Financing the global climate agenda:
Lessons learned or history repeating itself?

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The need for financing mitigation and adaptation in developing countries is one of the core challenges in current climate governance. While studies and proposals debate the reform of the climate finance architecture and how to detect new funding sources, policy development is in full activity: Governments and International Organizations have created a number of new climate funds to boost private sector investment. Accordingly, an important role is ascribed to the global carbon market as a source of climate finance. But carbon market and CDM experience with private sector funding for climate protection is ambivalent: The success of increasing financial flows to developing countries is relativized by unequal distribution patterns and shortcomings in contributing to sustainable development. In developing instruments for climate finance, policy makers can learn from this experience, to develop a better understanding of the potential and limits of private investment and market mechanisms in climate change governance.

Dipl. Pol.
Simon Wolf
PhD Candidate
Helmholtz Centre for Environmental Research (UFZ)
University of Kassel
simon.wolf@ufz.de

Introduction

In the run up to COP 15 in Copenhagen in December 2009, the issue of finance has moved to the core of the climate agenda. This is, first of all, due to a rising awareness of the need for mitigation policies in developing countries as an essential key to a succesful global response to climate change. Two main reasons account for this shift: On the one hand, fast emerging economies, such as China and India, already are responsible for a substantial share of global greenhouse gas production. This share is expected to rise sharply. On the other hand, huge and comparably cheap abatement opportunities have been identified in developing countries.

There is a general consensus that developed countries will have to contribute largely to financing mitigation measures in developing countries. But the question arises how the necessary levels of finance can be achieved. While a great number of studies calculates the financial needs for adaptation and mitigation in the global south, and proposals aim at reforming the multilateral finance architectur or finding new sources for climate finance, governments have already started to take action: The World Bank has created several new climate funds, and national governments alike launched their own financial mechanisms.

Many of these initiatives share the aim of boosting private sector investment. This is consistent with an argument raised repeatedly in the climate finance debate: Given the level of finance needed for mitigation and adaptation in developing countries, financial resources will have to come from the private sector in the first place. It is therefore not surprising that for many, the global carbon market is expected to play a major role in realizing these financial transfers.

The experience with market instruments as part of the climate regime is ambivalent, however. Whilst generating fast growing financial flows into the global south, mainly through the Clean Development Mechanism (CDM), proponets and critics of these instruments alike consider its compliance with sustainability criteria to be at best mixed.

To point out potential difficulties the evolving climate finance architecture might face, this paper examines the recent development of the *climate finance agenda*, taking into account both the discursive situation and the newly launched mechanisms. These developments are analyzed against the background of the CDM experience, in particular its shortcomings.

The argument proposed is that proponents and critics of market mechanisms often act within rather seperated discourse arenas. The former concentrate their focus on the generation of huge sums of capital, and therefore often fall short of considering the environmental and equity problems that have arisen so far. The latter concentrate on the failures of the actual system, without offering viable alternatives to meet the growing needs for financial transfers.

In its first section, the paper describes what is referred to here as the climate finance agenda, highlighting the growing importance of climate finance (1.1), the main insights from scientific studies (1.2), and the recent political developments (1.3). The second section begins with pointing to the emphasis of private investments for climate finance (2.1); the problems with the CDM are than illustrated (2.2) to ask for lessons that can be learned for the climate finance architecture (2.3). In place of conclusion, the third section aims at reflecting the potential and limits of private investments in climate politics.

1. The Climate Finance Agenda

The issue of finance looms large in current climate debates. One of the central questions in the run-up to the Copenhagen Summit in December 2009 is the finance of mitigation and adaptation in emerging and developing countries.

A number of industrialized countries, first of all the United States, keep emphasizing that they will only accept binding obligations to reduce emissions if developing countries, or at least the emerging economies, contribute to emissions reductions as well. Governments from these countries, to the contrary, have made clear that a necessary precondition for any such contribution is adequate financial support from the richer countries.[1]

With this political situation as a starting point, the issue of finance is to be found at the centre of the debates regarding the possible future of the climate regime: A great number of (scientific) studies elaborates on the sums needed for adaptation and mitigation; possible financial commitments play an important role for the formulation of national strategies; and a great number of proposals and initiatives aims at detecting new financial sources for climate policies.

Before these developments are described and analyzed in more depths, the next paragraph will take a closer at the reasons for this new emphasis on climate finance. When negotiating the Kyoto Protocol, and in the years thereafter, questions of (international) finance were related to adaptation programs in developing countries mainly. This debate is strongly rooted within the development discourse. International institutions like the World Bank and globally acting NGOs like Oxfam frequently claim the immense financial requirements for adaptation policies in the South. Filling the respective funds under the UNFCCC has been a constant source of conflicts between developed and developing countries (Raworth 2007).

In recent times, mitigation and adaptation are increasingly discussed together as *global climate agenda*, with the focus being on possible finance (Porter, Bird et al. 2008). What is new, than, is the emphasis on finance for mitigation in developing countries. This needs some explanation.

1.1 Emphasis on finance: Vulnerability in the north and emissions of the south

The importance that is given to this issue reflects a new dimension of global interdependence – or at least the perception of such a new dimension. On the one hand, growing awareness is given to the negative consequences of climate change in the countries of the north, and on the other hand, GHG reductions in southern countries are said to be increasingly important.

[1] Shortly before COP 15 in Copenhagen, Brazil offered a 36-39% in GHG emissions and a 80% reduction in its deforestration rate by 2020, if these measures are to be financed through the international community..

Emission reductions in countries of the south

It is now accepted almost generally that emission reductions in developing countries are of utmost importance for successful mitigation efforts on a global scale. Fast emerging economies, such as China and India, are already responsible for a substantial share of absolute global greenhouse gas production, and this share is expected to rise sharply.

Admittedly, differentiation is needed here between national greenhouse budgets and per capita emissions. In absolute terms, China even overtook the United States as biggest emitter. Regarding per capita emissions, however, China is clearly dragging behing the United States and most European countries, and India is still a minor emitter.

Besides the increasing share of emissions, huge and comparatively cheap abatement opportunities have been identified in developing countries. Two main reasons are given for these comparative cost advantages: Developing countries have the opportunity to 'leapfrog', that is, to leave out environmental harmful stages of development, and jump directly into more sustainable stages of development. This level switching is expected to be less costly than the rebuilding of the industrial sectors in the North. The second extensive and low price abatement opportunity can be found in the forestry sector mainly in poorer countries, through aforestation and avoided deforestation.

Therefore, studies like the Mc Kinsey Global Greenhouse Gas Abatment Cost Curve, frequently quoted in recent debates on climate finance, conclude that two thirds of global emission reduction will have to take place in developing countries (Mc Kinsey 2009, in a similar manner: Climate Works and European Climate Foundation 2009b).

