

Towards an Effective and Equitable Climate Change Agreement

A Wuppertal Proposal for Post-2012

First Draft

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Key Messages

Due to the slow progress of climate policy in the last two decades and the increasingly alarming results from climate science, what is needed now is no less than an emergency programme to drastically reduce GHG emissions as quickly as possible. We consider that an adequate interpretation of the ultimate objective of the Convention would mean a peak of global emissions in the next decade and a reduction of global GHG emissions by at least 80% below 1990 levels by 2050.

While emissions in Southern countries are increasing rapidly, per capita emissions are generally still lower than in the North and most Southern countries are still struggling to meet the basic welfare needs of their populations. A fair distribution of what little remains of the atmospheric sink capacity and access to emission-free energy sources are therefore at the heart of the climate challenge.

Industrialised countries have so far largely failed to take the lead in combating climate change as they committed to in the Convention. While there is clearly a need to slow emissions growth *in* Southern countries, that does not mean that all or even a major part of the required reduction need to be done *by* Southern countries all alone. The scale of industrialised country commitments should therefore be broadened and in the future consist of two pillars:

- Ambitious Kyoto-style national emission reduction targets.
- A legally binding obligation to support Southern countries in mitigating their emissions by a specific amount to be laid down in the Copenhagen agreement.

We consider that the national and international obligations combined should be equal to an Annex I reduction of about 60% below 1990 levels.

In addition, industrialised countries should assume a quantified legally binding obligation to support Southern countries in their adaptation efforts.

The current division of Annex I and non-Annex I is no longer an accurate reflection of comparative responsibilities and capabilities. In the mid-term, the Annexes should therefore be abolished and a principle-based approach be adopted, which dynamically assigns to each country its share of the global effort based on its evolving responsibility and capability.

In the short term, especially OECD member countries as well as other countries that have comparable levels of development should consider committing to Kyoto-style legally binding emission targets. Among the remaining Southern countries, emission targets should also be considered by other more advanced and major emitting countries. A target-based approach would make it much easier to achieve a global emission trajectory that is compatible with the ultimate objective of the Convention than a bottom-up. To nevertheless preserve the core balance between Annex I and non-Annex I efforts established in the Convention and the Bali Action Plan, these targets would only become legally binding if Annex I countries did in fact provide the agreed levels of financial and technological support.

In addition, all Southern countries, with or without targets, except Least Developed Countries (LDCs) and Small Island Developing States (SIDS), should develop Low-Emission Development Strategies (LEDS). These LEDS should set out a long-term vision for low-emission development and comprehensive nationally appropriate mitigation actions (NAMAs) covering all key emitting sectors needed to implement this vision. To take into account their lower responsibility and capability, LDCs and SIDS could be invited to propose specific individual NAMAs rather than comprehensive plans. The guidance and requirements for elaborating NAMAs/LEDS as well as the assessment process could be inspired by the reporting infrastructure that is already in place under the FCCC. Industrialised countries should commit to cover the costs related to preparing, monitoring, reporting and verification of NAMAs and to deliver the necessary capacity building to enable Southern countries to meet the related requirements.

Given the urgency of achieving a peak and decline of global emissions, the international framework should include the possibility to fast-track implementation of and support for specific NAMAs where the assessment is straightforward.

In addition to mitigation, all countries should commit to develop national adaptation plans, including industrialised countries. Southern countries are entitled to receive appropriate financial support and capacity building. To improve their institutions/structures to identify and absorb both new and existing funding options, lessons can be learned from the experiences made under the Global Mechanism of the United Nations Convention on Combating Desertification (UNCCD).

The level of funding currently provided for mitigation and adaptation needs to be scaled up significantly. We consider that resource flows from emissions trading will be neither reliable enough nor adequate to incentivise mitigation actions at the scale needed to prevent dangerous climate change. The currently existing funds are also characterised by significant shortcomings, many of them similar to the CDM's deficits. The FCCC's financial mechanism therefore needs to be substantially reformed.

The post-2012 negotiations are now seeing a range of complex proposals on how to determine costs and what level of support developing countries would require to implement NAMAs. However, such an approach would threaten to replicate and exacerbate the substantial problems the Global Environmental Facility (GEF) has encountered with implementation of the incremental cost principle and the problems the Clean Development Mechanism (CDM) has encountered with the determination of “additionality”.

We therefore recommend that financial support should not be based on assessing the costs and additionality of mitigation and adaptation actions. Instead, financial support should be provided upfront on a country basis rather than activity basis, based on criteria for responsibility, capability and vulnerability to impacts of climate change.

To maximise efficiency, comprehensiveness and to exploit synergies, a combined financial mechanism should be established for mitigation, adaptation, technology and capacity building. Such a new global climate fund should be established and operate under the authority and guidance of the COP and be fully accountable to it. The COP should determine the needed amount of resources every five years and review the decision every year.

We consider that the international sale of AAUs is the “first-best” solution to generate resources for such a fund. The proportion of the AAUs to be set aside would depend on the estimated revenue needed and the expected carbon price. To take into account countries’ varying responsibility and capability, the quantity of AAUs to be withheld from each industrialised country should vary based its comparative responsibility and capability. Further revenue should be sourced from international aviation and shipping.

Enhanced technology cooperation should include a Technology Development, Deployment and Diffusion Objective and a Technology Cooperation Mechanism. The Objective should relate to the total financial support to be provided and include ambitious quantified renewable energy as well as energy efficiency targets. The mechanism should include elements that enable cooperative research, development and demonstration (RD&D) of new as well as the rapid diffusion of existing environmentally sound and low-carbon technologies. It could be based on a funding window under the global climate fund, national mitigation and adaptation actions and technology road maps.

Given the current status of the negotiations it seems very unlikely that the Copenhagen agreement will be adequate to prevent dangerous anthropogenic climate change. We therefore propose a review clause combined with a full-scale evaluation of the environmental effectiveness of the provision or agreement. At the latest, the first such review of the Copenhagen agreement should be conducted in 2014/15, after the release of the fifth IPCC assessment report as currently scheduled.

1 Into the Anthropocene

Due to the slow progress of climate policy in the last two decades and the increasingly alarming results from climate science, what is needed now is no less than an emergency crash programme to drastically reduce GHG emissions as quickly as possible. We consider that an adequate interpretation of the ultimate objective of the Convention would mean a peak of global emissions in the next decade and a reduction of global GHG emissions of at least 80% below 1990 levels.

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner. (Art. 2 UNFCCC)

Humanity is conducting an unprecedented experiment with the natural basis of its very existence. The amount of fossil fuel resources that are currently burned per year required about 1 million years to be generated. Given the current state of the climate negotiations, the 21st century may well see a temperature increase of 3-4°C above pre-industrial levels - nearly the same as the temperature difference between the last glacial maximum (18,000 years ago) and the present interglacial (Holocene). The temperature rise out of the last ice age took about 8,000 years – humanity is about to trigger an equivalent temperature increase within 200 years. Hence, Crutzen (2002) declared our geological age to be human-dominated and proposed to call it the “Anthropocene”.

The “ultimate objective” of international climate policy is laid down in Art. 2 UNFCCC: to prevent dangerous anthropogenic interference with the climate system. This objective is on the one hand very ambitious given current emission trends, but on the other hand it does not provide a clear direction, since there is so far no agreement on what level of climate change should be considered to be “dangerous”. The EU and an increasing number of other countries have defined the threshold to be an increase of the global mean temperature above 2°C compared to pre-industrial levels. The Alliance of Small Island States (AOSIS) and least developed countries (LDCs) have recently requested to aim for a global temperature increase of not more than 1.5°C.

However, even a definition of the “danger” threshold in terms of temperature change does not provide a clear direction since temperature change is itself one of the effects of climate change, not the cause, which can be addressed by policy, i.e. emissions. To

make a temperature target operational, climate science first needs to determine which levels of GHG concentration in the atmosphere would lead to which level of temperature change, and which amount of GHG emissions over time would lead to which levels of GHG concentrations.

The fourth assessment report of the IPCC (AR4) (IPCC 2009) received enormous headlines, but the two most important findings were actually rarely covered, even though they have significant implications for reaching any given temperature target:

- The IPCC revised its “best estimate” of climate sensitivity. Climate sensitivity is a measure of how sensitive the climate system is to an increase in GHG concentrations, measured as the temperature increase that results from a doubling of atmospheric CO₂ concentrations. With the AR4, the IPCC revised its best estimate of this central parameter from 2.5 to 3°C, that is, it now estimates the climate system to be one fifth more sensitive than it did previously. This means that if temperature increase is to be kept below a given level, such as 2 or 1,5°C, GHG concentrations will have to be kept lower than previously assumed.
- How close humanity is to the danger zone is not only a measure of climate sensitivity, but also of the amount of emissions humanity has so far released into the atmosphere. AR4 established that the level of GHG emissions reached in 2004 was about 49 Gt CO₂-eq./a. This is 5 Gt, about 15%, higher than assumed in the emission scenarios developed by an IPCC working group 10 years before and which are the basis used in any backward calculation of GHG trajectories which are compatible with the 2°C target available from science so far. The increase stems mostly from inclusion of emissions from peat forests, which had so far not been included in the IPCC assessments. This means in terms of temperature targets that much of the atmospheric sink capacity, the (already limited) space for accumulated emissions of GHGs in the atmosphere, that was previously thought to be still available has in fact already been consumed. That is, the amount of GHGs that may still be released into the atmosphere while staying below a given temperature target is much smaller than assumed before.

