BRIEFING PAPER

# Climate Summit in Bali: Starting Point for decisive Steps towards a low-emission model of prosperity?

## A groundbreaking post-2012 agreement must be clinched until 2009

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GERMANWATCH

## Brief Summary

At the Climate Summit in Bali in December 2007, a UN negotiation process will be initiated which should be terminated by 2009. With this process, fundamental decisions with important implications for the future of our planet will be made. Are we heading for an uncontrollable large-scale experiment with man and nature? For a climate apartheid, in which high-emission prosperity will be the privilege of a global minority? For a global climate partnership which will develop a fair strategy to fight highly dangerous climate change and to share the burden of adaptation? Or for the attempt to control Planet Earth by the means of geo-engineering?

In this paper Germanwatch specifies the demands on the Climate Summit in Bali assuming that it should serve as the starting point of a global climate partnership. Moreover, the central points of a groundbreaking agreement that should be negotiated by 2009 are put up for discussion.


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# Contents

# 1 Summary

The UN climate summit in Bali marks the beginning of a decisive phase regarding the future of global climate. By 2009 a new global climate treaty should be negotiated which provides the political framework for international climate protection for the time after 2012. With this paper we intend to raise awareness of the fact that the decisions made in Bali lead the way into the direction of one of the four following scenarios:

A) ***Uncontrolled large-scale experiment with mankind:*** Global climate change is not or hardly slowed down. Currently observed global emission trends point in this direction. At the same time climate science reveals more and more clearly that we might be close to reaching certain threshold values. Trespassing them could induce substantial feedback mechanisms which might cause uncontrollable climate change and irreversible catastrophes of global magnitude.

B) ***Climate Apartheid:*** Climate protection that enhances and reinforces existing global inequalities. Developing countries and emerging nations fear this scenario.

C) ***Global Partnership on Climate Protection:*** The joint attempt to mitigate climate change in order to avoid large-scale dangers and to support the most affected people in their adaptation efforts at the same time. The global framework of a UN treaty would be complemented by a variety of decentralised activities and bilateral agreements.

D) ***Planet Earth on the Heart-Lung Machine:*** It is attempted to replace the earth's collapsing self-regulating mechanisms by the technologies of geo-engineering in order to retain control. This scenario bears enormous risks of inducing unintended side effects and creates a potential for military misuse.

**Expectations from Bali**

Germanwatch clearly favours scenario C and the creation of a global climate partnership. We hope for Bali to be the starting signal for an accordant climate treaty: Bali has to be the beginning of negotiations which overcome the rules of horse-trading ("I am only willing to make a step forward if you do, too") and instead focus on finding a common answer to substantial problems concerning the provision of a global public good: the prevention of dangerous climate change. This is the objective of the international community according to Article 2 of the Framework Convention on Climate Change.

This goal can only be achieved if we stop quarreling over burden sharing with sorrowful faces and instead enter the race for a new model of prosperity – driven by an active civil society and supported by financial markets that see opportunities in the upcoming "great transformation".

The following fundamental criteria and principles should serve as an orientation in the upcoming negotiation process:

- ***Climate effectiveness:*** The negotiation process must provide the basis for passing a treaty by 2009 that leads towards limiting global warming to less than two degrees celsius as compared to preindustrial levels. The agreement must give the highest pri-

ority to setting the stage for reaching the peak of global emissions between 2015 to 2020. The long-term goal must be to reduce global emissions by 50 to 85 per cent (compared to 2000) until 2050.[1] Moreover the agreement should be comprehensive in terms of including all relevant and methodologically sound carbon sinks as well as emissions from aviation and shipping traffic. It should also provide incentives to avoid deforestation on a national level.

- More concretely, this requires a negotiation process that leads to a reduction commitment of 30 to 40 per cent until 2020 (compared to 1990) in industrial countries on the one hand;

  and that, on the other hand, replaces the previous talks about the fair share of emerging nations by serious negotations. It is not necessary that these negotiations result in absolute emission limits or even reduction targets for newly industrialising countries. However, increasing energy efficiency by 4 per cent annually as compared to the "business as usual" scenario would be required. The implementation of appropriate measures would reduce costs, enhance energy security and support climate protection at the same time.

- ***Equity:*** The process should aim to create a global climate partnership. The idea of common but differentiated responsibilities and respective capabilities is a basic principle of the Framework Convention on Climate Change and it applies to both mitigation and adaptation. The introduction of equal per capita emission rights worldwide by the middle of the century ought to be an important guideline.

- ***Dimension of adaptation:*** We need a larger range of opportunities for financing adaptation to climate change and we must provide financial security for its victims. Many industrial countries have not yet realised that they have to enter into substantial financial commitments in the area of adaptation in order to allow a successful conclusion of the negotiations.

- In this context it is crucial to support local approaches to adaptation. Moreover innovative instruments of risk allocation such as international co-financed insurance instruments need to be developed. They will not only help to bear the damages but also to stimulate local adaptation processes.

- ***Relevance for Investment:*** The international carbon market needs an effective political framework that is received to be "long, loud and legal"[2] and that induces the development and the significantly accelerated implementation of innovative technologies. Bali must send a clear signal to the financial markets assuring that the chosen path will be pursued with even more stringent targets and a much more considerable price signal.

[1] Of course, reaching the trend reversal in global emissions before 2015 is preferable from a climate protection perspective. However, taking into account that emissions have been growing progressively worldwide for the last couple of years, this objective appears to be beyond reach. Possibly technological breakthroughs will make more ambitious reduction targets than 50 to 85 per cent appear feasible but for the time being, keeping the right to development and social issues in mind this seems to be rather unrealistic.

[2] see defra, 2006

- The framework needs to coherently comply with developmental and environmental objectives. This means on the one hand that the targets regarding climate that were mentioned above need to be coherent with the objective of energy security. On the other hand it implies that the framework must include a strategy of decarbonisation in developing and industrialising countries which aims at reducing emissions and furthering adaptation without eroding the millenium development goals.
- Aside from preventing dangerous climate change, Article Two of the Framework Convention on Climate Change defines sustainable development as a major goal.
- A framework that enables a boom in technological development;
- An impulse for innovation and technological cooperation (south-south; north-south)
- The climate regime as a self-sustaining system of combined incentives for climate protection and adaptation;
- Synergies between the central UN process and complementary processes (Gleneagles, G8, the US Meeting etc.).

We hope that all of the negotiators are aware of the extent to which their decision affects the destiny of billions of people. We also want to support them and encourage them to face this challenge with the necessary energy.

# 2 Preparing for fundamental decision-making processes: From Nairobi to Bali

The UN climate summit in Bali (December 3-14 2007) should serve as a starting point for international negotiations that induce a decisive phase for global climate politics: To what extent is the international community willing to combat climate change – by reducing greenhouse gas emissions on the one hand and enhancing adaptation on the other hand? The negotiation process that will be initiated in Bali should be concluded in Kopenhagen in 2009 resulting in a new treaty for the time after 2012. It is so crucial because it entails fundamental decisions on what the world of our children and grandchildren in a few decades will look like.

## *2.1 Why the climate summit in Nairobi 2006 failed*

By the end of last year, negotiations at the UN Climate Conference in Nairobi did not make any progress. Two reasons – a tactical one and a substantial one – account for the failure of the summit

### 2.1.1 Is there a first-mover disadvantage?

Governments were concerned about losing ground in the international climate gamble when revealing their cards first. And everyone brought forward the same argument: If no one else joins in there is no point in me going ahead.

Global climate change is a typical problem of the type "Tragedy of the Commons". For each individual country exploiting as much of our atmosphere as possible is a completely rational decision. Initiating climate protection efforts at home bears the danger that other countries continue exploiting and moreover benefit from the realised savings. (Expressed in economic terms this means: If I consume less fossil fuel its price will decline which makes other players want to buy even more of it.) That is why everyone points at the inactivity of the others instead of making the first step. In fact, the head of the Chinese delegation announced that there will be no negotiations about reducing emissions in China until 2080 (!). Until then, it is necessary for China to focus on a strategy of economic growth that is mainly based on energy supply from coal-fired power plants. India, in fact, with its significantly lower per capita emissions was not even willing to discuss any kind of contributions – let alone targets. Japan, the industrial country with the highest energy efficiency in the world made its decision on further reduction targets dependent on an accordant commitment from the USA. And at the climate conference in Montreal (2005), the U.S. delegation, representing the richest country worldwide with immensely high emissions, even left the room when other industrial countries showed their willingness to consider more stringent targets. Over and over again the U.S. government referred to the fact that emerging nations such as China and India were not assigned any reduction targets in the Kyoto Protocol despite their fast growing emissions. And although the European Union has extensively expressed its willingness to negotiate in Nairobi, the credibility of this announcement appeared more than doubtful considering the EU’s

struggle with accomplishing its Kyoto targets and its failure to commit to any serious reduction goals for the time until 2020.

### 2.1.2 The hidden economic agenda

Even more important was another substantial reason that was closely related to the tactical one presented above. The environment ministers were well aware of the fact that the ministers of economy and the heads of government at home would veto against taking a leadership role in climate protection. Since the invention of the steam engine, fossil fuels have been the driving force behind the wealth of industrial nations and recently also behind the fast growing "islands of prosperity" in the newly industrialising countries. And from the USA to India, from Europe to China governments were concerned that serious climate protection might constrain their chances for economic success. The arguments of an influential industry lobby that has been trying extensively to impede the realisation of any constructive suggestions ever since the preparative negotiations preceding the UN conference on environment and development in 1992 had started were actually making an impact. Even today U.S. delegates emphasise that they are not ready to take any binding reduction commitments for their own country into consideration since these are said to hurt the economy. "The fundamental question is whether or not we will be able to grow our economy and be good stewards of the environment at the same time," Bush said during a question-and-answer session after a speech on the federal budget in Arkansas in October 2007.[3]

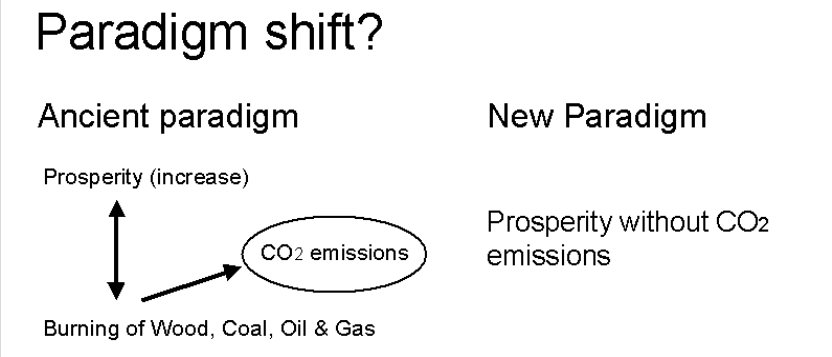
**The illusion of climate diplomacy: The false analogy with the combat against the ozone hole**

The combat against the destruction of the ozone layer also initially encountered massive opposition from industrial pressure groups. Mario Molina, a researcher at the Massachusetts Institute of Technology (MIT), has intensely experienced the resistance. He received the Nobel prize in chemistry in 1995: More than 20 years earlier, in 1974, Molina and his colleagues had discovered that chlorofluorocarbons (CFC) destroy ozone molecules in the stratosphere’s life protecting ozone layer. Despite the initially strong resistance from industrial groups this discovery actually resulted in the passing of the Montreal protocol, which nowadays prohibits the deployment of CFC. (In Germany, refrigerator manufacturers claimed during a hearing of the climate enquiry commission of the German Bundestag that a ban on CFC was totally inacceptable for them. Nevertheless, shortly after the announcement of the ban all of them offered devices free of CFC and celebrated their innovative leadership position in glossy brochures.) Today, Molina and many other observers consider the Montreal process a role model for climate politics. "It is feasible", states the born Mexican optimistically.

But does the comparison with the successful Montreal Protocol that is frequently drawn by many observers actually help? Sure, there are analogies: Both cases deal with a dramatic climate issue which is caused by industrial development. Both times the industrial lobby has initially offered serious resistance. And in both cases a UN process was initiated to solve the problem as soon as the severity of the challenge became clear. However,

[3] http://www.enn.com/climate/article/23891

there are also fundamental differences. While the CFC issue was about substituting certain gases in a few applications – sprays, refrigerators, cleaning agents, fire drenchers – we are now facing a different kind of problem. CFC is an industrial gas whereas $CO_2$ is the most important "civilization gas". Fossil fuels such as coal, oil and gas have been driving the engines of progress in the industrial and most recently also in the emerging nations since the invention of the steam engine. But now they need to be replaced very, very soon.




Adapted from: Held, Edenhofer, 2007

Fossil fuels represent the fundamental basis of our model of industrial progress. The mental, political and economical turnaround that is needed represents a global challenge whose magnitude is simply not comparable with the replacement of CFC in certain applications and in certain regions of the world. The fact that a growing number of actors refer to the necessity for a new industrial revolution therefore seems to be justified. It is about restructuring the world's total energy, transportation and building system. This transformation requires broad acceptance in the population. This means that it can only be successful if it is done in a socially acceptable way – on the national as well as on the international level. An important step is therefore to break down barriers in the people's minds worldwide who – based on their experience of the last 150 years – set fossil fuels equal to economic progress. The transformation must be done against the severe opposition of certain industrial pressure groups that are fortunately diminishing in number but that are still quite influential in their effort to defend the past. (Indeed it is not surprising that the past is often better organised than the future which is just about to emerge.) One only has to realise that Exxon is the company that has made the largest effort worldwide to undermine global climate protection.[4] But at the same time it is also the company that has capitalised the most on high oil prices and therefore has by far made the highest profits. The political influence of the fossil fuel industry is also shown by the fact that the present U.S. President, the U.S. Vice President and the U.S. Minister of Foreign Affairs all used to be involved in that business before turning to politics.

The analogy to the Montreal Protocol represents one of the illusions in the international debate on climate protection. It is not right to narrow this debate down to an environmental issue. This finding also implies that environmental diplomacy alone is not able to introduce the required economic transformation.

[4] For an up-to-date analysis compare Greenpeace, 2007

## 2.2 The turnaround in the economic perspective on climate change

Up to now the Stern Review has provided the most important basis for illustrating economic interests in a constructive manner. The current IPCC report (IPCC, 2007) has contributed further fundamental findings. The insight that climate change is more than a "soft" issue but that it could actually induce the most severe recession since the second world war has raised the attention of many politicians who up to now used to degrade the priority of climate change and treat it as a minor problem that is not really worth spending any time on. The observable change in the politicians' attitude is a necessary but not yet a sufficient condition for finding a fair balance of different developmental and economic interests. Only if this balance is achieved, a pact between the highly emitting industrial and emerging nations and the particularly affected LDCs[5] and AOSIS states[6] becomes feasible. This pact is required for agreeing on a bundle of measures addressing climate protection and adjustment to the consequences as an appropriate response to the challenges we are facing.

