Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

The Clean Development Mechanism

The world's first carbon crediting mechanism

IMPRINT

Published by:	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) Division KI I 4 · 11055 Berlin · Germany Email: KII4@bmu.bund.de · Website: www.bmu.de/english
Editor:	BMU, Franzjosef Schafhausen, Head of Division KI I: Fundamental Aspects Environment and Energy, Climate Protection. Email: franzjosef.schafhausen@bmu.bund.de
Subject editors:	Wuppertal Institut für Klima, Umwelt, Energie GmbH (Wuppertal Institute for Climate, Environment and Energy) Research Group 2: Energy, Transport and Climate Policy
Authors:	Nicolas Kreibich, Christof Arens, Wolfgang Sterk
Design:	Sven Scholz, OFFSET COMPANY Druckereigesellschaft mbH
Printed by:	OFFSET COMPANY Druckereigesellschaft mbH
Photo credits:	p. 1: Nordex AG p. 10: KfW p. 12: GIZ/Lloyd Wright p. 14: Nic Bothma/UNFCCC CDM Photo Contest p. 17: Mi Wenju/UNFCCC CDM Photo Contest p. 19: atmosfair
Date:	Information current as of May 2012
First Print:	1.000 copies

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Preface

Climate change mitigation is one of the biggest environment policy and economic challenges of the present day. The only way to keep the foreseeable consequences of climate change within manageable proportions is to break the global emissions trend and significantly cut emissions. This means radical change in the economy and our lifestyles, change that calls for smart, efficient solutions. The realisation that the economic cost of business as usual far exceeds the cost of effective climate change policy requires continued refinement and use of the Kyoto Protocol's market mechanisms as the economically efficient way to address climate change. However, the carbon market, and notably the two project-based mechanisms, CDM and JI, depend on the international community being prepared to agree new emission reduction targets.

The Durban Climate Change Conference in late 2011 laid the foundation for exactly this to happen with the agreement of a second Kyoto commitment period. Individual states still have to follow up, however, by stating their national emission reduction targets. The task through to the year-end at the next Climate Change Conference in Doha is to arrive at sufficiently ambitious, binding targets for individual states. In a submission to the UNFCCC dated 19 April 2012, the European Union reaffirmed that it was ready to raise its voluntary reduction commitment from 20 percent to 30 percent by 2020 against the 1990 baseline if other developed countries commit to similar cuts and developing countries contribute according to their responsibility and ability.
The climate change talks at Doha will be ultimately judged by whether they succeed in paving the way for a comprehensive post-2020 climate change agreement with developing countries on board and also whether they allow the carbon market to go on developing so that the market mechanisms can stay in use through to 2020. This latter point is important because, as in the first Kyoto commitment period, business, too, must be included in order to mobilise enough capital to combat climate change.

That the carbon market has the capacity to make an economic contribution to global climate change mitigation is shown by the outcome of the first commitment period: by the end of 2012, far more than 1.3 billion tonnes of carbon dioxide emissions will have been avoided in some 2,000 registered CDM and JI projects. The total number of CDM and JI project activities in the pipeline is now over 9,000. This is also a sound basis to continue encouraging investment in emission reductions into the future.

The reformed CDM, programmes of activities (PoAs) and the standardised baselines for calculation of additional emission reductions mean market mechanisms are now in place to implement emission reductions on a larger scale and in nearly all sectors of the economy. The Federal Environment Ministry supports the development of enabling conditions, networks and dedicated support offerings in cooperation with partner countries under the CDM/JI initiative and through projects under the International Climate Initiative (ICI).

This publication presents what the carbon market has accomplished in the last few years together with the prospects for the future.

Berlin, May 2012
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Fostering Climate Protection Investments in the Developing World: The Clean Development Mechanism

In 2012, it will be 15 years since the Clean Development Mechanism (CDM) was introduced under the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC). Following its inception in 1997, the CDM became fully operational after its modalities and procedures had been agreed on in Marrakesh in 2001 and gained momentum with the Kyoto Protocol entering into force four years later.

In May 2012, the CDM presents an impressive record: more than 4000 projects have been registered, while further 179 projects are requesting registration. With currently more than 4000 further projects in the validation process, the number of projects entering validation has risen considerably over the years, as can be seen from figure 1.

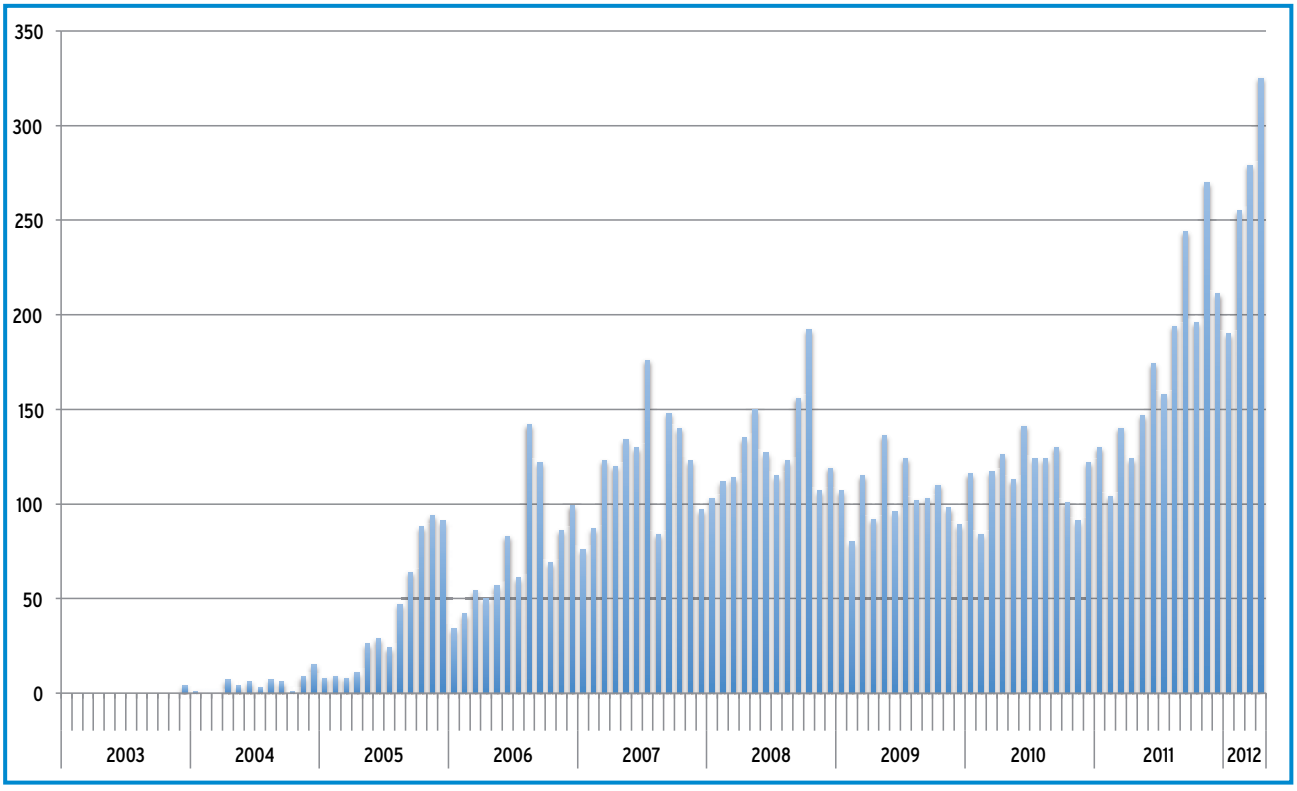

Figure 1: Number of CDM projects entering validation by month / year as of 30 April, 2012
Source: Own illustration, based on: UNFCCC data (April 30th 2012).