A strong scientific intervention is necessary to produce this argument. A first important step was taken with the Stern Report *The Economics of Climate Change*, that played a major role in pushing climate change to the centre of the political agenda in 2006.[2] Stern and his team compare the global macroeconomic costs of climate change, with and without mitigation policies, outlined for time horizons of 50, 100 and 200 years. Their core message is that climate protection efforts are economically rational, since the costs of climate change would rise significantly without mitigation efforts (Stern 2006). Finding a global answer to climate change, than, must always strive not to negatively affect economic growth. 'The world should aim for [...] the most effective, efficient and equitable emissions reductions' (Stern 2008: 3).

With this perspective as a starting point, it became possible to compare mitigation opportunities on a global scale, taking their costs or cost efficiency as the most important (or even single) criterion. Now a growing number of similar approaches enquires into the climate economics of particular sectors, illustrating the increased importance of this perspective – and revealing the problems that are attached to it (Wolf 2009).

[2] Stern and his team were not the first to enquire into the *economics of climate change* (Spash 2007). To the contrary, economic perspectives formed part of the scientific enterprise concerning climate change almost from the beginning. As early as 1992, William Cline focus on the long-term consequences of climate change. published his book 'The Economics of Global Warming' (Cline 1992)With the Stern Report, however, awareness of this perspective was spread beyond the inner circle of economists and climate professionals for the first time.

Of particular importance is the already mentioned Mc Kinsey study. The calculation of the *Pathways to a low carbon economy* departs from the insight that mitigation efforts 'close to the full potential' are necessary to remain within 2-degrees global warming (Mc Kinsey 2009).[3] The study compares the potential of different sectors and world regions to contribute to this objective.

This approach escapes parts of the criticism of the Stern Report, as it does not compare costs to benefits. As a consequence, the political aims do not result from the calculations, but are predefined; in this case it is the reduction of emissions to a level compatible with a 2-degree temperature rise. 'This is cost-effectiveness, not cost-benefit analysis' (Pearce 2003: 364).

The authors identify and compare four potential ways of emission reductions (Energy efficiency, low-carbon energy supply, terrestrial carbon (forestry and agriculture), and behaviour changes), not keeping in mind the complex social and environmental circumstances that are intrinsically linked to the abatement opportunities. Aforestation, to give only one example, is cheap when considered exclusively as a means of mitigation, excluding its effects on sustainable development.

Successful implementation of the *Global Greenhouse Gas Abatement Cost Curve* is therefore compatible with quite diverse *per capita* emissions in the long run. The calculations of the study for the year 2030 result in *per capita* emissions of 7.7 tons CO2 in industrialised countries; populations in China and India would emit 3.7 tons; in developing countries with a significant share of forestry this value is expected to be 1.9 tons.[4]

The authors see no contradiction to equity perspectives, because reduction efforts in the South are expected to be financed by developed countries. Living on less carbon, then, is finally a question of finance. It is this financial intermediation as well that allows for locating two thirds of global emissions reductions in developing countries.

Climate vulnerability in the north

Adding to the growing need for mitigation in developing countries, awareness of the vulnerability against climate change has risen in industrialized nations in recent years. Although the consequences of climate change in these regions are by no means comparable to those expected in many developing countries – due to the less intense climatic changes in many countries of the north, a minor probability of climatic extreme events, lower immediate dependence on ecosystems and greater resilience and adaptation capacity – governments are increasingly paying attention to adaptation needs.

The countries of the European Union in particular have intensified their adaptation planning, to cope with the consequences of a changing climate. The focus here is on resilience building of economic sectors like agriculture, energy production or tourism (Europäische Kommission 2007; Europäische Kommission 2008; Jacob 2008). Although particularly vulnerable groups

[3] The study was prepared by the consultancy McKinsey, resulting from a common initiative with a number of Think Tanks, companies and NGOs, among others the Carbon Trust, Climate Works, Shell, Vattenfall, Volvo, and the WWF.

[4] The particular low value for these regions results from the fact that avoided deforestation is equalled with negative emissions, resulting in small overall emissions budgets.

have been identified (older people, invalid people and people with lower incomes), vulnerability is much less a social phenomenon (European Commission 2007). Consequently, the European Commission concludes that action will range between 'Soft, relatively inexpensive measures', and 'Costly defence and relocation measures', emphasizing that adaptation will also bring jobs and market opportunities (ibid. 10). The Umweltbundesamt, the governmental organization responsible for coordinating Germanys adaptation strategy, conludes in an early study that 'For all issues and regions, more or less complex solutions are available, that, if implemented, could reduce vulnerability in almost all cases to a minor degree' (Umweltbundesamt 2005: 11)

More than the direct consequences of climate change, many industrialized countries seem to worry about indirect threats. Climatic changes and the resulting problems may, from this perspective, lead to increased migration, political instability and conflicts in a number of world regions, or call in question energy supply and transport routes, all of which are seen as security threats through climate change (WBGU 2007, CNA 2007).

1.2 Scientific debate: variety of numbers

In sum, growing importance is assigned to emissions reductions in developing countries. An almost complete consensus exists, however, that these measures will have to be financed within a global framework – the money coming from industrialized countries in the first place.

Given the high level of uncertainty regarding the consequences of climate change, it is not surprising that there is no scientific consensus regarding the level of finance needed for mitigation and adaptation in the countries of the south. In line with Mc Kinsey and the Stern Report, an increasing number of additional studies numeralizes these financial needs.

According to the UNDP, the need for adaptation is in the range of US dollar 86 billion annually in 2015; Oxfam calculates with US dollar 50 billion, the World bank 10-40 billion. Giving reference to the great uncertainties involved, the UNFCCC chooses a margin from US dollar 49-171 billion (Schalatek 2009).

Comparability is more difficult in the case of mitigation. Most studies calculate the costs of climate protection, or the investment needed, as a fraction of (global) GDP. As a consequence, the results depend on a number of additional influence factors like economic growth, population size and technology development. The Stern Report states that the expected annual costs of limiting global warming to 2 degrees will be around one percent of GDP (although the estimates range from – 1 per cent (net gains) to 3.5 per cent of GDP); the IPCCs estimation is at 3 per cent. According to a study by the OECD, a yearly investment of 0.1 percent of GDP will be enough from now to 2030 to limit global warming to 3 degrees.[5]

According to the UNFCCC, it will cost US dollar 380 billion in 2030 to return emissions to the 2007 level. The authors of the study emphasize that this sum is huge compared to the current investments into climate protection, but is only a fraction of 1.1 to 1.7 of total investments and financial flows in 2030.

[5] This calculation from the OECD is particular interesting, as there is something like a common sense in political debates to limit global warming to no more than 2 degrees.

Additional to these scienfic studies, a number of policy papers aims at concreticizing the scientific recommendations, through a reform of the current climate finance architecture of the UNFCCC (Müller and Gomez-Echeverri 2009), differentiating responsibilities for the scaling up of climate finance (Climate Works and European Climate Foundation 2009a), or new sources for mitigation and adaptation (see for an overview: UNFCCC 2007).