**The economic reasoning for serious climate protection**

On October 30, 2006 the former chief economist of the World Bank, Sir Nicholas Stern, demonstrated in a review report for the British government that missing the opportunity to work against climate change will cause significantly higher costs than getting active now.[7] Stern considers global climate change to be "the biggest market failure in history". His calculations show that about 1 per cent of the annual gross domestic product worldwide could be sufficient to prevent disastrous developments in global climate change (stabilisation at a level of 550 ppm $CO_2$ equivalents). (Here he uses a scenario that includes reductions which are substantial but not substantial enough to avoid a global temperature rise that exceeds the threshold of two degrees compared to preindustrial levels with sufficient probability. This requires a stabilisation level of less than 450 ppm.) But he also demonstrates that doing nothing would cost 5 to 20 times as much.

The review which covers the time period until 2100 serves as a warning saying that global climate change could cause the most severe recession since the Wall Street crash and the following great depression. The review is seen as the most relevant cost estimation of climate protection and of the damages caused by climate change that has been done up to now. Of course it has also aroused criticism. However, it is a fact that the estimated damages caused by global climate change have increased in value over the last years whereas at the same time it became clear that serious climate protection including an appropriate political framework and assuming the avoidance of an increase of global temperature of more than two degrees can be realised at significantly lower costs than initially anticipated in the economic models. The latter statement also reflects the most positive conclusion of the latest IPCC report saying that the costs of stabilising emissions at a level below 450ppm of $CO_2$ equivalents in order to comply with the two-degree limit do possibly not exceed 0.12 per cent of the annual economic perfomance. In this calculation it is assumed that a suitable political framework accelerates technological progress.[8]

[5] Least Developed Countries
[6] Alliance of Small Island States
[7] Stern, 2006
[8] IPCC, 2007

## 2.3 Climate protection as a matter of the bosses

Since the first climate summit took place in Berlin in 1995 the Germanwatch team has been observing all of the UN climate summits. In 2005, ten years after the beginning of negotiations and after years of postponing, the Kyoto protocol eventually entered into force when Russia announced its ratification. Finally, the formal base for a discussion on serious negotiations for the time after 2012, the end of the first commitment period of the Kyoto Protocol, was given. But even the UN climate summit in Nairobi in November 2006 only resulted in "talking about talks". By then it was clear that negotiations on the level of delegates and environment ministers could not induce the needed political momentum. This can only evolve if the governments offer significantly more support to their environment minister and enhance their discretionary power in the negotiations.

Germanwatch commented on the results of the climate summit in Nairobi with the headline: "Now climate protection has to become a matter of the bosses."[9] We called for four actions in order to terminate the gridlock:

- First of all, the EU has to prove its leadership skills and demonstrate its willingness to act under the German EU presidency in the first half of 2007 by committing to a 30 per cent reduction target.
- Secondly it is crucial that the G8 summit – under German presidency as well – in cooperation with the five most important emerging nations clearly signals the common political will to provide the necessary mandate for negotiating a post-2012 treaty.
- Thirdly, this signal that might for example be given in a General Assembly of the UN needs to be backed up by a large number of government leaders all around the world.
- The fourth point is that the German government should think about possibilities to send another strong political signal to the global public – just like the British government has done with the Stern review.

Based on the further confirmation of the scientific facts[10], on economic cost calculations of realised and refrained climate protection measures, on declaring "the biggest market failure that the world had ever seen" (see box above), on Al Gore's wake-up calls concerning the "inconvenient truth" and on a stronger and stronger civil society all around the globe[11] climate protection indeed became a top-priority issue. And Angela Merkel, German chancellor, president of the European Council (first half of 2007) and chair of the G8 summit in 2007, substantially contributed to this change. Hats off to her performance in international climate politics of the last 12 months! (It remains to be seen, whether she has the backbone to demonstrate the leadership qualities that are required for the domestic implementation and the transformation of resource policy.)

- Due to Merkel's initiative the European Union took on an international leadership role at the EU summit in spring in Brussels. The heads of government agreed on reducing their emissions by 20 per cent until 2020 compared to 1990 even in case the

[9] Bals et al., 2006
[10] IPCC, 2007

international UN negotiations should fail. Assuming that international climate negotiations actually succeed, a 30 per cent cut of greenhouse gas emissions was accepted. The German government even committed to reducing by 40 per cent compared to 1990 emissions in order to support the realisation of the EU target. A few months later the German chancellery and the Ministry of Environment announced their belief that UN negotiations will be successful and their preparations for achieving the 40 per cent goal. On December 5, 2007 the German parliament decides on a law package that is supposed to entail reductions of at least 30 to 35 per cent in Germany – but again various lobby groups are already trying to defuse the bills' effectiveness. The EU backed up its decision on greenhouse gases by passing two more resolutions of similar importance and impact concerning the areas of renewable energy and energy efficiency. If possible the inclusion of air traffic into the European emission trading scheme should be passed by the end of this year. However, this appears more and more unrealistic considering the recent delays. (Interestingly Germany belongs to a group of countries that is in favour of less ambitious targets than those suggested by the environmental committee of the EU parliament.) There is no doubt that the resolution that was adopted at the EU summit in spring has secured the EU's leading position in international climate protection. "We have always demanded from the industrial countries to make the first step. Now the EU has done so – and it is our turn to respond," told us the head of the South African delegation. If the promised law package will actually be realised in a convincing way within the next months – this still needs to be proven – the EU is in an optimal position to become a core member of an international "Green Group" that is taking the lead in turning the post 2012 negotiations into a success.

- On the occasion of the G8 summit in Heiligendamm a common signal for serious post 2012 UN climate negotiations was sent. In fact, it was not possible to adopt the two-degree limit, which is the goal of international climate politics of the European Union, as the objective of the UN negotiations. However, even the hesitating presidents of the USA and Russia, Bush and Putin, finally demonstrated their willingness to "consider seriously" a target including mitigation of global emissions by at least 50 percent until 2050.[12] (Unfortunately there was no agreement on taking 1990 as reference year for reductions. A reduction by 50 per cent based on the year 2007 only equals a decrease of 38 per cent as compared to the level of 1990. This is probably not sufficient to comply with the two-degree limit.) For the first time ever the USA accepted the UN process as the suitable institution for administrating the negotiations. Furthermore, it was agreed that the debate should result in concrete decisions until 2009. Setting this time frame is very important for serious negotiations. The schedule leaves enough room for the treaty to go through the ratification process in order to have it into force by January 1, 2013 – on time to directly follow up on the first commitment period of the Kyoto Protocol. A UN meeting in Bogor (October 24/25 2007) that served as an important preparation for the conference in Bali has revealed that the U.S. government does not seem to question these central points anymore.

[11] Harmeling, 2007
[12] G8-Gipfel 2007 G8 summit 2007

- On the occasion of the UN high-level event on climate change in New York in September 2007 more than 80 of the world's leaders confirmed the urgency of serious negotiations about the reduction and limitation of greenhouse gas emissions and about adaptation issues.[13] Still, one must keep in mind that neither the G8 summit nor the UN meeting led to any actual decision making. These conferences only helped to build momentum for the start of negotiations at the UN climate change conference in Bali in December 2007. This is when time has come to separate talking from acting. At the preliminary meeting in Bogor China for the first time showed openness towards negotiations of this kind – even with regards to a fair contribution of newly industrialising countries.

- Now that the Stern Review has impressively demonstrated the economic case for action, a fundamental study published by the German Advisory Council on Global Change (WBGU) revealed the correlation between climate change and security.[14] The impacts of climate change on security policy are concisely illustrated, particularly with regard to the following conflict constellations: food supply, freshwater, storm and flood disasters and migration. Shortly before publication of the report in May 2007 the closely related issues of climate and energy security were discussed by the UN Security Council for the first time. This happened on demand of the British government. The relation between the two topics was further established at the UN General Assembly in September. Furthermore, Al Gore and the IPCC were awarded the Nobel Prize for *Peace*. It turns out that a promising strategy for international climate protection is to address the issues of climate change, energy security and energy supply (in developing countries additionally the general access to energy) altogether.

This approach seems to be rational from an economic as well as from a security policy perspective. Enhancing energy efficiency, promoting renewable energy and – in case this path proves its feasibility – $CO_2$ capture and storage from fossil fuel power plants (or from second generation biofuel processes) represent "no-regret" strategies since they help to reach both targets at the same time. In practice, however, we currently observe boosting investment in the exploration of coal and oil sands and energy production from these sources. This is part of a strategy that plays off energy security against climate security.

**A new negotiation round among the heads of government following Bali?**

In November 2007 the newly minted winner of the Nobel Prize for Peace, Al Gore, met with Angela Merkel. They both publicly suggested another meeting of the heads of government around three months after Bali in order to further the climate process. The meeting should take place in early 2008 under the roof of the United Nations. This approach might be useful considering that it might back up the successful start of negotiations in Bali. A meeting of this kind will even become a necessity if Bali does not turn out to be the starting point of a comprehensive negotiation process. Limiting the risk of climatic destabilisation requires exceptional diplomatic efforts for exploring new models of bilateral and global cooperation.

[13] http://www.un.org/webcast/climatechange/highlevel/index.asp?go=b070924
[14] WBGU, 2007

# 3 Setting the course: Which path into the future do we choose?

Meanwhile more and more heads of government seem to compete in their rhetoric pleas calling for action in the combat against climate change. Even President Bush tried to convince the governments of the 16 most emitting countries worldwide whom he had invited to Washington in September 2007: "What I'm telling you is, is that we've got a strategy; we've got a comprehensive approach."[15] However, it is worthwhile taking a closer look at the suggested plans. Often a similar wording is used to express very different intentions regarding the future of our climate system and the people and ecosystems living in it. In order to facilitate the assessment of different alternatives the following four scenarios provide a simple and intuitive overview of the confusing variety of possible future incidents.

**Our Climate Future**

- Scenario A: Large-scale Experiment with Mankind and Nature
  Unmitigated climate change
- Scenario B: Climate Apartheid (with Elements of a Climate Dictatorship)
  Major concern of the industrialising and developing countries: serious climate protection limiting growth in developing countries
- Scenario C: Global Climate Partnership
  Combination of binding UN process, bi-/trilateral agreements, technological innovations, self-financing process (auctioning emission trading etc.)
- Scenario D: Planet Earth on the Heart-Lung machine (geo-engineering)
  Self-regulating mechanisms of the earth collapse. Large-scale technical measures of permanent adjustments; significant side-effects and potential for misuse.

## *3.1 Scenario A: Uncontrolled large-scale experiment with mankind and nature*

Global emission trends show that unmitigated climate change will result in a large scale experiment with mankind and nature that is out of control and of unimagined dimensions. Having only read the speeches of the heads of governments and heads of state at the UN General Assembly one might easily have the impression that the problem of climate change is very close to being solved. The development of global emissions however, tells a different story. In fact, the growth of energy-related $CO_2$ emissions has been progressively increasing since the beginning of the new millennium. In the time period between 2000 and 2004 emissions increased almost three times as fast as in the years between 1990 and 1999 (3 per cent instead of 1.1 per cent annual growth).[16] Taking the small dif-

[15] http://www.whitehouse.gov/news/releases/2007/09/20070928-2.html
[16] Raupach et al., 2007

ferences in the data base used by the IPCC into account and comparing it with the observations presented in this paper one sees that the actual development ranges at the upper end or even slightly above the most energy intense IPCC scenario.[17]

The main reason can be found in the fast growing coal consumption worldwide – not only but to a large part – caused by China. "Every kilogram of coal being transformed to carbon dioxide captures a hundredfold of warmth in the atmosphere as compared to what we gain from it – it is time for a turnaround in energy supply," points out Carlo Rubbio, winner of the Nobel Prize for physics in 1984. But even the words of a Nobel Prize winner do not instantly initiate a change in the behaviour of politicians, producers and consumers. On the contrary, measured in absolute values coal is the fastest growing energy source of the new millennium. Although high oil and gas prices combined with concerns about energy security lead investment flows in the direction of renewable energy and enhanced energy efficiency, energy production from carbon and other $CO_2$-intense alternatives, for example the exploration of oil sands in Canada, still attract major parts of capital inflow. Thus, financial markets experience the so-called "Carbon Paradox" since the global discussion on climate protection coincides with an unexpected investment boom in the coal market. The reference scenario of the International Energy Agency predicts the large scale experiment mentioned above. However, the jump in emissions that was observable over the last years even exceeded the assumptions made in this scenario. Up to now the experiment is undamped, it is even accelerated.

**Never too late**

It is never
too late
for the lie
that it
is too late
and for the lie
that it is
never
too late.

*Erich Fried (translation: Germanwatch)*

### 3.1.1 More than ten single large-scale experiments

Scientific research has repeatedly shown within the last years that the trespassing of certain threshold values regarding the rise of global temperature could cause abrupt and irreversible changes in the system of the earth. We must be prepared to face these consequences when global warming reaches certain tipping points. The relation between global climate and the system of the earth is a complex and non-linear process including several feedback loops. The history of the earth shows that ocean streams have frequently stalled abruptly and that ice shields have suddenly melted or the monsoon has unexpectedly collapsed. Often even small disruptions were sufficient to entail fundamental changes.

[17] Rahmstorf et al., 2007

Simulations that are based on the knowledge about abrupt climate changes in the past as well as the scientific school of analysing highly complex processes that has been established since the 1970s support the finding that our climate and the system of the earth might react to this larger and accelerated greenhouse gas experiment with changes of enormous magnitude.

Will Steffen from Australia who used to be director of the International Geosphere Biosphere Programme from 1998 to 2004 summarizes: "Sudden changes are the rule and not an exception."[18] Are we blinded by an unjustified feeling of safety having experienced the benefits of an era of relatively stable climate which enabled our modern and complex cultures to thrive and prosper?