When AR4 was released, many scientists held that it had already been overtaken by new research results, for example on accelerating ice loss in the Arctic. The new findings increasingly call into question whether even 2°C is still an adequate definition of “dangerous”. Moreover, emission growth rates in recent years have outgrown even the worst-case scenarios of the IPCC. Thus, the remaining atmospheric sink capacity is getting consumed ever more quickly and the ability of socio-ecological systems to adapt to the consequences of climate change is increasingly reaching its limits, in particular in the least developed countries and low-lying island states, as well as already stressed ecosystems.

As a result, what is needed now is no less than an emergency programme to drastically reduce GHG emissions as quickly as possible, as well as to put in place measures to harvest the total mitigation potential of organic agriculture or other kinds of agriculture which utilise the sink capacity of soils. These have been estimated to amount to 4.5-6.5 Gt CO₂-eq/a (Müller and Davis 2009).

The lowest stabilisation scenarios assessed by the IPCC in AR4 – and which do not take into account the additional 5 Gt CO₂ emissions from peat forests highlighted above – consider stabilisation of atmospheric GHG concentrations at 445-490 ppm CO₂-eq. The IPCC considers that stabilisation at this level would lead to an average temperature increase of 2.0 to 2.4°C. That is, the IPCC has so far not considered any scenario that is consistent with the corrected amount of GHG emissions released so far and that would stabilise temperature increase below 2°C as called for by the EU and other countries.

But even in these scenarios a reduction of global CO₂ emissions by 50-85% below 2000 levels by 2050 would be required. Given that these scenarios actually project a temperature increase above 2°C, that the 5 Gt CO₂ of peat forest emissions are not included in these scenarios, and the increasing doubts whether 2°C is at all adequate as a target, the precautionary principle, as laid down in Art. 3 UNFCCC, would mean to aim for at least the upper end of the range considered in these scenarios. We therefore consider that an adequate interpretation of the ultimate objective of the Convention would mean a reduction of global GHG emissions of at least 80% below 1990 levels.

What this means in practice becomes clear when looking at the shares of GHG sources. Energy-related CO₂ emissions account for about 60% of total GHG emissions. The rest comes from industrial gases and biogenic sources, in particular methane emissions from agriculture and CO₂ emissions from deforestation and forest degradation.

Changing forms of rice cultivation and livestock farming in every last corner of the Earth would seem to be rather more challenging than changing our centrally organised fossil-fuel based energy infrastructures. Hence, it will hardly be possible to reduce emissions from all sources at the same rate as the required global emission decrease. Instead, emissions from fossil fuels and technical gases will probably have to be reduced to zero by mid-century, to account for the much smaller opportunities to reduce biogenic emissions.

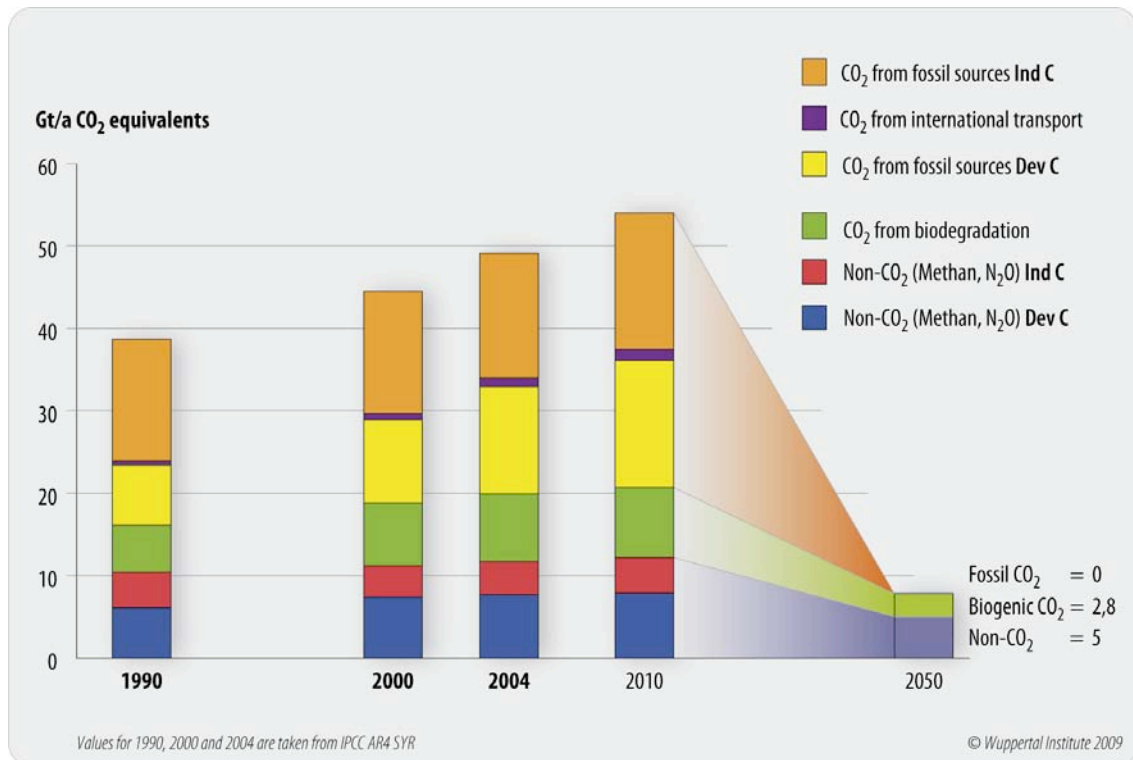


Figure 1: Current and Projected Emissions and Necessary Emission Reduction

Source: Wuppertal Institute 2009

Unfortunately, none of the major emitters have so far adapted their positions to the latest results from climate science.

2 Clashing Imperatives

While emissions in Southern countries are increasing rapidly, per capita emissions are generally still lower than in the North and most Southern countries are still struggling to meet the basic welfare needs of their populations. A fair distribution of what little remains of the atmospheric sink capacity and access to emission-free energy sources are therefore at the heart of the climate challenge.

One main reason why the climate challenge has become so intractable is that, at least in the current constellation, the ecological imperative of climate protection is clashing with the development imperatives of many Southern countries. While the primary responsibility of Annex I countries for combating climate change is widely accepted, it is clear that emissions from non-Annex I countries have been rapidly increasing and will account for more than 60% of global GHG emissions in most scenarios by 2020 (den Elzen, Höhne 2008).

At the same time, most Southern countries are still struggling to meet the welfare needs of their populations, with billions of people still suffering from acute poverty, malnutrition, lack of access to sanitary facilities etc. Any definition of human development that provides for basic human needs will require significant increases of energy-related services to provide for clean and healthy cooking facilities, lighting, access to water and sanitary facilities, health services etc.

So far, the only development pathway that has proven to be successful in lifting large numbers of people out of poverty is the development pathway developed in Western countries on the basis of fossil fuel use. Increasing (fossil fuel-based) energy services and their corresponding emissions immediately put meeting these very same human development goals at risk due to the adverse effects of climate change. The looming climate crisis therefore effectively closes this development pathway. A fair distribution of what little remains of the atmospheric sink capacity and access to emission-free energy sources are therefore at the heart of the climate challenge.

Figure 2 illustrates this crucial dilemma. It depicts an emissions trajectory reaching an 80% reduction of global emissions by 2050 (red line). Annex I countries are assumed to pursue a very ambitious reduction path reaching a 90% reduction of domestic emission by 2050 (blue line). Subtraction yields the atmospheric space that remains for non-Annex I countries: Despite the very ambitious assumption for Annex I that goes beyond what has so far been tabled by any Annex I party, non-Annex I emissions would still also need to peak before 2020 and be rapidly reduced thereafter.

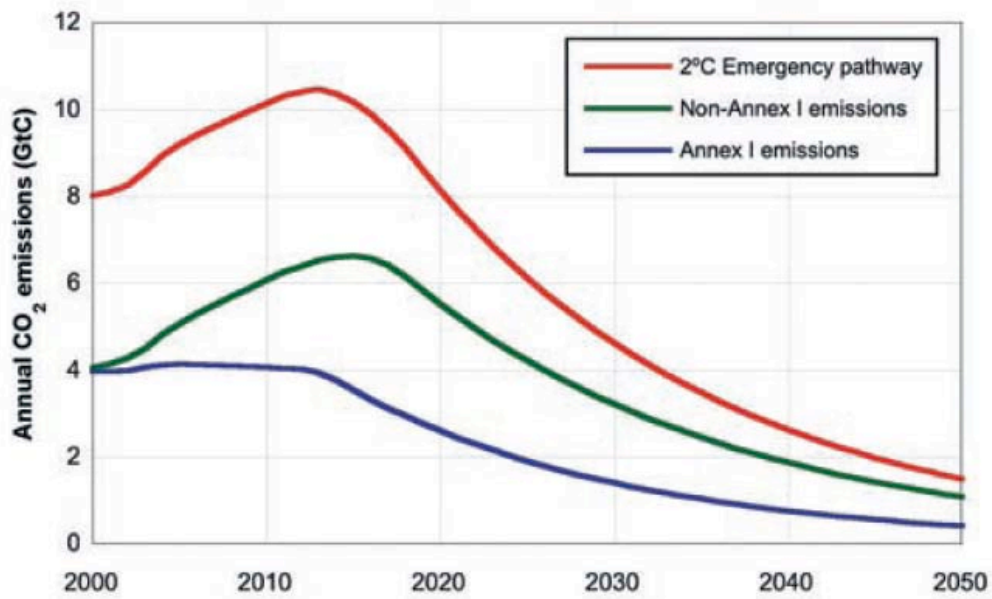


Figure 2: Global 80% trajectory, ambitious Annex I reductions and the remaining atmospheric space for non-Annex I¹

Source: Baer et al. 2008

¹ It bears noting that these trajectories do not include the 5 Gt CO₂ from peat forests highlighted above.

