economically unattractive with and without the CDM. For some projects, the impact of CERs is very small. In these cases, claiming additionality is not very credible, for example, if the IRR is increased from 2% to 3% in a situation in which the required IRR to make the project feasible is 10%. Although the demonstration that the CDM has a clear impact on the project was criticised by industry representatives (IETA 2005) and subsequently removed by the CDM Executive Board, the establishment of additionality is in some cases not very credible on the current basis.
- **Eligibility of projects that have started early.** The possibility of claiming retroactively CERs ended on 31 March 2007. Nevertheless, projects can still be submitted for registration which began operation many years ago. They should provide documented evidence that the CDM was considered in the decision making; however, as stated previously, it has been reported that such evidence is frequently back-dated. It is not very convincing if a project that started in 2001 claims that the CDM was considered in the investment decision, but begins the preparation of a PDD only years later. In order to address this problem, it is

[27] Meeting report of the thirty-first meeting of the CDM Executive Board, paragraph 31.

suggested that projects can only request registration if the project has started no earlier than one year before.

3.1.3 Sustainable development impact

Several authors (e.g., Pearson 2006) have recognized that each ton of GHG emission reduction is given a value through the CERs but that currently the sustainable contribution of CDM projects is not given a monetary value. Hence, the CDM gives a direct monetary value only to one of the objectives of the CDM, although it has a dual objective.

Premium markets, in particular the Gold Standard (GS)[28], could help in giving a value to the objective of the CDM to assist in achieving sustainable development. However, although there is considerable demand for GS projects, there are so far only few projects registered or under validation.

Additional capacity building has been discussed extensively as part of the Nairobi Framework at COP/MOP2. Whereas additional capacity building can result in more projects that have a better impact on sustainable development, it is not likely that this will change the overall project portfolio which is driven by market forces.

A more radical approach could be to reduce the quantity of CERs issued from projects which have little or no impact on sustainable development. This could include the introduction of ambitious benchmarks for HFC-23 and N_2O mitigation (see section 3.1.4) or discounting emission reductions from projects that are less important for sustainable development (see section 4.3). This would lend projects with higher benefits for sustainable development a higher market value, change the project portfolio due to reduced supply from less sustainable projects, while at the same time continuing to credit all types of projects. However, this option would require that Parties agree on which projects have high benefits for sustainable development and which have less benefits. This may be difficult in practice and not fully in line with the modalities and procedure which established that it is up to the host country government to judge which projects are deemed to contribute to sustainable development.

As a similar option, all or several Annex I countries could commit themselves to establish a minimum quota of projects with high sustainable benefits or long-term benefits in their portfolio, for example, by requiring that X% of the CERs portfolio come from projects that support the long-term transition of the energy system, such as renewable energy generation and energy efficiency improvement projects.

[28] The Gold Standard is a quality assurance label for CDM projects and credits endorsed by 44 NGOs from all around the world. For more information, please see: www.cdmgoldstandard.org

3.1.4 HFC-23 and N_2O destruction

The concerns with regard to HFC-23 and N_2O projects could be addressed by different means. One approach could be to exclude these projects from crediting in a post-2012 regime. Different incentives to abate these gases could be provided: The industry could commit itself to implement abatement measures, the host countries could introduce regulations or the GEF could fund the incremental abatement costs.

Within the CDM, the concerns could be addressed if crediting is based on ambitious benchmarks from 2012 or from the second crediting periods onwards. These benchmarks would serve as the baseline and be defined as emissions per production level (t HFC-23 / t HCFC-22, t N_2O / t adipic acid and t N_2O / t nitric acid). They should be chosen in a manner that ensures that they provide sufficient incentives for continuing mitigation of N_2O and HFC-23 but that the large windfall profits are reduced.

