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Climate Finance Requirements and the Current Status of International Climate Finance and Carbon Markets

Second Interim Report of the Project

Analysis of the Role Carbon Markets Can Play for Global Climate Finance from Today to 2020 and Beyond

On behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

FKZ UM12 41 155

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Wuppertal/Köln, 30 July 2013

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The views expressed in this paper are strictly those of the authors and do not represent the opinion of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

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I. Summary

Background and Scope of this Report

Financial support for developing countries is a core issue under the United Nations Framework Convention on Climate Change (UNFCCC). Industrialised countries strongly emphasise the potential role of carbon markets in mobilising needed finance. Carbon markets may either finance investments directly, as in the Kyoto Protocol's Clean Development Mechanism (CDM), or they may constitute innovative sources of public finance, for example from auctioning revenues in domestic emission trading systems.

If credits from the CDM or potential new mechanisms are counted towards the investor countries' emission commitments, the related finance may not at the same time be counted towards their financial commitments as this would constitute double counting. However, there are also discussions about using the infrastructure of the CDM not for offsetting, but as system for measuring, reporting and verification (MRV) of investment results, with cancellation of the emission credits that are generated.

The research project "Analysis of the Role Carbon Markets Can Play for Global Climate Finance from Today to 2020 and Beyond" aims at providing an analysis of and recommendations for how carbon markets can contribute to financing emission reductions in developing countries.

This report presents the results from the first part of the project, which aimed at scoping the framework conditions as basis for the further analysis in the subsequent parts of the project. It synthesises available estimates of climate-related financial requirements in developing countries and the current status of UNFCCC negotiations on finance and carbon markets, discusses sources and channels of finance and the achievements and shortcomings of the CDM, so far the UNFCCC's only carbon market mechanism available to developing countries.

The subsequent parts of the project will analyse how the various strands of the carbon market (traditional CDM, Programmes of Activities, potential new mechanisms) can be harmonised and better linked to national policies of developing countries than has so far been the case. They will also analyse where specifically international support is necessary and what contributions could be tackled by developing countries themselves. This analysis will be done both at a conceptual level and in case studies of specific countries and sectors.

Financial requirements

This study focuses on incremental investment needed annually. Incremental investment denotes the difference between the initial investment needed for a low-carbon asset and the initial investment needed for an alternative conventional one. The International Energy Agency's World Energy Outlook projects total global energy-related investments in the period of 2012-2035 at cumulatively USD 37 trillion even without increased mitigation actions.

The report surveys the available literature on financial requirements for mitigation, adaptation and reducing emissions from deforestation and forest degradation (REDD+) in developing countries. As different sources partially differ in methodology and focus, the range of estimates is relatively broad. For mitigation, estimates of annual incremental investments needed in developing countries to stabilise atmospheric greenhouse gas (GHG) concentrations at 450 ppm CO_2eq vary between about USD 100 billion and 1.1 trillion. Estimates for adaptation vary between about USD 20 and 100 billion per year, but could be 10-100 times larger if the 2°C target is substantially overshot. REDD+ incremental needs are very hard to calculate. Annual opportunity costs (costs of forgoing alternative use of forested areas) have been estimated as up to about EUR 270 billion for a full halt of deforestation.

By comparison, total current global climate-related investment has been estimated at about USD 370 billion per year while total global gross fixed investment has been estimated at about USD 20 trillion and total world GDP at about USD 84 trillion.

Status of UNFCCC Negotiations on Climate Finance

While there are various negotiation items related to climate finance, they ultimately all relate to two main topics: Mobilisation of the needed amount of financial resources and the institutional structure of funding.

Developed countries are required to provide "new and additional" resources to developing countries by Art. 4 UNFCCC. The topic has gained priority through the adoption of the Bali Action Plan, where finance was included as a key building block for a future climate regime. In Copenhagen and Cancún, developed countries committed to providing USD 30 billion in "fast-start finance" (FSF) between 2010 and 2012 and mobilising up to USD 100 billion per year starting 2020. However, so far there is no clarity on how climate finance will be scaled up to USD 100 billion annually. Also, to date, only seven countries have announced a continuation or scale-up of their fast-start commitments beyond 2012.

One core controversy is the definition of “new and additional” finance. Developing countries demand that increased climate finance should not come at the expense of funding for other development objectives, such as health or education. However, so far there is no commonly agreed definition of additionality, industrialised countries use various thresholds to demonstrate that the finance they provide is additional. The result is that industrialised countries claim that they are meeting their finance commitments while developing countries claim that they are not.

The Convention’s financial mechanism has so far been managed by the Global Environment Facility (GEF). In 2010, the Green Climate Fund (GCF) was designated as a second operating entity. The GCF was launched in Durban in 2011, and is to be made fully operational in 2013. However, substantial contributions to the GCF by industrialised countries are yet forthcoming.

At the conference in Durban in 2011, countries also decided to introduce a new market-based mechanism (NMM) covering "broad segments” of host countries’ economies to support mitigation actions in developing countries. Negotiations on the details of the NMM are ongoing. Possible relations between and consequences of the different mechanisms for each other are as yet mostly unclear.

Sources of Finance

Sources of finance can be defined as origins of funding. They may be divided into on the one hand public sources such as general government budgets and innovative public finance sources such as auctioning revenues and carbon taxes, and on the other hand private sources such as foreign direct investment (FDI) or portfolio investment.

Typically, climate financing from public budgets is subject to a country's financial planning procedures, and as such provides a fairly reliable source of funding. Therefore, public finance plays a major role in providing security by giving guarantees to private investors, and thus leveraging private finance. As for innovative public sources, so far only Germany has employed carbon market revenues directly as a finance source over the FSF period.

There is so far no agreed definition of what constitutes private climate finance. FDI is by far the most discussed source of private finance, especially in combination with leverage by public policies and measures. However, many climate-related foreign direct investment flows occur independently of countries' climate commitments. Other private sources include various types of private investment, notably portfolio investments. While they may have a high influence on the targeted country's development path, here as well it may be questioned

in how far these flows can be counted towards a certain country's finance mobilisation as they occur largely independently of the public sector's influence.

Channels of Finance

Channels of climate finance can be defined as the mechanisms through which climate finance is disbursed. They include public channels such as bilateral cooperation between countries or multilateral funding mechanisms within the UNFCCC (e.g. GEF, GCF, Adaptation Fund) or without (e.g. Climate Investment Funds of the World Bank), and private channels such as carbon markets or private credits and guarantees.

Bilateral climate finance is a very reliable channel, and is usable for a wide variety of activities. Multilateral climate finance often gives developing countries a higher level of control than bilateral channels, especially in the case of UN-based funding mechanisms. The funding levels through multilateral funds have generally been low, but reliable.

Private finance institutions play a significant role in channelling private finance to developing countries. However, the money disbursed can often not be attributed easily to specific countries. Given the private-sector character, developing country control is limited to private sector partners in developing countries. This channel is focused on generating revenue from bankable products, which limits its scope generally to mitigation activities, and possibly insurance against loss and damage.

Another possibly large channel for private climate finance is the carbon market. Carbon markets are especially suited for mitigation, as well as forest-related activities that can be converted to GHG abatement. Due to its inherently private nature, governmental control in developing countries is limited. Private sector partners in projects may have higher possibilities of influence.

Bi- and multilateral agencies, development banks, governments and different funds provide various instruments and sources of finance to scale up private financing. Such instruments include grants, concessional loans, equity investment, debt, guarantees, and insurance mechanisms. The amount of private investments that can be leveraged from public funds varies strongly with the type of financing instrument, the geographical location of the investment, and the type of project that is being financed. According to estimates, leverage factors may vary between 1:2 for non- or partly concessional debt to up to 1:20 for grant-financed equity and guarantees. However, high leverage rates may render the additionality of funded projects questionable, as the public finance element makes up for only a very minor share.

Current Status of the Clean Development Mechanism

Mobilised Resources

The CDM plays already a significant role for carbon financing and leads to leveraging of significant amounts of private financing, though the exact leverage effect is hard to gauge as the prices in primary transactions of Certified Emission Reductions (CER) are mostly secret. The World Bank has estimated the leverage factor at on average 4.6 and possibly up to 9 for some projects.

The total cumulative investment mobilised by the CDM up to the end of 2012 has been estimated at USD 280 billion. However, these are not all North-South flows. There is no accurate data available for all CDM project types, but the CDM Policy Dialogue's impact research concluded that for renewable energy projects the majority of the investment provided by the CDM has come from domestic sources. This might be one of several reasons why activities and respective financing under the CDM are distributed unequally, as poorer countries may have difficulties funding projects from domestic resources. In consequence, reforming existing or introducing new carbon market instruments may in itself not be sufficient to achieve a more balanced geographical distribution. Financial institutions and general investment framework conditions in developing countries will also have to be strengthened to enable them to attract more investment.

Unequal Geographical and Sectoral Distribution

Currently, only a few more advanced countries dominate the CDM market while entire continents like Africa have only a limited number of activities. More than 75% of the registered projects are hosted in only three countries (China, India, Brazil) and China alone accounts for more than 50% of the projects. No African country can be found in the "top-15". This dominance is even more pronounced for the actually issued CERs. Here, more than 90% of the issued CERs went to only four countries (China, India, South Korea, Brazil) and China alone accounts for more than 60%.

Besides the regional dimension, also at sectoral levels unequal distribution of CDM activities can be observed. Hydro and wind are the predominant project types in terms of registered projects. Project types such as methane avoidance, biomass energy and landfill gas are also frequently implemented but in significantly lower numbers. HFC and N_2O projects have low numbers of projects but have received more than 60% of all issued CERs so far. While there is a high number of registered solar projects, there are only very few actual issuance activities and a low amount of CERs. Afforestation, reforestation, transport, energy distribution, energy efficiency services and

energy efficiency in households have low numbers of projects. Agriculture has only one registered project and no CERs issued.

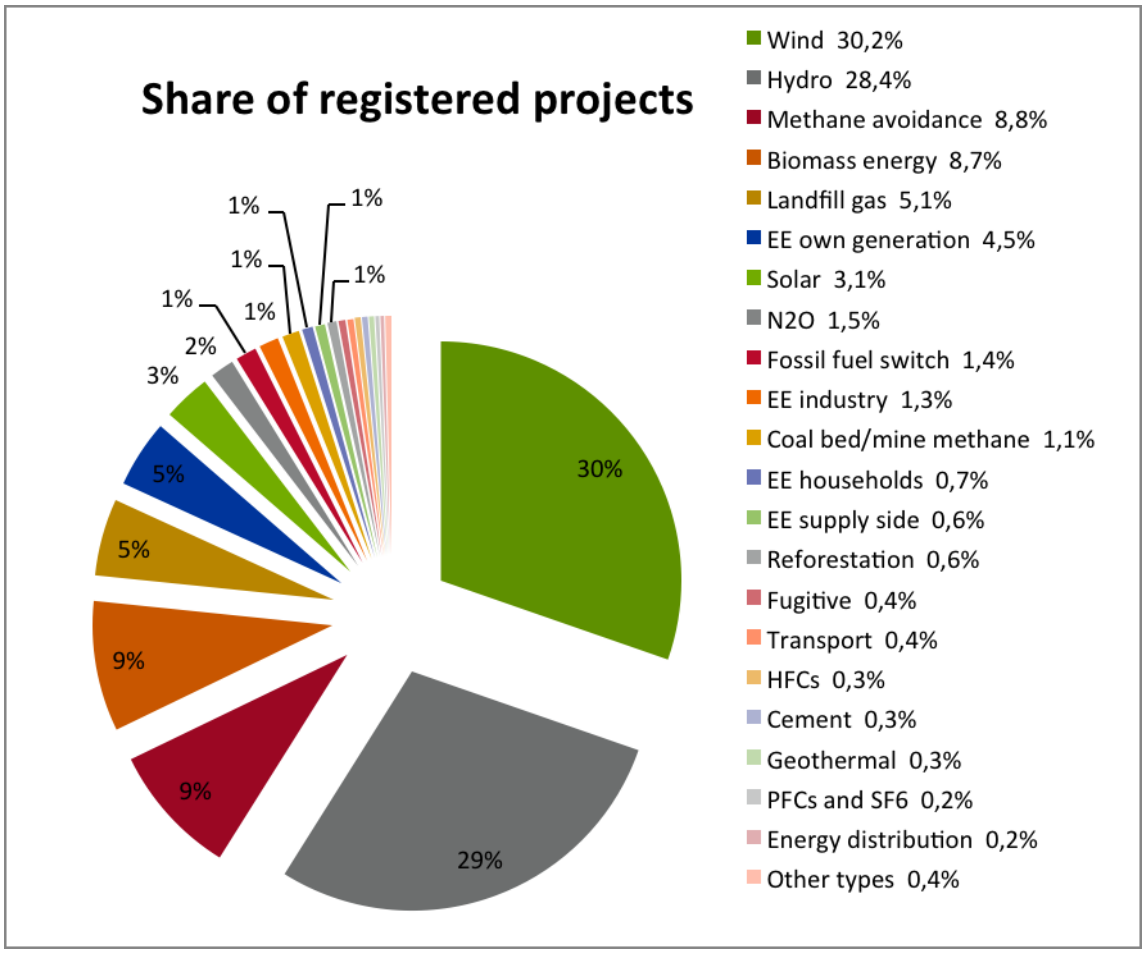

Figure I: Distribution of CDM activities per UNEP Risoe project type (source: own calculations based on UNEP Risoe 2013; cf. Annex)

Key reasons for this unequal distribution are the mitigation costs of project types as well as the general level of complexity of CDM projects that is caused by the nature of the underlying emission sources (e.g. dispersed and small vs. large point sources), as well as the related difficulties to set baselines and fulfil MRV requirements. This barrier can be reduced by other project type characteristics, e.g. if projects generate significantly high funds or if the projects are embedded in industry structures which can manage to comply with stringent MRV requirements.

Reform Efforts – Programmes of Activities and Standardised Baselines

Measures that have been taken to address these problems include the introduction of “Programme of Activities” (PoAs) as a new project category and the concept of “Standardised Baselines” (SBL).

The main objective of PoAs is to substantially lower transaction costs for the inclusion of dispersed mitigation opportunities by bundling similar opportunities and thus increasing the overall project sizes. While PoA uptake was slow in the beginning, they in the meantime achieved considerable importance and show a markedly better distribution than “traditional” CDM. African countries account for 30% of all PoAs in the pipeline and LDCs for 11%, while their shares in normal CDM projects are 3.0% and 1.1% respectively. PoAs have furthermore a significantly increased share in categories such as energy efficiency on the demand side (including energy efficiency in households, industry and service), waste and solar.

Remaining problems include the unquantifiable liability of Designated Operational Entities (DOEs) for erroneous inclusion of component project activities (CPAs) into PoAs and the lack of capacity in many developing countries to establish capable coordinating/managing entities (CME) for PoAs.

SBL are doubtless a useful approach but still require solving development challenges before they are available at a larger scale to impact also the scale of the CDM. So far, possible standardisation has been studied for only a few sectors, mostly large-scale industry. In addition, to develop a robust SBL reliable data is essential but often difficult to get or even unavailable, e.g. because of confidentiality issues. Moreover, most host countries do not have the necessary capacity to survey the required data.

CDM and National Policies

Besides technology-related barriers, especially the regional distribution of CDM projects can also be affected by the overall policy situation and CDM integration within the host countries. Host countries have a vital role for the success of the CDM since they can either support or hinder the implementation of CDM projects on their own territory. Some host countries identified the positive impact of the CDM very early, while others started to support CDM implementation rather late or just recently.

Looking into the host country capabilities might also in the future be important to determine the role of the CDM in different countries for providing carbon finance. The relation of host country circumstances and the potential of the carbon market will be addressed in more detail in the subsequent parts of the project.

II. Zusammenfassung

Hintergrund und Inhalte dieses Berichts

Finanzielle Unterstützung für die Entwicklungsländer ist eines der Kernthemen der UN-Klimarahmenkonvention (UNFCCC). Industrieländer betonen stark die potentielle Rolle von Kohlenstoffmärkten in der Mobilisierung benötigter Finanzmittel. Kohlenstoffmärkte können Investitionen entweder direkt finanzieren, wie etwa im Clean Development Mechanism (CDM) des Kyoto-Protokolls, oder innovative Quellen öffentlicher Finanzierung bereit stellen, z.B. aus Auktionserlösen in nationalen Emissionshandelssystemen.

Wenn Emissionsgutschriften aus dem CDM oder potentiellen neuen Mechanismen auf die Emissionsverpflichtungen der Investorländer angerechnet werden, kann die damit verbundene Finanzierung nicht gleichzeitig auf ihre Finanzierungsverpflichtungen angerechnet werden, da dies eine Doppelzählung darstellen würde. Es laufen jedoch auch Diskussionen, die Infrastruktur des CDM nicht für Offsetting, sondern als System für die Messung, Berichterstattung und Überprüfung (MRV) von Investitionsergebnissen zu nutzen, bei der die generierten Emissionsgutschriften gelöscht werden.

Das Forschungsvorhaben „Analyse der Rolle, die Kohlenstoffmärkte für die globale Klimafinanzierung von heute bis 2020 und darüber hinaus spielen können“ hat zum Ziel, zu analysieren und Empfehlungen zu entwickeln, wie Kohlenstoffmärkte zur Finanzierung von Emissionsreduktionen in Entwicklungsländern beitragen können.