1.3 Political developments

In any case, the estimates presented here can only serve as a rough indication for concrete political action. Rather than following these numbers, commitments by single governments will depend on strategic considerations and the momentum in political negotiations. A look at the negotiation process leading to the Kyoto Protocol may help to come to a realistic appreciation of the political process: The level of binding obligations accepted by the governments were not proportional to the emission levels or reduction capacity of the respectice countries, but first of all a consequence of political will and the logics of the negoatiation process (Oberthür and Ott 1999).

The general willingness to support developing countries in their efforts to mitigate climate change is therefore not the ending, but rather the starting point of discussions and raises a number of questions: Who will have to pay and how much? Who will receive the money, and what kind of projects and policies should be funded? And finally: How will the institutional setting of a future climate finance regime look like?

Finding answers to this last question is by no means a pure technical issue. Rather, the institutional design, the channels through which the money will flow, and the selection of responsible organizations will have a great influence on the other issues as well.

It is therefore of crucial importance that these questions are not only considered in countless debates and proposals, but that governments and international organizations have already begun to take first steps in implementing policies and instruments. The World Bank, equipped with a strenghtened mandate for climate activities since the G8 meeting in Gleneagles in 2005, has developed several new Climate Investment Funds. Likewise, a number of national governments have launched own initiatives and financial instruments, leading to a true ‘proliferation of new funds” within the last two or three years (Porter, Bird et al. 2008: 10).

Changes to the (multilateral) financial architecture

Until recently, the multilateral financial architecture within climate politics consisted mainly of a number of funds that aim at the finance of adapation policies. Launched at COP 7 in Marrakech 2001, the *Adaptation Fund* was established to finance concrete adaptation projects and programmes in developing countries that are particularly vulnerable to the adverse effects of climate change. It is financed from a 2 % share of the emissions certificates generated through the Clean Development Mechanism (CDM). The fund is managed by the Adaptation Fund Board under the umbrella of the UNFCCC. The board is composed of 16 members, taking into account fair and balanced representation among country member groups.

Two additional funds are operated through the Global Environmental Facility (GEF): The *Least Developed Country Fund* supports these countries in elaborating National Adaptation Programmes of Action; and the *Special Climate Fund* was established in 2001 to finance projects relating, among others, to adaptation, technology transfer and capacity building.

The Global Environmental Facility (GEF) was made the interim operating entitiy of the financial mechanisms for the UNFCCC in 1992, 'to a certain extent by default, as there appeared to be, in the eyes of many, no alternative' (Gomez-Echeverri and Müller 2009: 2). Though accepting the need for climate change funding in developing countries, the developed countries militated against establishing a new finanical mechanism.

Generally, the decision making process under the UNFCCC is governed by the principle of *one country, one vote*. This holds not true to the same extent for the GEF as the executing agency, where the voting rights depend, amongst others, on the size of financial contributions. This gives, in consequence, a de facto veto power to the largest donors. The decision making process for the funds under the UNFCCC therefore represents 'an imperfect and uneasy compromise between donor and developing country power over funding decisions' (Porter, Bird et al. 2008: 47).

This multilateral finanical architecture has come under considerable change through new funding activities mainly by the World Bank. Based on a mandate given at the G8 meeting in Gleneagles in 2005, the World Bank began to expand its climate funding activities. In 2008, the Board of Executive directors formally approved the creation of two *Climate Investment Funds*, the *Clean Technology Fund* and the *Strategic Climate Fund*. The Clean Technology Fund (CTF) will promote investments in clean technologies, and the Strategic Climate Fund (SCF) will serve as an overarching fund that can support targeted programs with dedicated funding aimed at specific programs or sectors.

Three programs have been launched under the umbrella of the SCF so far: the *Pilot Program for Climate Resilience (PPCR)* aims at integrating responses to climate change into development planning. The main task of the *Forest Investment Program* is to reduce deforestations and forest degradation. And the Program for *Scaling-Up Renewable Energy in Low Income Countries (SREP)*, aims at low carbon development pathways and the use of renewable energy in developing countries.

This new activity of the World Bank is more than a scaling up of climate finance. It is, first of all, a major power shift within the multilateral finance architetcure that has important consequences regarding governance and the influence of the involved parties. As mentioned before, the decision making process for the funds within the UNFCCC is oriented at the equal participation of all countries involved.

For decision making processes within the World Bank, on the other hand, the votes depend on the size of financial contributions of the respective country. Giving greater importance to the World Bank at expense of the GEF implicates a growing influence for donor countries as well. This is strengthened by the resources available to the different funds. The mechanisms

managed through the GEF dispose of roughly US dollar 1 billion so far.[6] For the World Bank funds, to the contrary, donors gathered to pledge US dollar 6.1 billion.

Instruments to foster private sector investment

But not only the multilateral financial architecture is growing – and changing – at accelerad pace. Several bilateral initiatives have been launched within the last two or three years, targeting different aspects of mitigation and adaptation (and often, at the same time, complementary goals like biodiversity conservation, development and poverty reduction). Most of these funds are not yet operational, however. As they are still under development, their final structure and operational practices cannot be stated with complete certainty. [7]

Besides the size of investments offered by the different funds and financial mechanisms, the type of funding is another important aspect. In the following, the focus will be on three initiatives that give particular importance to the engagement of the private sector.

- Global Energy Efficiency and Renewable Energy Fond

One of the new bilateral finance mechanisms is the *Global Energy Efficiency and Renewable Energy Fund* (GEEREF) of the European Union.[8] It is based on the so called *Patient Capital Initiative,* launched at the Renewable Energy Conference in Bonn 2004, and aims at channeling public and private money into energy efficiency and renewable energy projects that lack access to commercial financial markets.

This is backed by the asumption that investments in renewable energies in developing countries are deterred by a number of financial and bureaucratic hurdles, like the need for high upfront investment and unstable market environments. In the long run, however, these investments are usually expected to gain profits. The aim of GEEREF is to help projects and investors to overcome these difficulties, and as a consequence raise private sector investment. Therefore, the fund offers a number of funding mechanisms, risk capital and guarantees.

The main aim of bringing in the private sector is emphasized by the envisaged extent of the GEEREF portfolio. Private investors are expected to increase tenfold the Euro 150 million that are contributed by the European Union and national governments. Although public and private money will be blended, public donors 'can accept lower returns on a case by case basis [...] and thereby lift returns for the private sector towards commercial thresholds' (European Commission 2006: 6).