3 Developed Countries: Taking the Lead

3.1 Expanding Obligations

So far, industrialised countries have so far largely failed to take the lead in combating climate change as they committed to in the Convention. While there is clearly a need to slow emissions growth *in* Southern countries, that does not mean that all or even a major part of the required reduction need to be done *by* Southern countries all alone. The scale of industrialised country commitments should therefore be broadened and in the future consist of two pillars:

- **Ambitious Kyoto-style national emission reduction targets.**
- **A legally binding obligation to support Southern countries in mitigating their emissions by a specific amount to be laid down in the Copenhagen agreement.**

We consider that the national and international obligations combined should be equal to an Annex I reduction of about 60% below 1990 levels.

In addition, industrialised countries should assume a quantified legally binding obligation to support Southern countries in their adaptation efforts.

The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of **equity** and in accordance with their **common but differentiated responsibilities and respective capabilities**. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse affects thereof. (Art. 3 UNFCCC)

When determining the consequences of the above findings, the cause behind this dilemma has some influence on the evaluation: the vast majority of historical emissions have been caused by Annex I countries. In addition, significant amounts of emissions were not caused out of ignorance. Many Annex I countries have failed to rein in their emissions even after the consequences for the climate had become clear and the Convention been adopted, which commits them to taking the lead in combating climate change. According to the latest compilation of data by the UNFCCC Secretariat, GHG emissions from all Annex I countries as a whole decreased by 6.4% from 1990 to 2000 (excluding LULUCF) (UNFCCC 2009a). Thus Annex I Parties have jointly attained the aim of Article 4.2 of the Convention, to return emissions to 1990 levels by 2000. However, the decrease was mainly due to a 41.3% decline in emissions from Central and Eastern European countries with economies in transition to a market economy (EIT

countries). Emissions from non-EIT countries increased by 9.4% until 2000 and in 2006 still stood at 9.1% above 1990 levels. Moreover, emissions in EIT have recently been growing again as well, in 2006 they stood at 37% below 1990 levels.

Therefore, industrialised countries can hardly claim to have taken the lead in combating climate change as they committed to in the Convention.

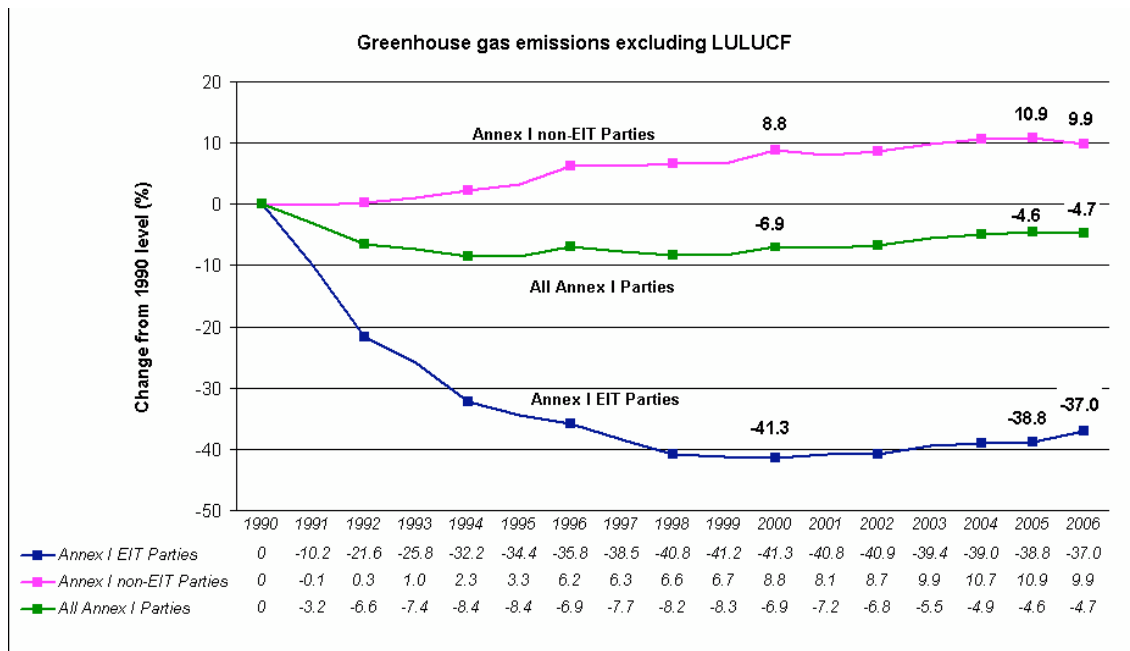


Figure 3: Trends in aggregate greenhouse gas emissions, 1990-2006 (excluding LULUCF)

Source: UNFCCC 2009a

The obligation of industrialised countries to take the lead is as valid today as it was in 1992. The reasons are threefold: responsibility, capability and potential. Firstly, the rapid increase of emissions in developing countries in recent years notwithstanding, emissions per capita of developed countries are still generally much higher than those of Southern countries. It would be patently inequitable if the industrialised countries, by virtue of being wealthier and consuming more fossil fuels both historically and currently, depleted the atmosphere's rapidly diminishing capacity to serve as a safe sink for GHG emissions.

Secondly, from the point of capability, in general industrialised countries are richer than Southern countries, although this picture is changing. This means industrialised countries have more financial capacity to pay for mitigation measures. Besides, physical infrastructure in industrialised countries is well established and there is less need to use highly energy and carbon intensive materials for expanding housing, transport or other infrastructure.

Thirdly, from the point of mitigation potential, Annex I countries have more “luxury” emissions, compared to emissions from activities related to basic human needs. For example, reduction of the use of automobiles in Western countries would have less impact on their basic human needs than reduction of fuel use for cooking in a non-Annex I country.

Industrialised countries do have a point in highlighting that the current emissions increases in Southern countries are not compatible with meeting the ultimate objective of the Convention. But while there is clearly a need to slow emissions growth *in* Southern countries, that does not mean that all or even a major part of the required reduction need to be done *by* Southern countries all alone.

To enable Southern countries to continue developing while at the same time reducing emissions, industrialised countries should assume responsibility for a major share of the *global* effort necessary to achieve an emission reduction trajectory as illustrated in Figure 1. To the extent that where mitigation activities in Southern countries require additional financial and technological resources, these resources should be provided by industrialised countries.

The scale of industrialised country commitments should therefore be broadened and in the future consist of two pillars:

- Ambitious Kyoto-style national emission reduction targets.
- A legally binding obligation to support Southern countries in mitigating their emissions by a specific amount to be laid down in the Copenhagen agreement.

The principle that the wealthy countries have not only national but also international obligations has so far been best captured by the Greenhouse Development Rights (GDR) Framework (Baer et al. 2008). Crucially, the GDR framework takes into account *intranational* differences by introducing a “development threshold”: People with a level of income below the development threshold are taken to have human development as their proper priority, and while they struggle to emerge from poverty they are not required to contribute to meeting the costs of combating climate change. People above the threshold are taken to be able to meet their basic needs and having a responsibility and capacity to contribute. The threshold is applied to North and South and serves a twofold purpose: shielding the poor from having to bear the costs of mitigation while at the same time preventing the emerging middle and upper classes in non-Annex I from shirking their responsibilities by hiding behind the poor majorities in their countries.

The FCCC’s criterion of responsibility has been defined in the Brazilian proposal as a country’s contribution to temperature increase (UNFCCC 1997; La Rovere et al.). Similar to the South-North proposal (Ott et al. 2003), the GDR proposal expresses responsibility as cumulative per capita emissions since 1990, the year of the IPCC’s

first assessment report. Taking 1990 as the reference year represents a compromise, as with the IPCC publication the implications of emitting GHGs can be said to have been well known internationally. Nevertheless, this indicator is arguably quite generous to countries which started to industrialise early and whose emissions up to 1990 were significant. Capability is expressed in the GDR proposal as national wealth and measured as the national gross domestic product. The “development threshold” is operationalised as a form of “tax exemption”. The emissions of those parts of the population that are below the development threshold are considered to be survival emissions and not taken into account for the calculation of responsibility. Equally, the income of those parts of the population are deducted from the total GDP of a country. On this basis, a “Responsibility and Capacity Indicator“ (RCI) is calculated, with responsibility and capability equally weighted, which assigns to each country a share of the necessary global mitigation effort.

Looking at the aggregate Annex I and non-Annex I shares of the necessary global mitigation effort thus calculated, the RCI for Annex I in 2020 amounts to 69% while the RCI for non-Annex I amounts to 31%. If there was a global Kyoto-like emission trading system where each country assumed targets according to the RCI, Annex I as a whole would receive an allocation of emission allowances equal to 37.9% of 1990 emissions levels whereas non-Annex I would receive allowances of 258.1% of 1990 levels.