Dieser Bericht präsentiert die Ergebnisse des ersten Teils des Projekts, der zum Ziel hatte, die Rahmenbedingungen der Klimafinanzierung zu analysieren, um als Grundlage für die weiteren Untersuchungen in den folgenden Teilen des Projekts zu dienen. Er synthetisiert vorhandene Schätzungen über die klimabezogenen Finanzierungsbedarfe in Entwicklungsländern sowie den derzeitigen Status der UNFCCC-Verhandlungen über Finanzierung und Kohlenstoffmärkte, diskutiert Quellen und Kanäle von Finanzierung sowie Erfolge und Begrenzungen des CDM, dem bisher einzigen Marktmechanismus der UNFCCC, der Entwicklungsländern zur Verfügung steht.

Die folgenden Teile des Projekts werden analysieren, wie die verschiedenen Stränge des Kohlenstoffmarktes (traditioneller CDM, Programmes of Activities, potentielle neue Mechanismen) harmonisiert und besser mit nationalen Politiken der Entwicklungsländer verknüpft werden können, als dies bisher der Fall war. Sie werden außerdem analysieren, wo konkret internationale Unterstützung erforderlich ist und welche Beiträge von den Entwicklungsländern selber erbracht werden können. Diese Analyse erfolgt

sowohl auf der konzeptionellen Ebene als auch in Fallstudien zu konkreten Ländern und Sektoren.

Finanzielle Erfordernisse

Die Studie konzentriert sich auf jährlich erforderliche zusätzliche Investitionserfordernisse. „Zusätzliche Investition“ bezeichnet die Differenz zwischen den Anfangsinvestitionen, die für eine Anlage mit niedrigen Emissionen und für eine konventionelle Anlage benötigt würden. Der World Energy Outlook der International Energy Agency projiziert für die Periode 2012-2035 globale energiebezogene Investitionen von kumulativ 37 Billionen USD, selbst ohne verstärkte Emissionsminderungsanstrengungen.

Der Bericht liefert einen Überblick über die verfügbare Literatur zu Finanzierungsbedarfen für Emissionsreduktionen, Anpassung und die Vermeidung von Entwaldung (REDD+) in Entwicklungsländern. Da die verschiedenen Quellen sich in Methodik und Fokus unterscheiden, ist die Bandbreite der Schätzungen relativ hoch. Schätzungen des jährlichen Investitionsbedarfs in Entwicklungsländern, um eine Stabilisierung der atmosphärischen Treibhausgaskonzentration bei 450 ppm CO_2-eq. zu erreichen, liegen zwischen rund 100 Mrd. und 1.1 Billionen USD. Schätzungen für Anpassung liegen zwischen 30 und 100 Mrd. USD pro Jahr, könnten aber um das 10-100fache steigen, wenn das 2°C-Ziel wesentlich überschritten wird. Zusätzliche Erfordernisse für REDD+ sind besonders schwer zu berechnen. Die jährlichen Opportunitätskosten (die Kosten des Verzichts einer anderen Nutzung von Waldland) sind für einen vollen Stopp der Entwaldung auf bis zu 270 Mrd. Euro (rund 350 Mrd. USD) geschätzt worden.

Zum Vergleich, Schätzungen der gesamten derzeitigen globalen klimabezogenen Investitionen belaufen sich auf ungefähr 370 Mrd. USD jährlich, Schätzungen der gesamten globalen Bruttoanlageinvestitionen auf ungefähr 20 Billionen USD und Schätzungen des gesamten Welt-BIP auf 84 Billionen USD.

Stand der UNFCCC-Verhandlungen zur Klimafinanzierung

Die Verhandlungen zur Klimafinanzierung beziehen sich letztendlich auf zwei Hauptthemen: Die Mobilisierung der erforderlichen Menge an finanziellen Ressourcen und die institutionelle Struktur der Finanzierung.

Die Industrieländer sind gemäß Art. 4 UNFCCC verpflichtet, den Entwicklungsländern „neue und zusätzliche“ Ressourcen zur Verfügung zu stellen. Das Thema hat durch die Annahme des Bali-Aktionsplans an Gewicht gewonnen, indem Klimafinanzierung zu einem Kern-Baustein des zukünftigen Klimaregimes wurde. In Kopenhagen und Cancún verpflichteten sich die

Industrieländer, zwischen 2010 und 2012 30 Mrd. USD an „fast-start finance“ (FSF) und ab 2020 100 Mrd. USD zu mobilisieren. Derzeit besteht jedoch keine Klarheit, wie die Klimafinanzierung auf jährlich 100 Mrd. USD ausgedehnt werden soll. Zudem haben bisher nur sieben Länder eine Fortsetzung oder Erhöhung ihrer FSF-Zusagen nach 2012 zugesagt.

Ein Hauptstreitpunkt ist die Definition von „neuer und zusätzlicher“ Finanzierung. Die Entwicklungsländer verlangen, dass eine Erhöhung der Klimafinanzierung nicht auf Kosten der Finanzierung für andere Entwicklungsziele wie Gesundheit oder Bildung gehen sollte. Bisher besteht jedoch keine allgemein anerkannte Definition von Zusätzlichkeit, die Industrieländer verwenden unterschiedliche Ansätze, um nachzuweisen, dass die von ihnen zur Verfügung gestellte Finanzierung zusätzlich ist. Das Ergebnis ist, dass die Industrieländern angeben, sie würden ihre Verpflichtungen erfüllen, die Entwicklungsländer dies jedoch bestreiten.

Der finanzielle Mechanismus der UNFCCC wurde bisher von der Global Environment Facility (GEF) betrieben. In 2010 wurde der Green Climate Fund (GCF) als weitere *operating entity* festgelegt. Der GCF soll bis 2013 voll funktionsfähig werden. Bisher sind jedoch noch keine substantiellen finanziellen Zusagen für den GCF gemacht worden.

Auf der Durban-Konferenz in 2011 entschieden die Staaten zudem, einen neuen marktbasierten Mechanismus (NMM) einzuführen, der „breite Segmente“ der Volkswirtschaft der Gastgeberländer adressieren soll, um Emissionsreduktionen in Entwicklungsländern zu unterstützen. Die Verhandlungen zu den Details des NMM halten an. Mögliche Verbindungen und Konsequenzen der verschiedenen Mechanismen füreinander sind bisher unklar.

Finanzierungsquellen

Finanzierungsquellen können definiert werden als Herkunft von Finanzmitteln. Sie können unterteilt werden in einerseits öffentliche Quellen wie allgemeine Regierungsbudgets und innovative öffentliche Finanzquellen wie Auktionserlöse und CO_2-Steuern, und andererseits private Quellen wie ausländische Direktinvestitionen oder Portfolio-Investitionen.

Typischerweise unterliegt Klimafinanzierung aus öffentlichen Budgets den Finanzplanungsverfahren des jeweiligen Landes und stellt damit eine verlässliche Finanzquelle dar. Öffentliche Finanzierung spielt daher eine starke Rolle dabei, Verlässlichkeit für private Investoren herzustellen und damit private Finanzierung zu hebeln. Was innovative öffentliche Quellen angeht hat bisher

nur Deutschland Einkünfte aus dem Kohlenstoffmarkt direkt als Finanzquelle für die FSF-Periode verwendet.

Bisher existiert keine vereinbarte Definition von privater Klimafinanzierung. Ausländische Direktinvestitionen sind bei weitem die am meisten diskutierte private Quelle, insbesondere in Verbindung mit Hebelung durch öffentliche Politikmaßnahmen. Jedoch erfolgen viele klimabezogene Investitionen unabhängig von Klimaverpflichtungen der Staaten. Andere private Quellen beinhalten verschiedene Arten privater Investitionen wie Portfolioinvestitionen. Während diese einen hohen Einfluss auf den Entwicklungspfad des Ziellandes haben können, ist es auch hier fraglich, inwieweit diese Flüsse auf die Finanzierungsmobilisierung eines Landes angerechnet werden können, da sie weitgehend unabhängig vom Einfluss des öffentlichen Sektors erfolgen.

Finanzierungskanäle

Kanäle der Klimafinanzierung können definiert werden als die Mechanismen, durch die Klimafinanzierung fließt. Sie beinhalten öffentliche Kanäle wie etwa bilaterale Zusammenarbeit oder multilaterale Mechanismen innerhalb der UNFCCC (z.B. GEF, GCF, Adaptation Fund) oder außerhalb (z.B. die Climate Investment Funds der Weltbank), sowie private Kanäle wie Kohlenstoffmärkte oder private Kredite und Garantien.

Bilaterale Klimafinanzierung ist ein sehr verlässlicher Kanal und für eine große Bandbreite an Aktivitäten einsetzbar. Multilaterale Klimafinanzierung gibt Entwicklungsländern oft ein höheres Maß an Kontrolle als bilaterale Kanäle, insbesondere im Fall UN-basierter Finanzierungsmechanismen. Finanzierungsvolumina durch multilaterale Fonds sind generell gering aber verlässlich.

Private Finanzierungsinstitutionen spielen eine wesentliche Rolle dabei, private Finanzmittel in Entwicklungsländern zu kanalisieren. Die Finanzflüsse können jedoch oft nicht einfach bestimmten Ländern zugeschrieben werden. Entsprechend dem privat-basierten Charakter ist der Einfluss der Entwicklungsländer begrenzt auf private Partner in den Ländern. Dieser Kanal ist konzentriert darauf, Gewinn aus bankfähigen Produkten zu erzielen, was seine Anwendbarkeit im Wesentlichen auf Emissionsminderungsaktivitäten beschränkt sowie möglicherweise auch Versicherungen gegen Klimaschäden.

Ein weiterer potentiell erheblicher Kanal für private Finanzierung ist der Kohlenstoffmarkt. Kohlenstoffmärkte eignen sich besonders für Emissionsreduktionen sowie für Wald-bezogene Maßnahmen, die in Emissionen umgerechnet werden können. Gemäß seiner inhärent

privatbasierten Natur ist der Regierungseinfluss von Entwicklungsländern begrenzt. Private Projektpartner haben potentiell höheren Einfluss.

Bi- und multilaterale Agenturen, Entwicklungsbanken, Regierungen und unterschiedliche Fonds verfügen über verschiedene Instrumente und Finanzierungsquellen, um private Finanzierung zu erhöhen. Diese Instrumente beinhalten Zuschüsse, vergünstigte Kredite, Eigenkapitalinvestitionen, Garantien und Versicherungsmechanismen. Die Menge an privaten Investitionen, die aus öffentlichen Mitteln gehebelt werden kann, variiert stark nach dem Typ des Finanzierungsinstruments, dem Ort der Investition, und der Art des Projekts, das finanziert wird. Nach Schätzungen variieren Hebelfaktoren zwischen 1:2 für nicht oder teilweise vergünstigte Kredite bis zu 1:20 für Zuschuss-finanzierte Eigenkapitalinvestitionen und Garantien. Hohe Hebelfaktoren mögen jedoch die Zusätzlichkeit der finanzierten Projekte in Frage stellen, da das öffentliche Finanzierungselement nur einen sehr geringen Anteil ausmacht.

Derzeitiger Status des Clean Development Mechanism

Mobilisierte Ressourcen

Der CDM spielt bereits eine wesentliche Rolle im Kohlenstoffmarkt und führt zur Hebelung beträchtlicher Mengen an privater Finanzierung, wobei die genaue Hebelwirkung schwierig abzuschätzen ist, da die Preise in primären Transaktionen von Certified Emission Reductions (CER) meistens geheim sind. Die Weltbank hat die Hebelwirkung auf im Durchschnitt 4,6 geschätzt und für einzelne Projekte auf möglicherweise bis zu 9.

Die gesamten bis Ende 2012 durch den CDM mobilisierten Investitionen belaufen sich auf geschätzt 280 Mrd. USD. Jedoch sind dies nicht nur Nord-Süd-Flüsse. Es liegen keine genauen Daten für alle CDM-Projekttypen vor, das Forschungsprogramm des CDM Policy Dialogue schlussfolgerte jedoch, dass für Erneuerbare-Energien-Projekte die Mehrheit der Investitionen aus inländischen Quellen der Gastgeberländer geflossen ist. Dies mag einer von mehreren Gründen sein, warum Aktivitäten und die diesbezügliche Finanzierung im CDM ungleich verteilt sind, da ärmere Länder Schwierigkeiten haben mögen, Projekte aus inländischen Quellen zu finanzieren. Als Konsequenz mag die Reform bestehender oder die Einführung neuer Marktmechanismen alleine nicht hinreichend sein, um eine ausgeglichenere geographische Verteilung zu erreichen. Finanzinvestitionen und die generellen Rahmenbedingungen für Investitionen in Entwicklungsländern werden ebenfalls gestärkt werden müssen, um sie in die Lage zu versetzen, höhere Investitionen anzuziehen.

Ungleiche geographische und sektorale Verteilung

Derzeit dominieren wenige fortgeschrittene Länder den CDM-Markt während ganze Kontinente wie Afrika nur eine begrenzte Anzahl von Aktivitäten aufweisen. Mehr als 75% der registrierten Projekte sind in nur drei Ländern beheimatet (China, Indien, Brasilien) und China allein macht mehr als 50% der Projekte aus. Kein afrikanisches Land findet sich in den „Top-15“. Diese Dominanz ist für die tatsächlich ausgestellten CER sogar noch größer. Hier gingen mehr als 90% der ausgestellten CER an nur vier Länder (China, Indien, Südkorea, Brasilien) und China macht alleine mehr als 60% aus.

Neben der regionalen Dimension kann eine ungleiche Verteilung auch auf der Sektorebene beobachtet werden. In Bezug auf registrierte Projekte sind Wasser- und Windkraft die dominanten Projekttypen. Projekttypen wie Methanvermeidung, Biomasse-Energie und Deponiegas werden auch häufig umgesetzt aber in deutlich geringerer Anzahl. HFC- und N_2O-Projekte machen eine geringe Anzahl der Projekte aus, haben aber bisher mehr als 60% aller ausgestellten CER erhalten. Während es eine hohe Menge an registrierten Solarprojekten existiert, gab es bisher nur wenige tatsächliche Ausschüttungen und geringe Mengen von CER. Aufforstung, Wiederaufforstung, Verkehr, Energieverteilung, Energieeffizienzdienstleistungen und Energieeffizienz in Haushalten haben eine geringe Anzahl von Projekten. In der Landwirtschaft gibt es nur ein registriertes Projekt und keine ausgeschütteten CER.

Wesentliche Gründe für diese ungleiche Verteilung sind die Minderungskosten der Projekttypen sowie der allgemeine Grad an Komplexität von CDM-Projekten, der in der Natur der zu Grunde liegenden Emissionsquellen begründet ist (z.B. kleine und verteilte vs. große Punktquellen), sowie die damit zusammen hängenden Schwierigkeiten, Baselines festzulegen und MRV-Anforderungen zu erfüllen. Diese Barrieren können durch andere Charakteristiken von Projekttypen reduziert werden, z.B. wenn Projekte beträchtliche Geldmengen generieren oder in Industriestrukturen eingebettet sind, die MRV-Anforderungen bewältigen können.

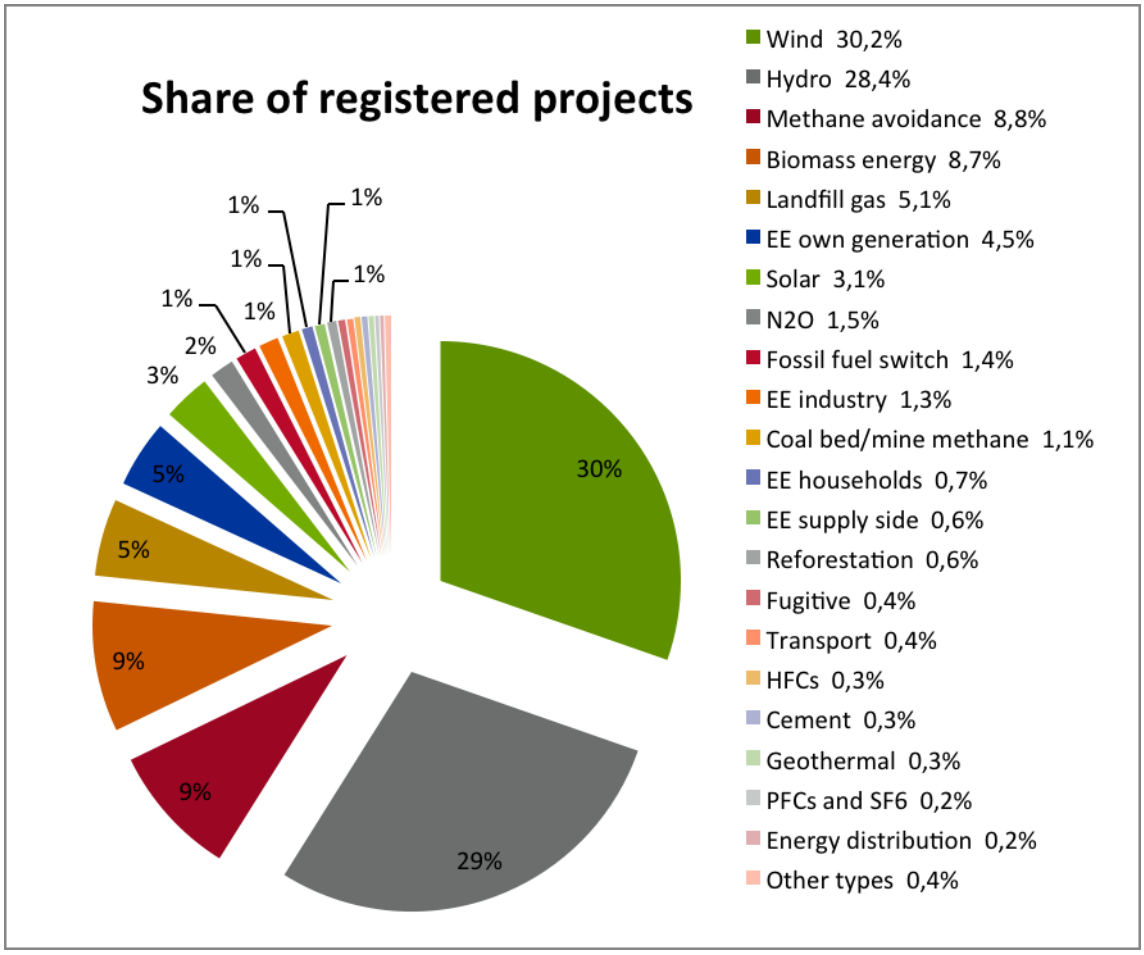

Abbildung I: Verteilung von CDM-Aktivitäten nach UNEP-Risoe-Projekttypen (Quelle: eigene Berechnung basierend auf UNEP Risoe 2013; vgl.. Annex)

Reformanstrengungen – Programmes of Activities and Standardisierte Baselines

Maßnahmen, die getroffen wurden, um diese Probleme anzugehen, beinhalten die Einführung von “Programmes of Activities” (PoAs) als neuem Projekttyp und das Konzept “Standardisierter Baselines“ (SBL).