In terms of sectoral distribution of the current project pipeline, renewable energy projects represent the most important project type, accounting for about two thirds of all CDM activities. Among these, wind (27%) and hydro power projects (26%) as well as biomass energy generation activities (11%) constitute the largest fraction, while the share of solar projects lies at around 3%.

Energy efficiency measures host large potentials for emission reductions, particularly in developing countries where technologies are often out-dated and inefficient. Around 10% of all CDM activities are directed towards achieving emission reductions through exploiting these potentials. The largest share of these activities are being implemented in the field of energy generation (6%) and in the industry (2%), while a limited yet growing part is targeting the supply side and households (about 2,5%). Other project types with a large share of the pipeline are methane avoidance and landfill gas activities, accounting for 9% and 5% accordingly (cp. figure 2).

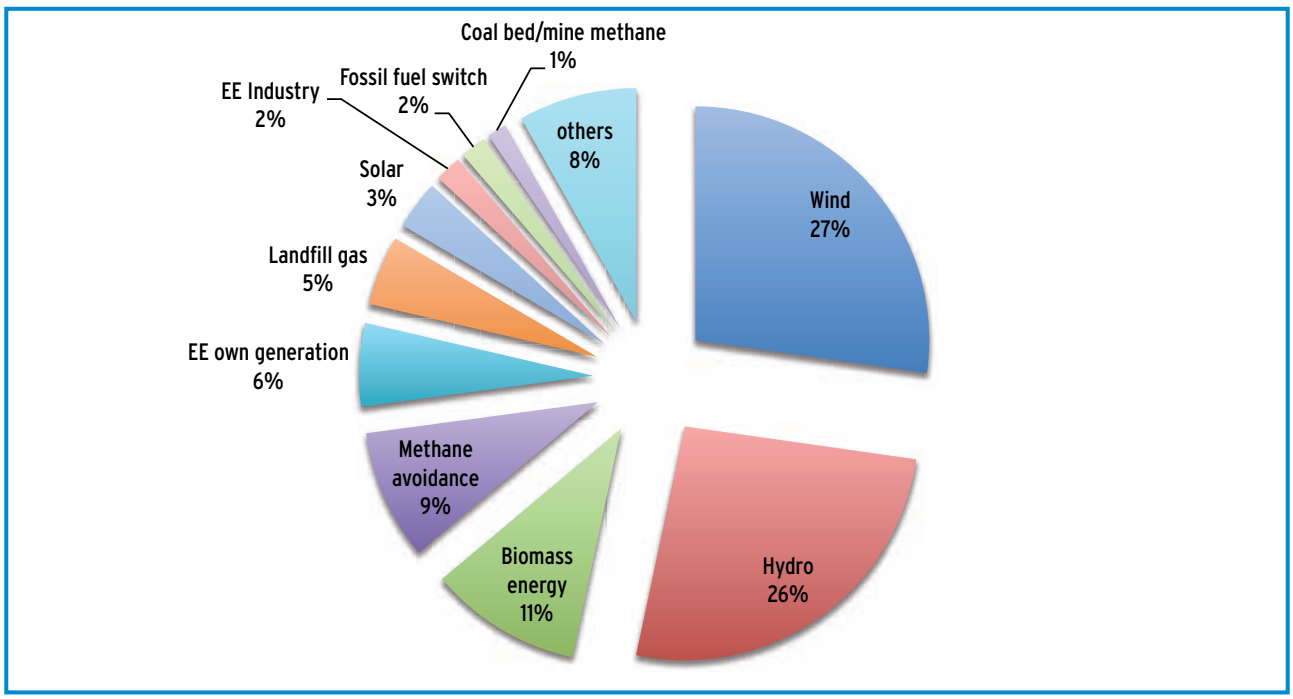

Figure 2: Sectoral distribution of the CDM projects in the pipeline
Source: Own illustration, based on: UNEP Risoe CDM/JI Pipeline Analysis and Database, May 1st 2012.

Concerning the regional distribution of the CDM, emerging economies are the most active host countries for CDM projects, particular in the Asian Pacific and in the Latin American region. As can be seen from figure 3, China and India have a dominating role in the CDM, together accounting for almost two thirds of all projects in the pipeline, while other large emerging economies such as Brazil, Vietnam and Mexico are also hosting large numbers of CDM projects. Countries in areas with lower levels of development such as sub-Saharan Africa, however, have not yet benefited accordingly. Only about 1% of the projects in the pipeline are hosted by Least Developed Countries, the countries with particularly low levels of socio-economic development. However, CDM project development in Least Developed Countries (LDCs) is constantly rising albeit not as fast as in other countries.

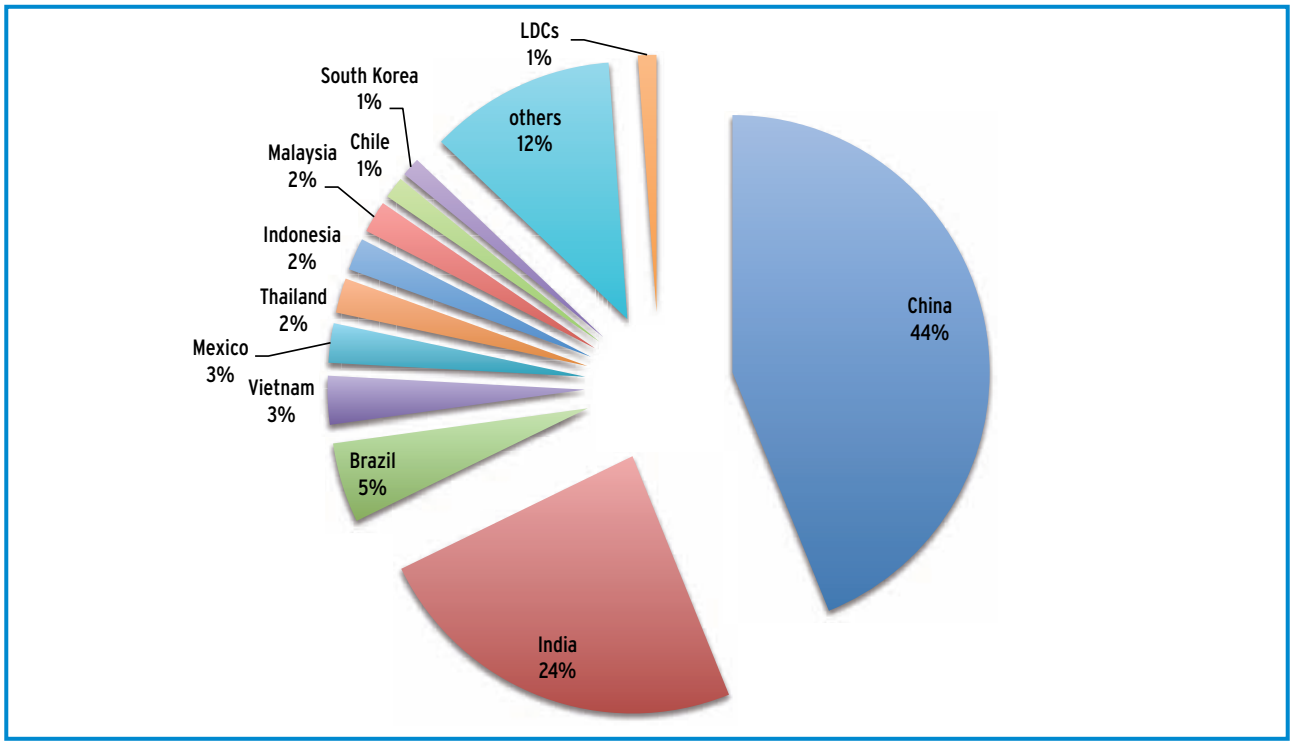

Figure 3: Regional distribution of the CDM projects in the pipeline
Source: Own illustration, based on: UNEP Risoe CDM/JI Pipeline Analysis and Database, May 1st 2012.