We live in a geological phase of exceptionally stable climate conditions. According to Richard Alley, one of the leading scientists documenting the unanticipated rapid melting process in Greenland, there were only two periods of that kind within the last 100,000 years. The first one, when the ice sheets were the biggest and the world was the coldest. The second one is the period we are living in. He refers to the example of strong temperature fluctuations that occurred at the end of the last ice age around 12,000 years ago when the ice sheets all over Europe retreated. Suddenly the temperature trend reversed and for the following 1,000 years the world was caught in a new cold spell that finally came to an abrupt end. According to the analysis of the ice nucleus that was done by Alley and his research colleagues temperatures increased by at least 5 degrees celsius over a period of only 10 years.[19]

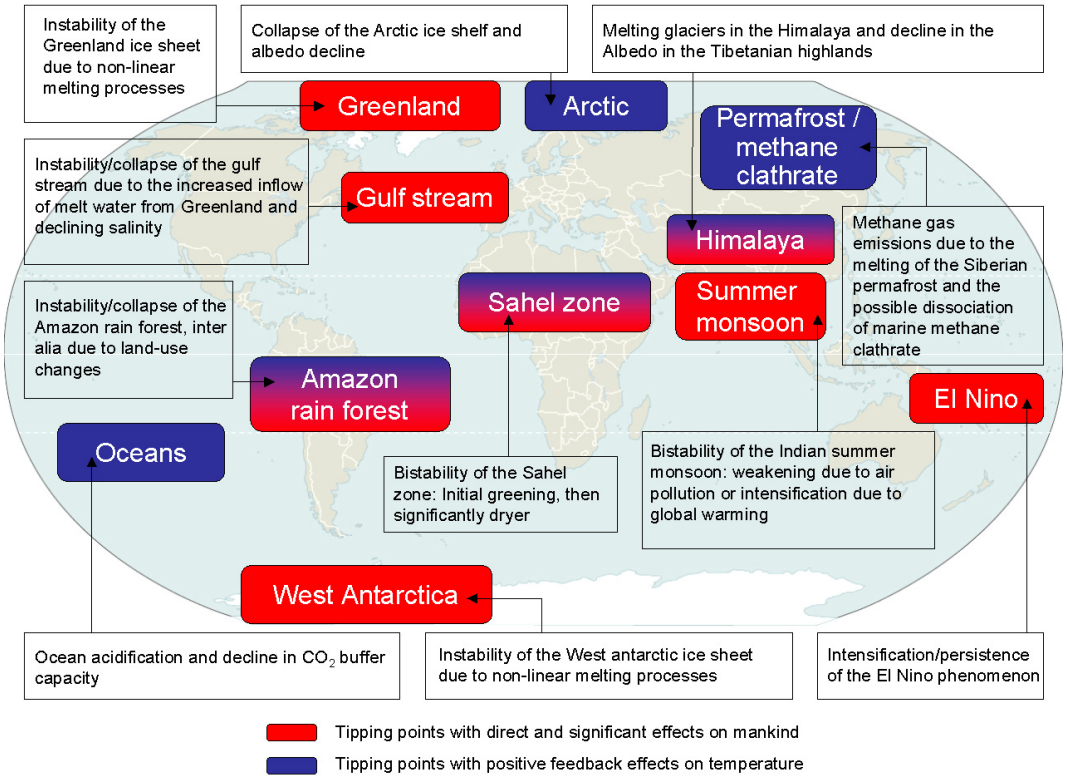
**The second expulsion from paradise?**

As a consequence of exceeding certain threshold values of global waming we might face a second expulsion from paradise: the paradise of stability which sheltered human civilization for the last 10,000 years.

Several possible tipping points have been identified so far. John Schellnhuber has developed the first version of the map[20] that has become an icon by now and that illustrates the rapid climate change and its effects. This icon is one of the "prostheses of political imagination", which help to visualise the unimaginable. Murray Gell-Mann who was awarded the Nobel Prize for physics in 1969 asks for instruments like these considering the highly complex challenges that our geological system is confronted with. We here show a revised version of this icon.

In some cases exceeding certain temperature thresholds could entail dangerous positive feedback (blue), in other cases there could be enormous direct consequences for human life (red) and in some cases both reactions could occur in parallel (red-blue).

[18] Cited from Pearce, 2007: 42.
[19] See Pearce, 2007, p. 43.
[20] Kemp, 2005




Source: Germanwatch, adapted from Schellnhuber, personal communication, 2007

For several tipping points the critical value of global temperature rise lies in the range of 2 to 5 degrees Celsius compared to preindustrial level.[21] However, at least in Greenland it cannot be excluded that an irreversible melting process might possibly already be induced by an even lower increase of global temperature.

Many aspects of these highly complex processes are not yet fully understood. The models that are used by climate scientists are not yet advanced enough to illustrate these dynamic processes with their multiple feedback loops. For some of the phenomena it will always be impossible to make reliable predictions since even minimal fluctuations at decisive points can induce very different outcomes. Therefore the anticipated developments are no deterministic predictions but rather well justified scenarios. On a scale of 0 to 100 Hans Joachim Schellnhuber, president of the Potsdam Insitute of Climate Impact Research and climate advisor of the German chancellor since the beginning of 2007, estimates the reliability of the simulation results for many of the feedback processes ranging "maybe at 30 to 50, for others only at 10".[22]

Hence there is no reason for anyone to pretend that there is an exact forecast of the future with regard to these non-linear, extremely complex processes. "We are conducting a disastrous experiment whose outcome we are just about to see", summarizes the theoretical physicist David Gross who received the Nobel Prize in 2004 for his contribution to quark

[21] John Schellnhuber is currently editing a special issue of the research journal PNAS (Proceedings of the National Academy of Sciences), in which leading experts estimate the probability that certain tipping points will be reached and what the threshold values are. As soon as this information is available we will update our own estimates that are based on various sources.
[22] Schellnhuber, 2007

research. "We do not have the appropriate instruments to anticipate the impacts of these drastic changes that we are talking about. The only serious climate experiment that we can conduct is the experiment that is done by emitting greenhouse gases. Only when we actually experience these devastating non-linear effects we will truly know where this is leading."

Gerhard Berz was head of the department of geological risks at the Munich Re, one of the world biggest re-insurance companies, for several decades – his role was comparable to being the "master of disaster". During the conversation with the Germanwatch team he points out another aspect: "If we were heading towards another ice age we would have a rough idea of what to expect. In this case we could use our knowledge about the past. But we are not given a map when entering the future of the greenhouse earth."

Outlooks on this type of abrupt change must therefore be handled with care. However, together with geological simulations showing that many of the described tipping point processes have already taken place before in the history of our planet the latest computer models indicate the dimension of the large scale experiment with mankind and nature that is conducted through the continuing climate change and the dimension of the surprises that we should be prepared to experience.

**Call the problem by its name?**

For the last two years the Germanwatch staff and the board members have been intensely discussing the question of how we should address the experiment of man-made climate change that is becoming more and more visible and that might have substantial impacts on the lives of billions of people if certain threshold values are exceeded. Does communication of this kind not inevitably result in fatalism? Since Germanwatch started addressing the issue of global climate change in 1992 it has been led by the principle that fear is a bad advisor. Facing the necessity of fundamentally transforming our society, hysteria is the least we need.

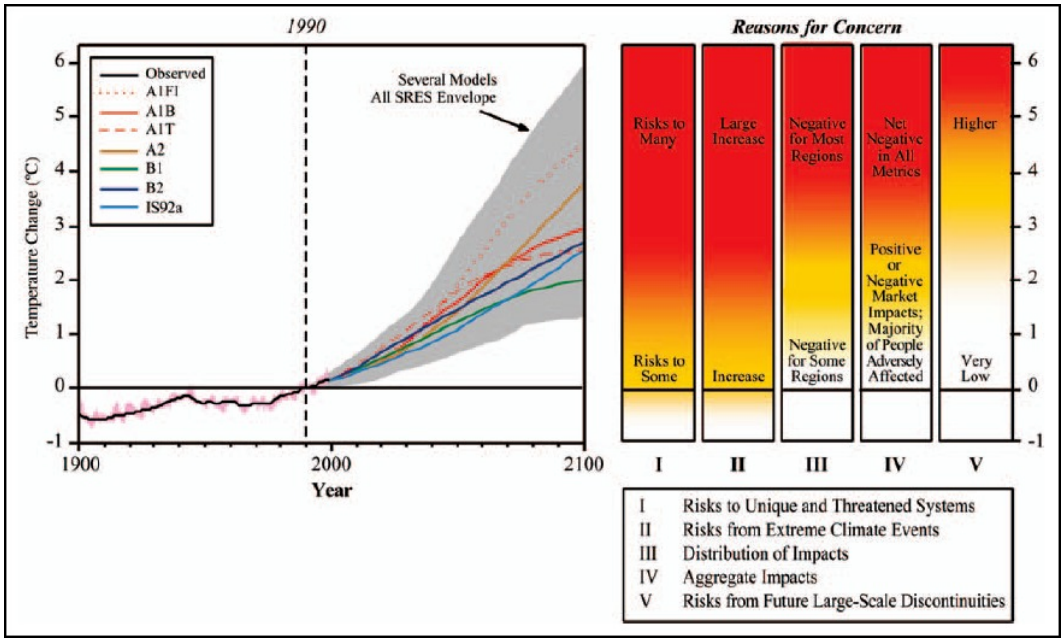
Nevertheless we decided to impart our knowledge with decision makers and the public. As soon as there exist well-founded presumptions about the disastrous outcomes and as soon as more and more observations point in this direction it is our duty to convey the information to the affected people and to the political and economic decision-makers who are able to react. We are whitnessing an experiment with mankind that is conducted without the prior informed consent of the affected individuals.

We therefore agreed on deliberately addressing the issue in public. However, first of all we want to explicitely point out the uncertainties. Secondly we want to show clearly that this is not a prediction but hopefully nothing more than a self-destroying prophecy. We hope that the anticipation of future dangers will enhance the formation of a mobilized civil society that will be able to avert exactly these risks. It would be a success if the prophecy was proven wrong by the future. Thirdly we intend to communicate the information on tipping points and their consequences in a way that is not fostering fatalism. Instead we rather wish to motivate young and old people to engage in the name of climate protection and adaptation with their minds, their hearts and their hands. Avoiding each tenth of a degree of global temperature rise is worth fighting for.

The risk of extensive discontinuities is a category of particularly drastic dangers induced by the continuing increase of global temperatures. However there are other equally important risk categories whose occurrence is highly dangerous even without taking discontinities into account:

- the loss of unique ecosystems
- the increasing number of extreme weather events
- the probability that the negative effects of climate change outweigh the positive ones on global average.

Even a rise in global temperature by 1.5 to 2.5 degrees compared to preindustrial levels causes these risks to increase significantly.




Source: Schneider / Lane, 2006

## 3.1.2 Ways out of the large-scale experiment

The latest IPCC report states keeping global temperature increase below 2 to 2.4 degrees Celsius requires reaching the peak of emissions between 2000 and 2015 and declining afterwards by 50 to 80 per cent until 2050 as compared to 1990.[23]

In an email from November 2007 Bill Hare, an Australian scientist and strategic leader of Greenpeace International who has observed negotiations right from their start called on his NGO colleagues for joint efforts: "There is no doubting that the next few years, starting with Bali are going to be decisive and there is no doubting that the voice from the environmental community is going to be critical to getting the scale of action agreed. Our voice needs to be clear, honest, strong, resolute, courageous, resourceful and finally, fierce."

[23] IPCC, 2007: p. 15; table SPM. 5

The following two scenarios (climate apartheid and global climate partnership) are based on the attempt to avoid a rise in global temperature of more than 1.5 to 2.5 degrees Celsius. They therefore correspond to the precautionary principle and Article three of the Universal Declareation of Human Rights: "Everyone has the right to life, liberty and security of person."[24] The *avoidance of the unmanageable* here serves as the guiding principle. Still both scenarios differ in central points. After all we face the question whether we are heading for an ecological dictatorship where the rich secure their priviliges while assigning the poor with climate protection or whether we are heading for a global climate partnership that comprises global, regional and bilateral elements. There are two main differences between the scenarios. One can be found in the degree of fairness that is reflected in the allocation of opportunities and risks related to climate protection, adaptation and possible catastrophies. The second one shows in the legitimacy of the applied measures.

## 3.2 Scenario B: Climate apartheid

At the UN conference on environment and development in Rio de Janeiro (1992) the former President of the United States, George Bush, signed the UN Framework Convention on Climate Change that defines in Article 2 the objective of avoiding dangerous climate change. Accomplishment of this goal would imply a reduction of global emissions by at least 50 percent as compared to 1990.[25] On the exact same Earth Summit the U.S. president also announced that the American way of life is not a matter under discussion. It is not impossible that there are paths towards a new, low-emission model of prosperity. But there are severe doubts whether it is possible to make a lifestyle that is based on air and car traffic, carbon based energy supply, air-conditioned bungalows and meat-intensive nutrition accessible for everyone and to avoid the dangerous impacts of climate change at the same time. Without an ecological transformation of today's dominating life style in industrial countries and among the booming elites of the emerging economies retaining this way of life is "structurally unfair – or only at the price of making the earth unhospitable".[26] Many people in the industrialising and developing countries fear a climate apartheid that allows industrial countries to secure their privileges and take advantage of the necessity for climate protection by using it to keep new competitors off the stage of global economics. That is one of the main reasons why the emerging nations, particularly China and India, hesitate to commit themselves to international climate protection.

First of all it is a question of justice: Why should they consider commitments as long as the United States with per capita emissions that are five times as high as in China and even twenty times as high as in India are not willing and getting active to reduce accordingly? Since the industrial revolution the European and American progress has been built on fossil energy sources such as coal, oil and gas. "And just when we – the Chinese and the Indians – are about to develop they say: You cannot do that anymore," points out A. Sen, Nobel Prize winner for economy. Secondly, international climate protection is a

[24] OHCR, 1948
[25] IPCC, 2007: 15
[26] Sachs/Santarius, 2005: p. 158

matter of legitimacy and participation – it is understandable that particularly India being the largest democracy worldwide is very sensitive to this issue. One has the impression that the international institutions including the UN and their Security Council, the WTO or the World Bank, do not properly integrate the individuals and states that are mostly affected by their decisions.

That is why the well-known Indian environmentalist Sunita Narain (CSE) is worried that industrial countries will not change their behaviour but instead intend to deny the industrialising countries their right on mitigating poverty and development through growth. She criticises the arrogant attitude of the industrial nations that used fossil energy sources to accumulate their wealth and thereby excluded the rest of the world from experiencing this kind of development. And now – without having even implemented any ambitious climate protection mesaures themselves – they demand drastic efforts from the newly industrialising countries.

Energy-related $CO_2$ emissions in the USA have increased by almost 20 per cent within the time period between 1990 and 2005. Similarly, those of the EU-27 only decreased by 3 per cent – the "Gorbatschow effect" in the new EU member states accounts for parts of this reduction. In the EU-15 emissions actually increased over the same time period by almost 5 per cent. There is no doubt: The convincing evidence that prosperity without fossil energy sources is feasible has not yet been provided by the industrial countries although they promised in Kyoto in 1997 to take a leadership role. As long as this is the case it is fairly understandable that the emerging economies are hesitant to become involved in the international climate strategy.

**The EU as a leader towards a new model of prosperity that yields a twofold return on climate protection?**

Many observers consider the EU's decision from March 2007 (to reduce greenhouse gas emission by at least 20 per cent as compared to 1990 until 2020 and even by 30 per cent in the framework of an international treaty) to be a first serious start-up to demonstrate that an almost carbon neutral model of prosperity is actually feasible. Taking the lead in climate protection is important for the EU – also regarding its own emission trends. However, even more important is that a rapid implementation of the announced climate policies provides evidence that low emissions and wealth do not exclude each other.

Sunita Narain only needs a few seconds speaking in a clear and explicit language that contrasts with her friendly smile to fascinate her listeners: "Nowadays the emission of greenhouse gases is closely linked with economic growth. Up to now no country succeeded in reinventing the battery of economic growth without fossil fuels. Up to now no industrial country has developed a low-emission economy", she calls out in the room and smiles friendly at her listeners. And she is right. Only if important industrial countries provide this evidence there is a realistic chance that emerging economies will choose this path as well. And if not the EU, who else is in the position to demonstrate the feasibility of this alternative approach that is of central relevance to the global acceptance of stringent mitigation targets? Supposedly the leadership position of the EU and other important industrial countries in the development of a climate friendly form of wealth is the pre-

condition for emerging nations to see the opportunities offered by the present situation. In fact, they have access to significantly more advanced technological alternatives as compared to the time of industrialisation. The lack of a sufficient infrastructure of energy supply in the newly industrialising countries offers the opportunity to "leap-frog" the inefficiencies and the mistakes of the industrialised countries. In contrast to that the developed structures in industrialised countries have created a situation in which transformation and reformation are far more complicated and difficult.