The introduction of benchmarks would have a number of advantages:

- Ambitious benchmarks result in a real climate mitigation benefit because the emission reductions would be larger than the number of CERs issued.
- Ambitious benchmarks would reduce the supply of CERs from HFC-23 and N_2O destruction projects to the market, while still providing sufficient financial incentives to implement the mitigation technologies. This could positively affect the overall CDM project portfolio and, with a given demand for CERs, result in other CDM projects being developed. Thus, ambitious benchmarks for HFC-23 and N_2O destruction projects could indirectly provide incentives for a more balanced CDM project portfolio.
- Benchmarks are fair and avoid market distortions between companies. Companies which have already reduced emissions to some extent, e.g. by using efficient processes, are not punished in comparison to companies which use very inefficient processes. The current methodologies discourage the application of efficient processes that result in less N_2O and HFC-23 emissions as this would lower the emissions mitigated by end-of-pipe measures for which CERs are provided. In contrast, benchmarks would provide incentives to optimise the processes.
- Benchmarks reduce the risk of gaming or manipulation of the baseline. In particular in the case of nitric acid production, the measurement of actual baseline emissions can be difficult and their level could potentially be manipulated by the operators of the plants in order to maximise CER revenues. Benchmarks avoid such incentives.

The introduction of benchmarks does not require a decision by COP/MOP. The CDM Executive Board could revise the baseline and monitoring methodologies respectively, even during the first commitment period under the Kyoto Protocol. Benchmarks are already used in some approved methodologies, e.g. for the construction of highly efficient fossil fuel fired power plants (ACM0013), PFC emission reductions from aluminium plants (AM0030), or the use of clinker in cement plants (ACM0005).

3.1.5 Stakeholder consultation

The current process of stakeholder consultation has two weaknesses. Firstly, it does not ensure that all relevant stakeholders are actually invited and, secondly, stakeholder comments are not made very transparent in PDDs. Therefore, the CDM Executive Board should clarify what types of stakeholders should be invited for comments and how the invitation should be made public. Such guidance could be included in the guidelines for completing the PDD. It should ensure that all stakeholders are informed and have the opportunity to comment. Letters to selected individuals are not sufficient; rather, stakeholder comments should be publicly invited through the most appropriate media. To increase the transparency of the stakeholder consultation process, it is further proposed that all stakeholder comments are made publicly available on a website, next to the summary of stakeholder comments in the PDD. Finally, additional guidance may be necessary on how due account should be taken of the comments that are received.

3.2 Environmental integrity of policy CDM

Under “policy CDM”, governments can credit the adoption and implementation of policies and measures under the CDM. This could include regulations, such as energy efficiency standards, financial and fiscal incentives, such as subsidies, and possibly even economy-wide measures, such as CO_2 taxes.

The most important advantage of policy CDM is that it enables implementation and crediting at the national level, in particular in sectors for which it is cumbersome to develop multiple single project activities, such as in the building or transport sector. For example, the adoption and enforcement of ambitious building codes can provide huge emission reductions and cost savings and may not only be more efficient than the development of multiple single CDM project activities, but also may be more efficient than the establishment of a programme that promotes efficient buildings by providing incentives to multiple stakeholders.

The key problem of policy CDM is the demonstration of additionality. Developing countries already adopt many policies and measures that lower GHG emissions, for several reasons: to increase the efficiency of the economy and achieve cost savings, to reduce the dependency on imports of fossil fuels, to reduce air pollution, for safety reasons or to mitigate climate change. Often several motivations result in a policy. Therefore, policy CDM would require assessing the motivation for adopting the policy – and not just the intention of the project developer.

This would be very difficult if not impossible. Whether or not policies and measures are implemented depends on many factors, including the political system, the political priorities of parliaments and governments, the public awareness and debate and the power of different non-governmental stakeholders. Therefore, any attempt to distinguish between policies and measures that are motivated by the CDM and those that would not be adopted without the CDM would fail. Given the large potential, crediting all policies would result in huge amounts of “hot air” that would undermine the system.

Moreover, the estimation of emission reductions from policies and measures is often methodologically much more challenging than determining emission reductions of single CDM project activities. Some policies, such as CO_2 taxes, would require complex economic modelling to estimate emission reductions and require detailed data on the relevant sectors which involves a high degree of uncertainty regarding the actual level of emission reductions achieved. Policies also often promote practices that are already being implemented by some entities. Assessing the additional effect of policies is equally challenging.