According to the project documents, it is not the primary objetive of the fund to gain the highest possible returns. Rather than investing in large scale projects, GEEREF was founded to target small and medium enterprises. Besides energy efficiency, GEEREF will promote small hydropower, biomass, on-shore wind farms and solar power. The intention is to bring

[6] This number is obviously higher when taking into account the resources delivered through the GEF Trust Fund: the GEF is the operation entitiy not only for the UNFCCC, but as well for other environmental organizations in the fields of biodiversity, international waters, land degradation, the ozone layer, and persistent organic pollutants. Alltogether, the GEF provided more than US dollar 6 billion for environmental policies in developing countries and economies in transition.
[7] See for an overview the regularly updated wepage: www.climatefundsupdate.org.
[8] Further information on GEEREF is available at: http://ec.europa.eu/environment/jrec/energy_fund_en.htm

almost 1 Gigawatt of environmentally sound energy capacity to developing country markets, serving 1-3 million people, and thereby substituting 1-2 million tonnes of CO2eq.

The structure of the fund is designed according to these goals. It is not the fund managers in Luxemburg, the European Investment Bank and the European Investment Fund, who sign the investments, but regional subfonds. GEEREF has, or will have, agencies in Asia, Africa, Latin America and the Pacific Region. Through this decentralised structure, easier access to the resources shall be possible for local entrepreneurs and stakeholders.[9]

- Strategic Climate Fund

The Strategic Climate Fund (SCF) is one of several new Climate Investment Funds managed by the World Bank (see above).[10] It focusses on renewable energies; complementary goals are promoting sustainable development, maintaining resource rich ecosystems, and contributing to poverty reduction.

One central aim of the fund is to 'unleash the potential of the public and private sectors to achieve meaningful reductions of carbon emissions and greater climate resilience" (Porter, Bird et al. 2008: 30). To this ends, the fund makes available a range of financing and risk management tools like loans, credits, guarantees and grants. Besides delivering finance to programs and projects, the SCF will deliver finance to specialized funds like the Clean Technology Fund.

In the medium term, the SCF will dispose of US dollar 1 Million. In a first round of pledges, a number of donor countries announced contributions of US dollar 350 million to the *Forest Investment Program* and another US dollar 200 million to the program *Scaling Up Renewable Energy*.

Officially, the duration of funding of the SCF depends on the proceedings of the UNFCCC process. According to the project document, the fund will conclude its operation 'once a new financial architecture is effective' (World Bank 2008: 20). Notwithstanding, the Trust fund committee reserves its right to extend the operation of the fund, 'if the outcomes of the UNCCC negotiations so indicates' – a formulation that leaves space for interpretation.

- GEF-IFC Earth Fund

This fund was initially founded as the *Public Private Partnership Initiative* of the GEF in 2007 and renamed as Earth Fund later.[11] Although managed by the GEF, in collobaration

[9] During COP 14 in Poznan Conference in December 2008, the GEEREF Investment Committee has given preliminary approval to investments totalling US dollar 22 million in two commercial renewable energy investment funds, one focusing on projects in sub-Saharan and southern Africa and the other in Asia with a primary focus on India. Both funds will invest equity in renewable energy projects such as wind energy generation, small hydro-electric generation, biomass and methane recovery.

[10] An overview over the World Bank funds can be found at http://go.worldbank.org/58OVAGT860; further information on the Strategic Climate Fund at http://go.worldbank.org/RUL7U4XTC0

[11] Further information on the GEF IFC Earth Fund can be found at http://www.ifc.org/ifcext/spiwebsite1.nsf/f451ebbe34a9a8ca85256a550073ff10/8ebb1f78450e4dc08525746b006770fb?OpenDocument

with the World Bank subsidiary International Finance Corporation (IFC), the fund is not part of the climate finance architecture under the umbrella of the UNFCCC.

The primary objective of the Earth Fund is to channel private sector resources into programs tarteting climate protection, biodervisity conservation, and the prevention of land degradation, with a main focus on technology transfer. The Fund began its operation in June 2008, and does not have a stated end date.

The majority of the financial resources are provided by the GEF, while the IFC acts as an executive agency, relying on its ability to engage the private sector in order to encourage venture capital to make earlystage investments. The Earth fund uses a wide array of financial instruments, including grants, soft loans and equity participation.

The target amount of the Earth fund is at least US dollar 200 million. The GEF has allocated $50 million from its global and regional funds. Once again, the private sector is meant to be the main driver of investements. The executing organizations hope to obtain at least US dollar 150 million in co-financing from private sector entities. Projects promoted through the Earth Fund are managed exclusively by private entrepreneuers; the responsibility of the international organisations is mainly in offering technical and organizational support to potential investors.

2 Climate Finance vs. carbon market and the CDM

The described funds form an important, though still small part of the evolving financial architectur in climate change politics, as they are indicative for the debates on and the future of climate finance. The general tendency of marketizing climate politics seems to persist: The increasing influence of the World Bank indicates the orientation towards an investment and credit strategy rather than the provision of non conditional assistance; and the strong emphasis on private sector investment within the bilateral initiatives is taking the same line.

2.1 Climate protection through private investments

Most studies and proposals on climate finance point to the central role of private investments for mitigation – and to a lesser degree adaptation – efforst in developing countries. It is imortant to distinguish here between two different objectives: To stimulate new investments into climate relevant sectors, like renewable energies or forest protection measures; and to redirect existing financial flows. According to the UNFCCC, private investments constitute 86 per cent of global financial flows, while ODA only contributes with less than one per cent[12] (UNFCCC 2007). This large share reinforces the conclusion that investment in climate protection will have to come from the private sector in the first place.

And it is not surprising, than, that the global carbon market is seen by many as a central tool and source for climate finance. Proposals point to a 'liquid international carbon market in order to allow for the most effective, efficient and equitable emissions reductions' (Stern 2008: 3). The expectations directed to the market are qualified by the insight that market investments 'will not cover all areas' (Scholz and Schmidt 2009: 3), and that adequate regulation is a precondition for private investor engagement: 'A predictable carbon price will be a powerful incentive to boost private sector investment in innovative low emission technologies, as businesses will see opportunities and a growing market for low emission technologies driving more investments in research and development' (Doornbosch and Knight 2008: 5).

Two sets of questions arise from the central role that is assigned to the carbon market, regarding the quantity and quality of market based or private sector funding. The first question concerns the amount of finance the carbon market is able to provide. While the World Bank estimates that over 80 percent of investment flows are expected from the carbon market (World Bank 2008) , others are far more critical about this potential: 'Private sector carbon markets are estimated to contribute only 15 % of total financing needs through direct offset purchases' (Climate Works and European Climate Foundation 2009a).

These estimates are all somewhat random, however, as the growth of the carbon market directly depends on political regulation. The future demand for credits from the CDM and related schemes, and hence the expected level of finance the carbon market can deliver to

[12] Allerdings ist dieser Anteil bei Entwicklungsländern und vor allem den Least Developed Countries zum Teil wesentlich höher oder übersteigt sogar die Privatinvestitionen.

developing countries, first of all result from reduction obligations taken in a possible Post Kyoto agreement – and hence can hardly be forecasted by now.

