FORES

A Bretton Woods for the Climate

Jakob Rutqvist
Daniel Engström
Martin Ådahl

Foreword by
Robert N. Stavins

4Es { *Essays on Environmental Economics and Entreprenurship*


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About FORES

FORES—Forum for Reforms, Entrepreneurship and Sustainability—is a think tank that seeks to renew the debate in Sweden with a belief in entrepreneurship and opportunities for people to shape their own lives.

Environment and the market economy, migration, entrepreneurship and civil society, integrity, gender equality, global democratisation and modernisation of welfare—these are some of the issues on which we focus. FORES is an open and independent forum for civil society, academics and policy makers throughout Sweden and Europe. Together with people in Sweden and abroad, we will find solutions to better meet the challenges that globalisation and climate change brings. We function as a link between the civil society, entrepreneurs, policymakers and serious research. FORES produces research papers and books, and organises seminars and debates.

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It has been and will likely continue to be exceptionally challenging to conclude a comprehensive and effective multilateral agreement to address global climate change. Negotiations have proven to be exceptionally difficult, largely because any domestic policy or set of policies to mitigate greenhouse gas (GHG) emissions whether or not intended to implement an international agreement extend so deeply into the economic fabric of a nation.

This book by Jakob Rutqvist, Daniel Engström, and Martin Ådahl addresses this challenge by laying out a creative vision of promising pathways forward, drawing on insights from economics, political science, and legal scholarship. The ground these scholars seek to plow has received insufficient attention. I know this from my own work as director of the Harvard Project on International Climate Agreements, a multi-national, multi-disciplinary effort to help the nations of the world identify the key design elements of a future international climate regime that is scientifically sound, economically rational, and politically pragmatic. What I have learned over the past several years leads me to resonate with some of the core messages of this new volume.

Setting the Stage

The United Nations Framework Convention on Climate Change (UNFCCC) entered into force in 1994, and is governed primarily by a Conference of the Parties, of which there are 194, typically

meeting once a year, in December. The Kyoto Protocol to the UNFCCC, adopted in 1997 and entering into force in 2005, was the first major step forward by the UNFCCC parties to reduce emissions of GHGs. It placed binding limits on the emissions of Kyoto parties from the industrialized world, the so-called Annex I countries. My own country, the United States, is a party to the UNFCCC, but it has not (and will not) ratify the Kyoto Protocol.

In December 2009, the Fifteenth Conference of the Parties (COP15) was held in Copenhagen, Denmark. The meeting resulted in the Conference taking note of the Copenhagen Accord, under which 126 parties made submissions that contain emissionsreduction pledges. These countries represent about 85% of global emissions (if forestry and landuse changes are taken into account), but the form and ambition of the pledges vary widely, and the total resulting emissions reductions will not approach the amount needed to stabilize GHG concentrations at 450 ppm or a mean global temperature increase of 2 C, a frequently discussed target.

Given the slow pace at which the UNFCCC negotiations have progressed and the relatively modest results of COP15, an outcome of Copenhagen other than the Accord may prove to be equally or more consequential: the decreased credibility of the UNFCCC as a venue for international climate policy negotiation.

Issues and Challenges

The two weeks of COP15 illustrated four specific challenges with the UNFCCC as a decision-making venue: the large number of countries involved; the widely varying degrees to which these countries contribute to and are affected by the problem to be addressed; the polarization between economically developed and

developing nations; and the rules for adoption of decisions. These problems, most of which were apparent long before the Copenhagen meetings, have caused many observers to question whether the UNFCCC is the best institutional venue for productive negotiations and action on global climate change policy, or at least whether it ought to be the sole venue.

First, the UNFCCC process is unnecessarily cumbersome, because 194 countries are involved in the debates, when just twenty of them account for more than 80% of global emissions. Second, there is a wide disparity in exposure of countries to the impacts of climate change and the consequent need to adapt. Most countries with very significant exposure are very low emitters. This has contributed to the problematic national incentives that manifest themselves in the negotiations.

The third problem is that UN negotiating dynamics tend to polarize many discussions into two factions: the developed world versus the developing world. This polarization is troubling because the world is much more diverse than such a dichotomous distinction would suggest. Developing countries, while accounting for more than half of global emissions (and growing rapidly in this regard), are generally more reluctant to commit to reducing GHGs, because they prioritize economic growth above environmental public goods.

Clearly, the emerging economies of China, India, Brazil, and South Africa (the key BASIC coalition in the climate talks) plus Korea and Mexico (with Chile, the only countries that are both OECD members and nonAnnex I countries) have more in common along some key economic dimensions with some countries in the socalled developed world than they do with the poorest

developing countries, such as those of subSaharan Africa. Some other countries lumped into this undifferentiated mass particularly the oilrich Persian Gulf states are more hostile to global efforts to reduce fossil fuel use than are other developing nations. Finally, some highly exposed small island states and nonoilproducing, waterdeficient states in the Middle East and North Africa have an interest in demanding much more stringent global emission reductions.