Policy CDM, as such, should therefore not be considered for a post-2012 climate regime, but policies and measures could play an important role and be credited indirectly in sectoral approaches which are discussed in the following.

3.3 Environmental integrity of "sectoral CDM"

Several types of sectoral approaches have been suggested for a post-2012 climate regime.[29] Under the sectoral CDM, a baseline is established for a whole sector and emission reductions below the baseline are credited. Sectoral baselines could be established as intensity baselines (tCO2 per output) or in absolute terms. In most cases, it has been suggested that the government receives the credits and provides incentives or regulations for the private sector to achieve the emission reductions. Thus, in a similar way to the policy CDM, the emission reductions are achieved by implementing policies and measures. However, in contrast to the policy CDM, emission credits are not based on the policies and measures, but on the actual emission trends observed in the sector and the baseline. Sectoral CDM allows governments to reduce emissions in the sector through a variety of measures, including infrastructure investments, promotion programs, regulations, etc.

The most important advantage of the sectoral CDM is that it avoids the counter-factual and hypothetical assessment of the motivation of private entities – which has led to many methodological problems and probably a significant number of projects for which additionality is unlikely or questionable. Instead, the sectoral CDM builds on historical emissions trends as well as projections in the sector to establish what would have happened without the sectoral CDM.

The key challenge regarding environmental integrity is thus the uncertainty of the emissions projection and not whether single projects would have been implemented without the CDM. Over longer time periods, emission projections are uncertain as are sectoral baselines. Experiences with national allocation plans in the EU ETS have shown that the quality of GHG emission projection varies considerably. However, detailed data on historic emission trends and relevant activity data as well as consistent methodological approaches for GHG emission projections can reduce the uncertainty. In order to avoid artificial inflation of GHG emission projections, such methodological approaches need

[29] See, for example, Baron and Ellis (2006)

to be developed using a conservative approach. In addition, the timeframe considered should not be limited. Further analysis is required to assess the uncertainty in establishing sectoral baselines.

Another important challenge is the limited data availability in some countries. Establishing a sectoral baseline may therefore require extensive data collection. Furthermore, it needs to be ensured that the governments have the resources and capacity to effectively develop and implement measures and programmes to reduce GHG emissions in the sector. In some cases, the incentives for the single entities responsible for reducing the GHG emissions may be less direct than with the project-based CDM.

In conclusion, further exploration is needed regarding how sectoral CDM could be made a feasible option to scale up the CDM, while achieving a high environmental integrity. A key advantage compared to project-based CDM and policy CDM is that the counterfactual determination of whether a single project would have happened without the CDM is circumvented.

4 Options for limiting the use of the CDM by Annex I countries and in emissions trading schemes

All Annex I countries and all existing and emerging emission trading schemes limit the use of offset mechanisms to a certain extent. The agreement on the use of flexible mechanisms at COP7 in Marrakech establishes that the use of the flexible mechanisms shall be supplemental to domestic action.[30] The use of flexible mechanisms is limited for several reasons. The Marrakech Accords acknowledge the objective of "narrowing per capita differences between developed and developing country Parties while working towards the achievement of the ultimate objective of the UNFCCC". Furthermore, an increase of GHG emissions in Annex I countries due to an extensive use of the CDM may result in a lock-in to GHG intensive technologies and jeopardise the achievement of ambitious long-term reduction targets. Another reason is that cap-and-trade-systems are different from baseline-credit-systems with regard to the certainty that the envisaged emission reductions are real and additional. Finally, some limitations aim at ensuring that only credits with a certain quality enter the system. An example is the requirement in the EU Emissions Trading Scheme (ETS) that large hydro power projects should follow the rules established by the World Commission on Dams (WCD).

This chapter analyses different ways of limiting the use of the CDM by Annex I countries, with a particular focus on the EU ETS. However, similar arguments hold also for other emissions trading schemes. In the following, three different measures to qualify the type of projects that enter the system are analysed:

- Positive / negative lists of project types
- Further criteria for all projects
- Discounting CERs against cap-and-trade allowances

Finally, it is discussed to what extent the use of offset mechanisms, such as CDM and JI, should be limited by a total cap within the ETS.