Das Hauptziel von PoAs ist, die Transaktionskosten für die Einbeziehung kleiner dezentraler Minderungsoptionen substantiell zu senken, indem ähnliche Optionen gebündelt werden und damit die Gesamtprojektgröße erhöht wird. Während der Aufwuchs von PoAs zu Beginn langsam war, haben sie inzwischen einen beträchtlichen Stellenwert erzielt und weisen eine deutlich bessere Verteilung als der „traditionelle“ CDM auf. Afrikanische Länder beheimaten 30% aller PoAs in der Pipeline und LDCs 11%, während ihr Anteil in der normalen CDM-Pipeline 3.0% und 1.1% beträgt. PoAs haben zudem einen deutlich erhöhten Anteil in Kategorien wie Energieeffizienz auf der

Nachfrageseite (einschließlich Energieeffizienz in Haushalten, Industrie und Dienstleistungen), dem Abfallsektor und bei Solarprojekten.

Verbleibende Probleme beinhalten die nicht-quantifizierbare Haftung von Designated Operational Entities (DOEs) für fälschliche Hinzufügung von component project activities (CPAs) in PoAs und den Kapazitätsmangel vieler Entwicklungsländer, fähige coordinating/managing entities (CME) für PoAs einzurichten.

SBL sind zweifellos ein nützlicher Ansatz, erfordern jedoch die Lösung von Entwicklungsherausforderungen, um in größerem Umfang verfügbar zu werden und damit den Umfang des CDM zu beeinflussen. Bisher wurden Standardisierungsmöglichkeiten nur für wenige Sektoren untersucht, größtenteils für Großindustrien. Zudem sind für eine robuste SBL verlässliche Daten wesentlich, diese sind aber häufig schwierig zu erhalten oder gar nicht verfügbar, z.B. wegen Vertraulichkeitsfragen. Zudem verfügen die meisten Gastgeberländer nicht über die notwendigen Kapazitäten, um die erforderlichen Daten zu erheben.

CDM and Nationale Politikmaßnahmen

Neben technologiebezogenen Barrieren kann insbesondere die regionale Verteilung des CDM auch von der allgemeinen politischen Situation und CDM-Integration in den Gastgeberländern beeinflusst werden. Gastgeberländer haben eine wesentliche Rolle für den Erfolg des CDM, da sie die Umsetzung von CDM-Projekten auf ihrem Gebiet fördern oder behindern können. Einige Gastgeberländer identifizierten den positiven Nutzen des CDM sehr früh, während andere erst spät oder vor kurzem anfingen die CDM-Umsetzung zu fördern.

Die Betrachtung der Fähigkeiten der Gastgeberländer dürfte auch in Zukunft wesentlich sein, um die Rolle des CDM für die Nutzung von Marktfinanzierung in verschiedenen Ländern zu bestimmen. Die Beziehung von den Gegebenheiten in den Gastgeberländern und dem Potenzial des Kohlenstoffmarkts wird in den folgenden Teilen des Projekts näher untersucht.

1 Introduction

Financial support for developing countries is a core issue in the international climate regime. Article 4 of the United Nations Framework Convention on Climate Change (UNFCCC) and Article 11 of the Kyoto Protocol both mandate industrialised countries to provide “new and additional” financial resources to developing countries to support capacity-building, development and transfer of technologies, mitigation of greenhouse gas (GHG) emissions, adaptation to the impacts of climate change, and economic diversification. In addition, Art. 4.7 of the Convention notes that, “The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology...”

This core balance between developed and developing country efforts was further fleshed out at the 13th and 15th Conference of the Parties (COP) to the UNFCCC. At COP 13 in Bali in 2007, developing countries for the first time agreed to taking measurable, reportable and verifiable nationally appropriate mitigation actions (NAMAs), subject to MRVable support from industrialised countries. This was a softening of their hitherto held interpretation of “common but differentiated responsibilities”, which strongly put the onus for reducing emissions on industrialised countries. Subsequently, at COP 15 in 2009, industrialised countries committed to “mobilise” US$100 billion per year by 2020 “from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources”. Industrialised countries also pledged “fast start finance” approaching US$30 billion of “new and additional resources” between 2010-2012 (Decision 2/CP.15). In return, developing countries made voluntary pledges to reduce greenhouse gas emissions.

1.1 Climate Finance and Carbon Markets

Industrialised countries strongly emphasise the potential role of carbon markets in mobilising needed finance for developing countries. The contribution of carbon markets to mobilising North-South financial flows for climate protection may take two basic forms.

The form that has so far been dominant is to mobilise finance for investments in concrete projects via the Clean Development Mechanism (CDM). Under the CDM, projects generate Certified Emission Reductions (CERs). The CERs may be purchased by the governments of industrialised countries to comply with their emission reduction targets under the Kyoto Protocol. In most industrialised countries they may also be purchased by companies to comply with national

obligations, such as the EU emission trading system (EU ETS) or the voluntary action plan of Japan's business association Keidanren. The CDM thus provides an additional stream of revenue for projects. The revenue may either be provided upfront or, the dominant form, after the project has started implementation and issuance of CERs.

The aim of the CDM is not to finance the entire investment volume of a project, the aim is to make climate friendly projects viable by closing the cost gap between them and alternative conventional projects that deliver the same service but at a higher level of emissions. The CDM thus leverages resources from the private sector and shifts investments from high-emission to low-emission trajectories. Given the scale of investments needed, as discussed in chapter 2, mobilising and shifting private sector investment will be crucial for meeting the 2°C target.

One crucial caveat is that if credits from the CDM or potential new mechanisms are counted towards the investor countries' emission commitments, the related finance may not at the same time be counted towards their financial commitments. If the purpose of credit purchases is to help industrialised countries achieve their emission commitments, counting the related financial flows towards their finance commitments would constitute double counting. However, there are also discussions about using the infrastructure of the CDM as system for measuring, reporting and verification (MRV) of investment results rather than as offset system, with cancellation of the emission credits that are generated.

Another form of contribution carbon markets can make is the revenue national governments derive from national emission trading systems such as the EU ETS. Starting in 2013, the majority of allowances in the EU ETS is auctioned, which will raise billions of euros of additional revenue for the EU member states. The EU emission trading directive urges member states to use at least 50% of these revenues for national and international climate activities. Such innovative public sources therefore allow governments to scale up their public climate finance without needing to tap into their general budgets, which are currently severely overstretched in many industrialised countries due to the financial crisis.

However, the use of auctioning revenues for climate finance only has an additional impact if they are indeed provided additionally to and not instead of the resources that have so far been used for climate finance.

1.2 Additionality in Climate Finance and Carbon Markets

The term “additionality” needs to be used with care in the context of climate finance and carbon mechanisms as it denotes two different issues in these two contexts:

1. In the finance context, “additionality” relates to the **resources that are provided by industrialised countries.** According to Art. 4 of the UNFCCC, these resources are supposed to be “new and additional”. The demand by developing countries is that increased climate finance should not come at the expense of other funding for other development objectives, such as health or education. However, so far there is no commonly agreed definition of additionality, industrialised countries use various thresholds to demonstrate that the finance they provide is additional. For example, Germany marks its fast start finance contributions as additional if they have been agreed after 2009[1], *or* if they come from innovative sources[2].[3] The result of the lack of a commonly agreed definition is that industrialised countries claim that they are meeting their finance commitments while developing countries claim that they are not (Sterk et al. 2013).

2. In the carbon mechanisms context, “additionality” relates to the **activities that are funded**. These are supposed to be additional to what would happen in the absence of the mechanism. That is, only activities should be eligible that would not take place in the absence of the carbon market mechanism and thus go beyond “business as usual”. "Where a GHG reducing activity would have been implemented in the absence of carbon finance, the project or program disqualifies as non-additional, regardless of the number of emission reductions it yields." (Streck 2010, 1).

1.3 Current Status of Carbon Markets

Carbon markets have had a mixed track record. Prices are currently severely depressed due to the impacts of the economic crisis and the low ambition of mitigation commitments. While to date more than 7,000 CDM projects have been registered[4], their regional and sectoral distribution is not very balanced. CDM Executive Board and UNFCCC Parties have taken initiatives to mitigate

[1] The reference point here is the Conference of the Parties in Copenhagen, where the delivery of fast start finance was agreed upon.
[2] Innovative sources in the German context are revenues from auctions of allowances in the EU emission trading system.
[3] For an overview and discussion of the various definitions used see e.g. Sterk et al. 2013.
[4] See http://cdm.unfccc.int/.

some deficits, such as introducing Programmes of Activities (PoAs) and standardised baselines. However, these instruments are relatively recent – their true potential remains yet to be seen.

In addition to reform efforts of the CDM, there are currently various parallel developments of GHG mitigation mechanisms. As mentioned above, the Bali Action Plan calls for developing countries to implement NAMAs, supported by industrialised countries. At the climate conference in Durban countries also decided to introduce a new market-based mechanism (NMM) covering "broad segments" of developing countries' economies (Decision 2/CP.17). For this mechanism, the EU has developed proposals on sectoral crediting and sectoral trading, according to which baselines or emission targets would be developed for sectors as a whole.

Possible relations between and consequences of the different mechanisms for each other are as yet mostly unclear.

1.4 Project Objectives and Aims of this Report

Against this background, the research project "Analysis of the Role Carbon Markets Can Play for Global Climate Finance from Today to 2020 and Beyond" aims at providing an analysis of and recommendations for how carbon markets can contribute to international climate finance. A number of research questions are relevant in this regard:

- What are the climate-related financial needs in developing countries?
- What is the carbon markets' mobilisation potential, as compared to other sources of climate finance?
- What are the causes behind current gaps in the CDM, and how can they be addressed through reform or new mechanisms?
- Where specifically is support from industrialised countries necessary and what contributions can be tackled by developing countries themselves, and how can the various strands of the carbon market (traditional CDM, PoAs, NMM) be harmonised and linked to national policies of developing countries?

This report gives a first overview of the status quo as basis for the further analysis in the subsequent parts of the project. The report is structured as follows:

Chapter 2, "climate-related financing requirements", gives a short overview of the current climate finance set-up. It summarises estimates on finance

requirements in the areas mitigation, adaptation and REDD+, relevant UNFCCC decisions and developed countries' pledges and finance commitments to date.

Chapter 3, "sources and channels of climate finance", discusses the main building blocks of international climate finance.

Chapter 4, “analysis of the CDM”, lays out the current status quo of the CDM regarding mobilised finance as well as its geographical and sectoral distribution. It also summarises the main findings of the literature on the causes behind the imbalances that have so far prevailed in the CDM and the steps that have been taken to address these imbalances.

2 Climate-Related Financing Requirements and Status of Climate Finance

This chapter consists of a number of related elements:

- First, it summarises available estimates of the financial requirements for stabilising global temperature increase below 2°C and for adapting to the impacts of climate change.
- Second, it summarises decisions that have so far been taken under the UNFCCC on climate finance and the integration of climate finance and carbon markets.
- Third, it summarises information on climate finance that has so far been provided by industrialised countries.

2.1 Estimated Financial Requirements of Combating Climate Change

This section gives an overview of estimated costs and incremental financing needs for adaptation to and mitigation of climate change, including cost estimates of REDD+. Estimates on the financial requirements of combating climate change vary widely across different studies.

When discussing financial requirements, it needs to be clarified what kind of requirements are being discussed. There are various layers of finance needs that should not be confused with each other (cf. Melle et al. 2011):

- Total investment refers to the totality of initial funding needed to invest in an asset, for example a power plant. Globally, even under “business as usual” conditions hundreds of billions of dollars will need to be invested annually in energy infrastructure, for example to satisfy the rising energy demand in developing countries and replace outdated plants in industrialised countries. The International Energy Agency’s World Energy Outlook projects total global energy-related investments in the period of 2012-2035 at cumulatively USD 37 trillion even without increased mitigation actions (OECD/IEA 2012).
- By contrast, additional/incremental investment is the difference between the initial investment needed for a low-carbon asset and the initial investment needed for an alternative conventional one, for example the incremental investment needed for building renewable energy installations instead of an equivalent coal power plant. Incremental investments are hence only a fraction of total investments.

- A further layer is the incremental cost. The initial investment needed for renewable energy installations is usually higher than for conventional energy installations but operating costs are usually lower, as most renewable energy installations incur no fuel costs. Similarly, the initial investment for energy efficient assets is often higher than the investment needed for less efficient ones, but the higher efficiency leads to lower operating costs. Incremental costs of an asset are hence calculated as the net present value of all related cash flows over the asset's lifetime (including investments, operating costs/gains and sometimes also capital costs). Incremental costs are usually lower than incremental investments in low-carbon assets due to lower operating costs. For many mitigation actions incremental costs are even negative as lifetime savings are higher than the incremental investment, especially in the case of efficiency improvements.

The annex to this report provides a tabular overview of the studies that are available. The following briefly summarises the main results.

For **mitigation**, the UNFCCC Expert Group on Technology Transfer (EGTT) in 2009 assessed that compared to BAU an additional investment of USD 262-670 billion per year would be needed for climate change technologies globally, and out of these USD 105-402 billion/a in developing countries, based on different scenarios in various studies (EGTT 2009). This represents the lower end of the available estimates. The upper end is represented by the UN Department of Economic and Social Affairs (UNDESA), which in its 2011 World Economic and Social Survey tripled that estimate. The Survey comes to the conclusion that between 2000 and 2050, compared to a BAU scenario about USD 1.8 trillion would need to be invested additionally per year in energy supply and energy end-use appliances in a 450 ppm CO_2-eq. scenario globally, and out of these about USD 1.1 trillion/a in developing countries (UNDESA 2011). In its most recent World Energy Outlook, the IEA has calculated that up to 2035, a total additional investment in the range of USD 16 trillion will be needed globally in order to still achieve a 450 ppm CO_2-eq. scenario, that is, an annual average of about USD 700 billion (OECD/IEA 2012).

Adaptation efforts will not reach the same dimensions, provided that mitigation actions are taken rapidly and decisively. EGTT (2009) estimated necessary additional investment and financial flows in 2030 at USD 17-62.4 billion in developing countries. The World Bank's World Development Report of 2010 calculated likely incremental costs of USD 28-100 billion in 2030 (World Bank 2010). UNDESA estimates annual incremental investment requirements in adaptation of roughly USD 105 billion between 2000 and 2050, but warns that these could be 10-100 times as large if the 450 ppm CO_2-eq. scenario is not reached (UNDESA 2011).

Cost estimates for **REDD+** activities are especially scarce and vary extremely, depending on the parameters of the study. Figures given here represent opportunity costs, i.e. the costs a country would face by forgoing other potential uses of the forested land. The comprehensive Eliasch report of 2008 came to the conclusion that cutting deforestation by 50% would yield annual opportunity costs of about USD 17-33 billion if forests were included in global carbon trading, including rent paid to forest carbon credit suppliers (Eliasch 2008). By contrast, the IPCC in its fourth assessment report calculated annual opportunity costs of up to EUR 271 billion for a full halt of global deforestation, as quoted in a report by the Meridian Institute (Meridian Institute 2009).

Even the lower range of quoted investment needs vastly exceeds current total global financial flows for climate change as surveyed by the Climate Policy Initiative (Buchner et al. 2012, see Chapter 2). The authors estimated global finance flows of on average approximately 364 billion USD each year in 2010/11, including domestic and South-South flows.

Compared to total global gross fixed investment estimates of about USD 20 trillion in 2012 (about 24% of USD 85 trillion world GDP in 2012, CIA World Fact Book), current investment for climate change mitigation and adaptation is very low, and even the high range of needed investment sketched out above is an order of magnitude lower. However, as the IEA's World Energy Outlook 2012 points out, a large part of CO_2 emissions (81%) that are compatible with staying below 2°C is already "locked-in" with existing energy infrastructure, so significant investments need to be taken before 2017 in order to keep in line with a concentration limit of 450ppm CO_2-eq. (OECD/IEA 2012). If the world does not succeed in keeping greenhouse gas levels below 450ppm CO_2-eq., especially investments in adaptation will need to be scaled up. With extreme weather events becoming more frequent, significant parts of funding will also be needed for loss and damage mechanisms (Harmeling 2012).

2.2 Relevant UNFCCC Decisions

This section gives a broad overview of the UNFCCC decisions relevant to climate finance, focusing on the decisions taken since COP13 2007 in Bali. This date was chosen as it marks a significant shift in the international negotiations, giving more relevance to climate financing, first establishing the concept of Nationally Appropriate Mitigation Actions (NAMAs), and making the Adaptation Fund operational.