But not only the number of projects in the pipeline rose considerably in the last years. Likewise, many existing CDM projects were able to get their Certified Emission Reductions (CERs) issued and the number of CERs increased remarkably. In May 2012, the number of CERs issued was more than 900 million. China, India, South Korea and Brazil are among the countries where the largest parts of these emission reductions have been achieved (UNEP Risoe 2012). Along this development, the investments in registered projects have also grown considerably amounting to a total of 189 billion US$ (2004-2011) (cp. figure 5).

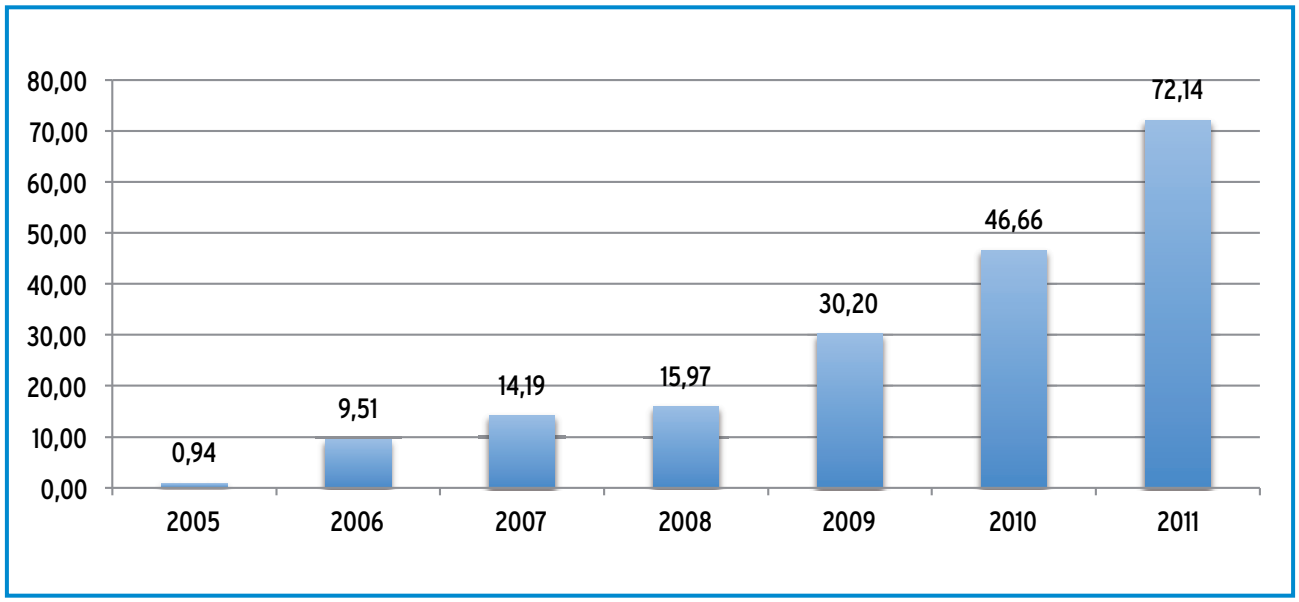

Figure 4: Investments in registered projects in million US$
Source: Own illustration, based on: UNEP Risoe CDM/JI Pipeline Analysis and Database, May 1st 2012.

Achievements of the CDM

Since its inception the CDM has had a number of successes. Among them, the **functioning of the mechanism** itself can be regarded a great achievement. Being the first crediting scheme for greenhouse gases established at UN level, the CDM was confronted with significant regulatory obstacles and financial constraints in its first years of operation. Over the years, however, the CDM managed to overcome these initial challenges and the mechanism reached a scale of thousands of projects and gigatonnes of emissions reductions.

As a result of the mechanism's constant evolution and expansion, the CDM has been a significant **catalyst of low-carbon investments** in developing countries. In 2011, the CDM has mobilised investments of more than 70 billion US$. By enhancing the financial viability of projects in low-income countries, it leverages additional investments from the private sector and initiates a shift of investment flows towards low-carbon development. Through its market-based approach, the CDM has initiated a dynamic process to identify the most cost-effective mitigation activities, allowing to direct the financial flows towards those activities that deliver the largest climate mitigation results at the lowest costs, maximizing the effect of climate change mitigation investments. Moreover, being the first carbon market mechanism established at the international level, the CDM is **functioning as a laboratory** for developing a deeper understanding on how carbon markets should be supported and regulated.

These experiences have particular relevance for the United Nations who had never before overseen the creation of a new commodity and the management of a multi-billion dollar market. With the numbers of projects constantly rising and emission reductions achieved in developing countries being extensively used by Annex I countries for

their Kyoto compliance, CERs have been established as the first internationally accepted currency for carbon at the carbon markets.

This development was facilitated through the **constant improvement** of the CDM's regulations and procedures in a learning-by-doing process. Regulatory hurdles for project developers were significantly reduced by increasing the clarity of guidance and removing unnecessarily complex rules. At the same time, the efficiency of the CDM process was improved by streamlining of procedures, for instance through the establishment of clear timelines for the individual registration steps. These improvements resulted in a significantly shorter time needed for the registration of projects.

Through the existence of a **uniform carbon currency** as well as the rising volume of the CDM market, climate change mitigation activities are increasingly seen as an attractive investment opportunity. Such awareness is not restricted to project developers and investors of the developed world, but was also raised in developing countries, **boosting creativity and initiative** in the development of projects. Companies, governments and NGOs all over the world are exploring emission reduction potentials and developing strategies how these could be exploited for the implementation of CDM projects.

However, CDM projects do not only result in emission reductions, but also contribute to the achievement of **sustainable development** in their host countries. Sustainable development benefits have shown to be particularly high in small-scale projects. By targeting small emission sources, these activities can lead to significant improvements for the environment and the livelihoods of the local population. Yet is has also been proven that large scale projects can make important contributions to sustainable development by **transferring low carbon technologies** from industrialised to developing countries. This is where the collaboration between industrialised and developing countries under the CDM becomes most visible. Private enterprises from industrialised countries actively contribute to the mitigation of climate change by exporting their technology to the developing world. This also comprises the transmission of knowledge, allowing developing countries to establish their own capacities. With the transfer of knowledge and the participation of local actors in CDM projects, developing countries further gain important **experience in implementing low carbon projects** on the ground. This growing capacity is reflected by the large number of projects that are initiated without assistance from developed countries.