The lack of sufficient climate finance so far is seen by some as a market failure, and consequently, a failure of governance: 'If current market rules are failing to attract – or drive – private investors into lower GHG, more climate-proof alternatives, there are a variety of steps governments can take to help address these market failures' (UNFCCC 2007: 27)

But even with the most effective market regulation and incentives in place, most studies and policy papers ascribe an important role to public money, 'to support developing countries in their mitigation efforts and encourage technology transfer" (Doornbosch and Knight 2008: 4).[13]

From this perspective, the funding instruments described in this paper provide an additional source of finance. Independent of global climate regulation, they aim at investors´ engagement in developing countries. So while the carbon market for many plays a central role in a future climate finance regime, governments and international organizations already build on a system that stimulates private sector investment beyond that market.

The question than arises whether this type of finding is more reliable than the carbon market. All political regulation notwithstanding, market development is not predictable and potentially highly volatile. The same holds true in principle for other funding schemes relying on private investors: They cannot guarantee to maintain a constant flow of finance. It is for this reason that many developing country governments oppose assigning a primary role to markets in climate finance, and call for reliable and predictable financial flows that could form a constant part of national budgets.

2.2 CDM: Origins, development, and shortcomings

Beyond size and predictability, the more general question arises which consequences the focus on private investments will have. Therefore, it seems to be fruitful to analyze the recent developments against the background of the experiences with the market mechanisms of the Kyoto Protocol, and especially the Clean Development Mechanism. Rather than a self evident comparison between these instruments, the experiences made with the CDM are considered to point to potential problems the emerging climate finance architecture might face.

[13] At the same time, some restriction will have to be placed on the flow of certificates from the CDM into the carbon market. From a political perspective, it seems to be necessary to prevent that some countries – or sectors – buy their way out of their reduction obligations, through purchasing cheap CDM credits. This has been an important point of discussions within the European Union´s ETS. Germany, for example, limited the puchase of CDM credits to 22 per cent of the total number of certificates appointed to the respective sectors. From an economic perspective, the number of certficates from the CDM flowing to the carbon market must be restricted to sustain market prices, in order to not make mitigation efforts in industrialized countries economically less attractive.

CDM and the climate finance agenda: Analogies and differences

The described climate funds are not a copy of the Kyoto mechanisms, however, and the circumstances have changed, too. The knowledge regarding the consequences of climate change has increased dramatically within the last years, and so has the urgency for political action. Mitigating climate change no longer seems to be the task of industrialized countries alone, but rather a real global challenge (see above). Both in the surrounding debates and in the concrete design of financial instruments, more emphasis is given to climate protection in developing countries today.

These differences notwithstanding, two main analogies between the CDM and the recent developments are identified here: First, both agendas share a similar goal: to deliver investment into climate related projects in developing countries; second, they are based on a similar rationality: the assumption that investments from the private sector are central in fostering sustainable and climate friendly development.

The existence of the CDM goes back to an initiative by developing countries. They feared being excluded from the dynamics unleashed by the Emissions Trading Scheme agreed on in the Kyoto Protocol, as only countries with binding emissions targets were meant to participate. The original proposal by Brazil therefore envisaged an independent fund for sustainable development, funded by industrialized countries that did not fulfill their emission reduction commitments. Two types of project were to be financed through this fund: The diffusion of sustainable technologies, and adaptation measures.

However, many of the industrialized countries opposed any financial obligations or penalties, and thanks to the pressure of a group of states led by the US, the brazilian proposal was reformulated to an investment instrument that should serve the interests of industrialized and developing countries alike (Oberthür and Ott 2000): Investments into CDM projects should help developed countries to fulfill their mitigation obligations, and at the same time foster sustainable development.

The experience since the CDMs kickstart in 1999 shows that the aspect of sustainable development was ruled out by the complementary goal to realize cost efficient mitigation opportunities in developing countries (Holm Olsen 2006). Accordingly, the CDM has been criticized for a number of reasons.

Contribution to sustainable development

One main point of critic is the regional distribution of CDM projects. The Brazilian proposal aimed at equally supporting the development needs of developing countries that ratified the Kyoto Protocol. But CDM investment patterns rather follow the flows of foreign direct investment (FDI). It is therefore mainly the emerging markets like China, India or Brazil that receive financial flows.

Many of the poorest nations that are unable to attract outside investment for other reasons also do not attract significant interest in investment in CDM projects. Poorer developing countries go away empty-handed in many cases – a problem that has been expected already in the early stage of the instrument (Ellis, Corfee-Morlot et al. 2004).

According to recent numbers from the UNFCCC website (November 2009), Africa so far received a share of less than two per cent of all registered CDM projects. The Asia Pacific Region accounts for more than 73 % of registered projects, with China (34.7 %) and India (24.76 %) as the most important host countries. In Latin America (23.65 %) it is first of all the fast emerging economies Brazil (8.77 %) and Mexico (6.32 %) that attract CDM investments.[14]

But the CDMs deficient contribution to initiate sustainable development is not only due to the unequal distribution of CDM projets. It results as well from the characteristics of a good deal of the projects. While many projects have clear benefits through lowering local environmental pollution or boosting economic development and employment, others have few outputs other than CERs and few direct environmental, economic or social effects other than to reduce GHG emissions.

Concerns regarding the CDMs contribution to sustainable development have been raised from the very beginning, not only by the critics of the market agenda. The International Energy Agency for example raised doubts about the CDMs capacity in this respect already before the instrument was officially put into practice (Ellis, Corfee-Morlot et al. 2004).

In the aftermath, there has been an intensive debate on the shortcomings of the CDM. Again, it is not only the critics of the instrument that see one fundamental problem in the inadequate contribution to sustainable development. Even the World Bank, as one of the central actors in the promotion of the CDM, refers to these problems – although indirectly: 'Important concerns have been voiced about CDM on issues of its additionality, its procedural efficiency and ultimately, its sustainability' (World Bank 2008: 10).

The role of private sector money

Against the background of the CDM regulation, its limited contribution to sustainable development can by no means be seen as an accident. In the aftermath, many critics regard the two goals of finding cheap abatement opportunities and contributing to sustainable developmend as competing, if not contradicting (Holm Olsen 2006). The main problem here seems to be the high influence private investors and their interests play in chosing the projects that are to be financed and realized.

After an initial phase, in which mainly the World Bank and donor organizations from several developed countries sustained financial flows into the CDM, private companies increasingly began capitalizing on the investment opportunities provided by the CDM. According to the World Bank, it is first of all the engagement of institutional investors that leads to a 'substantial increase in the number of funds seeking to provide cash returns' (World Bank 2008: 3). This increased interest makes the Bank speak of a success story.