The effectiveness of European climate policy must be measured against two criteria: Does it represent a marked step towards a new low-emission model of economic prosperity that furthers climate protection and energy security at the same time? And is this step – reasonable legislation is crucial here – replicable in other regions of the world, particularly in the newly industrialising countries? The exceptionally successful German law on renewable energies (EEG) and the not yet optimal but very important EU Emissions Trading Scheme serve as examples of legal regulations that are "exported" to a growing number of countries worldwide.

**Will the EU have the courage to demonstrate its position as a "Soft Power" in global politics?**

There are observable trends in several states of the U.S. which suggest that a competition among industrial nations concerning the realisation of this innovative prosperity model might emerge as soon as the EU makes the first step. (If this turns out to be true, Europeans have to be aware of the strong competition since innovative and highly productive industries in other countries are ready to take off as well!) Moreover this development could provide significant stimulations in the emerging economies – that effect would be the biggest success for climate politics! It would prove that global climate protection is not about the industrial countries trying to manifest their privileges regarding emissions but it would help to establish an atmosphere of trust. The decision of the EU to work towards the establishment of a new and credible model of prosperity that includes drastically reduced greenhouse gas emissions would clearly demonstrate that we are heading towards a future that is far away from climate apartheid.

**Merkel’s suggestion of equal per capita emission allowances**

Keeping this in mind, the suggestion of the German chancellor, Angela Merkel, to adjust global per capita emissions to an equal level of two tons per person in order to comply with the two degree limit in a fair manner should be interpreted as a trust-building measure. This proposition clearly implies that the scenario of climate apartheid is inacceptable. Thinking of a model of equal per capita emissions is a central focus of all scenarios that are based on a global climate partnership.

However, the attempt to actually enforce the model of equal per capita emissions in the near future might have counterproductive effects. As long as neither the EU nor other large industrial countries have made any significant steps to implement the low-emission model of economic prosperity the equal emissions regime is out of question, not only for the USA but also for emerging nations such as China or South Africa. In fact, the Chinese government aims for quadrupling its gross domestic product within the time period from 2000 to 2020. Therefore it will only be willing to consider climate protection if the com-

patibility of growth and emission reductions is made visible. In the present situation the optimum for China would be a commitment to lower energy consumption or emissions per unit of economic output.

Nevertheless, a fair allocation of emission reduction targets is the basic requisite for a global climate partnership. And the shared vision of equal per capita emission rights is the logical starting point for constructive discussions.

**Evaluation of the approach of the present U.S. government**

What is the meaning of the new proposal presented in October by U.S. President George W. Bush in this context?

It basically shows that the U.S. government has finally an international climate strategy that goes beyond the destructive attitude of the last years. But how constructive is this strategy? Its main objective is to close the gap that the UN Framework Convention on Climate Change has closed by introducing the principle of "common but differentiated responsibility". It is the gap between those countries on the one side that are historically the biggest greenhouse gas emitters and that even today have the highest per capita emissions worldwide and those countries on the other side that experienced a jump in development over recent years, entailing increasing emissions. However, per capita emissions in these countries are still comparably low and the majority of the population still suffers from disastrous poverty.

The rhetoric of the U.S. government had two main implications: First of all, we all have to get active – which is itself nothing new – however, the common action should not be organized by the principle of common but differentiated responsibilities but instead the rich and the poor should move in lockstep. And second of all, we are economically not in the position to accept binding targets. Crystal clear is Sunita Narain’s comment on this point: "This is the ultimate and deadly bribe to seduce India and China." She sees the main message of the U.S. approach as follows: "We will not allow the Europeans and others to push us into legally binding targets. This way is better: voluntary commitments and no targets." But Sunitra Narain contradicts: "Just think. This is a way in which we will all go to hell together. The fact is that the world needs to act." (Narain, 2007).

In detail Bush suggests:

- Those countries with the highest emissions join in a process organised by the USA to aim for a common, non-binding long-term goal. (These targets are not expected to be very ambitious since the most affected small island states and the poorest developing countries do not participate in the negotiations.)
- In a next step every country should determine its individual strategy to contribute to the accomplishment of this long-term goal. Setting global and national targets without any obligation means gambling with the climate security of mankind. This is because players of the financial markets have clearly signalled that the necessary reformation of investment streams towards low-emission technologies requires a binding political

framework (emission trading or eco-tax) that is relevant to financial decision-making.[27]

- Bush's government denies the need for a strong $CO_2$ price signal that is either set through emissions trading or taxation. Instead it hopes for technological innovations. But even if these will actually become reality, which we all hope for, they require suitable political and financial regulations. A clear and long-term $CO_2$ price signal serves as a necessary but not yet sufficient instrument.

- Finally the U.S. president adds a significant cutback: A country's accesss to energy sources, its state of development and its economic needs should be considered in the definition of emission targets.[28] That sounds like a banality. But it actually implies that the current government of the richest country in the world intends to relativise the need for climate protection according to its individual economic objectives and its climate-unfriendly lifestyle. This attitude is incompatible with a commitment to the necessary cuts in emissions.

After all the U.S. government confronts the rest of the world with the following alternatives: Large-scale climate experiment or climate apartheid – the latter option including a manifestation of American privileges and serious climate protection by all other countries. The U.S. government will probably know how to make their proposal sound positive. One therefore has to pay attention to the information that is given between the lines which reveals very different scenarios from what one might think at first glance.

**A strategy how to deal with the USA**

"We must start climate negotiations in Bali and finish them with a different U.S. government", summarises Jennifer Morgan. She is one of the NGO characters that contributed large parts to the progress of international climate protection over the last years. She used to be the head of the WWF climate change department and is currently working for E3G[29] and she is indeed one of the strategic minds behind the global NGO network. She points out that efforts should be focused on the realisation of a new UN treaty until 2009 and the definition of an ambitious climate protection goal for the USA.

The negotiators from all over the world now face a twofold challenge: On the one hand they have to make sure that the negotiation package that is developed with the current U.S. administration includes all relevant aspects so that negotiations can be finished off with the subsequent government. On the other hand, high-level talks with the senate and possible presidential candidates need to be arranged in order to coordinate future cooperation between the USA and the UN in the joint effort to enhance global climate protection.[30]

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[27] "Financial markets need a clear and long-term regulating framework to enable them to fulfill their function." This is said in a statement of the "Finanz-Forum: Klimawandel" on the occasion of the second climate research summit organised by the Federal Ministry of Education and Research (BMBF, 2007).
[28] White House, 2007
[29] www.e3g.org
[30] The so-called ICAP-initiative that aims for a climate cooperation between the EU and individual states in the USA and elsewhere represents a step in this direction.

The future will significantly depend on the ability of the new U.S. president to understand the climate issue as a security issue (and not "only" as an environmental issue). This point of view enables him to lead the USA, including the Congress, back into the UN alliance for climate protection. Through demonstrating an appropriate cooperative leadership style a new U.S. government would be able to at least partly regain international trust that was lost due to the Iraq disaster.

## *3.3 Scenario C: Global partnership on climate protection*

The main focus of the UN Climate Conference in Bali is directed on organising international negotiations in a way that allows for the agreement on a global partnership on climate protection until 2009. The main objective is to develop a roadmap for further proceeding that includes:

- serious negotiations on a post 2012 agreement
- which have a workable structure
- and which in particular define the commitmens of industrial countries within the framework of a global partnership with regards to mitigation and adaptation in developing countries.
- These commitments have to reflect ambition to comply with the two-degree limit and reflect the vision of equal per capita emissions and
- they need to be complemented by fair contributions of the emerging economies following the principle of common but differentiated responsibilities.
- This process has to come to an end within an appropriate time frame, i.e. until 2009.

**"Only" the beginning of serious negotiations?**

Some people among the general public might be disappointed. Considering the public pressure of the last 18 months one could expect decisions on further commitments instead of "only" the preliminary arrangement of serious future negotiations. But this viewpoint reflects a certain degree of naivity and the failure to really understand the dimension of this task. It is about setting the stage for a massive transformation of the energy, traffic, building, agriculture and forestry system. It is about the first technological revolution that is initiated by political regulation. Considering that this revolution must be debated among more than 150 states a 2-year time frame is extremely ambitious.

### 3.3.1 Principles for a process oriented at the idea of a global climate partnership

Bali has to result in negotiations which are no longer based on the rules of horse-trading but instead focus on finding a common answer to the problem of providing a global public good (the prevention of dangerous climate change, Article 2 of the Framework Convention on Climate Change).

This goal can only be achieved if we stop quarreling over burden sharing with sorrowful faces but instead enter the race for a new model of prosperity – driven by an active civil society and supported by financial markets that see opportunities in the oncoming massive transformation[31].

The following central criteria and principles should serve as an orientation in the upcoming negotiation process:

- ***Climate effectiveness:*** The negotiation process must provide the basis for passing a treaty by 2009 that leads towards limiting global warming to less than two degrees celsius as compared to preindustrial levels. The treaty must therefore give highest priority to setting the stage for reaching the peak of global emissions by 2015 to 2020. The long-term goal must be to reduce global emissions by 50 to 85 per cent (compared to 2000) until 2050.[32] Moreover, the agreement should be comprehensive in terms of including all relevant and methodologically sound carbon sinks as well as emissions from air and maritime traffic and it should provide incentives to avoid deforestation on a national level.

- More concretely, this requires a negotiation process that leads to a reduction commitment of 30 to 40 per cent until 2020 (compared to 1990) in industrial countries on the one hand;

  and that replaces the previous talks about the fair share of emerging nations by serious negotations. It is not necessary that these negotiations result in absolute emission limits or even reduction targets for newly industrialising countries. However, increasing energy efficiency by 4 per cent annually as compared to the business as usual scenario would be required. The implementation of appropriate measures would reduce costs, enhance energy security and support climate protection at the same time.

- ***Equity:*** The process should aim to create a global climate partnership. The idea of common but differentiated responsibilities is a basic principle of the Framework Convention on Climate Change which applies to both emission reductions and adaptation. Equal per capita emission allowances worldwide by the middle of the century ought to be an important guideline.

- ***Dimension of adaptation:*** We need a larger range of opportunities to finance adaptation to climate change and we must provide financial security for its victims. Many industrial countries have not yet realised that they have to enter into substantial financial commitments in the area of adaptation in order to successfully conclude the negotiations.

[31] Potsdam Memorandum, 2007

[32] Of course, reaching the trend reversal in global emissions before 2015 is preferable from a climate protection perspective. However, taking into account that emissions have grown progressively worldwide over the last couple of years this objective appears to be beyond reach. Possibly technological breakthroughs will make more ambitious reduction targets than 50 to 85 per cent appear feasible but for the time being, keeping the right to development and social issues in mind this seems to be rather unrealistic.

- Here it is crucial to support local approaches to adaptation. Moreover innovative instruments of risk allocation such as internationally co-financed insurance instruments need to be developed. They not only help to bear the damages but also to initiate local adaptation processes.

- ***Relevance for Investment:*** The international market for emission allowances needs an effective political framework that is considered to be "long, loud and legal"[33] and that induces the development and significantly accelerated implementation of innovative technologies. Bali must send a clear signal to the financial markets assuring that the chosen path will be continued with even more stringent targets and a more considerable price signal.

- The framework needs to coherently comply with developmental and environmental targets. This means on the one hand that the climate targets mentioned above need to be coherent with the objective of energy security and on the other hand that the framework has to include a strategy of decarbonisation in developing and industrialising countries which aims at reducing emissions and furthering adaptation without eroding the millenium development goals.[34]

- Aside from preventing dangerous climate change, Article two of the Framework Convention on Climate Change defines sustainable development as a major goal.

- a framework that enables a boom in technological development;

- an impulse for innovation and technological cooperation (south-south; north-south)

- the climate regime as a self-sustaining system of combined incentives for climate protection and adaptation;

- synergies between the central UN process and complementary processes (Gleneagles, G8, the U.S. meeting etc.).

Convincing the US government that the relevant negotiations must take place within the framework of the UN can be considered a breakthrough of the G8 summit in Heiligendamm. This is important to garantuee the bindingness under international law. Moreover it implies that the debate is not only dominated by the most powerful emitters but it ensures the integration of the most affected countries. Chances for serious discussions under the roof of the UN have further improved after the attempt of the US government failed to initiate a competing parallel process by organising a meeting of the highest emitting countries in Washington in September 2007. In fact, even at their own conference the position of the US government seemed to be rather isolated.

[33] see defra, 2006
[34] Harmeling/Bals, 2007a

### 3.3.2 The complex negotiation structure in Bali

It is a key question how the highly complex negotiations with their multiple threads can be organised in a constructive way. It is favourable if negotiations on "only" two levels will take place in Bali – after the preparatory meeting in Bogor this prospect has become more and more likely.

#### *3.3.2.1 Kyoto negotiations*

On the one hand there will be negotiations on the second commitment period of the Kyoto Protocol. (In contrast to what is said in many newspapers it is not the Protocol itself that expires but only its first commitment period.) Here the focus of discussion will be placed on binding reduction targets for industrial countries. The process is complicated by the fact that the USA and Australia do not take part in the negotiations. Regarding Australia this situation might change if a new government is elected in November. The opposition has already announced to ratify the Kyoto Protocol. However, the US government will only take the part of an observer.

Another point is the future advancement of the "Clean Development Mechanism" (CDM) that should provide significantly improved incentives for climate protection measures in emerging and developing nations (see also the section on CDM further below).

The institutional integration, strengthening and expansion of the Adaptation Fund is another important issue that will be debated in Bali.

#### *3.3.2.2 Negotiations within the UN Framework Convention on Climate Change*

The second major negotiation package happens within the UN Framework Convention on Climate Change (UNFCCC). In this context not only all of the large newly industrialising and developing countries take part in the negotiations but also the USA and Australia are included since they also ratified the convention. It is very important to transform the non-committal dialogue that has been established on this level into serious negotiations.

Of crucial meaning will be the negotiation package on the support for adaptation measures.

Secondly, on this level regulating technology transfer and cooperation will be dealt with.

A crucial point will be whether the emerging economies demonstrate their willingness to enter serious negotiations on their fair contribution to climate protection. This will be significantly complicated by the fact that the US government will be present which does not accept any absolute and binding reduction targets for themselves. Only if a sufficient number of US representatives including members of the Senate, the Congress and possible future US presidential candidates assure the last word is not yet spoken one can hope for a corresponding movement within the industrialising countries.

Indonesia as the host country together with a group of important developing countries has a strong interest in working out a strategy that helps to combat deforestation on a national – not a project-based – level.