The fourth problem is that the decisionmaking rules of the UNFCCC process require consensus (adoption by virtue of no objection) or unanimity (all 194 parties voting in favor) for nearly all decisions. It was lack of such consensus that resulted in COP15 not adopting the Copenhagen Accord, but rather simply noting it: only 188 of 194 countries supported it!

Alternative Venues

The problems associated with the UNFCCC are potentially farreaching. It is important to have an institutional arrangement in which the parties participating can come to agreements about not just the short term, but the more distant future. If the UNFCCC is not a viable framework to achieve such goals on its own, are there other venues which could supplement and complement the UNFCCC?

One promising venue was initiated in 2007 by the Bush administration in the United States as the Major Emitter Meetings the MEM process. The Obama administration recognized that this was a promising approach, adopted it, changed its name to the Major Economies Forum on Energy and Climate, and continued the process, now commonly referred to as the MEF. Several meet-

ings have taken place, bringing together Australia, Brazil, Canada, China, the European Union, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Russia, South Africa, the United Kingdom, and the United States. Those 17 countries and regions account for more than 80% of global emissions.

Some nations and advocates are concerned about a small set of large countries reaching decisions; and no doubt some are not comfortable with a process chaired by the United States. One might also be concerned that an agreement covering only a subset (albeit a large subset) of the worlds emitters will be undermined by leakage, as emissions shift to unregulated countries. Finally, the MEF is not recognized by its own participants as a forum for negotiating binding agreements.

Another conceivable institutional venue is the G20, the Group of Twenty Finance Ministers and Central Bank Governors, established in 1999 to bring together the leading industrialized and developing economies to discuss key issues. They recently turned their attention to climate change policy in Pittsburgh in September, 2009. The makeup of this group is similar to that of the MEF; the G20 includes all the nations represented in the MEF, plus Argentina, Saudi Arabia, and Turkey.

One advantage of the G20 is that its core mission is to provide a venue for discussing economic and finance policy. Such questions are fundamental to considerations of climate policy. Also, unlike the MEF, the G-20 is not the creature of a single nation.

There are other conceivable multilateral forums that could be convened, such as the C-30, made up of the G-20 nations plus some of the poorer countries that would be most disadvantaged by climate change. Bilateral approaches also have a role to play.

Recent bilateral efforts involving cooperation on lowcarbon technology innovation and deployment include an agreement between the United Kingdom and China to test new coal combustion technologies, and similar agreements by Australia and China, the United States and China, and the United States and India. However, it is easier to conclude such technologycooperation agreements than it is to reach binding agreements on outcomes in particular, emissions reductions.

The Path Ahead

It is unlikely that any of these alternatives will supplant the UNFCCC, and it is far too soon for obituaries to be written for this rather durable institution. The Kyoto Protocols first commitment period runs through 2012. The Clean Development Mechanism (CDM) and annual national reporting functions (such as those that are key parts of the Copenhagen Accord) are likely to work through the United Nations, most likely the UNFCCC.

Also, the UNFCCC has a very large constituency of support, including at a minimum most, if not all, of the G77 group of developing countries, which now numbers 130. In addition, the UNFCCC has significant international legitimacy, and is potentially key for implementation, no matter what the venue may be for negotiation.

Thus, even if these other institutional venues become viable forums for climate negotiations, the UNFCCC is unlikely to become irrelevant. Its role may change, however, so that it becomes one component of a set of overlapping climate regimes. Given the variation in compliance costs facing nations, and the transaction costs associated with climate negotiations, such

customized multilateralism may be desirable and even inevitable.

Whether the next steps in international deliberations should be under the auspices of the UNFCCC or some smaller body, such as the MEF or the G20, is an important and open question. Given the necessity of achieving consensus in the United Nations processes as currently defined and the open hostility of a small set of countries, other bilateral and multilateral discussions could be an increasingly attractive route, at least over the short term and at least as supplements to the UNFCCC process. There are many questions, however, that need to be addressed before anyone can identify the best institutional venue (or venues) for international climate negotiations and action. This book contributes in constructive ways to answering those questions.

Robert N. Stavins
July 28, 2010

Acknowledgements

It was after attending the Copenhagen Summit in December 2009 that the idea for this book formed. Before that meeting the co-authors of this book generally believed that there was not much that could be added to the climate debate. But after Copenhagen's failure, we realised that there was a need for new proposals, in particular proposals that did not only focus on burden sharing but on the institutions and organisations that are supposed to carry the global climate issue on their shoulders. In doing so we have tried to combine our different competencies at the FORES institute, by joining together economists, political scientists and lawyers.