An allocation of 62.1% below 1990 levels for Annex I evidently goes far beyond what anybody has so far put on the table and may seem to be rather utopian. But the reasons that lead to this startling result are quite simple:

- The level of ambition underlying the calculations, a reduction of global emissions by 80% below 1990 levels by 2050. This goes far beyond what any country or group of countries has so far envisioned.
- The taking into account of intranational disparities. Most effort sharing proposals so far have been calculated on the basis of national totals of emissions, GDP or other indicators. In the GDR approach, the emissions and income of three quarters of the population in Southern countries are not included in the calculation as their incomes are below the development threshold and hence exempted. By contrast, in industrialised countries 94.1% of the population are above the threshold and hence their emissions and income are included in the calculation of the RCI.

Moreover, as Höhne and Moltmann (2008) point out, the GDR framework is not necessarily more demanding for Annex I than other proposals as these other proposals would also envisage substantial financial and technological support for non-Annex I countries on top of domestic Annex I targets.

We propose to implement the total global obligation of Annex I countries as follows:

- An aggregate Kyoto-style target based on robust assessments of available domestic emission reduction potential.
- The difference between the aggregate Kyoto-style target and the total obligation would need to be covered by supporting Southern countries in reducing their emissions.

In addition, as laid down in Art. 3 UNFCCC, industrialised countries should also take the lead in combating the adverse effects of climate change. In other words, wealthy countries also have international obligations in regard to supporting adaptation. In particular since climate change impacts affect those most severely who have contributed – and often are still contributing – the least to climate change.

Each industrialized country's share in supporting adaptation in developing countries should also be determined based on its comparative responsibility and capability, adding a third pillar to the scale of Annex I commitments:

- A quantified legally binding obligation to support Southern countries in their adaptation efforts.

3.2 From Targets to Actions

As the first commitment period has shown, commitments to legally binding emission targets do not automatically mean that countries will in fact reduce their emissions. In most non-EIT industrialised countries, emissions have continued to increase, in some cases drastically, and Kyoto compliance is far from guaranteed. Canada has even officially announced that it is not going to meet its target.

Therefore, in addition to targets, Annex I countries should develop commitment achievement plans (CAPs) and these should be submitted to an international review process. The modalities for the development and review of the CAPs should build on the modalities already in place for the development and review of national communications, GHG inventories etc. In addition, in its post-2012 communication the European Commission (2009) has proposed very concrete ideas for how to ensure that non-Annex I countries achieve a pre-defined level of mitigation, which could also be very usefully applied to Annex I countries.

In particular, the modalities for CAPs should include the following elements:

- Under the Copenhagen agreement, all developed countries should commit to adopting commitment achievement plans at least two years before the start of each new commitment period. The first CAPs should be adopted by the end of 2011.

- These CAPs should set out a credible pathway to limit the country's emissions in line with its target through mitigation actions that cover all sectors. Ideally, the CAPs should break the national targets down to sectoral targets to end the current situation where for example transport emissions have been growing with hardly any constraint.
- To ensure that the CAPs have a level of ambition sufficient to meeting the country's emission target, the CAPs should be submitted to an independent technical analysis.
- Where the technical analysis finds that a CAP is not line with meeting the country's emission target, the analysis should explore options to raise the level of ambition of the CAP.
- The COP/CMP should review the results of the technical analysis and may decide to request industrialised countries to revise their CAPs to ensure that they are consistent with meeting their emission targets.
- The first such review should take place in 2012. Where the COP/CMP requests revision of a CAP, submission of a revised CAP and further review should take place within two years at the latest.

4 Nationally Appropriate Mitigation Actions by Developing Countries

The current division of Annex I and non-Annex I is no longer an accurate reflection of comparative responsibilities and capabilities. In the mid-term, the Annexes should therefore be abolished and a principle-based approach be adopted, which dynamically assigns to each country its share of the global effort based on its evolving responsibility and capability.

In the short term, especially OECD member countries as well as other countries that have comparable levels of development should consider committing to Kyoto-style legally binding emission targets. Among the remaining Southern countries, emission targets should also be considered at least by the more advanced and major emitting countries. A target-based approach would make it much easier to achieve a global emission trajectory that is compatible with the ultimate objective of the Convention. To nevertheless preserve the core balance between Annex I and non-Annex I efforts established in the Convention and the Bali Action Plan, these targets would only become legally binding if Annex I countries did in fact provide the agreed levels of financial and technological support.

In addition, all Southern countries, with or without targets, except Least Developed Countries (LDCs) and small island developing states (SIDS), should develop Low-Emission Development Strategies (LEDS). These LEDS should set out a long-term vision for low-emission development and comprehensive nationally appropriate mitigation actions (NAMAs) covering all key emitting sectors needed to implement this vision. To take into account their lower responsibility and capability, LDCs and SIDS could be invited to propose specific individual NAMAs rather than comprehensive plans. The guidance and requirements for elaborating NAMAs/LEDS as well as the assessment process could be inspired by the reporting infrastructure that is already in place under the FCCC. Industrialised countries should commit to cover the costs related to preparing, monitoring, reporting and verification of NAMAs and to deliver the necessary capacity building to enable Southern countries to meet the requirements.

Given the urgency of achieving a peak and decline of global emissions, the international framework should include the possibility to fast-track implementation of and support for specific NAMAs where the assessment is straightforward.

While we propose that a proper interpretation of taking the lead would mean that industrialised countries should bear the lion's share of the *global* mitigation effort,

Southern countries clearly also have some capacity to act, especially the economically more advanced among them. The current division of Annex I and non-Annex I is no longer an accurate reflection of comparative responsibilities and capabilities. A number of non-Annex I countries nowadays have significantly higher per capita emissions and GDP per capita than some Annex I countries. Ranking all countries according to the GDR's RCI leads to a list of 106 countries, 40 Annex I countries plus 66 non-Annex countries that have a higher RCI rating than the lowest-ranked Annex I country. In addition, many nationally appropriate mitigation actions such as energy efficiency improvements can help to promote the achievement of sustainable development goals while contributing to meeting the ultimate objective of the Convention.

In the mid-term, the Annexes should therefore be abolished and a principle-based approach like the GDR framework be adopted, which dynamically assigns to each country its share of the global effort based on its evolving responsibility and capability. The wealthier a country becomes, the higher should be the share of the global effort it shoulders.

In the short term for the purpose of Copenhagen, such an approach is clearly not feasible. Climate policy is caught in the Annexes and getting out will require taking intermediate steps.

Therefore, especially OECD member countries as well as other countries that have comparable levels of development should consider committing to Kyoto-style legally binding emission targets. A situation where countries with comparable responsibility and capability make contributions of a differing legal and substantive nature is clearly not equitable.

Among the remaining Southern countries, emission targets should also be considered by other more advanced and major emitting countries. A target-based approach would make it much easier to achieve a global emission trajectory that is compatible with the ultimate objective of the Convention than a bottom-up approach. To nevertheless preserve the core balance between Annex I and non-Annex I efforts established in the Convention and the Bali Action Plan, these targets would only become legally binding if Annex I countries did in fact provide the agreed levels of financial and technological support.

Moreover, past experience has shown that economic development in Southern countries is much more unpredictable than in industrialised countries. As mentioned above, recent emission growth in particular in the rapidly industrialising countries has been faster than envisioned even in the most pessimistic IPCC scenarios. In such cases, an absolute cap on emissions could indeed become a "cap on development", which Southern countries are concerned about. An option to address this problem would be to have Southern countries adopt intensity targets instead of absolute targets, for example in terms of

emissions/GDP. With this approach, strong economic development would automatically lead to a higher allowed level of emissions.

In addition, all Southern countries, with or without targets, except Least Developed Countries (LDCs) and small island developing states (SIDS), should develop Low-Emission Development Strategies (LEDS). These LEDS should set out a long-term vision for low-emission development and comprehensive nationally appropriate mitigation actions (NAMAs) covering all key emitting sectors needed to implement this vision. To take into account their lower responsibility and capability, LDCs and SIDS could be invited to propose specific individual NAMAs rather than comprehensive plans.

Many of the Southern countries that are most relevant for climate protection have in recent years already formulated national mitigation strategies and have the capacity to further develop them. Most Southern countries, however, will probably require capacity building to be able to prepare LEDS and NAMAs.

The actions taken by Southern countries should be inscribed into an international register under the UNFCCC and would need to be “MRVed” – monitored, reported and verified, to qualify for financial and technological support. The guidance and requirements for elaborating NAMAs as well as the assessment process could be inspired by the reporting infrastructure that is already in place under the FCCC. However, the current provisions for non-Annex I reporting are probably not adequate for robustly assessing NAMAs, so the process could also incorporate elements of current Annex I reporting and reviewing. The following modalities for the elaboration and MRV of LEDS and NAMAs could be envisioned:

- LEDSs should be organised by sectors and subdivided by greenhouse gas.
- Proposed NAMAs should include a robust assessment of their mitigation potential. In addition, at least the LEDS of the major emitting countries should establish credible pathways to limit emissions and indicate the level of ambition of the country. To this end, two emission projections should be provided:
 - A projection without implementation of the proposed LEDS
 - A projection with implementation
- Furthermore, they should include an elaboration of the costs and benefits of implementation and, where applicable, other constraints to implementation.
- In particular, NAMAs should clearly identify where financial and technological support is required.