Another key question is the required capital for financing the support for developing countries in their efforts to further adaptation, protection of the forests and technology implementation – beyond the capacity of the CDM. In this issue there might occur overlaps with the negotiations on the Kyoto level, especially concerning the development of sectoral approaches within the CDM.

#### *3.3.2.3 Only one stream of negotiations from 2008 on?*

Many of the central actors hope that the consolidation of the Kyoto and the UNFCCC negotiation streams to a "committee of the whole" will be achieved at the UN climate conference in Posen (Poland). From this point on negotiations could come to carefully balanced results by the time of 2009 (UN climate conference in Copenhagen). The three hosts of the climate conferences (Indonesia, Poland and Denmark) have formed a working group that is in charge of coordinating the dramaturgy of the negotiations.

### 3.3.3 Mitigation: Avoiding the unmanageable

In order to avoid a dimension of global climate change that cannot be dealt with by the means of adaptation the treaty that needs to be passed by 2009 must comply with certain criteria. Bali has to lead to a mandate for these negotiations.

#### *3.3.3.1 Reversal of emission trends*

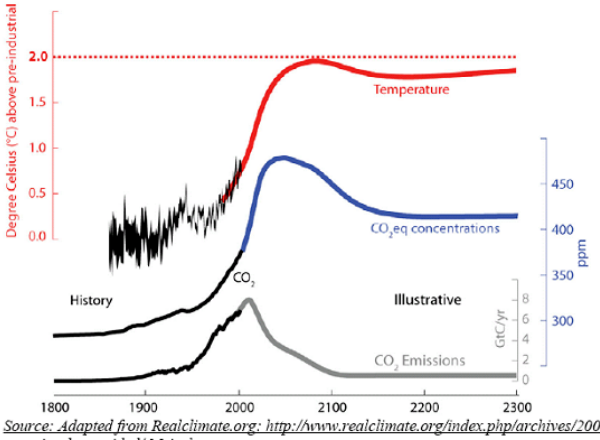
It is important to keep in mind that the peak of global emissions must be reached within the next 10 to 15 years and after that emissions have to decline massively to prevent dangerous climate change. Complying with the two-degree limit of global temperature increase as compared to preindustrial levels requires a drop in global emissions of 50 to 85 per cent (with 2000 as the base year) until 2050.

#### *3.3.3.2 Reduction targets for industrial countries*

One of the crucial points is the agreement on legally binding reduction targets for industrial countries. In the preliminary AWG negotiations in Vienna in August a reduction of 25 to 40 per cent compared to 1990 in industrial countries was considered so that the rise in temperatures should be limited to 2 to 2.4 degrees C as compared to preindustrial times. Germanwatch, however, demands that industrial countries will be committed to cutting emissions by 45 per cent on average until 2020 whereof 15 per cent maximum can be accomplished through international trade outside of the industrialised countries (CDM). (One must not ignore the fact that a 30 per cent target for industrial countries that can be completely accomplished by means of the CDM equals the abandonment of the two-degree limit. What is needed is a reduction of 30 per cent in industrial countries *in addition to* a significant decarbonisation of growth in the emerging nations. The emission target of industrial countries can only be adjusted if other financially meaningful support mechanisms are found that contribute to the decarbonisation in industrialising and developing countries.)

**Avoiding the Unmanageable**

- ***Climate effectiveness*** - Until 2009: deal that is compatible with the two-degree limit: Global emission peak before 2020 [2017], global emission reductions by 50 to 80 % until 2050 (compared to 1990)
- ***Emission reduction targets for industrial countries of 30 to 40 per cent until 2020*** (compared to 1990), feasible not more than 25 to 40 per cent
- 4 per cent increase in energy efficiency in industrialising countries
- Differentiation of DC
- Long term criterion: max. 2 tons $CO_2$ per person (middle of the century)




*Source: Adapted from Realclimate.org: http://www.realclimate.org/index.php/archives/2006/01/can-2c-warming-be-avoided/ Meinshausen*

### *3.3.3.3 Price signal through emission trading*

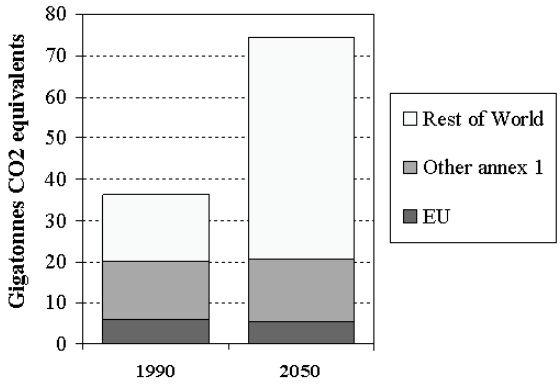
Without the establishment of an emission trading system that sets a "long, loud and legal" price signal the necessary redirection of investment streams will not take place. It is of importance that the price signal affects the decision to invest in the construction of coal-fired power plants and other technologies that finalise high emissions over a long period. However, the price signal that is set by emissions trading is only a necessary but not sufficient condition. Continuing with business as usual implies that 17 trillion US dollars will be invested in the energy sector until 2020, particularly in the exploitation of fossil energy sources. Without complementing measures a redirection of capital flows into sustainable energy supply structures cannot be accomplished.

### *3.3.3.4 A decarbonisation strategy for industrialising countries*

Entering the partnership for climate protection implies for newly industrialising countries that they have to initiate a process of massive decarbonisation of their economy. Significantly enhancing energy efficiency over the next decade should therefore be of highest priority. A well balanced strategy to reach this goal was put up for discussion by the Club of Madrid which is formed by former heads of state and government. It is suggested that industrialising countries enhance energy efficiency by 30 percent until 2020 – i.e. by 4 per cent annually over a period of seven years, from 2013 to 2020. After that these countries should be ready to commit to reduction targets. (Club de Madrid, 2007: p. 3). For reasons of justice emerging economies have the right to reject engaging in climate protection for a long time. This is because industrial countries account for the largest part of the high concentration of greenhouse gases in the atmosphere and they have thereby excluded other countries from using this resource. If they fail to lead the way towards serious climate protection, preventing dangerous climate change is impossible. Nevertheless, the industrial countries alone are not able to ensure compliance with the two-degree limit – even if they cut their emissions by 100 per cent until the middle of the century.

**The EU's share of global emissions**

**Projected development of greenhouse gas emissions in different regions of the world**




Source: Greenhouse gas reduction pathways in the UNFCCC process up to 2025, CNRS/LEPII-EPE, RIVM/MNP, ICCS-NTUA, CES-KUL (2003).

This chart demonstrates the business as usual development. Even if the EU succeeded in reducing emissions to zero the expected emissions in other countries would significantly exceed the acceptable level (15 to 50 per cent of the 1990 level). European climate policy that aims for compliance with the two-degree limit must therefore include a decrease in reductions by almost 100 per cent in addition to offering extensive support for the decarbonisation in emerging nations and developing countries.

#### *3.3.3.5 Grading or differentiating between developing countries*

Dealing with the whole block of developing countries according to the same criteria is more and more anachronistic – as if an equal treatment of Saudi Arabia, China, Tuvalu and Uganda could be considered reasonable and fair. A grading or differentiation that is based on fair criteria would be optimal. It is remarkable that most of the attempts to apply a grading differ significantly in their approaches but not in their outcomes. Worth mentioning is in this context the South-North-Paper published by the Wuppertal Institute and others.

#### *3.3.3.6 Financial incentives to reduce emissions due to deforestation and degradation (REDD) on a national level*

It is for sure that the stimulation of forest protection will be a central topic in Bali. In this context, it is important to consider the following principles.

There are at least three main reasons for improving protection of the rainforest: Biodiversity, climate protection and the people who depend on it. It is therefore a risk to search for a solution that isolates the aspect of climate change and that fails to take the other two problems into account.

It is important to realise that among the two ecological aspects the issue of biodiversity is logically dominating the issue of climate protection. A solution that is solely focused on providing incentives to combat climate change might imply opportunity costs concerning biodiversity. (This is particularly true in terms of afforestation but in a moderated form it also applies to avoided deforestation.) However, an incentive system that targets the preservation of biodiversity usually implies positive effects on climate. In pilot projects initiated by the carbon partnership that was formed at the G8 summit in Heiligendamm the establishment of biodiversity criteria could be tested. The discussion around the assessment of co-benefits could serve as an entry for these criteria into the negotation process. Moreover the next conference of the parties of the Convention on Biological Diversity

(CBD-COP9, Bonn 2008) could request from the UNFCCC to take biodiversity criteria into account when defining instruments concerning forestation.

Another point is that it is of importance to include the affected individuals into the possible solutions. They are mostly indigenous people living in the rainforest as well as farmers who make the land usable for them by the means of slash-and-burn.

It is equally crucial that it is not attempted to narrow the protection of the rainforest down to project-based approaches. Isolated projects are of no help – even though they offer positive local benefits – if rainforest is still being destroyed in the rest of the country. The impact of these projects is lost due to leakage. Solutions to REDD[35] should therefore be found on state level.

Integrating REDD into international emissions trading bears the risk that the market might be overstocked by cheap allowances. Thereby, the main stimulus for industrial countries to transform their economies as well as the incentives provided to emerging nations by a reformed CDM (sectoral or policy CDM) would be substantially weakened. Alternatively there are four different approaches to consider that can be combined in parts: i) other solutions, for example raising a fund; ii) creating a separated market for REDD certificates that is only allowed to cover a small part of the industrial countries' obligations; iii) setting accordingly higher targets for industrial countries; iv) using a high discount factor on REDD certificates.

#### *3.3.3.7 The integration of international aviation and shipping traffic*

The inclusion of international aviation and shipping traffic into a post 2012 agreement is overdue. This sector shows the fastest emission growth and that is why appropriate reduction targets are needed. In this context some additional steps appear reasonable:

- The EU negotiates with other states on developing an integrated emissions trading system. The integration of international air traffic should become part of these negotiations.
- Developing countries that benefit from tourism might be suggested to develop these CDM projects within their own country. The generated certificates could then be pooled in a fund that is also partly sustained by the money spent by airlines to buy additional allowances.

**The interrelation between decentralised and global elements of a Global climate partnership**

We refer to this scenario as a "Global climate partnership". To us, a trend-setting framework on UN level seems to be a necessary but not a sufficient basis for the required turnaround in climate politics. A synergetic interaction between decentralised approaches and those on UN level is crucial for a successful outcome. The following points are relevant:

- stringent regulations on a national level concerning climate protection, technology implementation and promotion of research;

- Bilateral and trilateral development cooperations among industrial and industrialising countries. For example, it is very important that the EU succeeds in forming cooperations of this kind with China, India, South Africa, and other emerging nations in order to build trust and provide access to technologies and policies.
- other multilateral processes such as G8+5, Gleneagles, the creation of an International Renewable Energy Agency (IRENA) make an important complementary contribution;
- The World Bank plays a key role in making sure that international financial flows are directed towards climate-friendly investments. Other central players are the IWF and the International Energy Agency.
- Regional approaches (like EU plus Africa) aiming for supporting sustainable development and adaptation to climate change. Regarding these approaches a major part of funding will rather be provided on a regional level than from centralised UN funds;
- Strong engagements of the cities where nowadays more than half of the people worldwide live;
- companies that proactively accept the challenge of developing business models that are compatible with the two-degree limit and thereby capitalise on new opportunities;
- A civil society that organises the necessary atmosphere of change and the pressure from below.

An example for civil action is the global day of action on December 8. In Germany the newly established "Klima-Allianz" (www.die-klima-allianz.de) organises events in Berlin and Neurath which will soon be the largest lignite power plant in the world.

**Deeply moved**

It is nice to be deeply moved
but it is even better to move yourself.

*Wolf Biermann (translation: Germanwatch)*

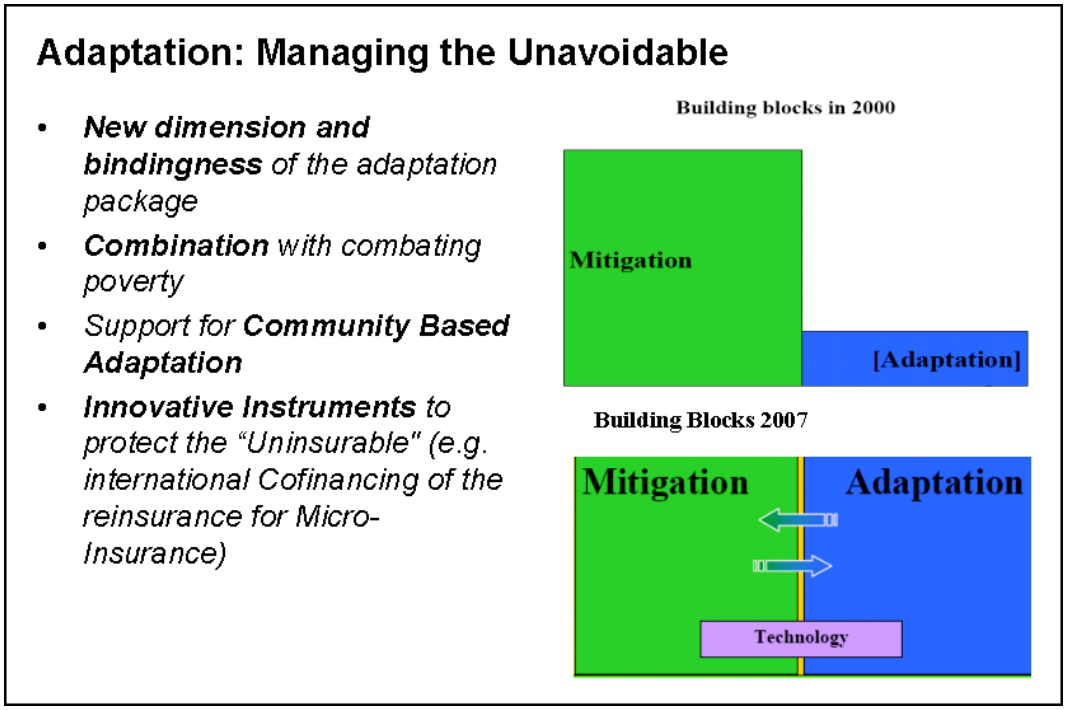
### 3.3.4 Adaptation: Managing the unavoidable

Mitigation – the avoidance of the unmanageable – is of central focus but it represents only one of the two pillars of a global climate partnership. Since the effects of climate change are already visible all around the world but particularly obvious in poor countries, means of adaptation need to be expanded.

Over the last years adaptation has doubtlessly gained in importance in international climate policy. In Bali several major decisions concerning adaptation are points of the agenda. With regards to a post 2012 agreement giving a significantly higher priority to

[35] Reducing Emissions from Deforestation (and Degradation) in Developing Countries

adaptation matters is a key question particularly from the perspective of those countries that are mostly affects by the negative consequences of climate change. Certain basic priniciples require further concretion so that a fair and just agreement can be found. These include the principle of common but differentiated responsibilites (for example with regard to greenhouse gas emissions) and capabilities, the polluter pays principle and the precautionary principle.