But the CDM has not only enhanced the developing countries' capacities for the implementation of their own projects. More importantly, developing countries' governments and their administrations have gained important experiences with the **management and controlling of greenhouse gases** and the establishment of respective capacities and institutions. With these capacities, the developing countries' role in the overall process of mitigating climate change is significantly strengthened. The willingness of developing countries to fulfil such a stronger role can in part also be attributed to the CDM, which contributed significantly to the **rise of general awareness of climate change** and showed the potentials of proactive engagement in its mitigation.

Egypt: Using Wind Energy in the North African Desert

Despite the excellent conditions for the use of wind and solar energy, renewable energy sources play only a subordinate role in meeting Egypt's rising demand for electricity. A key step towards better use of renewable energy comes in the form of the Zafarana KfW IV Wind Farm CDM project jointly conducted by the Egyptian New and Renewable Energy Authority (NREA) and Germany's KfW Bank. The wind farm is located in a desert approximately 80 km south of Suez and covers around 16 km^2. With a total capacity of 80 MW, the farm is expected to feed an annual 300 GWh into the national grid. The KfW Bank is the project's primary funder, with a loan of €74.9 million. It also manages the purchase of the emissions certificates generated by the project which flow into the KfW Carbon Fund.

Wind farms on the Egyptian coast.

As the Zafarana wind farm is designed and implemented as a CDM project, it can generate emission certificates that can be sold on the global carbon market at a later date. The revenue from the sale of those certificates serves to increase the viability of the project. Without this additional cash flow, the project would not be feasible and could not have been implemented. And without the project, all the electricity that would have been generated in the wind farm during project implementation would be supplied by existing power plants and capacity expansions. This would mean annual emissions of 171,500 t CO_2e because currently more than 80% of the electricity supplied by the Egyptian grid is generated in gas-fired power plants. These emissions can be avoided with implementation of the Zafaran KfW IV project, which was was validated at the end of 2008 by the Japanese company JACO CDM. Following its approval by the Egyptian government in December 2008 and by the German Emissions Trading Authority (DEHSt) in May 2009, it was registered with the CDM Executive Board (EB) in March 2010.

Room for Improving the CDM

Despite these important achievements, experience with the CDM in its first years has highlighted that there is room for improving the instrument. Large parts of the criticism are directed towards the **limited climate change mitigation effect** of the mechanism. Since emission reduction of activities implemented under the CDM generate credits that can then be used in developing countries to comply with their Kyoto targets, the instrument has been criticised for simply dislocating emissions without achieving a real net climate change mitigation effect. For the atmosphere, therefore, the CDM can be considered a zero-sum-game. This criticism is partly based on a misinterpretation of the instrument itself. The emission reductions are achieved by the imposition of legally binding targets under the Kyoto Protocol. The aim of the CDM and the other flexible mechanisms is to minimise the costs of achieving these emission reductions by directing funding towards those activities that achieve the largest climate effect at the lowest costs.

Another important point of criticism regards the **limited capacity of the CDM to induce a broader sector-wide transformation** in the developing countries. While having allowed for fast-start implementation of emission

reduction activities through a large number of individual projects, the project-based approach was so far unable to induce policy-changes that could lead to the mitigation actions at the scale needed.

There are, moreover, also concerns with regard to the **environmental integrity** of the instrument, the most contentious being doubts regarding the additionality of CDM projects. Since CDM projects generate certificates that can be used by industrialised countries to comply with their Kyoto targets, each CER has to be backed up by one tonne of CO_2e that has been reduced in the developing world. To maintain the environmental integrity of the system, it is crucial that these emission reductions would not have been achieved without the CDM. If this is not ensured and industrialised countries use CERs from activities that would have been implemented anyway, they emit larger amounts of greenhouse gases without the corresponding reductions being achieved in developing countries, resulting in an increased amount of global emissions. Estimating whether projects are actually additional or not, can be difficult since telling what would have happened without the CDM is by definition hypothetical. This has been particularly questioned in cases where large investments in infrastructure are being made, like, for example, Bus Rapid Transit (BRT) projects or large power plants. Among other things, it is difficult to prove that these large infrastructure projects would not have gone ahead without the additional income generated by CDM. Moreover, in order to assess this, it would to be possible to have insight into the host countries' as well as private sector companies' actual plans for the future.

Currently, however, this problem is still linked to the project-by-project approach of the CDM, which requires project proponents to develop a baseline, a scenario of what would have happened in the absence of the project. This baseline is then used to determine the emission reductions achieved by the project by comparing the baseline emissions with the project emissions. Project developers and host countries may therefore be prone to develop less stringent baselines in order to maximise the creation of CERs. Detecting these so called inflated baselines is further doubtful, since the verification of baselines is being conducted by private companies selected and paid by the project participants themselves.

There is also criticism that the CDM is not fulfilling its very first objective of assisting developing countries in achieving sustainable development. Several reasons have been identified for the CDM's **limited success in contributing to sustainable development:** one pivotal aspect is that no clear definition and guidance is provided at the international level, leaving it to the host countries how to assess project's contribution to sustainable development. Most host countries, in turn, have not established robust sustainable development criteria and do not require project proponents to deliver concrete details on how the project will contribute to sustainable development. Another aspect is the lack of financial incentive, since the mechanism only puts a price on carbon but does not reward sustainable development contributions of the projects. Hence, projects with higher abatement costs may be neglected despite yielding larger sustainable development benefits.
One particular way the CDM was expected to contribute to sustainable development in host countries was technology transfer. Critics however claim that the CDM has only delivered **limited technology transfer benefits**. Such benefits are mostly achieved in CDM projects with bi- or multilateral participation. However, these projects are not only lower in number than those implemented unilaterally by developing countries. Moreover, the technology transfer impact of the CDM is generally limited to individual projects, while broader policy changes that could induce sectoral transformations in host countries were not achieved. Also, technology transfer has been restricted to a limited number of sectors, while others, such as the transport sector, are widely bypassed by the CDM due to complex additionality and monitoring requirements.

The limited contribution to achieving sustainable development has also been criticised in the context of the **unbalanced sectoral and geographical distribution of projects**. As can be seen from figure 3 above, emerging economies, particularly China and India are dominating the CDM while less developed regions were unable to participate accordingly. While it is plausible that the growing emissions in emerging economies offer

larger possibilities for project implementation, underrepresentation of less developed regions is particular relevant with regard to the CDM's sustainable development goal. Furthermore, the CDM has not been able to target all sectors equally. There are, for instance only a very limited number of transportation projects, despite this sector being responsible for around 13% of the global human induced greenhouse gases.

The Transmileneo Bus Rapid Transit Project in Bogota, Colombia, is one of the few registered CDM transport projects.

Criticism has also been raised towards the **procedural structures and regulations of the CDM**, which are often perceived as being too complex and costly. Developing the project design document (PDD) and undergoing the different procedural steps (validation, registration, monitoring, verification and certification) results in large transaction costs for project developers, which can be prohibitively high for some projects. Bearing these CDM specific costs with the additional revenues the project generates through the CDM can be difficult, since the revenue stream is subject to high risks. Hence, project developers cannot be sure whether their project will be successfully registered, whether it will achieve the expected amount of emission reductions and at which price it will sell these CERs. Similarly, **the procedures at the CDM Executive Board (EB), the mechanism's supervising body**, have been criticised for being too inefficient and time consuming. Hence, procedures such as the registration process has in the past taken several months. Long and indeterminate delays in the registration process may lead to higher project costs and reduce project returns, possibly deterring private actors from engaging in the CDM.