- The review process would be undertaken by the Mitigation Panel under a newly established Financial Mechanism Board (FMB) (see section 6.3.1) and could build on the procedures already in place for the assessment of Annex I national communications, initial communications, GHG inventories etc.
- Once a country's LEDS or NAMAs have been judged to be robust, the country qualifies for financial support as outlined in section **Fehler! Verweisquelle konnte nicht gefunden werden.**
- Industrialised countries should commit to cover the costs related to preparing, monitoring, reporting and verification of NAMAs and to deliver the necessary capacity building to enable Southern countries to meet the related requirements.
- On this basis, requirements for non-Annex I emission inventories and reporting should become similar to the requirements for Annex I countries. All non-Annex I countries except LDCs and SIDS should commit to prepare robust emission inventories as early as possible and by 2013 at the latest, with annual updates thereafter.
- The reporting on implementation of NAMAs should be integrated into the non-Annex I national communications, the requirements for which should also become similar to the requirements for Annex I communications.

Similar to the national Ozone groups under the Montreal Protocol, high level cross-ministerial and multi-stakeholder groups that include the government, technicians, representatives of the business community and civil society should be established in each country. These groups would be responsible for formulating LEDS, NAMAs and national adaptation plans of action (NAPAs) (see below). The final plans would be approved and submitted internationally by the national governments, which would also be responsible for the implementation. The multi-stakeholder groups would monitor implementation of the plans and actions and report to the FCCC, in parallel to the reporting by governments (Aprodev 2009).

Given the urgency of achieving a peak and decline of global emissions, the international framework should include the possibility to fast-track implementation of specific NAMAs where the assessment is straightforward. As a new financial mechanism will probably take several years to establish, industrialised countries should pledge to provide adequate amounts of support for such fast-start strategies.

5 Actions on Adaptation

All countries should commit to develop national adaptation plans, including disaster risk reduction measures. Southern countries are entitled to receive appropriate financial support and capacity building, while information sharing should be further strengthened. To improve their institutions/structures to identify and absorb both new and existing funding options, lessons can be learned from the experiences made under the Global Mechanism of the United Nations Convention on Combating Desertification (UNCCD).

Similar to CAPs, NAMAs and LEDS, all countries including industrialised countries should commit to develop National Adaptation Plans of Actions (NAPAs) or National Adaptation Strategies to inform adaptation needs and facilitate adaptation. This should also include disaster risk assessments and prevention planning to reduce disaster risk and to facilitate the development insurance infrastructures. Southern countries are entitled to receive appropriate financial support and capacity building for the development and implementation of NAPAs or National Adaptation Strategies according to their capabilities.

As mentioned above, multi-stakeholder groups would be responsible for formulating NAPAs or National Adaptation Strategies, helping to ensure the participation of (advocates of) the most vulnerable groups. They would also monitor implementation, including risk prevention measures (cf. Aprovev 2009).

While additional finance needs to be generated at the international level, at the national level developing countries can improve their institutions/structures to identify and absorb both new and existing funding options for adaptation from within and outside of the UNFCCC. These processes can learn from the experiences made under the Global Mechanism of the United Nations Convention on Combating Desertification (UNCCD) in setting up country-specific Integrated Financing Strategies for sustainable land management and mainstreaming land management into countries' development. Transferring these experiences to the adaptation context holds a lot of potential for replication since land management is similarly cross-sectoral, even though the scope of adaptation is even larger.

Transferred to the adaptation context, the main idea is to examine the national institutional, legislative and financial frameworks for adaptation activities and to identify current financial flows into adaptation to identify opportunities and barriers for implementation of adaptation projects, (ideally) as identified in NAPAs or National Adaptation Strategies. In a next step all potential funding sources for adaptation, including both national public spending and international adaptation funding or other

funding programmes, the resources of which could also be used for certain adaptation actions, would be identified and budgetary decision-making analysed. On this basis an action plan could be developed, highlighting the main activities necessary to mobilise additional resources for adaptation planning and implementation. These activities should address institutional and legal framework conditions (creating an enabling environment), internal budget distribution, as well as enhancing resource mobilisation from external sources of funding, such as the Adaptation Window under a new financial mechanism, but also funds outside of the UNFCCC. Where required, the UNFCCC should provide assistance and capacity building for the development of such integrated finance strategies for adaptation similar to the support provided for the development of NAPAs.

Such an analysis and development of an integrated finance strategy for adaptation could also help identify the funding needs for adaptation sub-sectors in particular countries, identify synergies with other existing programmes such as the Hyogo Framework for Action on disaster risk reduction and promote mainstreaming of adaptation into national development planning. Integrated finance strategies could thus become an integral part of National Adaptation Strategies,

In the meantime, actions on adaptation should continue to follow a learning-by-doing approach and information sharing should be further supported through continuation of the Nairobi Work Programme, as well as through new or existing regional adaptation centres or networks,

6 Financial and Technological Support for Adaptation and Mitigation in Developing Countries

The level of funding currently provided for mitigation and adaptation needs to be scaled up significantly. We consider that resource flows from emissions trading will be neither reliable enough nor adequate to incentivise mitigation actions at the scale needed to prevent dangerous climate change. The currently existing funds are also characterised by significant shortcomings, many of them similar to the CDM's deficits. The FCCC's financial mechanism therefore needs to be substantially reformed.

The post-2012 negotiations are now seeing a range of complex proposals on how to determine costs and what level of support developing countries would require to implement NAMAs. However, such an approach would threaten to replicate and exacerbate the substantial problems the Global Environmental Facility (GEF) has encountered with implementation of the incremental cost principle and the problems the CDM has encountered with the determination of "additionality".

We therefore recommend that financial support should not be based on assessing the costs and additionality of mitigation and adaptation actions. Instead, financial support should be provided upfront on a country basis rather than activity basis, based on criteria for responsibility, capability and vulnerability to impacts of climate change.

To maximise efficiency, comprehensiveness and to exploit synergies, a combined financial mechanism should be established for mitigation, adaptation, technology and capacity building. Such a new global climate fund should be established and operate under the authority and guidance of the COP and be fully accountable to it. The COP should determine the needed amount of resources every five years and review the decision every year.

We consider that the international sale of AAUs is the "first-best" solution to generate resources for such a fund. The proportion of the AAUs to be set aside would depend on the estimated revenue needed and the expected carbon price. To take into account countries' varying responsibility and capability, the quantity of AAUs to be withheld from each AI country should vary based on its comparative responsibility and capability. Further revenue should be sourced from international aviation and shipping.

Enhanced technology cooperation should include a Technology Development, Deployment and Diffusion Objective and a Technology Cooperation Mechanism. The Objective should relate to the total financial support (bilateral and multilateral) and include ambitious quantified renewable energy as well as energy efficiency targets. The mechanism should include elements that enable cooperative research, development and demonstration (RD&D) of new as well as the rapid diffusion of existing environmentally sound and low-carbon technologies. It is based on a funding window under the global climate fund, national mitigation and adaptation actions and technology road maps.

The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources ... including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures...

The developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects. (Art. 4.3 and 4.4 UNFCCC)

6.1 Financing Mechanisms: The Limits of Emissions Trading

The level of funding currently provided for mitigation and adaptation needs to be scaled up significantly. For example, the 2007 report on investment and financial flows by the UNFCCC Secretariat estimated that additional flows of 200-210 billion USD would be necessary in 2030 to reduce global GHG emissions by 25% below 2000 levels. Almost half of these would be needed in developing countries. In addition, several tens of billions will be needed for adaptation in developing countries (UNFCCC 2007).

For mitigation, two basic types of financing mechanisms are currently discussed in the negotiations, fund-based mechanisms and emission trading mechanisms. We consider that resource flows from emissions trading will be neither reliable enough nor adequate to incentivise mitigations actions at the scale needed to prevent dangerous climate change.

In particular sectoral mechanisms have received a lot of attention. That is, mechanisms where a baseline or target would be set for a whole sector instead of individual projects as in the current Clean Development Mechanism (CDM). If actual sectoral emissions were kept below the baseline or target, credits would be generated. Another option that is being discussed is to issue emission credits for the successful implementation of NAMAs. Other proposals relate to streamlining and improving the environmental integrity of the project-based CDM, such as establishing multi-project baselines and discounting emission reductions (UNFCCC 2009b).

However, the reliability of funding under the current CDM is characterised by significant structural limitations related to the high levels of risk and uncertainty at various stages of the project development process, relatively high transaction costs and complexity, and the timing of credit generation. Projects often require financing before the start of the project. CDM credits, however, are only generated when the project is already operational. While there are some purchasing programmes where it is possible to receive part of the CDM revenue upfront, the dominant market model has so far been “payment on delivery”. Moreover, upfront payment is a tradeoff between receiving early financing and the amount of CDM financing received: since there is always a risk that a project will fail or not generate as many credits as expected, credits sold upfront fetch a lower price than issued credits. The range is currently 5-7 Euros for medium-risk forward sales, 7-8 Euros for low-risk forwards, 8-10 Euros for CERs from registered projects, and 11-12 Euros for issued credits (GTZ 2009).

Moreover, the additional CDM revenue is subject to high risks. Ex ante, project developers cannot be sure whether their project will be registered, whether it will actually achieve the expected amount of emission reductions and which price they will receive for the credits. Relying on CDM revenues to make an otherwise unprofitable project profitable is therefore a very uncertain proposition. Moreover, as a result of these risks banks often do not take credit revenues into account when deciding on giving a loan to a CDM project (EcoSecurities/UNEP Risø 2007: 73). This effectively shuts many project developers out from one of the most important financing options.