From Germanwatch's viewpoint the following four aspects represent minimum requirements in the area of adaptation that a fair and appropriate agreement needs to meet:

1. Sufficient and solid funding of adaptation measures and the coverage of damages caused by climate change in the most vulnerable countries, particularly LDCs and small island states. This can be achieved with the help of new and innovative financial instruments.

2. Giving priority to the needs of the most vulnerable groups of the population and to the locally developed approaches to adapting to the negative effects of anthropogenic climate change;

3. Scientific and technological support for the expansion of capacities to design and implement adaptation strategies;

4. Combination of supporting mechanisms with incentive mechanisms in order to maximise the effectiveness of adaptation strategies;

5. Consideration of the direkt link between adaptation and mitigation.

Already today it is obvious that the extent to which Annex I countries (industrial nations) financially support adaptation measures has two major implications. On the one hand it has an effect on the number of promising strategies that are developed and implemented

and on the other hand it positively affects chances for the realisation of a progressive post 2012 agreement. That is why financially relevant aspect will play an important role in Bali.

#### *3.3.4.1 Operationalisation of the Adaptation Fund (AF) of the Kyoto Protocol*

The AF must be considered an innovative financial mechanism. It must not be funded from voluntary payments from industrial countries but from a two per cent fee on Emission Reduction Certificates (CERs) that are generated through CDM and that are tradeable. The developing countries receive the capital that is generated this way in addition to the Official Development Assistance (ODA). This is a crucial point to many developing countries because they are afraid of losing a part of the ODA funding to fight poverty in exchange for the support of adaptation. According to different estimates the AF will contain between 160 and 950 million USD available for financing adaptation programmes. Taking the expansion of CDM in the medium term, i.e. during the second commitment period of the Kyoto Protocol into account one can even expect an increase in its financial volume. Furthermore, it is possible to contribute additional money to the fund, for example from private foundations.

After several fundamental decisions concerning the AF have been made at the Climate Conference in Nairobi the next step is to finalise its operationalisation. In detail, the AF's decision structure needs to be determined and the administrative institutions need to be elected. It does not make sense to organise the AF in a donor-driven way, that means putting its administration in the hands of the countries giving the assistance. Instead the affected countries should be in charge since they know best where the money is needed. Therefore particularly the G77 countries request that all of the Kyoto member states decide together on fundamental questions. This way the majority of the developing countries would be ensured.

While the EU and other industrial countries prefer the Global Environment Facility (GEF) that belongs to the World Bank – one of the reasons among others is that they deny the creation of a new institution – many of the developing countries assess this option sceptically: First of all because of the major influence of the USA in the GEF, even though the USA did not sign the Kyoto Protocol and therefore cannot directly affect the AF. Secondly, many developing countries criticise the management of the UNFCCC funds (Special Climate Change Fund and Least Developed Countries Fund). Therefore several actors think that the AF is distinguished enough to justify the creation of a separate institution with its own decision structure. Although a soon operationalisation of the AF is necessary so that urgent needs can be satisfied it is equally important to carefully and thoughtfully develop its decision making features. This is particularly true taking the AF's growing significance into account.

Another controversial subject is the choice of countries or regions that should benefit from the AF. It is hard to understand why a country like China should receive the same support from the AF as, for example, the LDCs or the small island states which are significantly less capable of funding any measures on their own. Particularly in the LDCs adaptation is closely linked to decreasing the general vulnerability through succesfully combating poverty. Therefore measures of adaptation and development assistance will be

inseparable in practice. They are intended to form an integrated strategy in order realise potential synergies. In this context there exist worries that the money from the AF might only be used to finance the extra costs of adaptation to the effects of anthropogenic climate change and not to support development in a wider context. A possible solution might be to reserve a part of the financial means for development-oriented adaptation measures and another part for purely infrastructural programmes such as the construction of dykes.[36]

Moreover it is important to separate the financing of adaptation to the negative impacts of climate change from adaptation to the negative impacts of climate policy. The latter argument is mainly put forward by G77 countries like Saudi Arabia or South Africa that see themselves as victims of the response to climate change and therefore request compensation. Saudi Arabians fear a decline in the demand for oil; South Africans are not willing to reduce their coal consumption. It is hardly imaginable that financial contributions to the AF would find political acceptance, for example, in the parliaments of the industrial countries, if the money could be used for compensation payments to Saudi Arabia for its lost profits that are entailed by reduced oil consumption in the name of climate protection.

#### *3.3.4.2 Expansion of the available funding for adaptation in developing countries*

Aside from the operationalisation of the AF it is equally important to significantly increase the total volume of capital that is available for adaptation in developing countries. A first step to widen the financial basis of the AF would be to extend the CDM fee (which flows in the AF) on the other mechanisms, Joint Implementation and Emissions Trading.

In the EU as well as in Germany it is debated to partly use the proceeds from the EU emissions trading scheme to finance adaptation measures in developing countries. It is expected that in Germany over 60 million Euros a year could be generated this way over the period from 2008 to 2012. The EU has suggested this approach with regard to the integration of air traffic into the emissions trading scheme. This instrument could also be considered by countries/regions like Norway or New Zealand that plan on introducing emission trading systems.

Müller and Hepburn suggest to impose a tax on international air traffic for adaptation (IATAL).[37] According to their calculations a fee of 10 USD per flight could generate 8 billion USD a year. However, some countries already impose a tax on flight tickets which contributes to the realisation of developmental targets (e.g. France and Luxembourg). Moreover the discussion on charging flight tickets has shown that a global consensus in this question seems beyond reach.

[36] Tompkins, E., N. Hultman, 2007: Funding adaptation to climate change: are the emerging institutions for financing adaptation already too inflexible? Working paper. 20 June 2007. http://www.puaf.umd.edu/ecolecon/details/fall2007/HultmanTompkins-WP-instfinance.pdf [26 July 2007].
[37] Müller, B., Hepburn, 2006: IATAL – an international air transportation adaptation levy. Oxford UK. Oxford Institute for Energy Studies.

#### *3.3.4.3 Further implementation of the Nairobi Work Programme*

The "Nairobi Work Programme on impacts, vulnerability and adaptation to climate change (NWP)" was determined at the UN Climate Conference 2006. It is supposed to further the understanding of the consequences of climate change and successful adaptation strategies. It is not likely that Bali will bring about any major decisions on this issue. However, the UNFCCC secretary will present a report on the progress within the previous year which may allow first conclusions about the efiiciency of this programme.

**New concepts concerning risk splitting and risk reduction**

1. The frequency of disasters due to weather and climate increases and particularly affected are the most vulnerable people in developing countries who are not able to pay for private insurance.[38] We therefore see a growing necessity for transferring parts of the risk of floods, droughts, hurricanes etc. to global financial and insurance markets and providing incentives for adaptation at the same time.

2. Private insurance alone will not be a solution for people in developing countries who are the most vulnerable but who are not able to pay for private insurance.

3. However, there is a rapid establishment of micro-insurances in developing countries. This development must not be undermined but supported.

4. For answering the question "How can we reach the poor?" we should definitely consider private-public partnerships (PPP). Almost all of the successful insurance systems that offer advantages to the poor in developing countries are PPPs of any kind.

5. Nevertheless, it is important that the involvement of the public authorities should not disturb a major function of insurance: Through insurance the society realises the price of risk – in this case the price of weather extremes. This implies that the risk share of the rate should not be subsidised. The contrary is true. Well designed insurance products can induce the implementation of risk-minimising adaptation measures. One could even think of a system where poor individuals pay their insurance rate by engaging in local efforts regarding flood prevention, drought management or storage of food.

6. One point is to make meteorological and risk-related data accessible. Another point is to enhance the availability of insurance and micro-insurance instruments. Moreover risk-allocation programmes for those who are not able to pay for private insurance could be invented and funded by international contributions. One possibility might be to create reinsurance opportunities for micro-insurances and other climate-related insurance instruments. The international community could cover risks that exceed a certain upper limit. Thereby the sensitivity of micro-insurance concepts and other climate-related insurances could be mitigated. Moreover, it would mean a lower rate payment for the persons concerned. As an example serves the index-based insurance system in Mongolia. Herdsmen are given the possibility to insure against the loss of their livelihood due to winter or extreme events. Minor losses that do not affect the foundation of their business are paid for by the herdsmen directly. More significant losses however, are transferred to the pri-

[38] Harmeling/Bals, 2007b

vate insurance industry. And the highest range of losses from disasters are covered by the World Bank. Multi-donor organisations might take this role in future, possibly in cooperation with the World Bank.

7. Where should the money come from? From our point of view Annex I countries should make binding commitments to contributing fixed annual contributions according to the principle of common but differentiated responsibilities and capabilities. It is crucial that the fund raising is done in a way that stimulates mitigation of greenhouse gases. The vision is a self-financed climate regime comprising a global system and regional subsystems.

8. What should be done next and who should do it? It does not make sense to start off with a global approach but it is better to gain experience fast in some particularly vulnerable regions. An African insurance organisation might be an appropriate start due to the exceptional vulnerability of the continent.

An alternative starting point might be seen in creating an insurance fund to support the necessary substantial transformation in the small island states (AOSIS).

9. Insurance instruments alone do not provide a sufficient solution to the problem. However, they can serve as an important part of an adaptation system that is drastically gaining in importance.

The development, transer and implementation of innovative methods and technologies is not only the key to mitigation but also to large-scale adaptation. Therefore, a negotiation package concerning technologies for adaptation and climate protection will be introduced in Bali.

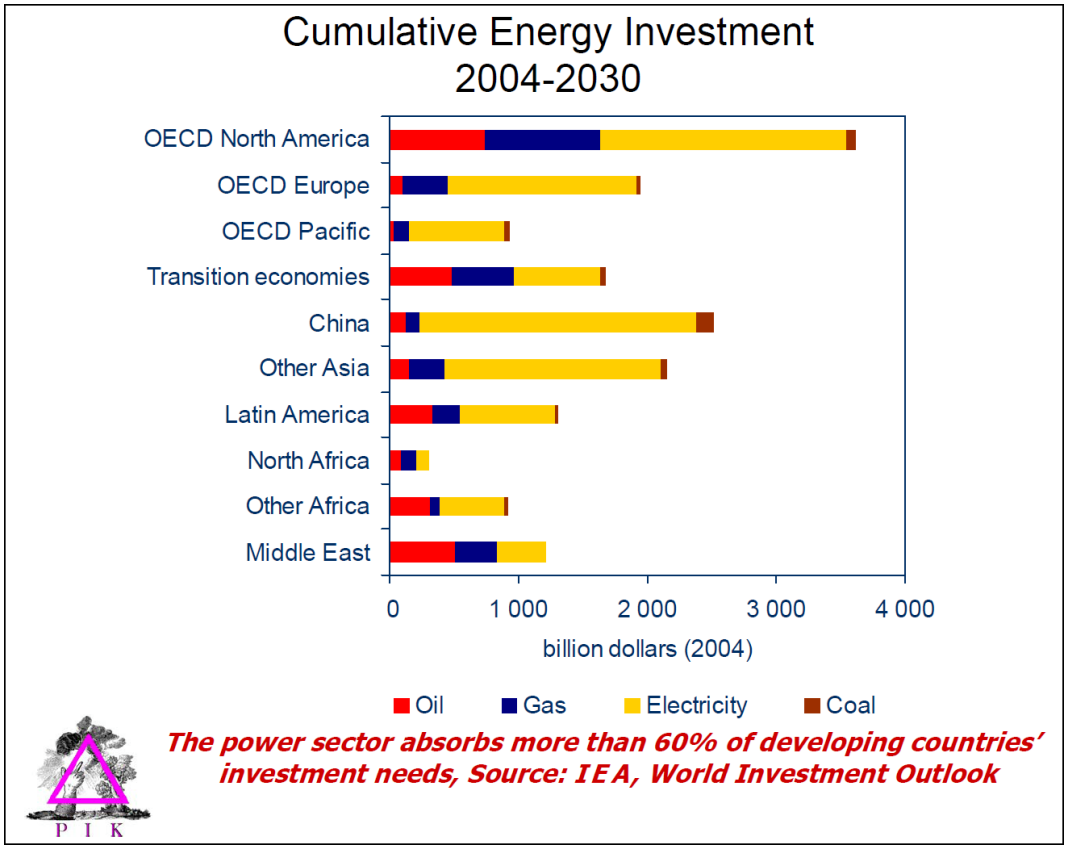
### 3.3.5 The litmus test: The relevance of the climate regime for investment

The effectiveness of a climate regime in the area of mitigation is measured by its capability of redirecting investment towards more climate-friendly alternatives.

As mentioned above, the financial market’s clear response says that the according regulations must be "long, loud and legal".

First of all the international market for $CO_2$ emission allowances needs to be considered. It is of crucial focus that the continuity of the emission trading system will be confirmed in Bali.

Assuming a business as usual scenario 17,000 billion US$ (IEA, World Energy Outlook 2004) will be invested in the energy system between 2004 and 2030. These investments will basically decide on whether the required climate-friendly transformation will remain possible without entailing major capital losses.




Source: Held, Edenhofer, 2007

Since the depreciation period of power plants normally exceeds a period of 10 years, two conclusions can be drawn. Firstly, it is reasonable to determine a second commitment period until 2020 instead of 2017 if a significant reduction target will be set. Secondly, it is important that the second commitment period is initiated in the knowledge that the system will definitely be continued with more stringent targets after 2020 even if concrete goals will only be negotiated years later. Negotiators must understand that an ambitional target is not sufficient to create investment security. This rather requires a strong and binding commitment to the continuation of the system. The remaining uncertainty regarding the exact target and the resulting $CO_2$ price can be handled by the financial market.

A clear price signal generated by international emissions trading is a necessary but not a sufficient condition to induce the required financial flows. Nicholas Stern (2007) demonstrated that stabilising emissions at a level of 550 ppm (for comparison: the EU targets a level of 450 ppm) implies the need for additional 69 billion US$ in developing countries until 2015 and even 294 billion US$ until 2025. In fact, emission trading is expected to generate only 24 billion US$ until 2015. This means that two thirds need to be funded from different sources. However, it is expected that by 2025 this relation will have reversed; the surplus from emission trading (173 billion US$) then is expected to cover almost two thirds of the required 294 billion US$. Although these figures are only rough estimates they still reflect the dimension of financing which will be needed to realise an ambitious reduction target that is still not ambitious enough.

The estimates below show the scale of additional costs that will need to be made in developing countries by 2015 and 2025 (at 550 stabilisation)

| | Costs in non OECD countries, per year 2015 | Costs in non OECD countries, per year 2025 |
|---|---|---|
| **Mitigation** | $69 billion | $294 billion |
| **Carbon market funding** | $24 billion | $173 billion |
| **Emerging technologies where further funding needed** | $45 billion | $121 billion |

Source: Morgan, 2007, after Stern, 2006

Moreover these figures point out that other sources will be needed to meet the financing requirements in the following years.

One should consider the following alternatives.