Reforming the CDM – A Permanent Challenge

The experiences with the CDM from the last ten years have delivered impressive figures. However, even though the Marrakesh Accords provide a comprehensive set of modalities, guidelines and rules, the regulation of the CDM proved a challenge and is subject to reform until today. Moreover, all scopes of project activities and the CDM methodologies were set up as a bottom process, a system which has reached a stadium in which consolidation is needed. While the rising numbers of projects and emission reductions achieved indicate the mechanism's potential and its broad acceptance, the shortcomings identified show the need for reform. In the last years, the Conference of the Parties serving as the Meeting to the Parties of the Kyoto Protocol (CMP) has therefore undertaken several steps to address some of CDM's most pivotal limitations and mandated the CDM Executive Board to further improve its rules and guidance. While this reform process is still ongoing, significant progress has been achieved in different areas.

Enhancing the Efficiency of the Registration Process and Simplifying the Procedures

The CDM has often been criticised for its procedures being too complex and time consuming. This particularly regards the registration process that comprises several individual steps and represents a crucial phase in the lifetime of a CDM project. With the date of registration often being linked to the beginning of the crediting period, the moment in which the project starts to generate certificates, the delay of registration can reduce the effective time a project is registered and could therefore affect the future supply of CERs.

An important reason for delay is when the CDM Executive Board (EB) requests a review of the Project Design Document (PDD) submitted for registration. In order to reduce the delay associated with this process, the registration procedures of CDM projects have been significantly streamlined. Important improvement was achieved with the revision of the review process adopted by the Executive Board in summer 2010, which, inter alia, now includes clear timelines for each stage of registration. Further modification of the review process now allows the date of the submission of a complete PDD to be the effective date of registration. With this modification, the number of days between a project requesting registration and its effective date of registration was drastically reduced. These improvements in terms of efficiency provide more reliability to project proponents potentially fostering the future development of CDM projects.

Another important improvement has been made with regard to the absence of a central package of rulings and procedures. With the CDM regulations being developed on a step-by-step basis, project developers and validators are required to always be informed about the latest decisions adopted by the EB. In order to consolidate and clarify the requirements project developers and validators are to meet, the CDM Executive Board adopted a package of new standards: Project Standard (PS), PoA Standard, Project Cycle Procedures (PCP) and Validation and Verification Standard (VVS). These new standards, which became operational at the beginning of March 2012, consolidate existing rules and provide further guidance for project developers and validators.

Programmes of Activities: Reducing Transaction Costs and Paving the Way for Sectoral Transformation

With the CDM being a project-based mechanism, projects are systematically directed towards those activities and installations holding the largest and most cost-effective potential for emission reductions. While this aspect promises highly efficient outcomes, it has also been criticised for benefiting project development in specific sectors, such as the industrial sector, where large emission sources can be easily reached, while other sectors are

being neglected. Since large industrial plants and respective emission sources are predominantly existent in emerging economies, this functionality also contributes to the geographic unbalance of CDM project distribution. With the aim to tap into dispersed emission reduction potential of previously neglected sectors and countries, the Parties to the Kyoto Protocol expanded the project-by-project approach by introducing the concept of Programme of Activities (PoA). This modality allows several individual activities, so-called CDM programme activities (CPAs) to be registered under one single programme (PoA). This approach offers the possibility to significantly reduce transaction costs, allowing to tap micro emission sources that are too small to be targeted by stand-alone CDM projects. While the mere number of registered PoAs and those in the pipeline has so far failed to live up to the general expectations, those PoAs that have been registered indicate that the programmatic approach does indeed have the potential to mitigate the geographic and sectoral unbalance of the CDM.

Hence, the sectoral distribution of PoAs is much more balanced when compared to the conventional CDM. Previously neglected project types such as demand side energy efficiency and solar energy activities, accounting for 29.2% (CDM: 4.9%) and 18.7% (CDM: 4,6) respectively, are dominating the current PoA pipeline. Similar observations can be made with regard to the regional distribution of PoAs: while still accounting for a share of about 30% of the current PoAs, the role of China and India is much less dominant here as in the conventional CDM, where more than two thirds of the projects are hosted in these two countries. In contrast, the African participation was significantly increased, reaching a share of 30% of the programmes in the pipeline (CDM: 3%). Least Developed Countries, accounting for only 1% of the conventional CDM, are also profiting from the new modality with a share of 10% of the PoA pipeline.

The Kuyasa CDM Small Scale Project involves retrofitting of solar water heater, insulated ceilings and energy efficient lighting in over 2 300 low-cost homes in Khayelitsha, Cape Town, South Africa. Currently, the expansion of the project to a broader Programmes of Activities is considered.

To further exploit these potentials in the future, the CDM Executive Board started a process to reform the programmatic approach addressing regulatory issues that had previously constrained the number of PoAs. Within this reform, the PoA standard was introduced in November 2011, consolidating previous PoA rules regarding the demonstration of additionality, the combination of methodologies and the inclusion of the individual measures under the PoA, the CDM Programme Activites (CPAs).

In terms of additionality demonstration, the standard clarifies the different requirements individual CPAs have to meet in order to be considered additional. The standard further stipulates minimum requirements for the establishment of criteria to identify CPAs that can be added to the PoA (eligibility criteria), making the process of CPA inclusion more transparent and reducing the potential for the so called erroneous inclusion of CPAs.
In order to further improve the expansion of the programmatic CDM, the CDM Executive Board also modified the regulation regarding the erroneous inclusion of CPAs. The large liability of Designated Operational Entities (DOEs) in case a CPA has been included erroneously, had been criticised as one major obstacle to the expansion of PoAs. With the new rulings, the time span in which a CPA can be put under review was reduced to a maximum of one year, significantly reducing the DOEs' liability.

With these new rules, the programmatic approach can be expected to further expand in the future. In the long term, this expansion could have important repercussions well beyond the CDM mechanism itself, since PoAs hold the potential to pave the way towards a broader sectoral transformation in the host countries.
With the programmatic approach allowing the inclusion of an unlimited and unspecified number of individual projects under one PoA, a framework with respective eligibility criteria for emission reduction activities is established. This allows to target different emission sources within one sector, and even beyond: PoAs can also be designed in a cross-sectoral way, making it possible to include activities from more than one sector. Since PoAs can also be designed to support the enforcement of national laws, they can be regarded a tool for the implementation of government policies. Hence, PoAs represent a stepping stone towards sectoral approaches and can inform the design of future climate change mitigation policies.