Also, private finance by nature focuses on the countries that can offer attractive conditions to the investors, such as political stability and administrative capacity. This holds for general investment flows as well as the CDM, where the four leading countries, China, India, Brazil and Mexico, account for $\frac{3}{4}$ of all projects (UNEP Risø 2009).

Finally, the environmental integrity of the CDM is very much in doubt. Several studies have come to the conclusion that the additionality of many projects is at least questionable (e.g. Schneider 2007; Wara and Victor 2008). Arguably, this is not a problem of bad implementation but goes back to the core of the mechanism. The baseline-and-credit approach measures projects based on assumptions about what would have happened in the future under “business as usual” conditions, which is by definition hypothetical. In essence, it is not logically possible to prove a counterfactual, i.e. that something would not have happened without the CDM. Moreover, external validators are always at an information disadvantage against project developers, and indicators used to determine additionality such as the internal rate of return can be easily manipulated by modifying project assumptions such as the discount rate and capacity factor.

Given all these shortcomings, project-based mechanisms hardly suggest themselves as major financing channels.

As for sectoral mechanisms or crediting of NAMAs, it bears noticing that these would constitute a fundamental break with the current CDM in that they would turn an instrument that was originally targeted at private investment into a tool for governments to finance climate-friendly policies. Hence, such mechanisms would introduce an intermediary (the Southern governments) between the emissions trading market and those who actually undertake the investments. It would therefore be necessary for the Southern governments to implement appropriate policies to pass the incentive on to investors or those affected by the policies.

However, it is doubtful whether emission trading mechanisms can constitute a strong incentive for governments to implement ambitious climate policies. Sectoral mechanisms would retain the limitations of the current project-based CDM in terms of receiving the revenue only ex-post and not being able to predict accurately how much revenue will be received. Instead, Southern countries would need to prefinance sectoral schemes or NAMAs and run the risk of not being able to recoup their costs. Due to these factors, Ward et al. (2008: 71) question whether sectoral mechanisms would in fact provide a strong incentive for developing countries to implement climate-friendly policies: “As governments are not investing in policies and measures to speculate in carbon markets, the volatility of carbon credits may be a serious problem for governments.”

It also bears pointing out that the incentive mechanism now discussed for Southern countries is already in place for industrialised countries. Annex I countries that manage to reduce their emissions below their Kyoto targets dispose of a surplus of assigned amount units, which they can sell to other countries. But there is no indication that countries are pursuing aggressive climate policies in order to generate such surpluses. Instead, as discussed above most non-EIT countries are in fact significantly above their targets. Which raises the question of why a mechanism that is obviously failing to incentivise industrialised countries to reduce their emissions should succeed in incentivising developing countries.

Organising the reduction of emissions from deforestation and forest degradation (REDD) via the emissions market would seem to be particularly problematic. Accounting for about ¼ of global CO₂ emissions, REDD emissions clearly need to be tackled as a matter of urgency. But integration into the carbon market is highly risky especially as the potential supply of REDD credits is massive. REDD emissions currently amount to about 8.5 Gt CO₂. Halving current deforestation rates by 2020, as is usually called for, would therefore amount to 4.25 Gt CO₂ – which is equivalent to about 25% of Annex I 1990 emissions (about 17.5 Gt CO₂-eq.). In addition, REDD emissions are generally deemed to be very low-cost emission reduction options. DIE (2008) puts the costs at 2,2 – 5,5 USD/t CO₂.

Integrating REDD into the carbon market therefore creates the risk that the market will be flooded with very inexpensive REDD credits.

6.2 The Limits of Current Fund-Based Approaches: Bypassing Smaller Countries and the Conundrum of Costing

While we consider that fund-based approaches hold a much better promise to incentivise the necessary structural changes, the currently existing funds are also characterised by significant shortcomings, many of them similar to the CDM's deficits.

While public funds should be able to support the countries that do not attract private finance, they do not play such a role so far. This is mainly because the Global Environment Facility (GEF) trust fund, the largest public fund currently, is provided on the basis of the resource allocation framework (RAF), which is based on the criteria of achieving a global environmental benefit and capacity to implement GEF projects. As a result, here as well a large share of the funding is flowing to China, Brazil, and India.

In order to provide financial resources to other countries, the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF) were established. Yet, the size of these funds is inadequately small. Moreover, the requirement of incremental cost calculation causes difficulty for the countries with less administrative capacity to receive resources from public funds. The requirement of calculating incremental costs also results in eliminating many projects that could contribute to sustainable development but do not yield a large amount of GHG emissions reductions, such as small renewable power plant projects.

The post-2012 negotiations are now seeing a range of complex proposals on how to determine costs and what level of support developing countries would require to implement NAMAs. However, such an approach would threaten to replicate and exacerbate the substantial problems the Global Environment Facility (GEF) has encountered with implementation of the incremental cost principle and the problems the CDM has encountered with the determination of "additionality".

In fact, since NAMAs would probably include policies, the problems would probably be even greater than encountered at the project level by the GEF and the CDM:

- How to prove that an action is not part of the baseline? Would this even be possible given that policies are usually introduced for a variety of reasons and that GHG emission reduction actions usually entail a number of benefits, such as reduction of pollutant emissions, technology promotion, creation of wealth and employment, decreased dependence on fossil fuel imports etc.?
- Baselines would need to be dynamic since for example an energy efficiency standard may be very stringent at the time of introduction but over time it will become common practice.
- Appropriate or reliable data is often missing.
- Cost calculations very much depend on what economic conventions are used and are prone to manipulation. Tying support to proofs of incremental costs or additionality

generates a strong perverse incentives to calculate costs as pessimistically as possible.

- Furthermore, it may in many cases be impossible to establish a direct link between an action and the climate benefit achieved. This applies especially to policies since policies typically intervene in complex environments where many factors come into play. If a government, for example, introduces vehicle fuel efficiency standards and consequently a drop in transport emissions is measured, it would be necessary to differentiate to what extent this drop has been a result of the government policy and to what extent it has been due to other factors such as rising fuel prices.

Based on the many difficulties the GEF has encountered in application of the incremental cost principle, it has in fact recently moved away from calculating incremental costs to instead narratively explaining the increment.

Moreover, even if measures such as energy efficiency improvements have negative costs, implementation is generally prevented by a wide array of non-economic barriers. Removing these barriers requires the introduction of policy instruments, including the provision of start-up financing. One central recommendation of the Wuppertal Institute to mobilise energy efficiency potentials has therefore been to establish national energy efficiency funds (see e.g. Irrek and Thomas 2006). Even if such an instrument is conceived as a revolving fund, the initial funding will need to come from somewhere and many developing country governments would probably be hard-pressed to make such upfront investments.

As a result of these considerations, we recommend that financial support should not be based on assessing the costs and additionality of NAMAs. Doing so would require establishment of a huge assessment bureaucracy to examine projected emissions reductions and costs for each NAMA or LEDS. Moreover, such an approach would incentivise Southern countries to calculate their baselines and mitigation costs as pessimistically as possible.

Instead, financial support should be provided upfront on a country basis rather than activity basis (see section 6.3.2).

6.3 A Reformed Financial Mechanism

6.3.1 Institutional Structure

Under the existing financial mechanism the decision on the necessary amount of resources for multilateral environmental agreements operated by the GEF is taken by the GEF Assembly and the GEF Council. Although the COP provides guidance, it is difficult to judge if the GEF in reality reflects the guidance provided by the COP. Furthermore, currently no single organisation coordinates the total amount of resources that are available. This makes it difficult to efficiently utilise the limited amount of

resources in an effective manner by avoiding duplicated funding for the same objectives.

Therefore, to secure the necessary amount of resources for adaptation and mitigation, in the future the COP should determine the needed amount of resources every five years and review the decision every year.

To maximise efficiency, comprehensiveness and to exploit synergies, a combined financial mechanism should be established for mitigation, adaptation, technology and capacity building. Such a new global climate fund should be established and operate under the authority and guidance of the COP and be fully accountable to it.

Mitigation, adaptation, technology and capacity building should be serviced by one specific funding window each under the fund. Each of the four windows might have further sub-windows, for example REDD and transport sub-window under the mitigation window. REDD and transport have proven to be sectors which pose very particular challenges to reducing emissions and should therefore receive special attention (on transport approaches, cf. Bongardt et al. 2009). The adaptation window should at least include an implementation sub-window, an insurance sub-window, including climate risk pools, and a restitution and compensation window for unavoidable damages, such as forced migration due to inundation of SIDS because of sea-level rise.

In addition, a financial mechanism board (FMB) should be established under the COP. Its tasks would be to support the COP in taking the above decision on the needed amount of resources, to manage the information to be reported by relevant organisations, and to undertake the activities described below. The FMB should consist of experts who have extensive knowledge about climate change, financing, development, infrastructure, forestry, etc. In particular, a specified number of seats with full voting rights should be reserved for civil society, as is case in the Global Fund to Fight AIDS, Tuberculosis, and Malaria.

In addition, there should be two independent expert panels, one each for mitigation and adaptation. Based on submitted LEDS, NAMAs, NAPAs and their assessments of financial and technology needs, the expert panels would give recommendations to the FMB on the size of funding needed, based on which the FMB would in turn make its recommendation to the COP.