Financing efforts of developing countries to combat climate change and to adapt to its adverse effects has since the beginning been one of the crucial points of contention in the climate negotiations. Developing countries have always stressed that, in addition to GHG emission reductions, providing

sufficient financial support is the other side of the responsibility of industrialised countries in combating climate change.

While there are various negotiation items related to climate finance, they ultimately all relate to two main topics: Mobilisation of the needed amount of financial resources and the institutional structure of funding. UNFCCC outcomes therefore range from general decisions on financing requirements across multilateral financing instruments and institutions to suggestions on national instruments relevant to climate finance. The following chapter summarises the relevant decisions along these dimensions. The Annex provides a historic overview of the decisions in a tabular format.

2.2.1 General Decisions on Finance

As noted above, Article 4 of the UNFCCC and Article 11 of the Kyoto Protocol both mandate the Parties listed in Annex II of the Convention[5] to provide "new and additional" financial resources to developing countries to support capacity-building, development and transfer of technologies, mitigation of greenhouse gas (GHG) emissions, adaptation to the impacts of climate change, economic diversification etc. in developing countries (Articles 4.3, 4.4, 4.5 and 11 of the UNFCCC, Article 11 of the Kyoto Protocol).

Despite these commitments, the actual amount of resources provided by industrialised countries has historically been relatively low. The 2010 World Development Report put the climate finance provided by industrialised countries at the time at around USD 10 billion annually (World Bank 2010).

The priority level of the finance issue in the negotiations has changed significantly since the adoption of the Bali Action Plan (Decision 1/CP.13) adopted in 2007, which contained the provision of financial resources as one of the key building blocks of the future climate regime. At COP 15 in Copenhagen in 2009, developed countries pledged to jointly mobilise 30 billion USD of new and additional "Fast Start Finance" for the period of 2010-2012, and defined their goal to mobilise up to 100 billion USD per year starting from 2020. The afore-mentioned financing goals of developed countries were reiterated and strengthened a year later in the Cancún Agreements (Decision 1/CP.16) that, other than the Copenhagen Accord, were adopted by the Conference of the Parties.

[5] These are essentially the member states of the Organisation for Economic Cooperation and Development (OECD) as of 1992, the most wealthy among the industrialised countries.

2011's Durban decision on finance for the first time affirms the importance of a continuation of climate finance after the end of the Fast Start period in 2012. To this end, a work programme on Long-Term Finance was launched.

No agreement could be reached on the question of continuation and possible up-scaling of climate finance after the Fast Start Finance period in Doha 2012. The work programme on long-term finance that was launched in Durban was extended another year (Decision 4/CP.18), but otherwise fundamental decisions on finance have still to be taken.

2.2.2 Multilateral Financing Instruments and Institutions

Art. 11. of the Convention defines the UNFCCC's Financial Mechanism. COP 2 subsequently defined the Global Environment Facility as an operating entity of the Financial Mechanism (Decision 12/CP.2), COP 3 brought the Memorandum of Understanding between the COP and the GEF into force (Decision 12/CP.3). In addition to its trust fund, the GEF also manages the UNFCCC's special funding mechanisms, the Least Developed Countries Fund (LDCF), the Special Climate Fund (SCF), and the Adaptation Fund.

The Copenhagen Accord in 2009 first mentioned the establishment of a new Green Climate Fund (GCF), even though at that point it was unclear how the institution would look like (Decision 2/CP.15). In Cancún in 2010, the GCF was established as a second operating entity of the Financial Mechanism of the Convention, alongside the GEF (Decision 3/CP.17).

In 2011, the GCF was launched in Durban, with any interim arrangement to be concluded latest by COP19 in 2013 (Decision 3/CP.17). At COP18 in Doha, Songdo in South Korea was selected as host of the Green Climate Fund, which is to be made fully operational in 2013 (Decision 6/CP.18). The fund has not been filled yet by developed country Parties.

2.2.3 NAMAs and Market Mechanisms

As did Art. 4.7 of the Convention, the adoption of the Bali Action Plan (Decision 1/CP.13) in 2007 again clearly conditioned mitigation actions by developing countries on adequate financial support from industrialised countries. Parties agreed to in the further negotiations consider "Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner".

The Cancún Agreements again recognised NAMAs as to be supported by developed countries financially, and considered the establishment of a new market-based mechanism (NMM) as one possible instrument to support mitigation actions (Decision 1/CP.16).

The Durban COP established the NAMA registry of the UNFCCC, and defined the NMM (Decision 2/CP.17). However, it has not been fleshed out yet, so its institutional arrangements are as yet unclear.

2.3 Developed Country Pledges and Committed Climate Finance

This section gives an overview of developed countries' pledged contributions to the Fast Start Finance goal of USD 30 billion in the period of 2010-2012, committed finance, its distribution over the thematic areas mitigation, adaptation, and REDD+, countries' additionality criteria, their use of public and private finance, and carbon markets to reach their financing goal. It compares Fast Start Finance commitments with total disbursed bilateral climate finance in the respective countries, if possible.

The annex provides a tabular overview of the information, the following briefly summarises the main results.

Information on this section was mainly compiled from the data compilation on countries' climate finance commitments provided by the UNFCCC's Climate Finance Portal, an analysis by the World Resources Institute from December 2012 (Polycarp et al. 2012), and data on 2010 climate finance disbursements of OECD countries by the OECD-DAC. It bears to be noted that especially data on committed finance may be out of date, as not all countries have provided regular and detailed updates on their Fast Start Finance activities. The OECD data is provided as reference only, as it does not include contributions to multilateral organisations. OECD data on multilateral contributions is only available in aggregated form for the targeted multilateral institutions.

According to the information provided, only Germany has employed carbon market revenues for the fulfilment of its FSF pledge. Roughly one third of Germany's financing has been supplied by auction revenues from the EU emissions trading system. All other countries did not specify the source of their commitments, but it is likely that finance was derived from the general budget.

Only Japan has counted private finance toward its Fast Start Finance goal. The country is also the only one that has specified other official finance (OOF) as part of its FSF commitment, though the United States have also included export

credits in their finance portfolio. Almost all countries have specified that their FSF contributes to their official development assistance (ODA) budget.

In general, mitigation (including REDD+) accounts for the largest part of Fast Start financing activities by developed countries. This correlates with the bilateral financing data of OECD countries for 2010 provided by the OECD-DAC, which shows roughly a two-to-one ratio of mitigation versus adaption finance (USD 17.6 billion mitigation, 9.3 billion adaptation, with an overlap of about 4 billion which can be ascribed to both).

Currently, there are no instruments in place that are geared towards a synergetic funding of both adaptationa and mitigation activities in a systematic way. However, the need for integrated approaches to climate-compatible development has been recognised repeatedly. A move from project-based to programmatic approaches could be used to better integrate mitigation and adaptation in developing countries (Illman et al. 2013).

The CPI in 2012 calculated overall global climate finance flows of about USD 364 billion annually in 2010/2011, with the majority stemming from the private sector (Buchner et al. 2012). About 350 billion of this sum were dedicated to mitigation efforts. CPI figures are used here as Buchner et al.'s (2012) survey constitutes the single most comprehensive source of information on climate finance flows to date. However, the authors acknowledge that there are weaknesses in their tracking abilities, especially for adaptation measures.

Seven countries have announced a continuation and scale-up of their Fast Start Finance commitments for 2012 and beyond. However, information on the pledged amounts is scarce as yet. It has to be seen how countries will count their pledges, and how they will relate to regular ODA expenditure.

3 Sources and Channels of Climate Finance

This chapter is divided into *sources* of climate finance on the one hand, and *channels* of climate finance on the other. This chapter mainly, but not exclusively, uses figures derived from the report "The Landscape of Climate Finance 2012" by the Climate Policy Initiative (CPI) (Buchner et al. 2012). Despite some shortcomings in the tracking freely admitted by the authors, this study represents the single most complete and coherent overview on global climate-related finance flows.

Sources of climate finance can be defined as origins of funding. They may be divided into on the one hand public sources such as general government budgets and innovative public finance sources such as auctioning revenues and carbon taxes, and on the other hand private sources such as foreign direct investment or portfolio investment. CPI has also highlighted the role of dedicated private developers of emission reduction projects as a major source of climate finance. These are not congruent with CDM project developers: "We define project developers as dedicated entities with the ability to design, commission, and operate and maintain emissions reduction projects." (Buchner et al. 2012: 29). It needs to be borne in mind that public sources may directly or indirectly influence private sources through leveraging of climate finance.

Channels of climate finance can be defined as the mechanisms through which climate finance is disbursed. They include public channels such as bilateral cooperation between countries or multilateral funding mechanisms within the UNFCCC (e.g. GEF, GCF, Adaptation Fund) or without (e.g. Climate Investment Funds of the World Bank), and private channels such as carbon markets or private credits and guarantees. Mixed channels in the form of Public Private Partnerships combine public and private channels in various ways.

Box 1: Climate finance - definitions urgently needed

Currently, there is no agreed definition of what constitutes private finance in the climate context. This leads to major difficulties in all efforts to track and MRV private sources. Various authors have attempted to define private climate finance, depending on the focus of their respective studies.

In its 2010 report, the High-Level Advisory Group on Climate Change Financing (AGF) considered the role of private finance in the over-all goal to meet the target to mobilise USD 100bn from 2020. The Advisory Group defines private climate finance as

> international private finance that flows as a result of interventions by industrialised countries such as risk mitigation or revenue-enhancing instruments or capacity building (AGF 2010).

Thus, the Group does not define private climate finance as such, but in relation to catalysing effects of government choices.

AEA chose more a concrete definition of what constitutes private climate finance. In its report on Monitoring, Reporting and Verifying systems for climate finance in EU and its Member States for the EU Commission (Varma et al. 2011), the authors propose to divide private-sector climate finance into two subsets (broadly following OECD propositions, see Corfee-Morlot et al. 2009):

> Climate-specific private finance are all capital flows that are directly aimed at GHG mitigation and climate adaptation, including investments in renewable energy, energy efficiency, sustainable forestry or agriculture.
>
> Climate-relevant private finance has a much broader scope. Such flows have an impact on climate, but are not primarily aimed at climate change mitigation or adaptation. Instead they may support the development of climate-relevant sectors, e.g. power supply, production, agriculture etc. Anyhow, their impact is not limited to positive effects on the climate, but may also have negative impacts.

The paper points out that especially the issue of funds being "new and additional" presents further difficulties when defining private climate finance. Similar to public finance, flows from the private sector are expected to be new and additional, but a common definition of this term is lacking in the international context. As a minimum requirement, the Commission proposes parties to provide information on public efforts to increase the amount of private investments on climate in developing countries.

Similarly to (and in parts because of) the lack of a common definition on what constitutes private climate finance, there is no general agreement on what to include as a source of private finance. Depending on the scope of the different studies, their respective authors have included a wide variety of financing sources. In the following chapter, we have included foreign direct investment and portfolio investments as private finance sources. However, some authors even include voluntary payments and charity donations as private climate finance sources (see e.g. Stadelmann et al 2011).

3.1 Sources of Climate Finance

Public sources of finance are not as dependent on generating returns on investment, whereas as a rule private sources are geared towards such investment returns. Public finance sources are therefore especially suited for pilot activities in mitigation, adaptation and REDD+, as well as for adaptation measures that often do not generate revenues. Private sources of finance, on the other hand, will as a rule be geared towards more mature project activities, and especially towards mitigation and possibly REDD+ measures that generate a positive return on investment over their lifecycle.

3.1.1 Public sources

Public budgets: Governments earmark parts of their budgets for financing targeted at climate change. The CPI has calculated that annually USD 93 to 99 billion of public finance globally is targeted directly at climate change-related issues. This figure includes direct spending from government budgets as well as finance disbursed through development finance institutions and climate funds. It refers to overall global flows, so domestic and South-South flows are included (Buchner et al. 2012).

Typically, climate financing from public budgets is subject to a country's financial planning procedures, and as such provides a fairly reliable source of funding. Therefore, public finance plays a major role in providing security by giving guarantees to private investors, and thus leveraging higher amounts of private finance. Funding from public budgets is also pivotal in launching pilot projects that are not yet guaranteed to run successfully on their own, and to create revenue that pays off the initial investment.

As indicated in WP1, most developed country governments have declared their contributions to climate financing as part of their overall ODA strategy. This may raise questions about the actual additionality of their spending, as most countries do not yet fulfil their commitment to spend 0.7% GNI on ODA. No general comment is possible on the additionality of governments' budgetary spending - this would need to be evaluated on a country-by-country basis.

Innovative public sources: Innovative sources of public climate finance include revenues from carbon markets, such as auctioning revenues or the CDM’s adaptation levy, carbon taxes that generate public income for a government, and financial transaction taxes. To count as a source of climate finance, these flows need to be earmarked to be spent purely as climate finance. As a rule, revenues from carbon mechanisms can be considered additional if they are used for climate finance and are added to rather than displacing climate finance from other sources, as they create a totally new source of finance that has so far not been part of the regular budgetary process.

However, the reliability of carbon market revenues for climate finance may be problematic as they are subject to economic fluctuations. Notably, the price for EU emission allowances has been continuously falling over the recent years due to a massive oversupply combined with the economic crisis of recent years. Several auctions of EU emission allowances even failed because bids were too low (Vitelli and Carr 2013).

According to CPI figures, public carbon market revenues have amounted to about 2 billion USD in 2010/2011, including over 1.6 billion USD from the auctioning of allowances from the EU ETS alone (Buchner et al. 2012). However, so far only Germany directly earmarks its auctioning revenues to its Energy and Climate Fund (EKF), which was set up to finance the "Energiewende", Germany's transition to more climate-friendly ways of energy generation, and Germany's National and International Climate Initiatives (NKI and IKI).

Revenues from carbon taxes have generated public income of at least 7.3 billion USD according to CPI figures, and could be a lot higher now, as various new schemes have recently started (e.g. Australia) or are expected to start in the very near future (e.g. South Africa). However, again the revenues are not commonly earmarked for climate-related activities. An exception is Denmark, which has allocated 40% of its carbon tax revenues for mitigation projects. 60% of the revenues are reallocated to its industry (Buchner et al. 2012).

EU member states have agreed that 11 of them (Austria, Belgium, Estonia, France, Germany, Greece, Italy, Portugal, Slovakia, Slovenia and Spain) may move ahead of the others with a harmonised financial transaction tax (FTT) (KPMG 2013). The European Commission now needs to make a legislative proposal. An FTT has long been debated as a promising source of fresh money for domestic and international climate finance. The German Institute for Economic Research estimated that the tax could raise 37 billion Euros per year. France has indicated that it would commit 10% of its share to global public goods like development and climate change and that it would commit 3.7% to go to the Green Climate Fund (Schäfer 2012).

3.1.2 Private sources

Foreign Direct Investment (FDI): FDI gives an investor "control or a significant degree of influence on the management of an enterprise that is resident in another economy" (IMF 2009). It is by far the most discussed source of private finance, especially in combination with leverage by public policies and measures (e.g. Whitley 2012, Stadelmann et al. 2011a, AGF 2010 and many others). It should be noted that many climate-related FDI flows occur independently of countries' climate commitments.

FDI has large relevance for climate change, as it has a significant impact especially in sectors relevant for mitigation. This implies that investors' policies may have a strong influence on the carbon intensity of the targeted sector (Stadelmann et al. 2011a).

Estimating revenues from FDI is challenging, as there is currently no unified tracking of climate-friendly investments. Numbers range from USD 30-40bn for mitigation-specific FDI in the years 2008/2009 (UNCTAD 2010), to about USD 250bn for generally climate-relevant FDI in the years 2003-2005, as estimated by Corfee-Morlot et al (2009).

A special subset of (not only) foreign direct investors has been highlighted by the CPI. Private project developers constitute a major source of global climate finance, with a total value of about USD 115 to 129 billion in 2010/2011. Such developers are power and gas utilities, as well as private power producers. More than half of the money sourced has been deployed in developing countries (Buchner et al. 2012).

Portfolio investments and other forms of investment: Stadelmann et al. (2011) and others distinguish FDI from portfolio and other types of investments, as here the investors do not gain significant control over a company. Instead, the investor trades in debt or equity securities, with often quickly fluctuating gains and losses.

This makes it highly complicated to account for the climate change impact of these kinds of investments. However, the authors argue that portfolio investments could have a high influence on the development path of a country if there are strong investments in low-carbon businesses (Stadelmann et al. 2011). While this may be true, it may be questioned in how far these flows can be counted towards a certain country's finance mobilisation, as they occur largely independent of the public sector's influence.

Again, estimating revenues from these kinds of flows proves challenging, as no specific data is available. Stadelmann et al. assume the numbers to be in range of USD 3-4bn per year, extrapolating from UNCTAD data.

3.2 Channels of Climate Finance

There are multiple ways to channel public as well as private financing sources to adaptation, mitigation and REDD+ activities. This chapter will seek to analyse:

- The suitability of the channels for adaptation, mitigation and REDD+;
- Their current volume;

- The channels' funding reliability; and
- Possible influence on funding decisions of the public and private sector in developing countries.

3.2.1 Public channels

Bilateral climate finance: Direct bilateral finance is typically part of governments' ODA budgets, and is subject to bilateral negotiations on the programme, project, or general budget support in question between donor and recipient country. It mostly includes grants, concessional and unconcessional loans, and guarantees. Bilateral climate finance may be disbursed directly from the government budget, or through bilateral development institutions such as Germany's GIZ or KfW, or multilateral implementing agencies such as the World Bank, other multilateral banks, UNEP, or UNDP. CPI has calculated a global amount of about USD 23 billion in climate-related bilateral Official Development Assistance for 2010, a steep increase from 2009 (USD 9.5 billion) mainly due to implementation of developed countries' FSF commitments (Buchner et al. 2012).