Promoting the Development of the Programmatic CDM: PoA Support Centre Germany and the Foundation "Future of the Carbon Market"

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) is granting support to the development of Programmes of Activities from the very beginning. In 2008, the PoA Support Centre Germany was launched by KfW on behalf of BMU with the aim to create a portfolio of implementable Programmes of Activities (PoAs). The Support Centre provides advice and support for businesses and institutions interested in implementing PoAs and promotes the broad use of the programmatic CDM by establishing contacts with potential cooperation partners (banks, microfinance institutions and energy utility companies).
The initiative further helps fostering and disseminating best practice knowledge on structuring PoAs from a financial and methodological standpoint. With the KfW PoA Blueprint Book, a guidebook was published that aids the development of programmatic CDM approaches by providing practical examples from six typical sectors.
Additional support in the development of Programmes of Activities is provided through the recently launched Foundation "Future of the Carbon Market". The Foundation's purpose is to promote the use of programmatic CDM activities by providing initial financial support and boosting awareness of the PoA concept. It will primarily target least-developed countries (LDCs) which have benefited very little from the carbon market and are in urgent need of support in tapping their emission reduction potential. With the start-up capital provided by the Foundation for the Future of the Carbon Market several PoAs will come to fruition and be able to reach valuable emission reduction potential that would otherwise go untapped.

Further Information:
PoA Support Centre Germany
http://www.kfw.de/kfw/en/KfW_Group/Sustainability_and_Climate_Protection/PoA_Support_Centre_Germany/index.jsp

Foundation for the Future of the Carbon Market
http://www.kfw.de/kfw/en/KfW_Group/Sustainability_and_Climate_Protection/Further_activities/Foundation_Future_of_the_Carbon_Market.jsp

Top-down Development of Methodologies

Important steps have also been made with regard to the development of methodologies project proponents need to apply in the design and implementation of their projects. Originally, methodologies for baseline setting and monitoring could only be developed by individual project proponents and then submitted for approval to the CDM Executive Board (EB). The Board did not have the mandate to develop methodologies top-down on its own initiative. With this project-by-project approach, the development of methodologies was left to the market and methodologies were established where project proponents saw the greatest opportunities for emission reductions.

This concept has now been complemented by a top-down approach that allows the CDM Executive Board to develop methodologies on its own. With such an approach, the regional and sectoral distribution of projects can be enhanced and activities with particularly high contributions to sustainable development can be fostered by providing specific methodologies. These possibilities have already been widely used in the past and the EB developed several methodologies, particularly for small scale projects as well as for activities in countries with very small numbers of CDM projects. In 2011, for instance, six top-down methodologies for small scale activities have been developed that are suitable for different project types, including solar water heating, water purification systems and efficient outdoor and street lighting technologies. In the same year, the first top-down methodology for large-scale projects was approved, for afforestation and reforestation project activities.

Standards for Baseline Setting and Additionality Demonstration

A topic closely linked to the issue of the development of methodologies is the question of their application. Under the original procedures, methodologies were to be applied on a project-by-project basis. Hence, for each CDM project, a project-specific baseline has to be developed, describing what would have been occurred in the absence of the project proposed. Furthermore, the project proponent had to demonstrate that his project would not have been implemented without the CDM (additionality demonstration) and he was to apply project-specific monitoring methodologies.

Following a decision by the Copenhagen climate change conference in December 2009, this approach for baseline setting and additionality demonstration has been complemented by the concept of standardised baselines, where project development differs significantly from the original concept. Instead of developing and applying methodologies on a project-by-project basis, standardised default values and methodologies can be used by all projects of a certain sector or sub-sector within a geographical boundary or even globally.

Expectations linked to this approach are high. First, it is hoped that objectivity in determining baseline emissions and demonstration of additionality can be enhanced, since projects would no longer have to develop their own baselines on the basis of potentially subjective assumptions. This could substantially increase the environmental integrity of the mechanism. Second, from a project developer's perspective, standardised approaches hold the promise to significantly reduce transaction costs, since the burden for data collection and calculation is transferred from project developers to a central coordinator. Third, uncertainty and delays associated with the current project approval process could be reduced since each project would not have its baseline and additionality demonstration be approved individually. Hence, predictability of project approval and crediting amounts may be increased, resulting in higher economic efficiency and potentially facilitating access to finance for project developers. Furthermore, these simplifications are expected to foster project development in less developed countries, where data availability is low and additional data collection would be necessary under the project-by-project approach. Along with an improved regional distribution sectoral distribution could be enhanced as well, since the difficulties for project activities targeting small and dispersed emission sources, such as projects in the transportation sector or energy efficiency activities in households may be reduced.

In 2010, the climate conference in Cancún, Mexico, established **two tracks for the development of standardised baselines (SBL).**

1. The first track is a top-down procedure, where the EB is to develop standardised baselines prioritizing methodologies particularly suited for underrepresented project types and regions.
2. The second procedure follows a bottom-up logic, allowing Parties, project participants as well as international industry organisations and observers to submit standardised baseline proposals for consideration by the CDM Executive Board.

In 2011, the CDM Executive Board issued guidelines for the establishment of sector-specific standardised baselines. Through the development of positive lists and the definition of respective baseline technologies, the additionality of project activities can be demonstrated and their baseline emission factors determined. This gives the EB the possibility to treat particular sectors with a higher priority. The EB decided to prioritise the sectors households, energy efficiency in the construction sector, agriculture and progress was also made in the bottom-up development of SBLs. In July 2011, the CDM Executive Board approved a general methodological framework, which provides assistance and specifies the individual steps for establishing standardised baselines for particular sectors. Furthermore, guidelines for quality assurance and control have been approved, clarifying who is responsible for data collection and control. The Executive Board further agreed to provide financial support to developing countries in the development of SBLs. With the adoption of the last of the three guidelines in March 2012, the way for a broad application of standardised baselines has been paved.

First of its Kind and Common Practice

With additionality of project activities being a highly contentious topic, the CDM Executive Board undertook several steps to better scrutinise the demonstration of additionality, while at the same time trying to simplify the process for project developers. One significant step in this direction was made in 2011, when the CDM Executive Board agreed new rules for projects that can be considered "first of its kind". According to the new provisions, a project is automatically considered additional if the project developer demonstrates that the project differs from the technologies applied in the region on the basis of a specific benchmark. In cases where there are large differences with regard to the diffusion of the specific technology in the project's host country, the project developer is even allowed to use a geographical region that is smaller than the host country.

In the course of the introduction of these new rules, the requirements for the demonstration of additionality have also been revised. Under the new rules, projects which are not considered "first of its kind" have to provide information on the diffusion of the technology in the host country and the respective sector, allowing to identify those projects which are "common practice". According to the new rules, projects are considered "common practice" if the fraction of the technology applied in projects which have been started in advance of the CDM project lies above 20% or if at least three existing installations of the same size are applying the same technology.

Energy efficient energy supply: the CDM project Taiyanggong CCGT Trigeneration plant in Beijing, China.

By providing these new regulations on "first of its kind" and "common practice" the CDM Executive Board addressed one of the central shortcomings of the existing additionality rules. In particular the clear benchmarks regarding common practice represent an important improvement of the CDM, since the comparison of projects is facilitated, allowing to better answer the question of additionality.

Dealing with Suppressed Demand in Least Developed Countries

LDCs and other countries, particularly from the African continent, are characterised by low levels of socio-economic development and high levels of poverty. The majority of the population in these countries cannot meet their basic energy needs due to a lack of economic resources or access to energy infrastructure. Hence, the demand for energy services in these countries is not met but artificially "suppressed". In the future, however, this demand can be expected to be met along with economic development, potentially leading to a significant rise in greenhouse gas emissions.