4.1 Positive / negative lists of project types

To promote more projects that have benefits for sustainable development and are additional, the use of CDM and JI can be limited to certain project types. Such a limitation can be implemented easily in practical terms, as CERs and ERUs have a project identifier. However, the question of which project types should be excluded or included is difficult to answer. Most of the problems in the CDM do not relate to a particular project type, but have to do with the way in which DOEs are working and the way in which additionality is demonstrated. Thus, limiting the use of CDM and JI to certain project types will not solve the more general problems in the CDM.

[30] Decision 2/CMP.1, paragraph 1

In considering the exclusion of some CDM project categories, there is a clear trade-off between additionality and benefits for sustainable development: Project activities which are likely to be additional – this includes mostly projects in categories A and B (see Table 1) – often have few benefits for sustainable development, whereas additionality is often questionable for projects which have high benefits for sustainable development – this includes mostly projects in category C. Therefore, an exclusion of projects in categories A and/or B only makes sense if the way additionality is assessed under the CDM is improved.

For projects included in category A – covering the destruction of HFC-23 and N_2O as well as flaring at landfills – it is likely that by 2010 all major facilities in developing countries will have installed abatement technologies using the CDM. Thus, the reduction potential of these projects is already being tapped and limiting the use of CERs from these projects is unlikely to change their share in the global CDM project portfolio. It is therefore doubtful whether an exclusion of projects in category A would have positive benefits for sustainable development.

Generally, it is also questionable whether the exclusion of some project categories in an emissions trading scheme, such as the EU ETS, will impact the global CDM project portfolio, given that the global demand for CERs also originates from governmental purchase programs and possibly other emissions trading schemes. A limitation in one system may shift the use of those credits to others, with the result that CERs or ERUs from project types excluded in one system will increasingly be used by others, including governmental purchase programs or other emissions trading schemes. On the other hand, this argument holds only as long as other buyers do not also prefer certain project categories. Several EU governmental purchase programs have prioritised certain project types. For example, Finland has in its first purchase programme prioritized the purchase of credits from small-scale project activities. The CERUPT tenders by the Netherlands have paid higher prices for preferred project types. In addition, emerging emissions trading schemes in the US have limited the use of offsets to certain project types.[31] In this regard, this type of “leakage” may be limited to some extent if several Annex I countries and emission trading schemes develop similar positive or negative lists.

4.2 Further criteria for all projects

Given that many problems in respect of the environmental integrity of the CDM are not related to certain project types, governmental purchase programmes or regional emissions trading schemes could introduce further qualitative requirements for the use of

[31] For example, the Regional Greenhouse Gas Initiative in the United States (RGGI 2007) limits the use of offset projects to five project categories, including landfill methane capture and destruction, reduction of SF_6 emissions, afforestation, energy efficiency improvements in the end-use of natural gas, propane or oil, and avoided methane emissions from agricultural manure management operations.

CDM and JI, for example, relating to the demonstration of additionality or the contribution to sustainable development. The development of such requirements is not straightforward, as the debate on additionality has shown, and would require careful consideration. Whereas some criteria, such as those for additionality, may be developed in general terms, others may be more specific for certain project types, requiring extensive methodological work to develop them.

Another challenge with regard to this option is the implementation at EU level. The experience with the requirement to consider the World Commission on Dams (WCD) principles for hydro power projects has shown that implementation at Member State level is varying. The EEA has reported that "in Austria, Belgium (Wallonia), Italy, Poland and Sweden there is no legal requirement to project participants to adhere to the guidelines" and that Italy and Poland reported that compliance with the WCD "is not checked", whereas there are legal requirements in some other countries (EEA 2007). This shows that it would be challenging to implement additional EU requirements on CDM and JI projects in a consistent manner in all 27 EU Member States. This experience suggests that additional criteria should rather be assessed by one institution at the EU level. One institution would also be more efficient than the development of respective procedures in each Member State.