In a early study, the International Energy Agency points to another positive effect of CDM finance: Although investments were low compared to Foreign Direct Invesment (around 1 billion USD) at the time of evaluation, these funds were expected 'to have the potential to

[14] http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByRegionPieChart.html and http://cdm.unfccc.int/Statistics/Registration/NumOfRegisteredProjByHostPartiesPieChart.html

leverage six to eight times this amount – or about 6-8 billion USD of investment capital towards GHG mitigation activities. [...] Thus, the CDM has the potential to contribute not only to reducing the overall cost of meeting GHG objectives, but also to lasting technology change over time' (Ellis, Corfee-Morlot et al. 2004: 7).

In the same study, however, the IEA points to the flip side of the coin. Investor interests appear to be a main hurdle for sustainable development,: '[...] more recent buyers in the carbon market appear to prefer investments in lower-cost GHG reductions rather than more capital-intensive energy technology options with long leadtimes. This development may be a sign that the market for GHG reductions is beginning to function as a true market' (Ellis, Corfee-Morlot et al. 2004: 37).

Regarding this goal, the CDM fully met with expectations: '[The CDM] is working perfectly in doing what a market-based mechanism is designed to do: discover and direct funding to projects that will produce the maximum volume of carbon credits for every dollar invested' (Pearson 2007).

But from a sustainability perspective, it is this same development that raises concerns. As certificates from the CDM are valued exclusively for their contribution to reduce emissions, investors disregard the complementing goals associated with the CDM. Projects that explicitly aim at contributing to sustainable and social development are usually more cost intensive, and therefore discrimated within the market (Gupta 2008).

What has been regarded as one of the primary strengths of market mechanism turns out to be a central problem: The high diversity of projects within the CDM and the carbon market offers profitable investment opportunities, but hampers the capability to channel resources according to the desired outcomes (Wara 2007).

Consequently, proposals to reform the CDM aim at higher regulation standards, through the discrimination between different types of certificates (Cozijnsen, Dudek et al. 2007), or the reformulation of the CDM as an instrument targeting entire sectors. This *sectoral CDM* would support all companies or projects that meet energy efficiency or carbon intensity criteria within a particular sector (Boyd, Hultman et al. 2007).

What these proposals have in common is that they aim at reducing flexibility for investors: Instead of formulating a general goal and leaving broad space for investment decisions, they demand compliance with a number of specified criteria. The experiences with the CDM so far obviously led to the insight that less market flexibility and more regulation is needed.

2.3 CDM experience and the climate finance agenda: lessons to be learned

The problems identified with the CDM, and in particular its regulation, are now used to point to potential problems the climate finance architecture might face. In the following, the focus is on the achievement of sustainable development and the role ascribed to the private sector.

Climate finance and sustainable development

Looking at the Climate Finance Agenda, the problem of unequal regional distribution of financial flows could possibly be met through the proposed fund solutions: Instead of handing over complete responsibility to market actors, it is IGOs or governmental organizations that decide over investments and loans. Opening up markets is a dedicated goal of these mechanisms: The GEEREF fund explicitly aims at developing market environments that allow for private sector investment. All three funds presented here offers risk sharing instruments to support private sector investment when market environments are perceived as being too unstable, or not providing profitable investment opportunities. This would, according to the unequal patterns of FDI flow described abover, favor poorer developing countries in the first place.

But contributing to sustainable development no longer seems to be a dedicated and independent goal of climate politics. This is not to say that climate protection and development are not seen as intertwined issues, all to the contrary: Emphasis is put on a holistic strategy that allows for emission reductions on a global scale, while meeting the needs of developing countries for economic growth and adaptation to the unavoidable consequences of climate change (Stern 2008, Scholz and Schmidt 2009).

Important is, however, how this relation is defined more exactly – and which consequences are drawn from this definition. Due to the developments described above, the global south is no longer seen as the other side of climate politics, that is, as being affected by climate change, without being responsible for its causes. Developing countries are expected to form an equivalent, if not primary part of a global solution.

The same focus on emissions reductions that has been applied to the industrialized countries is being applied to them now. While two different forms of reasoning legitimize this perspective – emission budgets on the one hand, cost efficiency on the other hand – the reduction of emissions has somewhat become the criteria against which all strategies and projects are judged. This evokes the problems experienced with the CDM: Focussing on emissions reductions, climate finance is likely to be directed to the countries with highest emissions, and therefore usually stronger economies. As a consequence, sustainable development as an explicit and independent aim will even more fall behind.

The role of private sector money

Once again, it is informative to see what role is ascibed to private capital in recent debates on climate finance. Alhough most studies and policy papers agree that an important share of investments will have to be provided by governments, there is a clear primacy for private sector investment. Public spending should always follow the ‘golden rule of public funding [...]: governments should support only those investments that are economically efficient but not financially viable‘ (Doornbosch and Knight 2008: 24). In other words: ‘The role of public organizations using valuable taxpayer contributions should be in funding those projects which the market forces will not deem profitable‘ (Schalatek 2009: 22).

But public money should not only fill the gaps left by the private sector. Public spending 'is essential to generate the enabling environment for private sector financing fast enough to make a difference in current investment decisions' (World Bank 2008: 3). It is exactly here where the described mechanisms come in. They are designed to boost private sector investment, through blending public and private capital, or offering risk sharing instruments.

This explains why GEEREF investments are required to be 'financially viable and in line with market standards' (http://www.eif.org/about/geeref.htm), but do not carry the same return expectations they would when using commercial capital. The gap between market returns and the returns expected from GEEREF investments will be bridged by donor money.

This reflects the basic purpose to target small and medium sized energy projects, and to channel investments to countries and regions that do not meet investor interests so far. A special emphasis is on 'serving the needs of ACP countries' (European Commission 2006: 8). The decentralised structure shall allow easier resource access for local entrepreneurs and stakeholders.

But: 'Funding will be market-driven whilst priority will be given to investments in those countries or regions with renewable energy and energy efficiency policies that are conducive to private sector engagement' (European Commission 2006: 8). This would prefer countries that already have higher inflows of foreign investments, because they usually have the necessary institutions in place. In other words, GEEREF 'is fundamentally a capital formation exercise at the top, with investment being executed on the ground by locally expert investment managers'.[15]

In sum, the GEEREF fund turns out to be a hybrid between market instrument and political project. An analysis of the first financial transfers realized will have to reveal how the need for returns can be brought in line with focusing on small and medium sized projects, and supporting public goods. According to the project document, 'Taking the public goods benefits fully into account often makes renewable energy and energy efficiency projects economically attractive' (European Commission 2006: 3).

Related concerns regarding the direction of investments can be raised for the Earth Fund. As the fund targets projects and investors rather than countries or sectors, policy makers may feel obliged to give priority to create investor friendly institutions – and neglect social and environmental issues.

Here, the experiences with the CDM are once more insightful: According to the CDM regulation, host country governments are responsible for setting sustainability criteria, and to finally decide whether a single investment fulfills the objective of contributing to sustainable development. Taking into account that each realized CDM project involves the inflow of foreign capital, it can be of no surprise that governments tended to handle these criteria rather lax.