Against this background, the CDM Executive Board agreed on new guidelines that allow project developers to assume these future increases of greenhouse gas emissions when calculating the project baseline. With this approach, called "suppressed demand", a minimum service level is established, which describes a baseline of emissions where minimum human needs such as basic energy services are met. The baseline can be applied in cases where the basic energy services are below the minimum service level at the time of project implementation. With these new guidelines, the introduction of new low carbon development technologies is incentivised, allowing to circumvent the use of dirtier technologies in the development of a host country. Hence, the approach holds the potential to foster project implementation in countries with particular low levels of development, which are currently underrepresented in the CDM.

Facilitating Development of Microscale Projects through New Additionality Guidelines

Under the original rules, every single CDM project has to demonstrate that it would not have been implemented without the additional benefits the CDM provides. While such additionality demonstration is crucial in order to maintain the environmental integrity of the mechanism, the "Tool for demonstration and assessment of additionality" has often been criticised for acting as a barrier to project development due to its complexity and the high transaction costs involved. Due to the small amount of revenues they generate, the transaction costs associated with the conventional additionality demonstration would be prohibitively high for very small projects. Therefore, the CDM Executive Board introduced a simplified additionality demonstration requirement for these small-scale projects. In order to further support the development of small-scale projects, a simplified approach of additionality demonstration was adopted in May 2010, targeting small-scale renewable energy and energy efficiency projects. These guidelines where further expanded in scope to include all other project types, finally resulting in the "Guidelines for demonstrating additionality of microscale project activities". Under these guidelines, projects of eligible size are automatically considered additional if they are implemented in particular countries and/or under specific conditions. For instance, micro-scale projects are automatically considered additional if implemented in Least Developed Countries or Small Island Developing States (SIDS). Similarly, additionality of micro-scale renewable energy projects is automatically taken for granted if these are off-grid activities supplying energy to households or communities.

These new rules are particularly beneficial to Least Developed Countries since most greenhouse gas emission sources in these countries are small and geographically dispersed, making their tapping extraordinarily costly. With the new guidelines this particular barrier is addressed. Transaction costs for micro-scale projects in LDCs have been significantly reduced, since the project proponents for the respective sectors can simply state it takes place in an LDC. The rising number of micro-scale projects using the new guidelines indicates that additionality

demonstration has been one major hurdle for project implementation. The procedures are currently further being simplified and their application will be expanded to other project types in the course of 2012.

Providing financing support: the CDM Loan Scheme

The participation of Least Developed Countries in the CDM has historically been low due to several reasons. LDCs are generally characterised by weak political and macroeconomic structures that lead to high interest lending rates and a generally unfavourable investment climate. Of particular relevance to CDM projects is the low availability of data for calculating GHG emissions. In LDCs, this information is often more difficult and expensive to obtain, adding additional costs to project implementation.

In order to assist project developers in coping with these financial challenges, the CDM Executive Board has launched a new loan scheme that will provide interest-free loans for CDM projects in Least Developed Countries and host countries with less than ten CDM projects registered. The loans will finance the different steps of the CDM project cycle: the development of the PDD, the validation fo the project and its registration as well as the monitoring and the verification process. Support will be given to projects that meet particular criteria, such as a high probability of registration and the expectation that the project will generate a particular amount of CERs. Launched in April 2012, the CDM loan scheme administered jointly by the UNFCCC, the UN Environment Programme (UNEP) Risoe Centre, and the UN Office for Project Services (UNOPS) is expected to significantly boost the participation of underrepresented countries in the CDM.

Saving Energy with Efficient Fuel Wood Stoves in Nigeria

Like many other areas in Africa, Nigeria's Savannah zone is severely impacted by deforestation and desertification. Overuse of firewood for cooking is one of the key causes. The aim of the "Improved Cooking Stoves for Nigeria" Programme of Activities is to reduce the amount of wood used by disseminating efficient cooking stoves at a reduced, CDM-subsidised price. The stoves can be used for cooking and roasting foods, heating and sterilising water, and for baking bread. The programme coordinated by the German-based company atmosfair gGmbH is being implemented with the support of the German Non-Governmental Organisation Lernen – Helfen – Leben e.V. (LHL) and DARE (Developmental Association for Renewable Energy), its Nigerian project partner.

A group of adults and children watch as an efficient cooking stove goes into operation.

The PoA will consist of several individual CDM programme activities (CPAs). The CPAs will distribute portable cook stoves made of stainless steel that are developed and prefabricated in Germany and will be assembled locally. Financing is provided by atmosfair in the form of advance payments on the expected CERs. Atmosfair orders and pays for the stove components and for their transport from Germany to Nigeria, including the customs tax. The localised project costs which arise in Nigeria are covered by the sale of the cookers. At various locations throughout the region, sales training and instruction sessions to show people how to use the cookers properly will be conducted. The first CPA submitted for registration together with the PoA is expected to achieve emission reductions of almost 90,000 t CO_2e over its registration period of ten years.

Without CDM funding, the programme and the individual CPAs would not be feasible. The PoA makes it possible to give away the stoves for only half the actual cost upon purchase. Furthermore, a micro-credit is offered to families that lack the financial means to purchase the cooking stove. Without the support

structure established by the programme, it can be expected that the use of the traditional inefficient cooking stoves would continue, hence requiring large quantities of non-renewable fuel wood that lead to greenhouse gas emissions.

After it had been positively validated by TÜV Nord in November 2011, the "Improved Cooking Stoves for Nigeria" PoA was successfully registered by the CDM Executive Board in January 2012. The Programme of Activities is the first cook stoves PoA ever to be registered and the second PoA targeting sub-Saharan Africa.

Achievements of the CDM Reform and the Way Ahead

The numerous reform elements introduced by the CDM Executive Board have demonstrated the capacity of the CDM in adapting to new requirements and in responding to the need for reform. A broad range of innovative tools and solutions has been developed that target some of the mechanism's most pivotal shortcomings.
The CDM reform made important progress with regard to the aim of **mitigating the unbalanced regional distribution** of the projects. Several individual reform steps could be implemented, such as the introduction of guidelines for dealing with suppressed demand in particularly low developed regions or the establishment of new additionality rules for microscale projects. With the introduction of the CDM loan scheme, the problem of financing of transaction costs in currently underrepresented countries was also approached.

These steps complement previous attempts to **improve the regional and sectoral distribution** of the CDM, such as the introduction of PoAs, which was to reduce the regional and sectoral unbalance through the reduction of transaction costs. However, several regulatory hurdles had until now hampered a broader expansion of this approach into previously neglected regions and sectors. With the introduction of the PoA standard and the clarification of several regulatory uncertainties, the CDM Executive Board responded to these initial difficulties. The clarification of additionality requirements and CPA inclusion as well as the guidance regarding the combination of methodologies can be expected to foster the future development of PoAs, including also sector-wide programmes.

However, **standardisation** is not limited to the programmatic approach but represents one of the main elements of the CDM reform. With the introduction of the Project Standard and other standards, a central package for rulings and procedures was established, holding the potential to increase the transparency of the requirements and procedures for project developers and validators. The guidelines for the development of standardised baselines (SBL) can be expected to result in a large number of baselines applicable to more than one project in the future, which would allow for a greater objectivity in baseline determination and may increase the environmental integrity of the mechanism.