- Competition in developing and industrialising countries for the introduction of the latest technologies. This means that innovators from emerging nations present their new ideas on decarbonising instruments – such as a concept for using thermal solar energy or developing express bus systems in megacities. The winners should be offered financial support for realising their projects.
- Co-financing for incentive systems for large-scale demand-side management in terms of contracting.
- The various possibilities for a south-south transfer need to be supported because the technologies that are used there often are better adjusted to local conditions and needs.
- One must search for solutions to provide access to patent-registered technologies that are crucial to climate protection without thereby destroying the incentive for progress and innovation.
- However, often having access to patented technologies is not a problem but rather their implementation. In these cases consulting and maybe cofinancing for suitable national incentive systems might help.

### 3.3.6 A reformed CDM as an incentive framework in industrialising and developing countries

#### *3.3.6.1 Points of critique regarding the CDM*

There are many critical voices with regard to the implementation of the Clean Development Mechanism in its current form. The major points of criticism are:

3.3.6.1.1 The lack of sustainability

In many cases only one of the two objectives of the CDM was accomplished namely providing a low priced opportunity for industrial countries to comply with their mitigation goals through the realisation of climate protection measures abroad. The other objective that is mentioned in the Kyoto Protocol which is offering support to a sustainable development, however, was completely neglected. During the negotiation of the Kyoto Protocol and its rules of implementation the developing countries were the main opponents to international sustainability standards. They argued by referring to their sovereignty. But after all only a few developing countries have actually based their decision to accept CDM projects on stringent sustainability criteria. And even if this was done on paper the example of India reveals that there seem to be problems of realisation. The race for the lowest sustainability standards was even furthered by the countries' concern about not being allocated an appropriate share of the financial flow generated by the CDM.

3.3.6.1.2 The lack of involvement of the local population

Although the Kyoto Protocol provides better rules on the involvement of the local population than any other investment treaty its realisation often fails. Local NGOs often do not have the capacity to control systematically to what extent the participation requirements are met. However, analysing random samples in India has revealed that the relevant passage about how this obligation is fulfilled was frequently just copied and pasted from other documents.

3.3.6.1.3 Every CDM project impedes climate protection acitivities in industrial countries

Many NGOs in the North and the South have responded critically to the basic mechanism of the CDM. They raise the concern that industrial countries and companies are given the opportunity to free themselves from their own reduction obligations for low costs.

As a counter-argument it is often said that it does not matter where on earth greenhouse gases are emitted. However, it is efficient to realise mitigation as inexpensive as possible. But this argument is only relevant assuming that both alternatives involve investments that cause a shift in long term emission trends towards a low carbon economy. In fact, these long term investments are often avoided in industrial countries and instead "low hanging fruits" that do not affect long term emissions are realised in developing countries. In addition another problem needs to be considered. The market mechanism that identifies the most efficient ideas for projects is blind for the type of technology. Assuming that certain technologies (for example energy efficiency or renewable energies) are preferred

by society due to their contribution to securing energy supply or its lower risk, these preferences are not taken into account by the CDM in its current form.

#### 3.3.6.1.4 Substitutional instead of complementary projects

The structure of the CDM that defines it as a zero sum game where every climate protection success in the South is outweighed by less activity in the North is not the CDM's only weakness. Often not even this calculation is balanced. The CDM is then used to finance projects which would have been realised anyway assuming a business as usual scenario. Therefore, it is an obvious failure of the CDM that the people who apply for support for their projects are the ones to choose and pay someone to attest the supplemental character of the project. This conflict of interests needs to be corrected soon.

#### 3.3.6.1.5 Misleading incentives provided by the rule on the supplemental character of the projects

The rule on the supplemental character of the supported projects is offended also for another reason. It could contribute to the low number of realised projects concerning integrated climate protection (e.g. energy efficiency on the demand or supply side) because for this type of projects it is much more difficult to document their supplemental character.

But it is even worse: This might be a reason for why urgently needed legislation in industrialising countries is not realised yet. For example, if a law on renewable energy is introduced that effectively raises the rentability of investments in renewable energies then these projects become profitable even without the CDM. As a consequence these projects then become "business as usual" and cannot be considered to be supplemental anymore. In other words, a country with a progressive legislation does not benefit from the CDM whereas one without it does. It remains to be seen to what extent the present attempts of the CDM Executive Board to correct this mistake will have the desired effects.

#### 3.3.6.1.6 The lack of credibility concerning the measurement, the monitoring and the verification of mitigation

Concerns about the measurement, the monitoring and the verification regarding the CDM are frequently raised. It is obvious that now that the CDM has left its introduction phase a lot more needs to be invested in this infrastructure.

#### 3.3.6.1.7 Unequal allocation of CDM investments

Particularly less developed countries in the South have pushed for a rule about the fair allocation of CDM projects in developing countries. However, the currect conceptual structure of the CDM actually implied a lack of fair allocation. It is no surprise that a market mechanism which searches for the most inexpensive and less risky investment opportunities rather strengthens already existing capital flows instead of redirecting them to completely new regions. This fact will not be changed without the necessary alterations in the respective national frameworks (good governance). Assuming the future will offer more support to the least developed countries and not just quiet them with worthless confessions on paper it is crucial to develop alternative ways to further sustainable development.

#### 3.3.6.2 Strengths of the CDM

It does not help to ignore the CDM's weaknesses but it is equally useless to give up on it completely. It should therefore be kept in mind that strong criticism of the CDM benefits those (e.g. in the USA) who do not see emissions trading as an opportunity for low priced CDM certificates but who intend to introduce an upper bound on prices serving as a "valve". (Exceeding a certain price level no certificate needs to be presented but instead a fixed fee is paid.) This alternative does not help the climate neither in industrial nor in developing countries.

The CDM's strengths should not be ignored.

At the "Kyoto Plus Conference" organised by the Heinrich Böll Foundation the Pakistani environment minister surprised many of the listeners with his statement that nowadays more money from the North enters his country due to CDM than due to governmental development assistance. (Nevertheless, the large CDM project is one of the debated projects to reduce industrial gases). From 2005 to 2006 the volume of primary CDM transactions (that is without considering the further trade of certificates) doubled from 2.4 billion Euros to 4.2 billion. Still, according to Stern up to 24 billion Euros need to be generated annually by the means of flexible mechanisms in developing and industrialising countries. This means that we still have a long way ahead of us.

Several actors from development countries point out the change of paradigm that is reflected in the shift from caritative help towards mechanisms that consider their right to the financial flows. They are no longer recipients of assistance but a needed partner.

Particularly within the last two years the CDM has proven its capability to influence financial markets to a larger extent than many critics had anticipated. Fortunately, financial markets are more and more willing to supply risky capital to innovative projects. Although today this is still an exception a significantly growing trend can be observed.

Moreover the CDM is a very innovative mechanism regarding its capability to generate money for adaptation. A two per cent fee is imposed that contributes to the adaptation fund of the Kyoto Protocol. This system reflects a unique precedence for an international climate tax.

#### 3.3.6.3 Criteria for reforming the CDM

It is of major importance that the negotiators who discuss the design of a post 2012 Emission Trading Scheme in the EU keep one thing in mind: The design of the so called EU linking directive which regulates the possible ways of using the CDM in future is one of the EU's crucial trump cards in the negotiations with the newly industrialising countries. At the same time its design is determining the potential contribution of emission trading to the "Great Transformation" (Potsdam Memorandum, following Karl Polani). There is no way that the EU decides on this point for the time after 2012 without knowing what the international regulation concerning a reform of the CDM looks like.

- **Continuity:** It is very important that Bali confirms the continuity of the international emission trading for the time after 2012 as well as the continuing validity of the CDM certificates as long as there is no breach of rules. On t-shirts that were distributed by

the international NGO community at the climate conference in Montreal in 2005 it said: "Mind the Gap!" A disruption would lead a step backwards for the engagement of the financial sector by several years.

- **A CDM that does not simply substitute incentives in industrial nations for incentives in emerging nations.** A development path that is compatible with the two-degree limit can only be reached if industrial countries accomplish ambitious goals and emerging economies decarbonise their growth at the same time. This means that the CDM must not just imply *either or*. The IEA expects the major share of investments in the energy sector until 2030 to be made in North America, followed by China, the rest of Asia, and Europe. Industrial countries therefore need to set more ambitious targets when introducing the according CDM instruments (sectoral CDM, policy CDM). Only then emission trends in newly industrialising countries can be substantially influenced without taking away the incentive in industrial countries to construct a new generation of power plants as a part of the Great Transformation. In this case the average mitigation target in industrial countries should not be set at 30 per cent but indeed it should be enhanced by about 15 percentage points. It is *then* possible to achieve a third or half of the reductions by means of the CDM.

**Giving up on the two-degree limit through the backdoor?**

We need to be aware that it is well possible that Bali will yield a result that includes a 25 to 40 per cent target in industrial countries but that allows a major part to be accomplished through CDM certificates. The respective wording in the AWG[39] is ambiguous at this point. However, even the wording used by the EU Council at the end of October could be interpreted as an abandonment of the two-degree limit through the backdoor: The environment Council points out that the lowest $CO_2$ levels analysed in the fourth IPCC report imply that the group of developed countries together need to reduce emissions by a range of 25 to 40 per cent until 2020 compared to the 1990 levels. This goal is to be reached by combining domestic and international measures (Council of the European Union, 2007: Para 10). This can easily be considered a trick. Only if reductions of this range are realised in industrial countries (!) and additional improvements of $CO_2$ efficiency in emerging nations are accomplished there will be a serious chance to stay below the threshold value of two degrees. (Council of the European Union, 2007: Para 10) Nature is not ready to compromise!

However, it is equally possible to understand the phrasing in a way that is compatible with the two-degree limit: Reducing 30 per cent compared to 1990 at home and additional 10 per cent by the means of international measures might be sufficient. But since the usage of international instruments is not restricted and moreover linked to the lower part of the mitigation range (25 per cent) the EU here implicitly circumvents the two-degree limit that is highly praised at different points in the same paper.

- **Discounting:** The tightening of targets could be less drastic if CDM certificates were discounted. For example, if they could only be exchanged for emission allowances in industrial nations in the relation 2:1.

[39] Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol

- **Fair share:** The reformed CDM needs to ensure that the industrialising countries (not all of the developing countries) contribute a fair share to their decarbonisation. This was promised at the G8 summit in Heiligendamm. Regarding the Sectoral CDM[40] one could make use of a double baseline. Emerging economies commit to climate protection clearly below the business as usual baseline. In case they make an even larger effort they are allowed to sell all certificates below the second baseline. It is important to note that the baseline needs needs to be adjustable. Regarding the Policy CDM[41] co-financing concepts can be effective instruments. Thus, demand side management could be co-financed through incentive programmes or renewable energy laws. The time before 2012 should be used to gain experience with these instruments in a regional setting.

**Regulations that impede the harvesting of "low hanging fruits".** Up to now the project based CDM was mainly used to crop low hanging fruits. Consequently, projects on industrial gases generated by far the most certificates. Project categories of this kind yielding enormous amounts of low cost certificates should be legally banned after 2012. Then national legislation (possibly supported by fund models) would simply prohibit the respective gases and the incentives provided by the CDM could be directed to more reasonable sectors. A positive example is the recently passed ban of HCFC gases under the Montreal Protocol.

**Learning from the mistakes of Kyoto: First the mechanisms – then the target**

It is important to learn from the mistakes that were made in Kyoto. At that time a reduction target for the industrial countries was set first so that a soon decline in emissions could be announced to the public. The US government claimed yet another loophole in exchange for every tightening of the targets that was demanded from them by the other states. To avoid a similar situation it is necessary to negotiate effective mechanisms first this time. The final targets must not be defined before all of the integrated loopholes and flexible mechanisms are known and taken into account. The Kyoto Protocol had enough weaknesses. But now we deal with another scale of urgency to act. In the worst case mistakes in the design of the sectoral CDM, the policy CDM and particularly the consideration of avoided deforestation could make the whole $CO_2$ market collapse and set the global incentives to internationally transform the energy, transport and building system equal to zero. A deficient negotiation package at this point in time could put the objective to stabilise climate change below the dangerous threshold value of two degrees completely beyond reach. But nature is not ready to compromise!

[40] In the sectoral CDM – in contrast to the conventional CDM – certificates are not assigned to specific individual climate protection projects. A developing country instead receives certificates if a whole sector (like energy, steel, cement …) remains below anticipated emissions. The model of the double baseline is an interesting feature. Here, industrialising countries make a commitment to stay below the business-as-usual emission trend in the respective sector due to their own efforts. In case they succeed in cutting emissions down to x per cent below the business-as-usual baseline every additional reduction yields certificates for the whole sector. Thereby the CDM turns from a zero sum game (all of the additional reductions in industrialising and developing countries result in a corresponding drop of climate protection in industrial countries) into a real benefit for global climate. It is important that the incentive structure is correct which means that the money generated by the certificates is transferred to those who actually engage in climate protection.

[41] In contrast to the conventional CDM which focuses on single projects, in the framework of the policy CDM, the climate protection policy of a country is co-financed by the generation of certificates. This could mean, for example, that a renewable energy law or a programme with incentives for energy efficiency is co-financed by the policy CDM.

The feasibility of the agreement is of major importance. Trust in the practicability of the resolutions is a necessary precondition. Only if there is trust a regulatory framework will be able to induce a new industrial revolution and only then a market for $CO_2$ will be able to cause investments of thousands of billions of Euros. An interaction of international sanctions and incentives on the one side and national obligations on the other side that goes beyond the Kyoto resolutions is required.

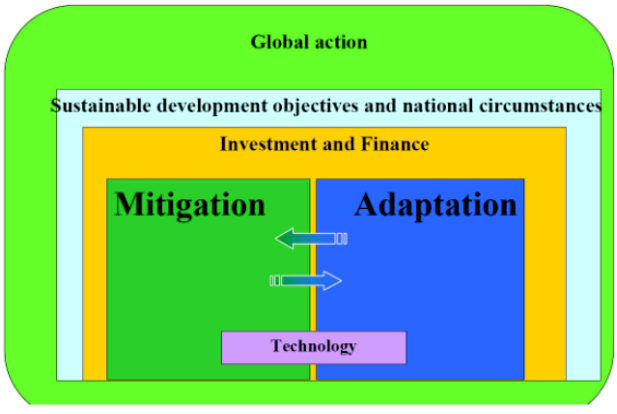
Many observers only focus on the targets but they do not recognise the importance of the sanction mechanisms and the incentive mechanisms that ensure their accomplishment. The Kyoto negotiations revealed that the international framework regarding sanctions and incentives is a crucial but difficult field. For example, in Japan concerns are raised regarding the conformity of an international sanction regime with the Japanese constitution. In the EU it becomes obvious that the sanction mechanisms of the European Emission Trading Scheme are far more stringent than the international sanction and incentive system. Based on these findings experts on international law should think about a system that combines international and national elements.

Regarding the dialogue with US representatives from the Congress and the Senate it is important to decide on the agreement on an ambitious national U.S. climate protection package in the near future aside from the international treaty.

If industrialising nations should participate in an extended CDM (sectoral/policy) an intense data collection and thorough control since the effectiveness of local climate protection efforts and the success of the international $CO_2$ market are dependent on it.