The case of the World Bank is slightly different again. The Bank has longstanding experience in financing environmental projects, and likewise expanded its climate change related

[15] Renewable Energy Policy Network for the 21st century: http://www.ren21.net/iap/commitment.asp?id=57.

investment in recent years. The question therefore arises how the management will exactly define its mission, and accordingly, what criteria will be set for project funding.

In this respect, civil society organisations criticize that the World Bank does not offer a clear definition of what is meant by clean energy. According to project documents, the business as usual scenario seems to be the criterion against which possible investments are judged. As a consequence, every investment that causes fewer emissions than the current development path can receive funding for its contribution to climate protection. The World Bank investments would then 'simply fund incremental improvements in technology rather than anything close to the lowest carbon alternative' (Porter, Bird et al. 2008: 45) – a critique that has been raised for the CDM as well.

Concern arises as well regarding to World Bank adaptation funding. Within its Climate Resilience Program, the Bank offers loans to developing countries to finance the development of climate resilient development plans (Bretton Woods Project 2009). This creates debt for developing countries, and is contrary to the widely shared insight that adaptation projects usually will not generate revenues. Often, the role of adaptation policies is to secure public goods, which does not usually happen along profit maximizing interests (Fankhauser 2006, BMZ 2009). As a result, loan taking countries would have to re-finance these loans taking money out of other sectors.

3 In place of conclusion

3.1 CDM and the climate finance agenda: lessons learned?

Finance has become a central topic in climate change debates, with political action already underway. This paper therefore aimed at reflecting the recent developments against the background of the CDM experience, to point to potential problems the climate finance agenda might face. Two main issues were raised: The contribution of financial instruments to sustainable development, and the role of private money within these processes.

The findings of this paper are, however, far too preliminary to draw final conclusions. This is due, on the one hand, to the fact that literature on this topic is very limited. A number of NGO publications outlines the most recent developments, in part critically questioning the role and initiatives of the World Bank: Main concerns here are the concentration on large-scale investments rather than proven sustainability, and the dominance of developed countries in the decision making process (Tan 2008).

A number of general questions remains to be adressed: How can the growing needs for climate finance be achieved while meeting sustainability criteria? What would be the appropriate role for private sector investments? And what are the intrinsic limits of market or private sector approaches to climate change?

It is not possible to answer these questions in general here. While the general need for enhanced climate finance is undeniable, the paper points to a problematic tendency to overestimate the role of private investments – regarding their potential level as much as the possibility to use them for particular benefits.

This problem roots in a limited understanding of market mechanisms. Once again relying on CDM experience, the shortcomings in meeting sustainability targets can be described as a problem of abstraction. Participants within the carbon market trade emission certificates, an artificially produced, virtual commodity. These certificates all carry the same value, 'despite the potentially very different material circumstances (a forest compared to a wind farm) in which they were produced' (Bumpus and Liverman 2007). The concrete conditions manifest in the production are not visible in the abstract form of certificates.

This abstraction is no random side effect, but rather a necessary precondition for the functioning of markets. This is illustrated by Robertson, using the example of wetland mitigation banking in the US (Robertson 2004). Policy makers were confronted with the need to choose between representing the diverse functions of wetlands in the issued certificated adequately, thereby making certificates less commensurable and finally inappropriate for market trade; and a higher standardisation of certificates, disregarding the various functions of wetlands such as plant species diversity or water cycles.

These difficulties within one sector in a single country increase within a global market, covering various sectors. Projects within the CDM can be as diverse as reforming the public transport sector in a big city; initiating socioeconomic development for a rural community; or substituting wind power for fossil fuels.

The problem framing presented in the Stern Report, and to an even larger degree in the Mc Kinsey Cost Curve, backs and further aggravates this logic of abstraction: Highly diverse mitigation oportunities are not only seen as a means of reducing emissions in the first place, but compared exclusively on basis of their respective costs and possible returns, reframing the debate in terms of investments rather than mitigation costs (Barker, Kenber et al. 2009).

3.2 Putting private investments in its place

The CDM experience shows the need to put things in proper perspective here. Rather than reframing climate politics as investment strategy, disregarding important dimensions of the measures that have to be taken, greater awarenes would be necessary for the diversity of potential mitigation opportunties.

This analysis would be the precondition for a more realistic use of market instruments at the same time. Many of the CDM shortcomings have been announced clearly long before the first project gained approval. And, as we have seen above, it where not only the critics of market instruments that raised these concerns.

Greater consideration, accordingly, would have to be given as to where instruments like the ones decribed in this paper can form the adequate solution. There is, indeed, a set of challenges through climate change that will not be met by private sector investments.

This holds true for most adaptation policies. The necessary measures here do not offer returns in many cases. The adaptation funds unter the umbrella of the UNFCCC consequently use public, non concessional funding only. With the he *Pilot Program for Climate Resilience* managed by the World Bank, this practice seems to undergo considerable change: Offering loans for resilience measures de facto produces the need for returns.

Focusing on the private sector can be problematic in mitigation policies as well. Projects to stop deforestation or to support reforestation are an illustrating example here. Through the REDD mechanism, interests of investors have been raised in forest finance schemes.[16] Experiences so far, however, show that these interests and the needs of local populations are in many cases contradicting and difficult to bring in line. From an equity and sustainability perspective, this seems to be a rather structural problem: '[…] the institutional design required to create markets for global services cannot deliver equitable and sustainable development and [that] is fundamentally a problem of mismatch of scale' (Corbera and Adger 2008).

As a consequence, meeting the challenges of mitigation and adaptation in developing countries will not be achieved without using considerable amounts of public money. Many rich countries, however, are still quite reluctant when it comes to earmarking taxpayers´ money for climate policies. As a consequence, a great number of proposals aim at detecting new financial sources, without provocing the resistance of finance ministries and treasuries in developed countries. These proposals range from passenger levies for international air travel and funds to invest foreign exchange reserves, to retaining and auctioning a number of emission permits at the international level (UNFCCC 2007).

The hesitation of developed countries to offer reliable and foreseeable financial assitance to developing countries, however, threatens the achievement of an ambitious climate protecion agreement. 'If there is to be a deal in Copenhagen, something will have to give – and it must be the rich countries finance ministries' (Müller 2009).

[16] REDD (Reducing Emissions from Deforestation and Degradation) is a scheme managed jointly by FAO, UNDP and UNEP. It invests public and private money into forest protection measures. More information can be found at http://www.undp.org/mdtf/un-redd/overview.shtml.

References

Barker, Terry, Mark Kenber, et al. (2009): Cutting the cost. The Economic Benefits of colloborative action. Cambridge: The Climate Group.

BMZ (2009): Financing the Climate Agenda: The Development Perspective. International Policy Dialogue. Berlin, 19th - 20th March: Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung.