Bilateral climate finance can be regarded as one of the most reliable channels of climate finance, and as such forms the "backbone" of climate financing. Developing countries' governments have modestly high possibilities of influence, as bilateral finance is subject to contract negotiations between countries, or at least official entities of the countries. However, donors retain full control over funding priorities and disbursement of finance.

Bilateral climate finance can be used for all activity types and all sectors, but may be most helpful for activities that do not yield commercial benefits, or have high start-up costs.

Multilateral climate finance: Also mostly part of countries' overall ODA budgets, multilateral climate finance comprises mostly grants and concessional loans to multilateral funding mechanisms.

Other than with bilateral climate finance, donor countries do not retain direct control over their contribution to multilateral funds. Instead, decisions on funding priorities are made by the governing mechanisms of the fund itself. Depending on the institutional setup of the governing mechanism, recipient country governments may have significantly greater influence on funding decisions. Especially funds within the UN system generally have governing bodies with more than 50% developing country representation. As an example, the Adaptation Fund Board consists of 16 members - 2 from each of the five UN regional groups, 1 from the Small Island Developing States, 1 from Least

Developed Countries, 2 from Non.Annex-1 countries, and 2 from Annex-1 countries. This gives developing countries a representation of about 69%.[6]

Funds disbursed through multilateral financing mechanisms can be mostly regarded as reliable, as disbursements are only planned after regular refilling of the fund. However, the amounts of finance for this channel have in the past been quite small: e.g., OECD members' contributions totalled only USD 612 million in 2010 (OECD-DAC 2011), global contributions amounted to USD 1.5 billion in climate-related multilateral climate finance in 2010/2011 according to CPI (Buchner et al. 2012). In general, donor countries have been reluctant to commit large sums to these institutions, possibly because of the limited control they retain.

Multilateral funding mechanisms within the UN system include the Green Climate Fund, Adaptation Fund, Least Developed Countries Fund, and Special Climate Change Fund. Apart from the Green Climate Fund, the UN funding mechanisms are mostly geared toward adaptation measures in developing and least developed countries. The amount of funding available to them is generally very low, e.g. OECD countries' contributions totalled only about USD 142 million in 2010 according to OECD-DAC (2011). The Green Climate Fund is supposed to fund both mitigation and adaptation measures, but as yet has not been filled, so no funding programmes have been set up as yet.

The Global Environment Facility plays a special role as the entity entrusted with the UNFCCC's finance mechanism. As such, it plays the part of the Convention's treasury, but also supports specific mitigation and adaptation projects. It also manages the Least Developed Countries Fund and the Special Climate Change Fund of the UNFCCC. Climate funding to the GEF has been a little bit higher than to the UNFCCC's funds at about USD 208 million in 2010 (OECD-DAC 2011).

Outside the UN system the largest funding mechanisms are the World Bank's Climate Investment Funds, consisting of the Clean Technology Fund for mitigation activities, and the Strategic Climate Fund as an overarching mechanism that targets REDD+ activities through its Forest Investment Program, adaptation measures through its Pilot Program for Climate Resilience, and the Program for Scaling-Up Renewable Energy in Low Income Countries for mitigation activities. The Clean Technology Fund is by far the largest of the CIFs, with more than double the amount of funding (USD 4.3 billion in 2009-

[6] See http://www.adaptation-fund.org.

2014) of the different programmes of the Strategic Climate Fund combined (USD 1.9 billion in 2009-2014) (CIF 2012).

3.2.2 Private Channels

Private finance institutions: Banks and private funds channel private capital to climate relevant investment projects through various investment vehicles, such as equity, debt, or structured finance. While contributing to global climate finance flows at possibly quite a large scale, it can only partially be attributed to specific countries. As these institutions mostly deal with private sector investments, countries in general retain very little control.

Accounting for private finance flows has proven to be very challenging, as only limited information exists. The CPI have estimated global flows of roughly USD 30 to 40 billion through various banks, insurance companies, venture capital funds, private equity funds, and infrastructure funds in 2010/2011. In total (sources and channels), the private sector contributed USD 250 to 285 billion to global finance flows in mitigation alone (Buchner et al. 2012).

Private investment channels are geared towards generating revenue for their shareholders, so their focus lies on bankable products. As a result, private finance will generally be strongest in deployment of proven climate-friendly (mitigation) technologies, which may also include forestry, and to a much lesser extent insurance against climate change impacts.

Especially investments in (perceived) high-risk countries and new technologies that have not yet been proven to yield reliable returns on investment in the particular country will need to be supported by public finance instruments (see section 3.2.3).

Carbon markets: Especially the CDM in the past provided a notable flow of private-sector finance to developing countries. However, a large portion of mobilised investments may actually not represent North-South flows, but domestic investments from within developing countries (see following chapter).

While very reliable data is available on the amount of CERs on the market and their secondary market price, the actual revenue flow from carbon credits is hard to estimate. A large portion of credits is sold prior to actual generation on the primary market, with prices held mostly secret. While the World Bank estimated up to USD 2.7bn in primary market transactions in 2009 (Kossoy and Ambrosi 2010), Stadelmann et al. (2011a) assume that actual payments amount to merely USD 1.6 - 1.8bn annually. The World Development Report 2010 estimates that revenues from the CDM have leveraged private investments in the range of on average USD 4.60 per Dollar of carbon revenue, and possibly up to USD 9 for some projects (World Bank 2010). The total

mobilised investment has been put by UNEP Risoe (2013) at USD 280 billion by the end of 2012 (see also chapter 4).

Other forms of international carbon markets with a direct link to developing countries are currently not operational. It is still open how a mechanism such as the proposed New Market Mechanism will be designed, and if it will be able to mobilise finance at significant scale.

Carbon markets are especially geared towards mitigation measures, which is how credits are generated. Currently the CDM covers greenhouse gas reduction measures as well as sink projects in the areas of re- and afforestation. Mitigation through REDD+ may become an option for carbon markets in the future.

Developing countries retain control over projects geared towards generating credits via the project approval process, but otherwise governmental control is limited due to the private sector nature of these endeavours. NAMAs are in principle fundamentally different from the CDM as it is governments that are supposed to implement actions. The role of the private sector will likely differ from NAMA to NAMA. The same would apply to the New Market Mechanism, which as it has been proposed by the EU would operate at the sectoral level and the host country government would be in charge of designing an appropriate sectoral implementation scheme.

Reliability of funds is low as compared to public forms of finance, as carbon prices depend on supply and demand. In recent history, prices for carbon credits have plummeted due to oversupply and low demand due to unambitious reduction targets in developed countries.

3.2.3 Leveraging Private Finance

In order to mobilise private climate finance at significant scales, barriers to private investments need to be overcome. At the heart of most of the barriers is the fear of investors that climate change related projects may entail high risks but yield only limited returns. Investment risks and limited liquidity are a general problem for low-carbon investments in many developing countries.

By facilitating access to finance and providing attractive financing options, public institutions put out a positive signal that can help leveraging significant amounts of private finance. Through guarantees or insurance schemes, public sources encourage private investors to invest in projects that may otherwise be shunned due to unattractive risk-return profiles.

Bi- and multilateral agencies, development banks, governments and different funds provide various instruments and sources of finance to scale up private

financing. Such instruments include grants, concessional loans, equity investment, debt, guarantees, and insurance mechanisms. Cooperation with the private sector can be strengthened through public-private partnerships, not only in investment projects, but also in research and development.

The amount of private investments that can be leveraged from public funds varies strongly with the type of financing instrument, the geographical location of the investment, and the type of project that is being financed. There is no agreed methodology on how to calculate the amount of private funding that flows as a result of leveraging measures by public institutions[7]. The workstream 7 paper of the AGF (AGF 2010) estimates leverage factors for:

- non- or partly concessional debt: 1:2 - 1:5
- grant-financed debt: 1:8 - 1:10
- grant-financed equity and guarantees: 1:20
- equity investments by MDBs: 1:8 - 1:10
- climate funds (partly concessional): 1:3 - 1:8,5

Lowering the risk for private investments makes leveraged financing more reliable, and may keep struggling activities working until a possible crisis has passed. If a public actor from the targeted country is part of the partnership, the developing country can retain a modicum of control over the project activity. It bears noting that high leverage rates make the additionality of funded projects questionable, as the public finance element makes up for only a very limited amount. It may be argued that activities financed through finance with high leverage factors would have been implemented even in absence of a public element. Similar arguments have been put forward under the CDM regarding large-scale power and infrastructure projects, where only a minuscule share of the investment is covered by CER credits.

Table 1 provides an overview of the climate finance channels as discussed in this chapter.

[7] The leverage factors given by the AGF rely on experience of of the Multilateral Development Banks. However, depending on different publications, these can fluctuate quite widely.

Table 1: Overview of Channels of Climate Finance

Channel	Volume in billion USD	Suitedness for mitigation (M), adaptation (A), REDD+ (R)	Reliability	Influence by developing country actors
Public bilateral	2010: 23	M, A, R; especially non-profit	very high, planned budgets, negotiated directly	relatively high for governments
Public multilateral	2010/11: 1.5	M, A, R, currently mostly A within UNFCCC	high, disbursement planning dependent on funding, but low overall levels of funding in the past	May range from low to high for governments, depending on institutional setup of funds
Private finance institutions	30-40	M, R? (possibly A through insurance mechanisms)	focus on proven technologies, actors highly risk-averse	very low for governments, may be moderately higher for private sector partners
Carbon markets	Mobilised investment: USD 280 billion by the end of 2012, leverage factor on credit price of 4.6-9 (CDM only)	M, R	currently low due to oversupply and low demand due to unambitious reduction targets in developed countries	limited government control (project approval), private sector higher (implementation)
Leveraged private finance	not calculated, as no concise data available, leverage rates not commonly defined	mostly M	varies	varies, but mostly limited

4 Analysis of the Clean Development Mechanism

The aim of this chapter is to analyse the experiences from the carbon markets during the first commitment period of the Kyoto Protocol. This includes an introduction to the estimated financing already provided by the CDM for mitigation activities in developing countries. In particular this chapter

- provides an analytical overview of the regional and sectoral distribution of the CDM,
- analyses the limitations and reasons for the unequal CDM distribution per scope / project type,
- describes the successes and limitations of approaches for scaling up of the CDM and
- concludes on the interaction between limitations in the CDM application and scaling up measures with national policy measures.

4.1 Carbon Market Experiences from the First Commitment Period of the Kyoto Protocol

Already during the first commitment period of the Kyoto Protocol the carbon markets played an important role for the mobilisation of financing for mitigation activities in developing countries. In its impact research study, the high level panel on the CDM Policy Dialogue concluded that the CDM generated total investments in CDM projects of about USD 215 billion by June 2012 (Spalding-Fecher et al. 2012). This estimate gives an indication of the approximate amount of investments which were initiated through the CDM. The underlying approaches and assumption used for this estimate are summarised in box 2 below. Similar estimations by UNEP Risoe based on their CDM database even led to a slightly higher result for June 2012 and showed a substantial increase to almost USD 280 billion by the end of 2012 (UNEP Risoe 2013).

The amount of initiated investments does, however, not correspond with the direct financing provided by the CDM. The latter amount is even more difficult to estimate since detailed information about actually paid prices for CERs is unavailable. While price formation through exchanges is transparent and yields important reference prices, they do not reflect the results of individual price negotiations documented in mostly confidential ERPAs (Emission Reduction Purchase Agreements). However, multiplying an assumed average CER price with the amount of actually issued CERs during the first commitment period of

roughly 1,155 million (UNFCCC 2012b) confirms a rather high leveraging factor of the CDM for initiated investments through the revenues of CERs (cf. chapter 3.2.2). A high leveraging factor demonstrates on the one hand the success of the CDM but on the other hand might also put the additionality of some CDM investments into question.

Box 2: Approaches and assumptions used by the CDM Policy Dialogue

- The capital investment information presented in the PDDs as part of the investment analysis was extracted and used for the analysis.
- Since only 69% of projects use the investment analysis, average investments per technology were derived and extrapolated to projects where such information was not available.
- Beside all registered projects, a further 608 projects were included in the analysis for which registration was expected shortly. Only for less than 50% of the included projects the actual implementation was demonstrated by at least one submitted monitoring report.
- The derived estimate assumes that 100% of the included projects are additional and that the investments would not have occurred without the CDM. It is furthermore assumed that the information provided for the investment analyses is correct, while project developers might in fact tend to overestimate this value to support their financial additionality argumentation.

In spite of no accurate data being available for all CDM project types, the impact research study also concluded that for renewable energy projects the majority of the investment provided by the CDM has come from domestic sources. This implies the majority of the investment that has been mobilised has not consisted of flows from developed to developing countries but instead has come from sources within the developing countries themselves. This might be one of several reasons why activities and respective financing under the CDM are distributed unequally, as poorer countries may have difficulties funding projects from domestic resources. The following sections will further elaborate on this aspect.

4.2 Overview of Regional and Sectoral Distribution of CDM Activities

The CDM has frequently been criticised for its unequal distribution of activities while reform proposals have also included measures that address this limitation. The end of the first commitment period of the Kyoto Protocol offers the opportunity to look back on the status of the distribution and the successes of related reform measures.

4.2.1 Regional Distribution

A first overview of the regional distribution of CDM activities in the different regions as defined by the UNFCCC is provided in the following table.

Table 2: CDM activities per UNFCCC region (based on: UNFCCC 2012b)

UNFCCC Region	Number of Kyoto Parties	%	Number of DNAs (host)	%	Number of registered Projects	%
Africa	52	34.7	49	37.4	104	1.9
Asia & Pacific	55	36.7	43	32.8	4692	85.1
Economies in transition	10	6.7	10	7.6	24	0.4
Latin America & Caribbean	33	22.0	29	22.1	691	12.5
Sums	150	100	131	100	5511	100

In Africa, almost every Kyoto Party has officially appointed a DNA. Africa is, however, clearly underrepresented with regards to actual implementation of activities under the CDM. Table 2 shows that the pure existence of national CDM institutions does not automatically lead to implementation. Further national barriers (e.g. limited mitigation potential, weak institutional CDM capacity, generally poor investment climate) have an impact on the use of the CDM in different regions and host countries. The detailed regional distribution of projects in preparation (pipeline), registered projects and issued CERs per host country is provided in the Annex (table A4) and visualised with the following figures.

For the data in table A4 and the below figures we used the database from UNEP Risoe while Table 2 is based on UNFCCC data. Despite covering the same period both data sources include slightly different numbers of registered projects due to different dates of analysis in a very busy time. It also needs to be noted that the number of projects registered by the end of the first

commitment period might still change since the registration decision can be made with delay while the official registration date is the date where the last changes were made to the project documentation.

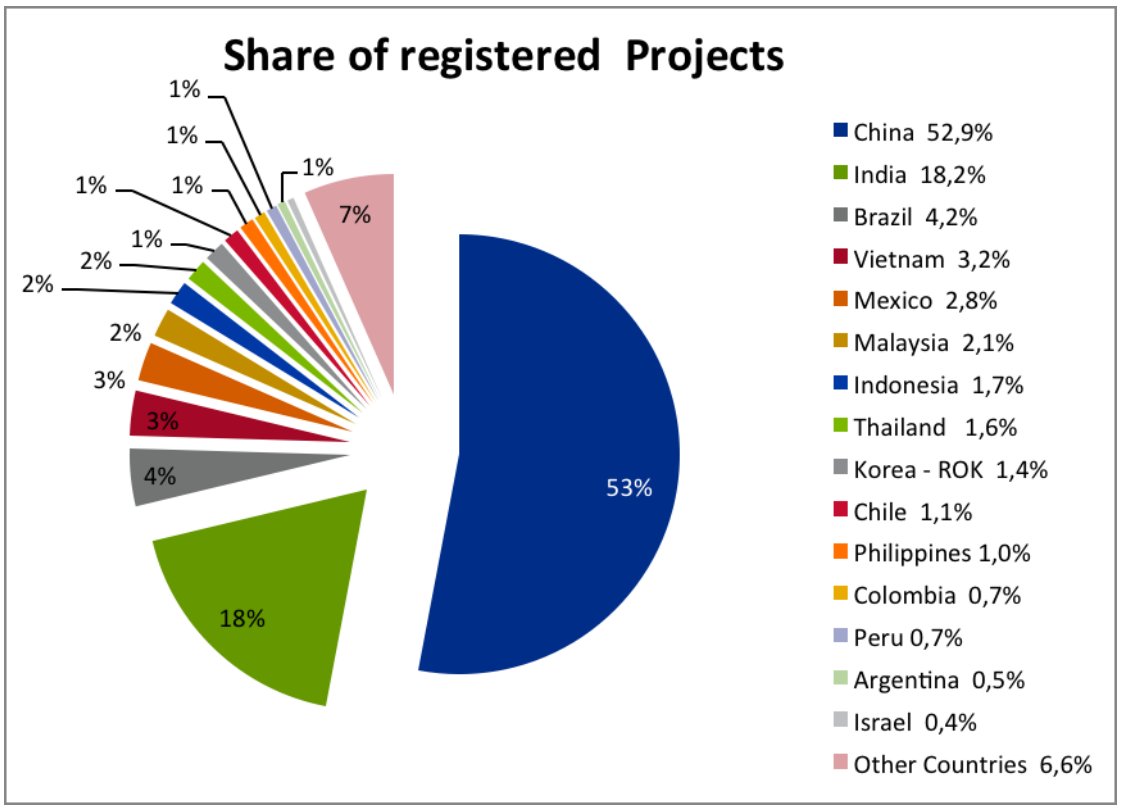

Figure 1: Regional distribution of registered CDM projects per host country (based on: UNEP Risoe 2013)

The number of registered projects in Figure 1 shows the predominant role of China with more than 50% of the projects. The unequal distribution of CDM activities across countries is further demonstrated by the fact that even more than 75% of the registered projects are hosted in only three countries (China, India, Brazil). No African country can be found in the “top-15”.