The introduction of additional requirements on CDM and JI in the EU ETS would indirectly result in a new type of commodities: EU ETS eligible CERs and ERUs. If these are short, they may be traded at higher prices than other CERs and ERUs. This could have some impact on the global CDM portfolio since higher CER prices would provide additional financial incentives to develop projects that conform to additional EU requirements. However, similarly to the positive and negative list - "leakage" may be a problem as CERs which are not eligible in the EU ETS may increasingly be used by other buyers.

4.3 Discounting CERs against cap-and-trade allowances

The difference in the nature of cap-and-trade-systems and baseline-project crediting systems could also be reflected by discounting CERs against cap-and-trade allowances. For example, two CERs may be exchanged for one EU ETS allowance. In this case, one CER would be exchanged for an EU allowance and one CER would be transferred into a cancellation account. In this way, the problem of a certain share of non-additional projects in the CDM would be addressed on an aggregated level by weighting a credit from a baseline-project crediting system lower than an emission permit in a cap-and-trade system. This approach has also been proposed recently in a similar manner as "value added CDM on the demand side" (Environmental Defense 2007).

Implicitly, this option would work in a similar way to a total cap on the use of CDM and JI. In 2007, the price for CERs is about 70% of that for EU allowances for the second trading period, mainly due to the cap on the use of CDM and JI in the EU ETS. Similarly, if two CERs are exchanged for one EU allowance, installations covered by the EU

ETS would only purchase CERs and ERUs if the price for EU allowances is more than twice the price for CERs and ERUs.

In contrast to a fixed cap on the use of CDM and JI, the discounting of CERs would have greater environmental benefits because the cancellation of a fraction of the CERs either reduces the amount of "hot air" in the CDM or – if no "hot air" would be in the CDM – results in a global mitigation benefit since the cancelled CERs are not used for compliance purposes. Moreover, this approach could result in a lower volatility of allowance prices because the use of CDM and JI would work in a similar way as a price cap.

Discount rates for CERs could also vary among project types. For example, for project types which have huge windfall profits, such as the destruction of N_2O and HFC-23, discount rates could be larger than for other project types, though this would make the system more complex. Moreover, different discount rates for different project types could again result in the "leakage" effects described previously, where CERs from a project type that is strongly discounted in one system may increasingly be used in another system.

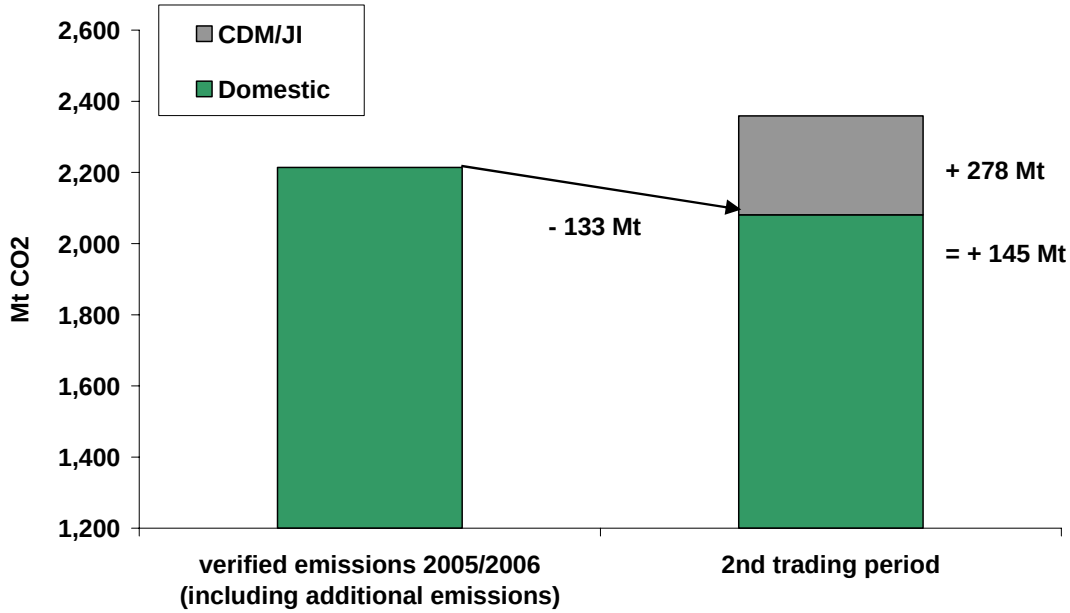
Similar to a total cap, discounting CERs against EU allowances would result in less demand for CDM and JI credits from the EU ETS than without any limitation. The lower demand for CDM and JI credits could result in a lower price, thereby also punishing "good" projects that are clearly additional and have positive impacts on sustainable development. Some of these projects may no longer be feasible with lower CER prices. Another disadvantage is that linking with other emissions trading schemes may be more difficult if CERs are discounted in the EU ETS, but not in other schemes. However, the other options discussed, positive / negative lists and further criteria for all projects, also pose an extra challenge to linking emissions trading schemes.