**Financing**

- Climate regime that is **self-financing** with combined **incentives for mitigation and adaptation**
- **Objective:** For adaptation and mitigation **50 billion $ each annually until 2020; (2012: each 12 billion $)** for **forest protection x billion $;**
- Potential **funding sources: centralised:** Adaptation Fee on every international emission trading transaction; **decentralised:** (EU-Africa, Interamerican, Asian): shares of **auctioning of emission trading; levy on air traffic;**
- **In addition** to **ODA**




Source: UNFCCC

The fourth negotiation package will deal with financing. The Club of Madrid demands from industrial countries to provide additional resources of ten billion US$ annually to finance adaptation, mitigation and forest protection in developing countries. Until 2020 the payments should be increased up to 50 billion US$ per year (Club of Madrid, 2007: p. 8). One cannot expect that the money can be supplied by public sources. Therefore it

makes much more sense to establish a self-financing international climate regime. There are several instruments to raise capital: auctioning of emission allowances, taxes on the flexible mechanisms of the CDM, Joint Implementation, and international emission trading as well as a tax on air traffic emissions which are not yet considered by the Kyoto Protocol. This way the required money is generated and at the same time an incentive for climate protection is given.

It is important that the money is not taken from the poor in order to give it back to them for supporting adaptation and mitigation. These financial obligations exist in addition to the official development assistance. Including them into the already fixed ODA could be considered false labelling. Moreover this issue could then become a serious drawback for further negotiations.

**A suggestion that needs to be considered: Catalysing Private Investment through the Clean Energy Investment Framework**

On the occasion of the Gleneagles action plan meeting on September 9-11 in Berlin the World Business Council for Sustainable Development (WBCSD) and the World Economic Forum (WEF) made an interesting suggestion about financial instruments that could be used to co-finance the upcoming transformation. This innovative idea should be thoroughly reviewed within the next months and considered as a possible complement to the expanding international market for emission allowances:

"Financial Instruments: A finance facility with a number of related windows should be created to develop a significant pipeline of clean energy projects by buying down the incremental investment costs of clean energy technologies through grants and concessional loans as well as increasing the creditworthiness of the future flows from carbon credits through partial guarantees. Innovative ways are presented for generating the initial capital for this facility from both public and private sources.

Preliminary analysis suggests that the upper end of support from such a multiple-window facility over an initial five to eight year period could reach US$ 10 billion in concessional loans (blends with grants) and US$ 10 billion in partial guarantees that leverage US$ 40 billion in private investment. For a combined donor commitment over this period of US$ 14 billion to US$ 16 billion (US$ 4 billion to US$ 6 billion in additional funds and US$ 10 billion in contingent liabilities), the Facility would likely delver around US$ 50 billion of financing. This would represent a significant proportion (approximately 30%) of the estimated incremental cost of ensuring that the total energy investment needs of developing countries (an estimated US$ 160 billion per year) are filled by clean technologies during this period.

Depending on the evolution of global and national climate policy regimes, the mitigation projects financed by the Facility could generate carbon credits that could be monetized and thereby yield a rate of return for the Facility's funders. In this scenario, the Facility itself could be in a position to raise capital from private investors, rendering it an even more potent mechanism for deploying limited amounts of donor government contributions to catalyze much larger private flows. Indeed, by the end of this initial period in which the Facility's institutional capacity and developing countries absorptive capacity ramp up, annual investment flows of US$ 15 billion to US$ 20 billion could be envis-

aged, especially if the transition to a deeper market for carbon credits is underway. This would represent between 50% and 65% of the annual incremental cost of applying clean technology to energy investment activity in developing countries, provided the US$ 80 billion underlying investment gap is being met at the time (a higher proportion if it is not being met). By this time – and under the CEIF assumptions regarding the strengthening of post 2012 regulatory regime – most of the financing would come from private financial markets. " (WBCSD, WEF, 2007: 3)

### 3.3.7 Necessary Alliances for the Great Transformation

The EU and Germany should share the vision of realising a carbon free prosperity model before 2050. They should enter targeted "Partnerships for Sustainable Development" with industrialising countries. Here, on the one hand, possibilities for bilateral cooperation dealing with questions on energy and climate security. On the other hand important issues of technology transfer should be discussed in particular cases in order to figure out bilateral or multilateral approaches to solve them.

The LDCs see more and more clearly that they are – and will be in future – the main victims of climate change besides the AOSIS. A growing number of governments therefore realises that the combination of effective global climate protection and intense adaptation efforts represents the most suitable strategy for them. There is a concrete request for a team of scientists, lawyers and economists to offer assistance to the LDCs in defining an independent position. The only conference of African states in preparation for Bali will be organised by Nigeria, an oil exporting country. There are interesting things going on within the Nigerian delegation but up to now, for the process of self-organisation principled by self-interests it was not of much help that it was mainly financed by oil producing countries which have very special interests. Considering the increasing negative effects of climate change and the growing public awareness of the issue it is well possible that the Least Developed Countries will join the AOSIS in forming a strong "green group".

It is important that the dialogue with central players in the US Congress and Senate is continued. As soon as the candidates for presidency will be announced, targeted talks with them should be initiated. The new government will be the one to sign the treaty in 2009.

Germany and the EU should not neglect bilateral communication with Russia but rather intensify it. (Climate was a major discussion point at a German-Russian meeting that took place recently) It would not be surprising to us if the decisive obstacles disturbing the process from Bali to Kopenhagen (2009) needed eventually to be overcome in Moscow. One has to keep in mind how long Russia hesitated to ratify the Kyoto Protocol although the country was assigned very low mitigation targets (stabilisation target despite massive drop in emissions due to the transformation of its society) and therefore was allocated a large amount of emission allowances without additional climate protection efforts.

### 3.3.8 The Courage to Bold Planning

Before important negotiations there are always a lot of people who know in advance that everything will fail. And it is true that the obstacles are high. But the three following aspects should not be ignored.

1. The international expectations from Bali are enormous. It will not be easy for politicians to return home in case the Climate Conference in Bali should fail.

2. The chances for coming to serious negotiations on the crucial elements of a global climate partnership with the goal to pass a treaty by 2009 have significantly increased. According to subjective Germanwatch estimates chances were about two to three per cent after the UN conference in Nairobi a year ago. In September, however, we declared an increase up to 25 per cent. Due to the relatively positive pre-COP we saw chances slightly rising again. Of course this is based on nothing else than the intuition of longtime observers. But following our estimates chances have multiplied by a factor of ten over the last year. However, not all of the signs indicate such a success. It is still not certain that the willingness to develop a political framework inducing a new technological revolution actually exists. Whether Bali will be a success will therefore strongly depend on the aptitude of the initiated negotiation process to enhance the probability of coming to a comprehensive agreement until 2009.

3. The negotiations have their own dynamic. Recently, at a conference in Brussels, Jennifer Morgan recalled the fact that climate negotiations can sometimes gain momentum. "There are situations when negotiations just take off. There are human beings sitting there. Think of the turnaround at the Climate Summit in Montreal two years ago. The US delegation that was convinced that they would be able to stop the process left negotiations frustrated at night. And the others were not willing to accept this – and this is where the dynamics evolved that carried us to Bali."

Bali has the potential to become a take-off in international climate politics. We must not miss this opportunity.

It's never over until it's over.

*Victor Frankl*

**The economic growth trilemma**

Eventually it all comes down to one crucial question: Does climate protection impede global economic growth? And if yes: How will these losses be allocated?

Carlo Rubbia, Nobel Prize winner for Physics in 1984, looks back on global growth during his life time – he was born 73 years ago. Since then global population has quadrupled and energy consumption has multiplied by 16. "And this happened over a period of only 73 years, that is just incredible", Rubbia looks at the figures he presents and shakes his head. But this is only the beginning of the challenge.

In mid October 2007 at the party congress in Peking the Chinese head of government and leader of the political party Hu Jintao announced that China aims for quadrupling its GDP between 2000 and 2020. Until 2050 he targets multiplying the GDP by 6.5 compared to 2000. The US government assumes national economic growth of 3 per cent annually until 2050. Thus, the American GDP would be quadrupled by the middle of the century. Fac-

ing these numbers the Nobel Prize winners meeting in Potsdam[42] dealt with the question whether the time has come for a fundamental change from quantitative to qualitative growth. As well Jennifer Morgan raises the question at a meeting of climate NGOs in October 2007 in Brussels: "Seeing that nowadays many countries grow by six, eight or ten per cent and that even industrial countries intend to keep growing by two per cent, don't we need a new qualitative growth model?"

Even for Nobel Prize winners it is easier to pose a question like this than to answer it.

We face a trilemma:

- Billions of people – not only but primarily in developing countries – wait for improvements of their material situation so that they are able to live a life in dignity and prosperity. Also the social security systems in industrial countries – no matter if funded through pay-as-you-go financing or through the capital market – depend on continuing economic growth.
- The current form of growth that is intense in its resource demands is constrained, even if resource efficiency was substantially enhanced. These limits of growth exist regarding both its sources (resource wars, break-down of ecosystems and fishing stock, increasing water scarcity etc.) and its sinks (climate change is probably the most prominent but only one of many problems that emerge when the intake capacity of ecosystems is overstrained).
- While periods of economic stagnation or recession in singular regions of the world is acceptable, global stagnation or even negative growth would inevitably entail the collapse of global economy. Carl Friedrich von Weizsäcker once compared this effect with a bike that falls as soon as it stops rolling.

Hans Peter Weser

Aside from the catch phrases the according discussions only yield vague answers. Paradoxically, we need a rapid but targeted growth over the next decades. On the one hand, it must provide benefits to the poorest people. On the other hand, it must further the transformation of unsustainable energy, transportation and building systems worldwide. But what happens when the lemon is squeezed out?

Up to now there are only fragments of a response to the call for "qualitative growth" which continuously reduces the conversion of valuable resources into eventually self-destructive waste or greenhouse gases.

[42] see Potsdam Memorandum, 2007

## 3.4 Scenario D: Planet Earth on the Heart-Lung Machine

Considering the extremely high risks and the – at least up to now – very slow political process and rapidly growing global emissions, another scenario is put up for discussion: Using the technical means of Geo-Engineering to take control of the earth's self-regulating systems that are completely overstrained by anthropogenic greenhouse gas emissions. Possible approaches are depositing iron in the oceans, spreading reflective materials in the atmosphere or using other reflection systems. James Lovelock[43] has found a meaningful analogy to these attempts. He recalls the never ending problems of individuals whose kidneys do not work poperly and who therefore are constantly concerned with balancing their intake of water, salt, and protein. Dialysis helps but the side-effects are significant and it is never a real replacement for the kidney's functioning self-regulation. Many of the methods of geo-engineering would plug our earth to a heart-lung machine.

The latest IPCC report clearly expresses this point: "Geo-engineering options, such as ocean fertilization to remove CO2 directly from the atmosphere, or blocking sunlight by bringing material into the upper atmosphere, remain largely speculative and unproven, and with the risk of unknown side-effects. Reliable cost estimates for these options have not been published."[44]

Ken Caldeira from Stanford University in California has done several research studies on the options of strategically influencing our climate.

There are three categories of questions that need to be taken into consideration. First of all questions of security and efficiency. Secondly the broader questions of moral, social and political dimensions. "And one of the most irritating questions is that people begin getting used to the idea that technical solutions might be available and less expensive than mitigation and therefore they begin to rely on them as an alternative to reducing emissions."

He therefore discourages from implementing these techniques too early but instead he calls for further research.

But whoever demands further research in this area should be aware of potential consequences: The results might easily be misused.

In 1946 scientists from General Electric revealed that dry ice molecules – frozen carbon dioxide – can transform to ice crystals which are identical to those that are found in clouds. This finding led to further research with the objective to supply rain to droughty areas.

It is worth mentioning how rapidly these ideas of controlling rain fall were used for military purposes. As far as we know the US forces were the first to make use of weather modifications during the Vietnam war. The secret mission had the code name *Popeye*. The U.S. Air Weather Service used three adapted transportation air planes of the type

[43] Lovelock, 2006
[44] IPCC, 2007: 15.

WC-130 to generate artificial clouds and strong rain falls over the Ho-Chi-Minh path. The plan was to extend the monsoon, soak the ground and thereby make tracks that were vital for logistics and communication impassable.[45] In the early 1970s the media uncovered the secret attempts to change the weather and induced a wave of public outrage. The US Congress put a fact-finding commission in charge and its findings substantially contributed to the UN treaty on banning environmental weapons of 1978.

In 1994 a plan of the U.S. Air Force called *Spacecast 2020* became public. In contrast to the UN charter this strategy included controlling the weather. The interest in military weather control has never stopped. The report "Weather as Force Multiplayer; Owning the Weather 2025" published by the U.S. Air Force reveals the options for action: Using antennas to heat the ionosphere in order to disturb the opponent's communication. Using laser to produce lightnings in order to make invasive air planes crash. Using air planes to spread micro dust in order to induce continuing rain falls. Redirecting winds to control the fall-out. On request China could be flooded or Europe could be deep-frozen. The Air Force is confident that by 2025 they will be able to create the suitable weather conditions for ever military operation.

Anyone who thinks that referring to the scenario "Planet Earth on the Heart-Lung machine" is a valid option should not only consider the unanticipated side effects but also the unexpected consequences on our higly complex global system. Furthermore, the fact that the possibilities to externally control global climate could be applied to meteorological warfare as soon as individual states know how to manage the art of changing the weather – or at least think they do so.

[45] see Durschmied, 2005, S. 319ff.

# 4 Setting off towards a low-emission model of prosperity?

The confirmation of scientific findings, the clearly demonstrated economic rationality of climate protection, the frequent occurence of extreme weather events and Al Gore's movie were not the only reasons why climate change has become a high-priority political issue. Many heads of government now realise that within the next two to three years they will be facing decisions concerning the post 2012 UN climate treaty which entail a preliminary decision between the illustrated scenarios. They notice that their attitude towards climate change turns out to be an important criterion in elections. Will they have the courage to set off to a low-emission model of prosperity?

Future generations will rate them against the inter-generational contract on climate change that they enforce.

**Global Inter-Generational Contract on Climate Change**

The previous generation
did not know yet
what it was doing.

We know
and are able
to act.

The generation following us only remains
to deal with the new global
inter-generational contract.

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## Germanwatch

We are an independent, non-profit and non-governmental North-South Initiative. Since 1991, we have been active on the German, European and international level concerning issues such as trade, environment and North-South relations. Complex problems require innovative solutions. Germanwatch prepares the ground for necessary policy changes in the North which preserve the interests of people in the South. On a regular basis, we present significant information to decision-makers and supporters. Most of the funding for Germanwatch comes from donations, membership fees and project grants.

Our central goals are:

- Effective and fair instruments as well as economic incentives for climate protection
- Ecologically and socially sound investments
- Compliance of multinational companies with social and ecological standards
- Fair world trade and fair chances for developing countries by cutting back dumping and subsidies in world trade.

You can also help to achieve these goals and become a member of Germanwatch or support us with your donation:

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