While the number of registered projects represents a good indication of the unequal distribution of the CDM activities, the issued CERs per host countries rather indicate the distribution of carbon financing from the CDM during the first commitment period (cf. Figure 2). Here, China’s role is even more predominant with more than 60% of the issued CERs. Also, more than 90% of the issued CERs went to only four countries (China, India, South Korea, Brazil). Some countries show different positions in the distribution of projects and CERs. South Korea generated 8.8% of the CERs with only 1.5% of the projects and

Vietnam generated only 0.7% of the CERs while it has 3.3% of the registered projects.

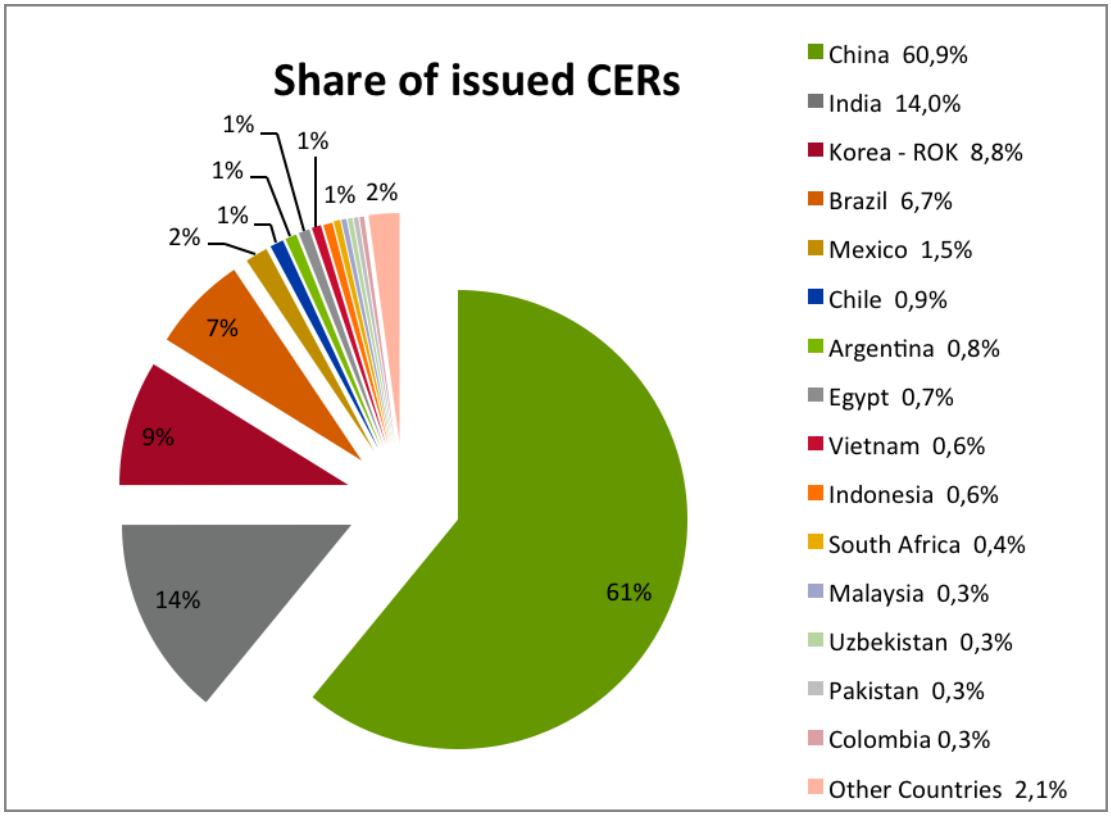

Figure 2: Regional distribution of issued CERs per host country (based on: UNEP Risoe 2013)

Africa in total generated only 1.4% of the globally issued CERs. Additionally, the distribution within Africa is unequal. The majority of CERs was generated by Egypt and South Africa while all remaining African countries (without Egypt and South Africa) in total generated less than 0.2% of the globally issued CERs. In Africa, only approx. 1/3 of host countries with registered projects received CERs (9/24) while this share for all host countries with registered projects is approx. 2/3 (56/82).

Potential reasons for individual situations of specific countries and the even larger unequal distribution of CERs compared to the distribution of registered projects are manifold. For example, the first issuance of CERs often occurs with substantial delay after project registration and so far only a continuously low share of approximately 1/3 of all registered projects has received initial issuance (Mizuno and Fukui 2010; UNEP Risoe 2013). Countries which started their CDM activities with delay are therefore even more underrepresented in the

issuance statistics. Also, different host countries have varying levels of CDM capacities (institutions, developers) available to bring projects from registration to successful issuance. Moreover, the average size of projects per host country might influence the issuance balance. South Korea e.g. has various large projects including industrial gas projects that received large parts of the issued CERs so far. South Korea thus ranks higher for the number of issued CERs compared to the number of registered projects.

4.2.2 Sectoral Distribution

Besides the regional dimension, also at sectoral levels unequal distribution of CDM activities can be observed. CDM projects and methodologies are allocated to different sectoral scopes according to the 15 defined scopes of the UNFCCC as listed in Table 3.

Table 3: UNFCCC sectoral scopes

Scope Number	Sectoral Scope
1	Energy industries (renewable - / non-renewable sources)
2	Energy distribution
3	Energy demand
4	Manufacturing industries
5	Chemical industries
6	Construction
7	Transport
8	Mining/mineral production
9	Metal production
10	Fugitive emissions from fuels (solid, oil and gas)
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride
12	Solvent use
13	Waste handling and disposal
14	Afforestation and reforestation
15	Agriculture

Figure 3 below shows the distribution of registered projects according to the sectoral scopes as defined by the UNFCCC as of 31 December 2012. Allocation to more than one UNFCCC scope is possible.

Despite the fact that this scope classification clearly indicates the existence of unequal distribution over different sectors it has a limited value for the

identification and explanation of the underlying reasons. The background of the UNFCCC sectoral scopes is a grouping of industry areas where specific knowledge is required for the accreditation of DOEs. This does not necessarily correspond to specific opportunities or barriers which lead to respective penetration rates of the CDM in these industry areas. More suitable for the purpose of this study is the classification according to project types which relate to the specific mitigation measure instead of the area in which this measure is applied (e.g. UNEP Risoe or IGES). The same energy efficiency measure can e.g. be applied in the manufacturing, the chemical or metal industries. However, potential implementation barriers in this case rather lie in the specifications of the energy efficiency measure than in the respective industry area.

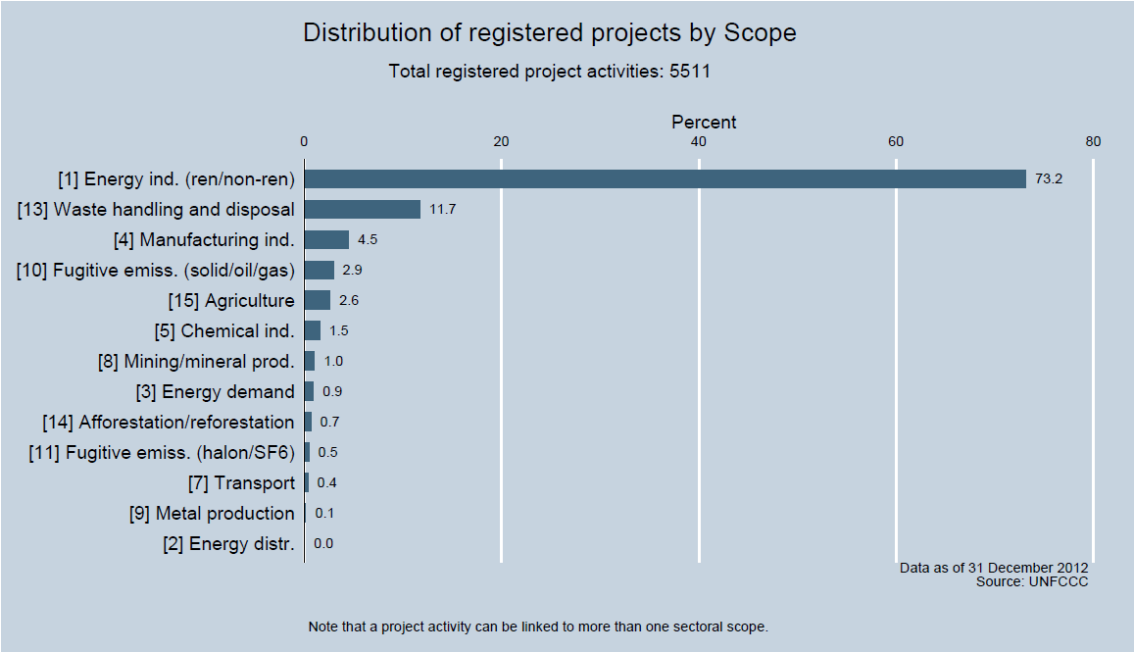

Figure 3: Distribution of registered projects by UNFCCC scope (UNFCCC 2012b)

The project types used by the UNEP RISOE database currently allocate CDM projects to 27 different project types (UNEP Risoe 2013). UNEP Risoe allocates CDM projects to only one project type whereas CDM projects can have different UNFCCC scopes. Some project types are directly convertible to CDM scopes (e.g. afforestation and reforestation, transport), others represent a more detailed classification of the UNFCCC scopes (e.g. renewable energy generation). A substantial difference exists for projects carried out in the agricultural environment. While the UNFCCC scope includes all projects that take place in this area (including methane avoidance, renewable energy generation, waste handling or the food industry), the UNEP Risoe database contains only

activities that are solely related to the specifics in the agricultural environment (e.g. land cultivation, irrigation). As a result, the UNFCCC scope includes a considerable number of registered projects while UNEP Risoe lists almost no activity under this project type.

The following figure describes the sectoral distribution of CDM projects according to the project typology of UNEP Risoe. More detailed data on the sectoral distribution of projects and CER issuance is provided in table A5 (Annex).

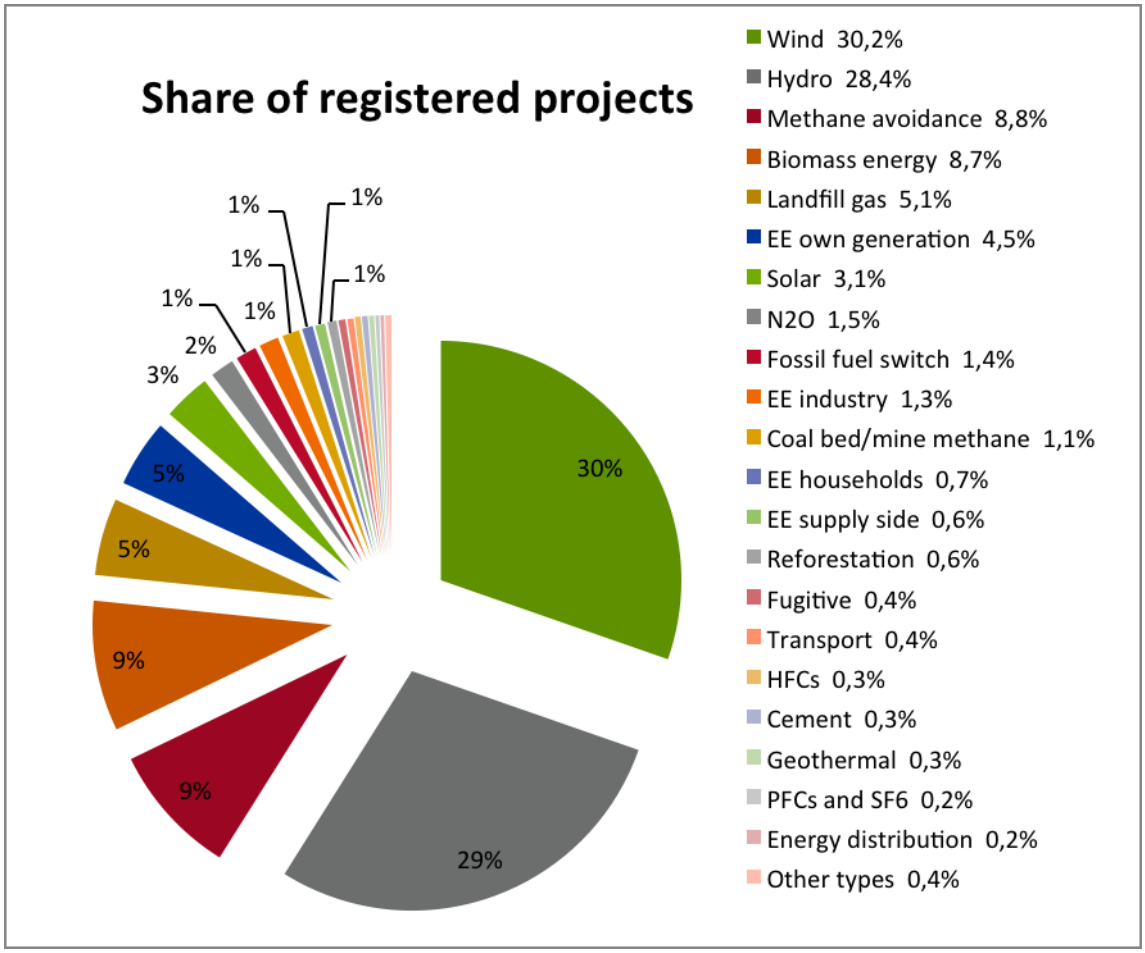

Figure 4: Distribution of CDM activities per UNEP Risoe project type (source: own calculations based on UNEP Risoe 2013; cf. Annex)

Hydro and wind are the predominant project types in terms of registered projects. Actual issuance rates[8] and project sizes for these project types are close to average values. Project types such as methane avoidance, biomass energy, landfill gas are also frequently implemented but in significantly lower numbers than hydro and wind. HFC and N_2O projects have low numbers of projects but have received more than 60% of all issued CERs so far. Issuance rates and average project size for these types are above average.

Furthermore, while there is a high number of registered solar projects, there are only very few actual issuance activities and a low amount of CERs. Agricultural activities are clearly underrepresented with only one registered project and no CERs issued. Project types such as afforestation, reforestation, transport, energy distribution, energy efficiency service and energy efficiency in households have average issuance rates, which are significantly below average values (13%-18%). On the other hand project types which are potentially more often embedded in larger industries or company structures have issuance rates above average values (e.g. energy efficiency in own generation, fossil fuel switch, energy efficiency in industry, coal bed/mine methane, cement, PFCs and SF_6).

The Risoe project types and subsequently the data in table A5 (Annex) do not include activities related to the UNFCCC scopes construction (6) and solvent use (12). Both scopes have neither projects nor methodologies.

4.3 Limitations and Reasons for CDM Application in Various Project Types

This section discusses the main different characteristics of CDM project types which facilitate explanations about successes as well as limitations for CDM project implementation. For this purpose, UNEP Risoe project types are compared against key characteristics and barriers in a matrix structure. This does not replace an in-depth analysis and assessment but allows to highlight the most relevant reasons for successes and limitations in certain project types and might allow to group project types together based on similar barriers.

The first assessed key characteristic is the general level of complexity of CDM projects that is caused by the nature of the underlying emission sources (e.g.

[8] Issuance rate means the share of all registered projects that achieved at least the first issuance.

dispersed and small vs. large point sources), the difficulties to set baselines and related monitoring, reporting and verification (MRV) requirements of CDM project types. Some project types require complex MRV which, in combination with low resources and capacities of the project participants, can pose a considerable constraint to implementation. This barrier can be reduced by other project type characteristics, e.g. if projects generate significantly high funds or if the projects are embedded in industry structures which can manage to comply with the stringent MRV requirements. It is assumed that a structured industry usually has more skilled resources, easier access to technology and better financial capacities.

Other issues related to dispersed emission sources that could affect the complexity of CDM project structures are unclear ownership of emissions and thus CER revenues. Mitigation costs[9] per tCO_2 reduced or CER also influence the financial attractiveness of a CDM project. For example for solar projects, these costs could be up to several 100 €/CER whereas for HFC projects the costs are negligible. Similarly, the transaction costs per CER of a project can act as a deterrent for CDM project investors. These transaction costs are due to locating the reduction opportunities, identifying partners and counterparties, development of CDM documentation, third party audits and UNFCCC related costs. As a result, scalability of projects is important for certain project types, where under the conventional CDM project application CER revenues do not always justify the transactions costs.

The comparison matrix of project types against four of the key characteristics affecting CDM implementation is provided in Table 4 below. For each characteristic that is considered, one of three ratings is applied. For example, complexity can be regarded as ‘low’, ‘medium’ or ‘high’ whereas industry or company structures are considered as ‘small’, ‘large’ or ‘various’ where no single size prevails. The approximate ratings are either based on expert judgements or on literature sources as indicated below the table. It needs to be noted that the literature sources used for the rating of cost aspects provide large bandwidths of cost estimates since the individual cost situation of projects relies on further aspects not covered by the project type.

The overview provided in Table 4 can be used to explain the different sectoral distribution of CDM activities per project type as shown in section 4.2.2.

[9] Mitigation cost are defined as the average costs of reducing one tonne of CO_2 equivalent (tCO_2e) for a project over its lifetime.