Whether the expectations related to these reforms will actually materialise, will, however, have to be proven through their application on the ground. The additional needs for reform identified through the application of these new rules will have to be addressed together with those issues which could not yet be resolved. One point of particular concern will remain the questions regarding the additionality rules of CDM projects. These and other fundamental questions regarding the future role of the CDM will have to be answered by the CMP, while further input can be expected from the CDM Policy Dialogue, an initiative launched by the Executive Board and UNFCCC Executive Secretary with the aim to compile the CDM experiences of policymakers, civil society and market participants.

New Frontiers for the CDM

The past years of negotiations under the UNFCCC have delivered significant outcomes and new structures where established that could pave the way towards a new comprehensive global climate agreement, including new market-based mechanisms. Simultaneously, the future of the Kyoto Protocol was safeguarded with the decision for a second commitment period taken at the climate conference in Durban in December 2011. Against this background, the Clean Development Mechanism is confronted with an auspicious yet uncertain future.

The Use of the CDM in the European Union

In 2013, the European Union Emissions Trading Scheme (EU-ETS) will enter its third trading period. With the EU-ETS being the largest market for CERs worldwide, its developments have important repercussions on the CDM market. This does not only concern the price of CERs, which has in the past strongly followed the price of the EU emission allowances (EUAs) regulated installations can use for trading of emissions. Another factor of large influence are the regulations that govern the use of credits under the emissions trading scheme.

In terms of the amount of CERs that may be used under the EU-ETS for compliance, there are important quantitative limits that result in a cap of about 2.4 billion t CO_2e by 2020. Beyond these quantitative restrictions, important qualitative regulations have been established. Hence, only CERs stemming from particular CDM projects can be used in the third trading phase of the EU-ETS. The most important provision in this regard is the decision taken by the EU to accept CERs from projects registered after 2012 only if they are hosted in a Least Developed Country or if a bilateral agreement has been signed with the respective host country. With emission sources in LDCs predominantly being small and dispersed, a strong focus is put on Programmes of Activities, which are particularly well suited for tapping these potentials.

The influence of these EU regulations on the CDM project development process are already discernible. With the representation of LDCs in the carbon market being historically low, the number of projects from Least Developed Countries rose considerably since the EU announced its decision in 2009. This trend is even more pronounced with regards to the development of PoAs. The number of submitted PoAs has also risen considerably and can be expected to further grow in the future.

The Global Demand for CERs

On a global scale, the future demand for Certified Emission Reductions is generally difficult to predict, since it will ultimately depend on the quantitative emission reduction targets that will be agreed on at international level. Here, the European Union is strongly pushing towards rising the general level of ambition.

While this negotiation process is still ongoing, emissions trading schemes are emerging in several countries that could represent new compliance markets for future CDM certificates. At the national level, Australia and New Zealand are currently in the process of establishing emission trading schemes. Starting with a fixed carbon price by mid 2012, Australia is planning to shift to a market-based emissions trading scheme by 2015 in order to reach the goal of cutting its emissions by 159 million t CO_2e by 2020. Under this envisaged scheme, Australian companies would also be allowed to use Certified Emission Reductions to meet their carbon reduction obligations. Also by 2015, this new ETS is to be linked with New Zealand's Emissions Trading Scheme (NZ ETS), which is expected to have achieved full coverage by then. The NZ ETS, which does not put a cap on the use of international offsets may also turn out to be an important market for CERs post 2012. Yet also events from outside the Annex I world may also trigger the demand for CERs in the future. Hence, a growing number of emerging economies are advancing with high speed in the establishment of their own emission trading schemes that may at some point generate additional demand for offsets.

Scaling-up Mitigation Action by Expanding the CDM

In order to further scale-up mitigation action in the developing world, the CDM will have to be applied on a much broader scale in the future. This does not only concern LDCs and large emerging economies such as China, India, Brazil and South Africa, but includes also other advanced developing countries, such as Argentina, South Korea and Mexico. These countries could already benefit from the CDM in the past, though not in a scale comparable to the larger emerging economies, leaving substantial mitigation potential untapped.

With the new tool of standardised baselines now being in place, reaching these untapped emission sources at a broader scale will be possible. Emerging economies are particular well suited for developing standardised baselines on their own, since their CDM structures are more advanced than those of smaller developing countries and the availability and quality of the data necessary for SBL calculation is much better. Once the SBL is in place, project developers in these countries would benefit from the advantages of the standardised approach, have higher project approval certainty and benefit from reduced transaction costs due to more streamlined CDM procedures. The experiences that can be made with standardised baselines under the CDM may even serve to go beyond offsetting in the future. Hence, once the baseline is set below the expected development of greenhouse gas emissions (business as usual) it would be possible to achieve a net carbon benefit.

The programmatic approach could also be used as a starting point to go beyond the mere offsetting function of the CDM. Countries that are implementing PoAs could in the future use the structures already established in order to initiate sectoral or even national mitigation actions that could contribute significantly to the aim of combating climate change.

The Future of the CDM

Eleven years after the first CDM project has been registered, the CDM is today a well-established climate change mitigation instrument. After an initial phase of experiencing, the number of projects rose considerably with the entering into force of the Kyoto Protocol and the mechanism received an additional boost through the demand for offset credits from the European Union Emissions Trading Scheme. With this dynamic evolution, the CDM emerged as the world's largest provider of emission offset credits and has several billions US$ of low-carbon investments. However, the experiences gained in the past years have not only shown the large potential of the CDM but also revealed some important shortcomings. While the numerous reform steps taken in the past allowed to properly deal with a large part of these challenges, there still remains room for further improvement in the future.

As part of this permanent challenge, the Executive Board decided at the end of 2011 to launch the **CDM Policy Dialogue** in order to develop proposals to better position the mechanism for the mid-term future. Conducted by a panel of civil society actors, policymakers and market participants, the CDM Policy Dialogue is to assess the experiences, merits and shortcomings of the mechanism. With a particular broad participation of stakeholders, issues such as the mechanism's environmental integrity or its contribution to sustainable development will be treated. The policy dialogue's output will come in form of a report to be published in September 2012, that will comprise recommendations for the future design and operation of the CDM as well as its potential responses towards the emerging of a new market-based mechanism. The comments and suggestions received in this process can be expected to help further improving the CDM's future role in an international policy field characterised by a highly dynamic evolution.

ABBREVIATIONS AND ACRONYMS

BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CERs	Certified Emission Reductions
CMP	Conference of the Parties serving as the Meeting to the Parties of the Kyoto Protocol
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide and Equivalences measured in Carbon Dioxide
ETS	Emissions Trading System
EU	European Union
EU-ETS	European Union Emissions Trading Scheme
EUAs	EU emission allowances
GEF	Grid Emission Factor
GHG	Greenhouse Gases
LDC	Least Developed Countries
MWh	Megawatt Hour
NGO	Non-Governmental Organization
NZ ETS	New Zealand's Emissions Trading Scheme
PCP	Project Cycle Procedures
PDD	Project Design Document
PoA	Programme of Activities
PS	Project Standard
SBL	Standardised Baseline
SIDS	Small Island Developing States
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US$	US Dollar
VVS	Validation and Verification Standard
BAU	Business as Usual

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This publication is part of the public relations work of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. It is distributed free of charge and is not intended for sale. Printed on recycled paper.