Boyd, Emily, Nathan Hultman, et al. (2007): The Clean Development Mechanism: An assessment of current practice and future approaches for policy. Tyndall Centre Working Paper 114. Oxford.

Bretton Woods Project (2009): Are we nearly there? Bridging UK supported funds and a post 2012 climate architecture. London: Bretton Woods Project.

Bumpus, A.G. and D.M. Liverman (2007): Accumulation by decarbonisation and the governance of carbon offsets. Oxford: Oxford University Centre for the Environment

Climate Works and European Climate Foundation (2009a): Scaling up climate finance. Finance briefing paper. Brüssel. http://www.project-catalyst.info/images/publications/climate_finance.pdf.

Climate Works and European Climate Foundation (2009b): Financing Global Action on Climate Change. Brüssel. http://www.project-catalyst.info/images/publications/finance_memo.pdf.

Cline, William (1992): The Economics of global warming. Washington: Institute for International Economics.

CNA (2007): National Security and the thread of climate change. Alexandria/Virginia: CNA.

Corbera, Esteve and Neil et al. Adger (2008): The equity and legitimacy of markets for ecosystem services: Carbon forestry activities in Chiapas, Mexico. Norwich: Tyndall Centre for Climate Change Research.

Cozijnsen, Jos, Daniel Dudek, et al. (2007): CDM and the Post-2012 Framework. Wien: Environmental Defense.

Doornbosch, Richard and Eric Knight (2008): What Role for public finance in international climate change mitigation. OECD Discussion Paper. Paris: OECD.

Ellis, Jane, Jan Corfee-Morlot, et al. (2004): Taking stock of progress unter the clean development mechanism. COM/ENV/EPOC/IEA/SLT(2004)4/FINAL. Paris: International Energy Agency, Environmental Directorate.

Europäische Kommission (2007): Anpassung an den Klimawandel in Europa – Optionen für Maßnahmen der EU. Grünbuch der Europäischen Kommission. Brüssel.

Europäische Kommission (2008): Klimawandel und Internationale Sicherheit. Papier des Hohen Vertreters und der Europäischen Kommission für den Europäischen Rat. Brüssel.

European Commission (2006): Mobilising public and private finance towards global access to climate-friendly, affordable and secure energy services: The Global Energy Efficiency and Renewable Energy Fund. Brüssel.

European Commission (2007): Adapting to climate change in Europe – options for EU action. Green Paper of the European Commission. COM(2007) 354 final. Brussels.

Fankhauser, Sam. (2006): The Economics of Adaptation. Retrieved 20.05.2009, from: www.hm-reasury.gov.uk/d/stern_review_supporting_technical_material_sam_fankhauser_231006.pdf

Gomez-Echeverri, Luis and Benito Müller (2009): The financial mechanism of the UNFCCC. A brief history. Oxford: European capacity building initiative.

Gupta, Joyeeta (2008): Post 2012: CDMs Role in the Climate Negotiations. Policy Note for the European Parliament 08-26: Institute for Environmental Studies.

Holm Olsen, Karen (2006): The clean development mechanism's contribution to sustainable development: a review of the literature. Climatic Change **87**: 59-73

Jacob, Daniela et al. (2008): Klimaauswirkungen und Anpassung in Deutschland – Phase 1: Erstellung regionaler Klimaszenarien für Deutschland. . Dessau: Umweltbundesamt.

Mc Kinsey (2009): Pathways to a low carbon Economy. London.

Müller, Benito (2009): Are treasuries killing the climate deal? Oxford Energy and Environment Comment, June 2009. Oxford: Oxford Institute for Energy Studies.

Müller, Benito and Luis Gomez-Echeverri (2009): The reformed financial mechanism of the UNFCCC. Part 1: Architecture and Governance. Oxford: Oxford Institute for Energy studies.

Oberthür, Sebastian and Hermann E. Ott (2000): Das Kyoto-Protokoll. Internationale Klimapolitik für das 21. Jahrhundert. Opladen: Leske + Budrich.

Pearce, David (2003): The social cost of carbon and its policy imlications. Oxford Review of Economic Policy **19** (3): 362-384

Pearson, Ben (2007): Market failure: why the Clean Development Mechanism won't promote clean development. Journal of Cleaner Production **15**: 247-252

Porter, Gareth, Neil Bird, et al. (2008): New Finance for Climate Change and the Environment. Washington DC: WWF/Heinrich Böll Foundation.

Raworth, Kate (2007): Adaptation to Climate Change. What´s needed in poor countries and who should pay. Oxford: Oxfam International.

Robertson, Morgan (2004): The neoliberalization of ecosystem services: wetland mitigation banking and problems in environmental governance. Geoforum **35**: 361-373

Schalatek, Liane (2009): Gender and Climate Finance. Washington: Heinrich Böll Foundation.

Scholz, Imme and Laura Schmidt (2009): Financing the climate agenda: the development perspective. Background Paper zum "International policy dialogue - Financing the climate Agenda", Berlin, 19. und 20. März 2009. Bonn: DIE-GDI/BMZ.

Spash, Clive (2007): The economics of climate change impacts à la Stern: Novel and nuanced or rhetorically restricted? Ecological Economics **63**: 706-713

Stern, Nicholas (2006): The Economics of Climate Change. The Stern Review. New York: Cambridge University Press.

Stern, Nicholas (2008): Key Elements of a global deal on climate change. London: London School of Economics.

Tan, Celine (2008): World Bank´s Climate Funds will undermine global climate action: Third World Network. http://www.twnside.org.sg/title2/finance/twninfofinance20080404.htm.

Umweltbundesamt (2005): Klimawandel in Deutschland. Vulnerabilität und Anpassungsstrategien klimasensitiver Systeme. Dessau: Umweltbundesamt.

UNFCCC (2007): Investment and financial flows to address climate change. Bonn: UNFCCC.

UNFCCC (2007): Report on the analysis of existing and potential investment and financial flows relevant to the development of an effective and appropriate international response to climate change. Bonn: UNFCCC.

Wara, Michael (2007): Is the global carbon market working? Nature **445** (8): 595-596

WBGU (2007): Sicherheitsrisiko Klimawandel. Berlin: Wissenschaftlicher Beirat Globale Umweltveränderungen,.

Wolf, Simon (2009): Reducing problems through reduced complexity? Considering the benefits and limits of economic perspectives on climate change. Paper presented at the 4th Annual Green Economics Conference, Oxford University, Friday 31 July to Saturday 1 August 2009, forthcoming in The International Journal of Green Economics

World Bank (2008): Proposal for a strategic climate fund. Design Meeting on Climate Investment Funds. CIF/DM.2/3. Washington D.C.: World Bank.

World Bank (2008): State and Trend of the Carbon Market 2008. Washington D.C.: World Bank.

World Bank (2008): Strategic Climate Fund. Washington D.C.: World Bank.