Table 4: Characteristics of CDM activities per project type of UNEP Risoe

Key characteristics / Project type	Complexity (MRV, nature of emission sources, baseline set.)	Size of company / industry structure	Mitigation costs (*) (costs / CER)	Relative transaction costs (**) (costs / CER)
Wind	low	various	medium	low
Hydro	low	various	low	low
Methane avoidance	medium	various	low	medium
Biomass energy	medium	various	low	medium
Landfill gas	medium	various	low	low
EE own generation	low	large	low	low
Solar	medium	various	low	high
N_2O	low	large	low	low
Fossil fuel switch	low	large	medium	low
EE industry	low	large	medium	medium
Coal bed/mine methane	medium	large	low	low
EE households	high	small	low	high
EE supply side	medium	large	medium	low
Reforestation	high	small	medium	high
Fugitive	high	various	low	medium
Transport	high	small	high	high
HFCs	low	large	medium	low
Cement	medium	large	medium	low
Geothermal	low	various	low	low
PFCs and SF_6	medium	large	low	low
Energy distribution	high	various	high	medium
Afforestation	high	small	medium	high
EE service	high	small	low	high
Mixed renewables	low	various	medium	low
CO_2 usage	medium	various	medium	medium
Agriculture	high	small	medium	high
Tidal	low	various	high	low

Note: EE stands for 'Energy Efficiency'
(*) Castro 2012; Spalding-Fecher et al. 2012; UNFCCC 2011a, 2012a; Rahman et al. 2012
(**) Warnecke et al. 2013

Renewable electricity generation technologies often benefit from their low complexity aligned with clear CDM rules for the calculation of grid emission factors and MRV of generated electricity. Wind and hydro projects represent a large share of CDM projects also due to further benefits resulting from the well-

known technology and mostly established industry structures. Especially wind projects are furthermore scalable and with low to medium cost structures. Other sources of renewable electricity have similarly low complexity levels but gathered less experience outside the CDM and might have lower potential. This includes projects of the types geothermal, tidal and mixed renewables. The project type mixed renewables includes projects combining different renewable generation technologies.

Further technology types cannot be assessed on the level of UNEP Risoe project types and require considerations related to sub-type level. Solar projects e.g. include technologies with completely different characteristics such as PV installations and cookstoves.[10] High mitigation costs are the main barrier for PV installations while cookstoves have suffered from high transaction costs that could be overcome with the application of the 'Programme of Activities' approach (cf. section 4.4.1).

Projects categorised as methane avoidance, landfill gas or biomass energy cover a wide range of different project setups and can result in high complexity e.g. due to different emission sources and energy generation opportunities. This however, seems in many cases manageable when the mitigation costs are low. Projects involving the avoidance of CH_4 emissions benefit from the high global warming potential (GWP) of methane and often have additional revenue streams due to the sales of energy. These project types were developed since the early days of the CDM and gathered considerable experiences.

Projects in the agricultural, transport and building[11] sector as well as afforestation and reforestation projects suffer from complexity e.g. resulting from dispersed and smaller emission sources. These act as a substantial barrier during MRV processes and for the boundary and baseline setting. Building sector projects e.g. suffer from a high "signal to noise ratio" because a changing user behaviour might significantly influence emission levels and thus makes the GHG quantification of the CDM activity impossible. Activities in the transport sector can often not completely be controlled by the CDM project owner (e.g. in case of individual drivers). For projects in the forestry and agricultural sector exact GHG quantification is also outside the CDM a challenging task. These project types are furthermore challenged since no other characteristic could

[10] In these cases the ratings in table 5 describe the dominating sub-technology in the project type category.
[11] Building sector projects are distributed over various EE project types in table 3 and section 7.2.2 (Annex).

compensate for these barriers. As a result they did neither reach a high CDM penetration rate nor a high success rate in their implementation.

Generally, the more structured an industry, the easier it is to implement projects within that sector and use the existing potential. For example, there is better access to technology providers or qualified MRV experts. Similarly, the larger the size of a company, the more likely it is to have set procedures, expertise and capacity to implement a CDM project. The N_2O, coal bed/mine methane and HFC sectors as well as energy efficiency measure in own generation or on the supply side reflect this reasoning with high number of implemented CDM projects.

Certain additional barriers are difficult to assess with the simplified approach in this section. For example, the scalability of projects represents a further important characteristic but depends on a country-specific scenario and might even require a project-by-project assessment. Apart from the main sector-related barriers to CDM implementation that are listed and discussed above, also other cross-sector barriers exist that have influenced success and limitation of CDM implementation. These e.g. include DOE bottlenecks, complex and changing UNFCCC procedures and lack of capacities in developing countries to implement CDM projects. These are not addressed in this section but might have increased the effect of some of the above discussed sector characteristics.

4.4 Successes and Limitations of Approaches for Scaling Up of the CDM

The aim of this section is to describe the development and the impact of upscaling measures that have been implemented to address different limitations of the CDM. These upscaling measures include the introduction of “Programme of Activities” (PoA) as a new project category and the concept of “Standardised Baselines”. In the following we at first separately recap the objectives of the upscaling measures and secondly we assess their impact and development stage. At the end we will draw conclusions on the reasons for current successes and limitations of both upscaling measures.

4.4.1 Programme of Activities

The background for the introduction of the project category Programme of Activities (PoA) was that previous project categories, and especially the simplifications resulting from reduced requirements for small scale projects,

were insufficient to provide incentives for “bottom-of-the-pyramid” projects. These are the smallest mitigation opportunities, which often include single appliances only. Beside the small size of these project opportunities, the term bottom-of-the-pyramid also applies to the status of the communities that potentially benefit the most from this project category. Distribution programmes for efficient cook-stoves or for efficient solar lighting solutions in the majority help the poorest communities in the world.

The main objective of PoAs is to substantially lower the transaction costs for the inclusion of these smallest mitigation opportunities in the CDM. This cost reduction for individual mitigation opportunities is achieved by bundling similar opportunities and thus increasing the overall project sizes. This group of similar projects is in this way enabled to cope with the CDM requirements and attract attention by the market. The possibility to bundle small scale project opportunities did, however, already exist before the PoA approach was invented. The main advantage of PoAs over small scale bundles is that once a PoA is registered, further single project activities (= component project activities (CPAs)), located in the boundary defined for the PoA, can be added over time while small scale bundles do not offer this option. CDM related risks and uncertainties for individual CPAs are thus considerably reduced through PoAs. CPAs to be included in a registered PoA furthermore do not have to pay registration fees. They also benefit from MRV facilitation through the use of sampling approaches and organisation on PoA level through Coordinating/Managing Entities (CME) supervising the PoA on a regional level.

Registered PoAs have the chance to reach sector coverage for the specific mitigation activities in the region or country as defined by the PoA boundary. In this way and in effectively allowing micro projects access to the carbon markets the PoA project category is able to upscale the CDM.

The concept of programmatic CDM was already considered during the Conference of the Parties in 2005. Its initial rules were agreed by the Executive Board of the CDM in 2007 (EB 32/June 2007), but only the adoption of an improved PoA guidance in 2009 (EB 47/May 2009) accelerated the actual use of this concept.

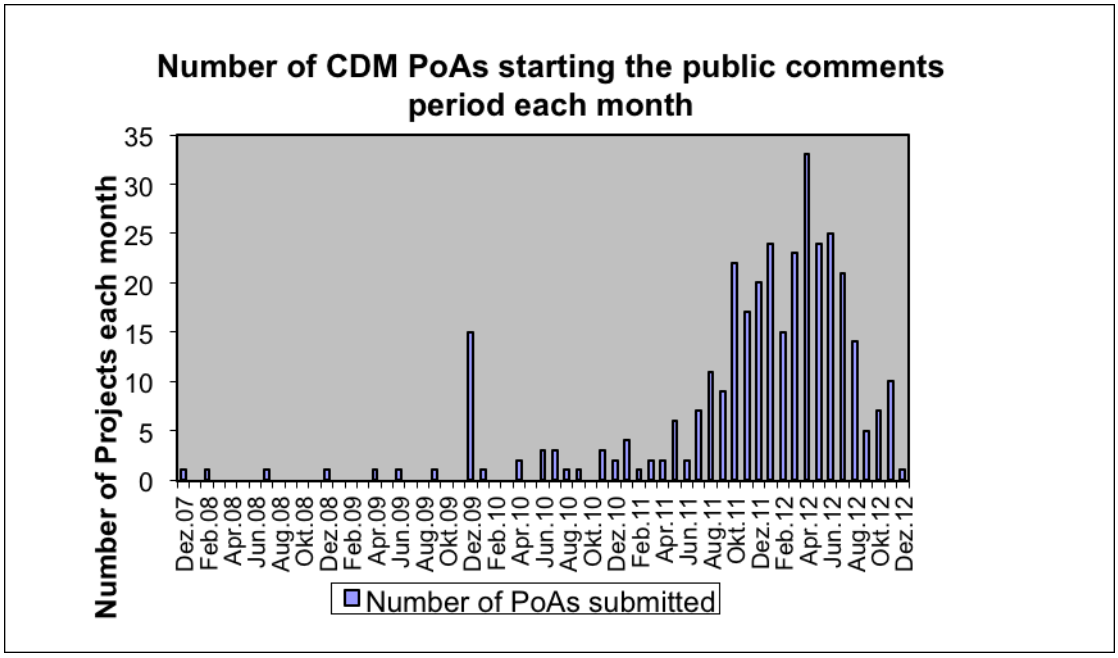

Figure 5: CDM PoA pipeline development (source: UNEP Risoe 2013)

Figure 5 shows the development of the inflow to the CDM-PoA pipeline in the first commitment period. The early peak in December 2009 can be explained by the rule on issuance of early credits, which required submission before the end of the year 2009. The pipeline especially started to develop in the years 2010 and 2011 while towards the end of 2012 the number of new initiatives decreased again in line with the general development of CDM activities. The first PoA was registered in July 2009, while still the total number of registered PoAs reached only 5 by the end of the year 2010. At the end of first commitment period, in total 63 PoAs were registered. By that date only one PoA managed initial issuance and actually received CERs (December 2012).

It can be concluded that the development path of programmatic CDM was slow in the beginning but increased its pace and reached considerable importance for the scale of the CDM and its distribution over sectors and countries. With regards to regional distribution the data from UNEP Risoe (2013) show that PoAs (in the pipeline) reached a considerably higher importance in African countries (30% share of all PoAs) and LDCs in general (11%), which are underrepresented in the share of normal CDM projects (3.0%; 1.1%). With regards to project types PoAs have furthermore a significantly increased share in categories such as energy efficiency on the demand side (including energy efficiency in households, industry and service), waste and solar.

In summary, it can be concluded that programmatic CDM has shown its ability to lower barriers and has in many cases reached its objectives but it was not yet

able to mobilise its full potential. The reasons that might explain why PoAs developed with delay and why they stay behind their full potential include the following aspects.

DOEs that are engaged in the validation of PoAs have the mandate to decide about the inclusion of CPAs within the PoA but face an unquantifiable liability risk in case of erroneous inclusion: DOEs could be made liable for returning all invalidly issued CERs, and the DOE would have to obtain them at market price. This unlimited liability risk is disproportional to the revenue that DOEs can obtain with PoA work. There is no guidance from the UNFCCC Executive Board to better align liability responsibilities, decreasing the incentive for DOEs to offer more validation and verification services to PoAs. To mitigate the risk, DOEs only accept PoAs where the inclusion criteria for CPAs are strictly defined and/or perform site visits for all CPAs instead of sampling, which increases the cost for the PoA. This hinders the growth of PoAs as DOE services can cause an unnecessary bottleneck. Criteria defining the inclusion of CPAs as proposed by the coordinating/managing entity (CME) thus need to be unambiguous. Other solutions may be transferring some of the liability to the coordinating/managing entity or introducing a cap on liability in terms of size of liability and the time period after inclusion of a CPA.

The set-up of a CME needs to be carefully designed with clear roles and responsibilities. Without a robust CME, the implementation of the PoA could suffer from unnecessary delays and issues. Many developing countries currently do not have the capacities and expertise to set up a CME, and at times it is a struggle to find organisations that are able to fill the role required for a CME. Connected to this limitation is that the cost advantage of a PoA is shifted away from the CPA (project level) to the PoA CME (organisational level). Other issues such as the ownership of CERs (particularly for community level projects) and MRV can be addressed through an appropriately appointed CME.

4.4.2 Standardised Baselines

A further measure to reduce barriers and scale up the CDM is the concept of standardised baselines (SBL). The baseline determination for CDM projects generally follows a project-by-project approach. This results in resource-intensive and lengthy approval processes with potential for inconsistent treatment of project activities. The introduction of SBLs for sectors or countries has the potential to reduce transaction costs and CDM-related risks. SBLs in the CDM are defined "*as a baseline established for a Party or a group of Parties to facilitate the calculation of emission reduction and removals and/or the*

determination of additionality for clean development mechanism project activities, while providing assistance for assuring environmental integrity"[12].

Transaction costs are reduced once SBLs exist and are available for project developers. Lack of data is a main barrier in some countries and the individual baseline definition used in the traditional CDM approach often overcharges single project participants. Risks for the project initiation are reduced by confirmation of already accepted baseline scenarios prior to project registration. SBLs have moreover the ability to lower the complexity of MRV processes and offer the flexibility to cover different measures (e.g. energy efficiency) with one emission baseline. They also allow broader regional coverage either for regions or even cross-country depending on the homogeneity of the baseline situation.

The concept of SBLs was introduced by a decision of the Conference of the Parties in Cancun (CMP.6/2010). The initial rules and procedures for the submission of standardised baselines were finally adopted by the Executive Board of the CDM in 2011 (EB 63/September 2011). The rules allow for two approaches to initiate the development of SBLs. From top-down, the UNFCCC institutions themselves can bring forward baselines while the bottom-up approach allows all stakeholders to develop proposals. The latter are, however, required to be submitted to the CDM EB for approval via the host country DNAs. Compared to PoAs, standardised baselines are a rather new concept, which is reflected by a currently low rate of proposed baselines. At the end of the first commitment period (December 2012) the list comprised only four proposals while no standardised baseline had been approved at the time[13]. The first two SBL were approved only in May 2013 (EB73). However, this does not mean that standardisation approaches in the CDM are completely new since diverse smaller standardisation approaches are embedded in current methodologies and actually lower barriers (e.g. grid emission factors, AM0013, AM0070). However, the larger impact expected from the above described concept is not yet visible.

SBLs are doubtless a suitable approach to successfully reduce barriers (also for PoAs) and to scale up the impact of the CDM once they are available. However, a few challenges in developing SBLs are yet to be overcome. One is that standardisation approaches of only a few sectors have been studied so far, mostly large-scale industry. Sectors such as energy efficiency in households

[12] Cf. paragraph 46 of Decision 3/CMP.6 Further guidance relating to the clean development mechanism (UNFCCC 2011b)

[13] The full list can be found here: http://cdm.unfccc.int/methodologies/standard_base/index.html

that are more dispersed and harder to quantify are yet to be examined. Top-down developments from the UNFCCC are not expected in the near future, and thus a bottom-up approach will be needed to progress the concept. This, however, requires significant resources and capacity of host country DNAs. DNAs, particularly in those countries that are underrepresented in the CDM, are already overburdened with current CDM requirements and will struggle to take on any additional work especially with regards to such complex tasks (e.g. resulting from the QA/QC guidelines for standardised baselines). To develop a robust SBL reliable data is essential and often difficult to get or even unavailable, e.g. through confidentially issues in obtaining industry performance data. Furthermore, a balance needs to be found between accuracy and scope for the aggregation of project and baseline technologies.

Besides these challenges, experts also raised concerns on the general approach chosen for SBLs in the CDM. The main concerns are the linking of methodological approaches for additionality assessment and baseline determination, the lack of clarity in some terms and definitions, the non-dynamic approach and the voluntary use of SBLs (Schneider et al. 2012).

4.5 CDM Integration into National Policies

Besides technology-related barriers which facilitate the explanation of the different sectoral distribution of the CDM, especially the regional distribution of CDM projects can also be affected by the overall policy situation and CDM integration within different host countries. Host countries have a vital role for the success of the CDM since they can either support or hinder the implementation of CDM projects on their own territory. Some host countries identified the positive impact of the CDM very early, while others started to support the CDM implementation rather late or just recently. Furthermore, host country governments might exist that neither support nor hinder the CDM but tend to consider the CDM as mechanism which just happens without giving it a specific direction.

Host country support can include measures ensuring an enabling environment or even directly providing support to projects or sectors. These measures range from supportive DNA resources and data gathering support to financial support via providing seed funding, lowering access barriers to domestic finance sources and by lowering tax charges and increasing further incentive structures (e.g. feed-in tariffs for renewable electricity). Besides these direct support measures, host countries might facilitate the CDM implementation via indirect support through strategic inclusion of the CDM as a tool to develop the country towards a more sustainable future. This might include to consider the CDM in

the overall national strategy with regards to climate change and national targets towards the renewable electricity generation or energy efficiency.

Integration of the CDM in the overall national policy strategies at least ensures that the CDM is considered as valuable instrument to support different mitigation or transformative measures which are also in the interest of the host country. In this way it can be ensured that the CDM is well known and has a general positive perception. The manifold values of the CDM might be better recognised and awareness about the CDM's co-benefits can be ensured.

This indirect support is however most difficult to identify and precise quantification of its effects is almost impossible. Nonetheless, a view on host countries which successfully participate in the CDM might allow to derive qualitative connections.