The mitigation panel would also make calculations of the total emission reductions achieved in Southern countries through support from industrialised countries and report annually to the COP. On this basis, the COP would then review the situation of MRV-supported mitigation in NAI countries and request further action if needed (Aprodev 2009). Similarly, the adaptation panel would assess the progress of the implementation of NAPAs and on risk prevention measures.

6.3.2 Resource Allocation

As argued above, financial support should be provided upfront on a country basis rather than activity basis for adaptation and mitigation. That is, the financial support should take the form of lump sum payments to cover administrative costs of registered NAMAs and NAPAs or National Adaptation Strategies and payouts that are part of them, such as feed-in tariffs or financial support for energy efficiency measures for mitigation or drought preparedness for adaptation. By contrast, the technology window would focus on supporting specific international activities for co-operative research and development, deployment and diffusion under a new Technology Cooperation Mechanism (see section 6.5).

For mitigation, the amount of funding that each country would receive could be differentiated on the basis of its responsibility and capability. That is, countries with high responsibility and capability would receive low levels of funding, whereas countries with low responsibility and capability would receive high levels of funding.

Since vulnerability to climate change is not a direct function of climate impacts but largely depends on both natural/physical and socio-economic circumstances, adaptation needs differ significantly even amongst countries with similar responsibilities and capabilities. For adaptation, the amount of funding that each developing country would receive should therefore be determined on the basis of responsibility and capability coupled with a vulnerability index, ensuring that LDCs and low-lying island states receive priority access to the funds.

Furthermore, direct access to adaptation finance should be guaranteed for the most vulnerable governments and communities. Finally, adaptation finance should be restitution or compensation finance, not provided as grants or loans.

Southern countries would have to account for the use they have made of the funding and, in the case of mitigation, the emission reductions achieved. If a country's use of the funds is deemed to not have been satisfactory, future funding would be cut.

A distinction must be drawn between major emitting and advanced developing countries and the remaining developing countries in respect to their individual capabilities. In particular for Least Developed Countries, support should also be provided even if resulting emission reductions cannot be estimated. In this case the MRV system may need to focus on actions achieved rather than tonnes of CO₂-eq. reduced.

6.4 Sources of Funding

A variety of proposals has been made on how to finance such a fund, including:

- Assessed contributions from countries on the basis of their responsibility and capability
- Selling or auctioning of assigned amount units
- Selling or auctioning of emission allowances in national or regional emission trading schemes
- A levy or emissions trading with auctioning for international aviation and shipping
- A global carbon tax or other international taxes
- Extending the share of proceeds on the CDM to the other flexible mechanisms

We consider that the international sale of AAUs is the “first-best” solution, for the following reasons (Harmeling et al. 2009):

- **Adequacy and additionality:** A new financial architecture must generate the amount of resources necessary for stabilising the GHG concentrations below the level that is sufficient to prevent dangerous climate change and sufficient to support developing countries in adapting to climate change that is unavoidable (or unavoids). In addition, the Bali Action Plan as well as the UNFCCC constitute the additionality of funds to Official Development Assistance (ODA) as a key criterion. The sale of AAUs is generally able to generate substantial resources in addition to already existing commitments (particularly to the 0.7% ODA target).
- **Predictability:** Resource availability must be reliable. This is important for building trust among different countries and for safeguarding the viability of the whole financial architecture, also regarding its catalytic effect on private investments. Selling AAUs has the potential to create an “automatic” funding mechanism and make the climate regime “self-financing”. In addition, the revenue stream could be insulated from market price volatility by choosing to sell AAUs at a fixed price instead of auctioning.
- **Climate mitigation impact and reflection of common but differentiated responsibilities, i.e. historical responsibilities and capacity to pay:** The former is a reflection of the polluter-pays principle, which ensures equity and enhances

further mitigation activities. An instrument should directly provide additional incentives for reducing emissions by internalizing their social costs into the polluters' calculations. Selling AAUs complies with the polluter-pays principle and provides incentives for further emission reductions. Moreover, it guarantees the equitable inclusion of all industrialised countries (i.e. all countries that will commit to absolute emission targets in Copenhagen).

- Political feasibility. Selling AAUs functions as an “upscaling” of the approach already implemented by the EU (auctioning combined with earmarking of revenues), and therefore is politically feasible for the countries that have already introduced an emissions trading scheme. In addition, this approach enables governments to pass the obligation to purchase AAUs and thereby the ultimate costs on to private emitters.
- Finally, this approach is technically relatively easy to implement and consistent with the structure of the Kyoto Protocol.

In principle, assessed contributions on the basis of criteria for responsibility and capability would equally comply with the polluter-pays principle. However, industrialised countries do not have a good track record of complying with their financial commitments. Even in the case of member states' contributions to the UN regular budget, which are as legally binding as is possible under international law, many member states do not pay their full dues. Hence, additional enforcement rules – particularly a credible sanctioning mechanism – would be necessary to safeguard the reliability of the financial flows. However, the political feasibility of such an adequate sanctioning mechanism is probably very low. While there is also no final guarantee that countries will purchase AAUs, this approach has the advantage that they do not necessarily have to purchase the AAUs themselves but instead may pass on this obligation to private emitters in an emissions trading system.

The proportion of the AAUs to be set aside would depend on the estimated revenue needed and the expected carbon price. In particular, the scale of the funding should be based on an assessment of the needs for financial support for mitigation in Southern countries in order to achieve a peak of global emissions within the next decade and an 80% reduction below 1990 levels by 2050, as well as the needs for adaptation (assuming a temperature increase of a minimum of 2 degrees). The revenue needed should ultimately be decided by the COP, on the basis of a recommendation provided by the FMB.

To take into account countries' varying responsibility and capability, the quantity of AAUs to be withheld from each industrialised country should vary based on its responsibility and capability. That is, countries with high responsibility and capability would have a proportionally high share of their AAUs withheld for auctioning, whereas countries with a low responsibility and capability would receive more AAUs for free.

As so far international aviation and maritime transport are not covered by the Kyoto Protocol, it would reflect the polluter-pays principle, equity considerations and the sheer volume of required revenue inflows that these sectors should be obliged to contribute – ideally through their inclusion in an emissions trading system with auctioning of the allowances. This is a logical extension of selling AAUs, as international aviation and maritime traffic are relevant sectors that up to now are excluded from national emissions budgets.

6.5 Technology Cooperation

Besides cultural and lifestyle changes, the rapid diffusion of mitigation and adaptation technologies will play a central part in limiting global warming to levels well below 2° C. Technology cooperation is here understood to address all stages of the innovation cycle. The transfer of technologies involves more than hardware supply. It encompasses the complex process of sharing knowledge and adapting technology to meeting local conditions. Domestic technical and managerial capacities, institutions and investments in technological learning all influence the effectiveness with which technologies can be absorbed, adapted and reproduced.

We propose the following key elements for a technology cooperation agreement:

- **Technology Development, Deployment and Diffusion Objective:** It should relate to the total financial support to be provided and include ambitious quantified renewable energy as well as energy efficiency targets.
- **Technology Cooperation Mechanism:** The mechanism includes elements that enable cooperative research, development and demonstration (RD&D) of new as well as the rapid diffusion of existing environmentally sound and low-carbon technologies. It is based on a funding window under the global climate fund, national mitigation and adaptation actions and technology road maps.

In order to be effective, support for mitigation technology cooperation should be linked to individual developing countries' NAMAs. NAMAs and the related financial and technological support should serve as one of the main instruments for the rapid deployment and diffusion of existing low-emission technologies.

The proposed Technology Cooperation Mechanism would be based on the technology window under the global climate fund. New multilateral funding for technology should be established to support the achievement of the technology objectives and fully capture the global public good aspects of climate technology. The funding could be provided through two sub-windows. While diffusion of market-ready technologies would be a central point of NAMAs and supported through the mitigation window, a diffusion sub-window under the technology window could support international activities for the

diffusion of existing and near market technologies through technology-oriented cooperation, barrier removal and incentives for the private sector. The RD&D window would provide resources for joint RD&D of key technologies relevant for mitigation and adaptation actions.

Basis for the allocation of the funds would be a Technology Strategy, originated by the FMB's Mitigation and Adaptation Panels in order to establish a diffusion agenda and strategic RD&D for climate mitigation and adaptation technologies within the UNFCCC. The strategy should help achieve the technology development objective (see above) and the targets agreed on in Copenhagen, in terms of quantified GHG emission reductions or in terms of a qualitative technology target.

Key components of the strategy would be framework programmes for deployment and diffusion as well as for joint RD&D on the basis of LEDSS, NAPAs and technology roadmaps:

- The listing of national mitigation actions or comprehensive national strategies indicate the financial and technological assistance that is needed in Southern countries to implement the measures. The Mitigation Panel should give basic guidance that enables the countries to indicate their technology needs in the NAMAs/LEDS and that helps them to identify appropriate activities.
- A similar approach could be followed for adaptation technologies, building on National Adaptation Plans of Action, as well as the adaptation chapters in existing technology needs assessments.
- Roadmaps for key technologies that are of strategic relevance for achieving the mitigation and adaptation targets are to be developed. According to their stage in the innovation chain, barriers and measures are identified to accelerate technology transfer. The roadmaps are regularly updated.
- The Multilateral Diffusion Framework Programme shall structure international cooperation on existing and near market technologies for mitigation and adaptation. Basis for the diffusion programmes are the needs outlined in the NAMAs, LEDSS, NAPAs and technology roadmaps.
- For the promotion and initiation of new joint research cooperation as well as demonstration of existing promising technologies, a framework programme on RD&D shall be set up.