4.4 Cap on the use of CDM and JI in the EU ETS after 2012

The use of CDM and JI for the second trading period of the EU ETS from 2008 to 2012 is currently capped at nearly 1.4 billion tons of CO_2 equivalent for the trading period, corresponding to 278 million tons per year.

Figure 10 overleaf compares the reduction effort and the use of CDM and JI for the second trading period. The annual cap for emission allowances in the period of 2008 to 2012 is about 133 million tons CO_2 lower than the verified emissions in 2005 and 2006. The maximum use of CDM and JI is, at 278 million tons a year, larger than the additional emission reduction from the first to the second trading period. This enables installations covered under the ETS to increase their 2005/2006 emissions by up to 145 million tons for the period of 2008 to 2012. Thus, if CDM and JI are extensively used by ETS installations – which is likely to happen – emissions from ETS installations will be higher in the second ETS trading period than in the first trading period.

Figure 10: Verified emissions in the EU ETS in 2005/2006 and allowed emissions in the second trading period



Source: CITL of the EU ETS, National allocation plans, decisions by the EU Commission, State: 29 October 2007 regarding decisions on national allocation plans (NAPs) by the EU Commission, 5 July 2007 for information from the CITL

Given the problems in respect of environmental integrity in the CDM, this raises concerns about the real mitigation achieved through the EU ETS. Moreover, the large caps for JI and CDM raise concerns about the long-term emission trends in the ETS sector. Increasing emission trends can result in a long-term lock to technologies that will jeopardise the achievement of ambitious emission reductions in the next decades. For example, new coal power plants, currently planned in many EU countries, will operate for decades and are likely to become stranded investments in the future.

To avoid such lock-ins in the EU and to address the problems relating to the environmental integrity of the CDM, the EU should require that the use of CDM and JI should be **supplementary** to emission reduction efforts in the EU ETS. This means that the use of CDM and JI would be limited to a fraction of the additional reduction effort from one trading period to the next trading period. This would ensure that actual emissions in the EU ETS decrease over time.

4.5 Conclusions on limiting the use of the CDM

It is likely that installations covered under the EU ETS will use CDM and JI extensively in the second trading period, given that currently allowance prices in the EU ETS are higher than CER prices. In this case, the use of CDM and JI will be much larger than the reduction effort from the first to the second trading period. As a result, it is likely that

CO_2 emissions from ETS installations will be greater in the second trading period than in the first trading period, by up to 145 million tons of CO_2.

To avoid a lock-in to high GHG-emitting technologies in Europe, the use of CDM and JI in the third trading period should only be supplementary to emission reductions undertaken by the ETS installations. The actual emissions of EU ETS installations should not increase but rather decrease over time. The use of CDM and JI could be limited by a total cap or by discounting CERs against EU allowances. The latter provides more environmental benefits, but may exacerbate problems with linking the EU ETS to other emission trading schemes. Both options should therefore be evaluated carefully.