China might serve as first candidate to look at. It very early proactively developed the CDM on a national level. Institutional set-ups, allocation of responsibilities and clear vision and targets e.g. for renewables have led to planning certainty for project developers. China today has a healthy domestic CDM business with considerable local capacity, which developed despite applying a CER taxation approach. Further countries followed Chinas pro-active CDM policy integration such as India, Mexico, South Korea or Chile. The data in this respect shows that India is behind China with regards to issuance of CERs and registered projects but replaces Chinas role when it comes to the pipeline of projects (cf. section 4.2.1 and table A4 (Annex)). This might be explained by the delay with which India promoted the CDM and the different lead times of measures to become effective in different parts of the world.

Countries such as Vietnam or Thailand have found their role and vision with regards to climate change and the carbon markets rather late but also show increased success and progress with a view on the data provided in section Table A4 (Annex).

Despite the fact that many of the above mentioned support measures or supportive strategies are domestically implemented they also can be induced or financed by international support. This international support is more required in LDC than in emerging economies which might explain, beside the general mitigation potential, why some countries show early use and integration of the CDM and why others need longer to find access to its potential.

5 Conclusions

This report has synthesised the current state of discussion on climate-related financial requirements in developing countries, the relevant decisions taken under the UNFCCC, current sources and channels of climate finance in general and the current status of the CDM in particular.

The report has surveyed the available literature on financial requirements for mitigation, adaptation and REDD+ in developing countries. As different sources partially differ in methodology and focus, the range of estimates is relatively broad. Estimates of the incremental investments required in developing countries to stabilise atmospheric greenhouse gas (GHG) concentrations at 450 ppm CO_2-eq. lie between about USD 100 billion and 1.1 trillion annually. Estimates for adaptation in developing countries vary between about USD 20 and 100 billion per year, but could be 10-100 times larger if the 2°C target is substantially overshot. REDD+ incremental needs are very hard to calculate. Annual opportunity costs (costs of forgoing alternative use of forested areas) have been estimated as up to about EUR 270 billion annually for a full halt of deforestation.

By comparison, total current global climate-related investments have been estimated at about USD 370 billion per year while total global gross fixed investment has been estimated at about USD 20 trillion and total world GDP at about USD 84 trillion.

In Copenhagen and Cancún, developed countries committed to providing “new and additional resources” of USD 30 billion in fast-start finance between 2010 and 2012 and to mobilising up to USD 100 billion/year starting 2020. There is so far no clarity how climate finance will be scaled up to USD 100 billion by 2020. To date, only seven countries have announced a continuation or scale-up of their fast-start commitments beyond 2012.

One core controversy is the definition of “new and additional”. So far there is no commonly agreed definition and industrialised countries use various thresholds to demonstrate that the finance they provide is additional. The result is that industrialised countries claim that they are meeting their finance commitments while developing countries claim that they are not.

The CDM plays already a significant role for carbon financing and leads to leveraging of significant amounts of private financing. The CDM’s leverage effect is hard to gauge as the prices in primary CER transactions are mostly secret. The World Bank has estimated the leverage factor at on average 4.6 and possibly up to 9 for some projects. The total cumulative investment

mobilised by the CDM up to the end of 2012 has been estimated at USD 280 billion.

However, these are not all North-South flows. There is no accurate data available for all CDM project types, but the CDM Policy Dialogue's impact research concluded that for renewable energy projects the majority of the investment provided by the CDM has come from domestic sources. This might be one of several reasons why activities and respective financing under the CDM are distributed unequally, as poorer countries may have difficulties funding projects from domestic resources. In consequence, reforming existing or introducing new carbon market instruments may in itself not be sufficient to achieve a more balanced geographical distribution. Financial institutions and general investment framework conditions in developing countries will also have to be strengthened to enable them to attract more investment.

Currently, only a few more advanced countries dominate the CDM market while entire continents like Africa have only a limited number of activities. This dominance is more prevailing for the actually issued CERs and less when it comes to registered projects. A view on the pipeline activities moreover shows that various underrepresented countries have started to increase their share.

Reviewing the sectoral distribution also showed that here as well the CDM is unevenly applied. A few sectors or project types have exploited their potential to a large extent (e.g. wind or hydro) while others stayed behind (e.g. transport and the buildings sector). Sector penetration by the CDM is related to the cost structure of project types and GHG quantification barriers such as MRV, baseline and boundary setting issues. These barriers are in a few sectors outbalanced by prevailing larger industries with respective larger resources and funds available.

Upscaling measures have the potential to lower some of the barriers for largely untapped sectors and underrepresented countries. We looked into successes and limitations of the PoA and SBL approach. The programmatic CDM has in many cases reached the objective to lower barriers but has not yet been able to completely mobilise its potential due to a few unsolved methodological and regulatory issues. SBL are doubtless a useful approach but still require to solve development challenges, in particular regarding data availability, before they will become available at a larger scale to impact also the scale of the CDM.

We can conclude that the CDM has reached successful levels of initiating mitigation activities in developing countries and providing carbon finance. It has still potential to further develop into underrepresented areas e.g. along the agreed upscaling measures.

As addressed in section 4.5, the CDM success in the past was also linked to the integration of the mechanism into national policies. Looking into the host country capabilities might also in the future be important to determine the potential role of the CDM in different countries for providing carbon finance. The relation of host country circumstances and the potential of the carbon market will be addressed in more detail in the subsequent parts of the project.

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7 Annex

A1: Estimates of Climate-Related Finance Requirements

Study	Mitigation	Adaptation	REDD+	Specific sectors
EGTT 2009	Additional financing needs for climate change technologies: USD 262-670 bn/a globally, USD 105-402 bn/a in developing countries	Additional investment and financial flows in 2030: USD 32.6-163.1 bn globally, USD 17-62.4 bn in developing countries		
World Bank 2010	Only for developing countries in 2030: Incremental costs: USD 139-175 bn, Associated financing needs: USD 264-565 bn	Incremental costs only for developing countries in 2030: USD 28-100 bn		
UNDESA 2011	Incremental investment requirements 2000-2050 in energy supply and energy end-use: ca. USD 1,800 bn/a globally, ca. USD 1,100 bn/a in developing countries	Assuming successful mitigation (below 450 ppm CO_2eq), otherwise 10-100 times as large: ca. USD 105 bn/a incremental investment needs		
IEA 2012	Additional investment for 450 scenario vs. "new policies"-scenario": USD 16.000 bn total up to 2035 globally			transport: USD 6,300 bn buildings: USD 4,400 bn power generation: USD 3,200 bn industry: USD 1,500 bn biofuels USD 600 bn

Eliasch 2008			Opportunity cost for halving emissions from global deforestation by 2030 (if forests are included in global carbon trading): ca. USD 17-33 bn/a globally	
Meridian Institute 2009			Compares opportunity cost estimates of various studies with considerable range: EUR 0.3-1.2 bn/a (10% abatement, Kindermann et al 2008); up to EUR 271 bn/a (full halt, IPCC 2007)	

A2: Relevant UNFCCC Decisions

UNFCCC Decision	Content on finance	Relevance to Carbon Markets
Art. 4 UNFCCC and Art. 11 Kyoto Protocol	Developed countries commit to providing “new and additional” financial resources	
12/CP.2: Memorandum of Understanding between the Conference of the Parties and the Council of the Global Environment Facility	defines the GEF as operating entity of the Convention	
12/CP.3: Annex to the Memorandum of Understanding on the determination of funding necessary and available for the implementation of the Convention	brings MoU between COP and GEF into force	
1/CP.13: Bali Action Plan	1 b(ii): NAMAs, supported and enabled through technology, finance and capacity building 1 b(v): Various approaches, incl. opportunities for using markets 1 c(i): International cooperation for adaptation incl. finance needs assessments 1 e (i-vi): Enhanced action on the provision of financial resources and investment, incl. improved access, innovative funding, mobilisation of public and private money	establishes concept of NAMAs and possible NMMs recognises innovative funding for climate action
1/CMP.3: Adaptation Fund	makes the Adaptation Fund operational	Adaptation fund receives 2% share of proceeds from CDM
2/CP.15: Copenhagen Accord	8: Developed countries to provide FSF of "up to" 30bn USD, goal to mobilise 100bn USD annually by 2020 “from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources” 10: Green Climate Fund first mentioned	reiterates various approaches

1/CP.16: Cancún Agreements	2 a, d: developed countries to mobilise and provide scaled-up, new, additional, adequate and predictable financial resources for mitigation and adaptation in developing countries 95: takes note of developed countries' FSF commitment "with a balanced allocation between adaptation and mitigation" 98: recognises developed countries' 100bn USD Long-Term Finance commitment 102: establishes the Green Climate Fund as an operating entity of the Financial Mechanism of the Convention, but with an own Governing Board 112: establishes the Standing Committee in matters relating to the Financial Mechanism	Part III B of the decision recognises and defines NAMAs by developing countries to be supported by developed countries 80: establishment of "one or more" market mechanisms considered
2/CP.17: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention	121ff: further defines modalities of the Standing Committee 126: affirms the importance for ongoing support after 2012 127,130: establishes a work programme on Long Term Finance to find ways of scaling up financing after 2012	45: establishes the NAMA registry 83: defines a new market-based mechanism
3/CP.17: Launching the Green Climate Fund	2: adopts the Fund's governing instrument (GCF Board) 8. balanced allocation between adaptation and mitigation 11. GCF has independent juridical personality 19. any interim arrangements to be concluded no later than COP19	
6/CP.18: Report of the Green Climate Fund to the Conference of the Parties and guidance to the Green Climate Fund	3: selects Songdo, Republic of Korea as host of the GCF 14: GCF to be made fully operational in 2013	
4/CP.18: Work programme on long-term finance	2: LTF Work programme extended to the end of 2013	

A3: Developed Country Pledges and Committed Climate Finance

Country	FSF Pledges in mio. USD (2010-2012), commitments post-2012	Commit-ted FSF in mio. USD	Distribution over Thematic Areas	Additionality	Public/ Private finance	Use of Carbon Markets	Total Bilateral Climate-related Aid in 2010 in mio. USD (OECD-DAC figures)
Australia	619 2013: 15 to Adaptation Fund	582	2010: 52% mitigation (incl. REDD+), 48% adaptation	growing aid budget	public grants		511.2
Belgium	189	75	2010: 40% adaptation, 40% capacity building, 20% REDD+	rising ODA budget, only finance post-Copenhagen	public		350
Canada	1,217	989	as of May 2012: 65% clean energy, 20% adaptation, 15% forest and agriculture	finance new and additional to Canada's pre-Copenhagen commitments	public		115.2
Denmark	203 2013: 88, 20% to GCF	52	2010: 52% mitigation (incl. REDD+), 48% adaptation	additional since above 0.8% BNI ODA finance	public		718.3
European Commission	189	126	2010: 50% adaptation, 36% mitigation, 14% REDD+	additional to programmed support	public		1254.5 (all EU institutions)
Finland	138 2013: continuatio	19	2010: 49.9% mitigation, 39.4% mitigation, 10.7% REDD+	increase of ODA vs. 2009 baseline	public grants		260.3

	n + 0.5 to GCF						
France	1,585 2013, 2014: ca. 2,600/a	1057	2011: 45% mitigation, 11% adaptation, 20% REDD+, 24% other	counted fully towards ODA	public		2653.9
Germany	1,585 2013: ca. 2,400	1412	as of 2011: 50% mitigaton, 28% adaptation, 22% REDD+	either additional to 2009 baseline, and/or derived from innovative sources (auctioning)	public	ca 1/3 of FSF contributions derived from auctioning of ETS certificates	3476.3
Japan	15,000	13,200	2010-2012: 68% mitigation, 7.5% adaptation, 1.5% REDD+, 11.5% multiple objectives, 11.5% others	10 bn USD already pledged in 2008, contains both ODA and OOF	claimed 9.6bn USD public finance, rest leveraged private finance		7757
Luxem-bourg	11	4	66% adaptation, 33% REDD+	additional to 1% GNI ODA	public		6.1
Netherlands	390	132	mainly mitigation	additional to 0.8% GNI ODA	public		654
New Zealand	72	42	ca. 60.5% mitigation, 33.5% adaptation, 3.5% others	additional increase of aid budget	public		34.7
Norway	1,000	580	2010: 65.5% REDD+, 19% other mitigation, 12%	additional to 0,7% GNI ODA	public grants		946.4

			adaptation, 3,5 others				
Portugal	45	15	roughly 50/50 split				53.5
Slovenia	10	1	2010: only mitigation				
Spain	472	296	planned: 20% REDD+; 2010: at least 45% adaptation	only commitments post-Copenhagen	public		1014.4
Sweden	1,007 2013: ca. 380	357	not specified; focus on climate resilience and adaptation	part of 1% GNI ODA	public		556.1
Switzerland	147	108	mitigation 35-55%, adaptation 20-30%, forestry 20-30%	additional to ODA of previous years	public		250.3
United Kingdom	2,380 2013/2014: ca. 2,800	1682	fiscal year 2010-2011: 46% mitigation, 37% adaptation, 17% REDD+	partly pledged pre-Copenhagen; part of ODA	public		1095.8
Remaining EU countries	876	548					
United States	7,500	7,500	clean energy 51.5%, sustainable landscapes 19%, adaptation 29.5%	increase of climate assistance budget	public		865.9

A4: Regional distribution of projects in preparation (pipeline), registered CDM projects and issued CERs per host country

Projects in Pipeline(*)				Registered Projects				Issued CERs			
Host Party	**Number of Projects**	**%**	**Cumu-lative %**	**Host Party**	**Number of Projects**	**%**	**Cumu-lative %**	**Host Party**	**Issued CERs [million]**	**%**	**Cumu-lative %**
India	1154	33.1	33.1	China	2939	53.0	53.0	China	703.4	60.9	60.9
China	1093	31.3	64.4	India	1013	18.3	71.2	India	162.5	14.1	75.0
Brazil	194	5.6	70.0	Brazil	234	4.2	75.5	South Korea	102.1	8.8	83.8
Thailand	97	2.8	72.8	Vietnam	183	3.3	78.8	Brazil	78.3	6.8	90.6
Vietnam	79	2.3	75.1	Mexico	157	2.8	81.6	Mexico	18.4	1.6	92.2
Indonesia	76	2.2	77.2	Malaysia	117	2.1	83.7	Chile	11.0	1.0	93.2
Mexico	62	1.8	79.0	Indonesia	97	1.7	85.5	Argentina	9.4	0.8	94.0
South Africa	59	1.7	80.7	Thailand	89	1.6	87.1	Egypt	8.9	0.8	94.7
Chile	57	1.6	82.3	South Korea	83	1.5	88.6	Vietnam	7.6	0.7	95.4
Colombia	52	1.5	83.8	Chile	64	1.2	89.7	Indonesia	7.5	0.6	96.0
Malaysia	51	1.5	85.3	Philippines	58	1.0	90.8	South Africa	5.2	0.5	96.5
Pakistan	39	1.1	86.4	Colombia	44	0.8	91.5	Malaysia	4.1	0.4	96.9
Philippines	32	0.9	87.3	Peru	43	0.8	92.3	Uzbekistan	3.8	0.3	97.2
Ecuador	26	0.7	88.1	Argentina	32	0.6	92.9	Pakistan	3.7	0.3	97.5
Argentina	24	0.7	88.8	Israel	27	0.5	93.4	Colombia	3.7	0.3	97.8
Other Countries	392	11.2	100.0	Other Countries	367	6.6	100.0	Other Countries	24.9	2.2	100.0
Sums	3487	100	-	Sums	5547	100	-	Sums	1,155	100	-

Based on: UNEP Risoe 2013

(*) This category includes projects at validation or projects requesting registration. It does exclude projects with negative or terminated validations by DOEs, projects rejected by the EB and withdrawn projects.

A5: Distribution of CDM activities per project type of UNEP Risoe

Project Type	Number of registered Projects	Share of projects [%]	Share of projects issuing CERs [%]	Number of issued CERs [million CERs]	Share of CERs [%]	Average project size (registered & pipeline) [kCERs/yr]
Wind	1683	30.3	31	98.67	8.5	91.5
Hydro	1585	28.6	39	122.93	10.6	141.3
Methane avoidance	494	8.9	32	13.41	1.2	44.2
Biomass energy	489	8.8	40	29.61	2.6	66.1
Landfill gas	289	5.2	36	33.21	2.9	140.0
EE own generation	253	4.6	49	51.26	4.4	129.9
Solar	178	3.2	7	0.20	0.0	32.0
N2O	89	1.6	56	236.75	20.5	529.5
Fossil fuel switch	78	1.4	63	40.16	3.5	489.7
EE industry	73	1.3	45	2.10	0.2	39.2
Coal bed/mine methane	64	1.2	45	17.78	1.5	621.7
EE households	40	0.7	13	0.13	0.0	36.4
EE supply side	37	0.7	32	2.04	0.2	479.8
Reforestation	34	0.6	18	5.61	0.5	47.5
Fugitive	26	0.5	38	16.67	1.4	767.5
Transport	23	0.4	17	0.67	0.1	129.5
HFCs	22	0.4	86	472.27	40.9	3,536.3
Cement	21	0.4	57	2.67	0.2	157.2
Geothermal	19	0.3	42	5.55	0.5	345.5
PFCs and SF6	14	0.3	50	2.37	0.2	325.4
Energy distribution	13	0.2	15	0.47	0.0	379.6
Afforestation	7	0.1	0	0.00	0.0	47.8
EE service	7	0.1	14	0.01	0.0	49.8
Mixed renewables	4	0.1	50	0.02	0.0	47.4
CO2 usage	3	0.1	33	0.01	0.0	26.6

Agriculture	1	0.0	0	0.00	0.0	28.8
Tidal	1	0.0	100	0.11	0.0	315.4
sums / averages	5547	100	av. 35.8	1,155	100	av. 137.6

Source: Own calculations based on UNEP Risoe 2013

Note: EE stands for ‘Energy Efficiency’