In addition to the FMB and its panels, regional technology centres should be established that could do targeted research and act as regional centres of excellence to spread best practice and provide advice back to the FMB. The regional centres could be based in existing independent research institutes or newly created collaborating centres linked to

existing research institutes. Regional centres should as well act as information pool and dissemination point for established low-carbon technologies, appropriate for the regional conditions.

Finally, due to the prominence of intellectual property rights in countries' positions, a failure to tackle competitiveness issues constructively will limit the pace of innovation and diffusion and potentially poison the international climate negotiations. A constructive approach would be a "protect and share" agreement involving government-to-government commitments for intellectual property rights (IPR) and licensing of climate technology. This agreement could include the use of existing flexibilities, which exist in the World Trade Organisation's agreement on Trade Related Aspects of Intellectual Property Rights and current national laws. This would include measures such as segmented/parallel markets (whereby IPR protection is enforced in some markets and provided freely in others), public sector purchasing of IPR and advance purchase commitments (such as under the Global Fund for HIV/Malaria and TB), compulsory licensing, pay to licence systems, and the use of Global Commons.

7 Revisit and Improve

It seems very unlikely that the Copenhagen agreement will be adequate to prevent dangerous anthropogenic climate change. We therefore propose a review clause combined with a full-scale evaluation of the environmental effectiveness of the provision or agreement. At the latest, the first such review of the Copenhagen agreement should be conducted in 2014/15, after the release of the fifth IPCC assessment report as currently scheduled.

Looking at the current state of negotiations, it seems very unlikely that Copenhagen will achieve an agreement that will be compatible with the ultimate objective of the Convention. Instead, the outcome will probably be a compromise between the status of climate science as of AR4 and what seems politically feasible. We therefore propose a review clause combined with a full-scale evaluation of the environmental effectiveness of the provision or agreement. This has become a standard feature of international environmental agreements and has also been used by the FCCC and the Kyoto Protocol. However, the record for compliance with review clauses is not perfect and the provision should thus be formulated with stricter legal quality. At the latest, the first such review of the Copenhagen agreement should be conducted in 2014/15, after the release of the fifth IPCC assessment report as currently scheduled.

In addition, the new agreement should contain a provision for the regular review and update of the IPCC reports. The intervals of more than half a decade between the reports is not adequate compared with the increasing speed of the advancements of climate science and, crucially, climate change itself. There was a widely held opinion that AR4 was already outdated when it was released. The COP should therefore request the IPCC to prepare at least bi-annual updates of its assessment reports.

The five-year length of commitment periods should be retained. In the current political climate, lengthening commitment periods would probably mean to lock the world in a weak long-term deal and forfeit any chance of preventing dangerous climate change. Moreover, five years is compatible with the time horizon of most policy-makers. Commitments that are due longer into the future are quickly seen as somebody else's problem, as was demonstrated in the run up to the first commitment period. Most countries only started to significantly strengthen their climate policies when the start of the commitment period was imminent. As a result, most non-EIT countries will probably have to heavily rely on the flexible mechanisms if they are to meet their targets at all.

Retaining five-year commitment periods does not mean that longer-term targets could not be agreed on. In fact, an approach modelled on the most prominent US emission

trading proposals, which spell out a binding emission cap until 2050, would be highly welcome as it would provide much-sought political certainty.

But such targets should nevertheless be broken down into five-year periods would need to be reviewed periodically in the light of the latest climate science, as outlined above.

References

- Aprodev (2009): The United Nations Climate Fund, Discussion paper: An equitable financial mechanism under the UNFCCC.
- Baer, Paul, Tom Athanasiou, Sivan Kartha and Eric Kemp-Benedict (2008): The Greenhouse Development Rights Framework, The right to development in a climate constrained world, Revised second edition. Berlin: Heinrich-Böll-Stiftung.
- Bongardt, Daniel, Frederic Rudolph and Wolfgang Sterk (2009): Transport in Developing Countries and Climate Policy, Suggestions for a Copenhagen Agreement and Beyond. Wuppertal: Wuppertal Institute for Climate, Environment, Energy (Wuppertal Paper 179).
- Crutzen, Paul J. (2002): Geology of Mankind – the Anthropocene. In: Nature, No. 415, p. 23.
- den Elzen, Michel and Niklas Höhne (2008): Reduction of greenhouse gas emissions in Annex I and non-Annex I countries for meeting concentration stabilisation targets. An editorial comment. In: Climatic Change, Vol. 91, No. 3-4, pp. 249-274.
- DIE (Deutsches Institut für Entwicklungspolitik – German Development Institute) (2008): Reducing Emissions from Deforestation and Forest Degradation in Developing Countries: Meeting the main challenges ahead. Bonn: DIE (Briefing Paper 6/2008).
- Ecosecurities/UNEP Risø (2007): Guidebook to Financing CDM Projects. The Hague/Roskilde: Ecosecurities/UNEP Risø.
- EC (European Commission) (2009): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Towards a comprehensive climate change agreement in Copenhagen, Provisional Version. Brussels, COM(2009) 39/3, 28.01.2009.
- EU (European Union) (2009): Submission by the Czech Republic on Behalf of the European Community and Its Member States, A negotiation text for consideration at AWG-LCA 6. Prague, 28 April 2009.
- GTZ (Gesellschaft für technische Zusammenarbeit) (2009): CDM Highlights 71, 13 May 2009.
- Harmeling, Sven, Christoph Bals, Wolfgang Sterk and Rie Watanabe (2009): Funding Sources for International Climate Policy, A Criteria-Based Analysis of the Options Discussed under the UNFCCC. Bonn: Germanwatch.
- Höhne, Niklas and Sara Moltmann (2008): Distribution of emission allowances under the Greenhouse Development Rights and other effort sharing approaches. Berlin: Heinrich-Böll-Stiftung.
- Irrek, Wolfgang and Stefan Thomas (2006): Der EnergieSparFonds für Deutschland. Düsseldorf: Hans-Böckler-Stiftung (Edition der Hans-Böckler-Stiftung 169).
- IPCC (Intergovernmental Panel on Climate Change) (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth

- Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva.
- La Rovere, Emilio Lèbre., Laura Valente de Macedo and Kevin Baumert (2002): 'The Brazilian Proposal on relative responsibility for global warming'. In: Kevin Baumert, Odile Blanchard, Silvi Llosa and James Perkaus (Eds): Building on the Kyoto Protocol: Options for protecting the climate. Washington, DC: World Resources Institute, pp. 157-174.
- Müller, Adrian and Joan Davis (2009): Reducing Global Warming: The Potential of Organic Agriculture, Policy Brief.
- Ott, Hermann E., Harald Winkler, Bernd Brouns, Sivan Kartha, Mary Jane Mace, Salemuul Huq, Yasuko Kameyama, Agus Sari, Jiahua Pan, Youba Sokona, Preeti Bhandari, Andrzej Kassenberg, Emilio Lèbre La Rovere and Atiq Rahman (2004): South-North dialogue on equity in the greenhouse. A proposal for an adequate and equitable global climate agreement. Eschborn: Gesellschaft für Technische Zusammenarbeit.
- Schneider, Lambert (2007). Is the CDM fulfilling its environmental and sustainable development objective? An evaluation of the CDM and options for improvement. Berlin: Öko-Institut.
- UNEP Risø (2009): UNEP Risoe CDM/JI Pipeline Analysis and Database, Updated 1 May 2009. <http://www.cdmpipeline.org>.
- UNFCCC (1997): 'Implementation of the Berlin Mandate. Additional Proposals from Parties.' FCCC/AGBM/1997/MISC.1/Add.3. (30 May 1997). Bonn: UNFCCC.
- UNFCCC (United Nation Framework Convention on Climate Change) (2007): Investment and Financial Flows to Address Climate Change. Bonn: UNFCCC.
- UNFCCC (United Nations Framework Convention on Climate Change) (2008a): Synthesis of information relevant to the determination of the mitigation potential and to the identification of possible ranges of emission reduction objectives of Annex I Parties: an update, Technical Paper, FCCC/TP/2008/10, 7 November 2008.
- UNFCCC (United Nations Framework Convention on Climate Change) (2008b): Investment and financial flows to address climate change: an update. FCCC/TP/2008/7, 26 November 2008.
- UNFCCC (United Nations Framework Convention on Climate Change)(2009a): Trends in aggregate greenhouse gas emissions, 1990-2006. http://unfccc.int/ghg_data/ghg_data_unfccc/items/4146.php, accessed 26.05.2009.
- UNFCCC (United Nation Framework Convention on Climate Change) (2009b): Emissions trading and the project-based mechanisms. Draft conclusions proposed by the Chair. FCCC/KP/AWG/2009/L.2, 8 April 2009. Bonn.
- Wara, Michael W. and David G. Victor (2008): A Realistic Policy on International Carbon Offsets. Stanford University Program on Energy and Sustainable Development (PESD Working Paper #74).
- Ward, Murray, Charlotte Streck, Harald Winkler, Martina Jung, Markus Hagemann, Niklas Höhne and Robert O'Sullivan (2008): The Role of Sector No-Lose Targets in Scaling Up Finance for Climate Change Mitigation Activities in Developing Countries. Prepared for the International Climate Division, Dept for Environment, Food and Rural Affairs (DEFRA), United Kingdom.