The problems related to environmental integrity in the CDM should preferably be addressed in the context of UNFCCC. However, if this fails, additional criteria for the use of CDM and JI in the EU ETS should be established. Due to the nature of the problems in the CDM, additional requirements for all projects may be preferable to excluding certain project types. For HFC-23 and N_2O destruction projects, ambitious benchmarks for second crediting periods would address the current criticism to these projects and provide real climate mitigation benefits. If such benchmarks are not implemented by the CDM Executive Board, the EU could consider excluding these project categories from the EU ETS, although this is unlikely to have much impact on the global CDM project portfolio.

All limitations on the use of CDM and JI in the EU ETS raise challenges for linking the EU ETS with other emissions trading schemes. Different rules for limiting the use of CDM and JI would not work well if two or more emissions trading schemes are linked. For example, if a certain project category is excluded in one system but allowed in another, the exclusion would not be effective since the CERs could be introduced in the linked system, exchanged for allowances and then be transferred in the EU ETS system. This type of “market leakage” applies to all ways suggested for limiting the use of CDM and JI. However, linking may be even more difficult if CERs are discounted in one system but not in another.

5 Overall conclusions

The CDM has experienced a tremendous growth during the past three years. Soon, 1,000 projects will be registered, delivering several hundred million tons of CERs per year. With the adoption of rules for programmatic CDM, the volume of credits could grow further. For the period beyond 2012, several proposals are on the table for upscaling the CDM. At the same time, the CDM, being a baseline credit system, is fundamentally different from cap and trade systems, as established for Annex I Parties under the Kyoto Protocol and in various emissions trading schemes around the world. As shown by this report, the establishment of additionality is difficult, which makes maintaining a high level of environmental integrity much more challenging for the CDM than for cap and trade systems.

Although the CDM has, after a difficult start, been very successful in creating a global market for GHG emissions, it has so far not been very successful in achieving a high level of environmental integrity and assisting host countries in achieving sustainable development. There is certainly room for improvement. The performance of DOEs appears rather varied. For a significant number of projects that were registered in the past three years additionality seems unlikely or questionable. The overall contribution of the CDM to assisting host countries to achieve sustainable development – although the prerogative of the host country – is rather small.

As the CDM will further grow and should play a role beyond 2012, addressing its deficiencies is a key prerequisite to making it a success. Without addressing the deficiencies, we risk seriously undermining the emission reductions efforts of Annex I countries and may jeopardize the achievement of ambitious reduction targets. COP/MOP and the CDM Executive Board have already started a processes to address these deficiencies, including the adoption of the Nairobi Framework to promote a better geographical distribution of CDM projects, a strengthened assessment of projects by the CDM Executive Board, the development of guidance for validation and verification, and the development of a policy framework to address non-conformities by DOEs. Further measures should be taken before 2012, including, inter alia, the revision of the tools to demonstrate additionality with the view to provide clearer and more objective guidance to demonstrate additionality and the introduction of ambitious benchmarks for HFC-23 and N_2O destruction projects.

Beyond 2012, it should be evaluated whether the CDM can move away from a project based mechanism towards sectoral approaches. For two reasons: firstly, this enables larger and more effective emission reductions and secondly it circumvents the necessity of proving the hypothetical additionality of single projects – a key flaw in the architecture of any project based offset mechanism. However, a larger supply of credits from the CDM will also require larger emission reduction commitments from Annex I Parties.

Despite the problems that we currently face in the CDM regarding its environmental integrity and sustainable development objectives, the CDM has had a great impact on the thinking of business and policy makers in developing countries which have main-

streamed climate change in their business. One of the key contributions of the CDM is its impact on the awareness and understanding about clean technologies, emission trading and future action for climate change both in the private and public sector. Moreover, the CDM has considerably changed GHG emissions paths in some sectors in developing countries. For example, it is likely that by 2010, there will be no adipic acid and nitric acid plants or major landfills that have not installed GHG abatement technologies. This is a remarkable progress, as there are still a number of such facilities in industrialized countries that do not yet have implemented these measures. In this regard, the CDM can be considered a success by introducing climate change as an issue to key stakeholders in developing countries. If the problems of the CDM regarding its environmental integrity and sustainable development objectives are properly addressed, the CDM will continue to be an important instrument in the fight against climate change.

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