I wish to thank my two co-authors for doing the major work in constructing this proposal of a Bretton Woods of the Climate, to Jakob Rutqvist for the cap and trade, Green Fund and burden sharing texts in particular, to Daniel Engström for the discussions on international negotiations and institutions. I would also like to thank Oskar Taxén for his important contribution to the discussion on international trade rules and the WTO, and Mattias Johansson who through his previous work within the Swedish Environment Ministry has important insights into the negotiation process. A special thanks also to FORES' research assistant Selma Oliver who has contributed by reviewing different drafts of this text.

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Martin Ådahl
Director FORES

Executive Summary

Solving the Problem of Climate Change Requires New Strong Institutions

This book has four distinguishing features:

1. **Strong institutions.** This book is based on the idea that, when faced with an economically pervasive issue such as climate change, it is more important to build strong and efficient international climate policy institutions than to reach a particular deal at a particular point in time. Strong institutions geared to solve this particular problem will stand a much better chance of carrying the process forward and underpinning rational argument than would a permanent state of diplomatic negotiation. In 1944 in Bretton Woods the creation of the IMF, the World Bank and GATT/WTO laid the basis for cooperation on international finance and

economics. For all its shortcomings, the Bretton Woods institutions did support the rebuilding of the international economic system, and became an enduring pool of expertise on international financial and economic issues.

2. **A core agreement among major emitters and an open-ended exchange rate mechanism for linking to outsiders.** This book argues that the world's 13 major emitters of greenhouse gases (responsible for over three-quarters of all emissions) should create a separate forum dedicated solely to solving the climate issue, to avoid being hampered by the coordination of almost 200 nations. The Major Emitters Forum should try to reach a core agreement on capping emissions in line with fair principles for burden sharing. However, to give an incentive to emitters outside the agreement to gradually adhere, there should be the opportunity to link up cap and trade markets to the agreement on the basis of an exchange rate that also give incentives to outside countries to reduce their caps.
3. **Sanctions against free-riders.** Without means to sanction those violating the agreed rules the institutions are not credible, and without means of sanctioning those refusing to join an agreement, there is the risk of large scale free-riding. Trade sanctions are virtually the only potent international tool for sanctions, but are also risky as they could be misused and lead to trade wars. Any kind of Border Carbon Adjustment must therefore be used as a very last resort policy and must be

fully WTO compatible. This book tries to sketch such a mechanism.

4. **Functionality and transparency**. Many proposals for an ideal global deal on climate change seek to reach perfection by factoring in all relevant parameters. Unfortunately this often results in models so complex that policy makers and the political system cannot properly understand them. Despite taking stock of theory and policy on the subject, we wish to sacrifice perfection for functionality and transparency.

Our proposal is the creation of global climate institutions based on a basic agreement in the Major Emitters Forum that would manage links between emissions markets, collect and distribute support for mitigation and adaptation projects in developing countries, and sanction free riders in accordance with WTO rules.

Reasons for Failure in Copenhagen: Poor Institutions

It is now widely accepted that the climate summit in Copenhagen in December 2009 was a failure. Years of intense negotiations resulted in a three page Copenhagen Accord with modest commitments and very weak legal status and implementation instruments. A substantial part of the negotiations were tied up in semantic discussions and horse-trading on climate aid.

A popular explanation for this is the lack of political will. World leaders, and their respective political systems, in particular the United States and China, were not willing to make the necessary

changes and therefore could not agree.

Although this is evidently part of the problem, this book explores another explanation; that even if the political will were to be present, today's institutions are inadequate for the task.

- The negotiation process of the UNFCCC is modelled on the UN format for negotiations on environmental conservation, not for global economic agreements. Over 190 participants are in principle required to reach consensus, with diplomats in charge of day-to-day work. Most former or present developing nations are regrouped in the G77, an exceptionally heterogeneous negotiation machine (ranging from Singapore to Rwanda) suited for winning the majority in the UN General Assembly. Furthermore the present Kyoto Protocol does not allow any nation to be sanctioned for violating commitments under an agreement, without the sanctioned party's own consent to the mechanism. Overall, the UNFCCC is geared towards achieving a one-off treaty.
- The international organisations behind the negotiation process are weak by any international standard. The UNFCCC Secretariat consists of an office of 300 people devoted to serving negotiators, as compared to for example the highly specialised staff of approximately 2,400 working for the IMF, 10,000 for the World Bank and 620 for the WTO. The body that supplies the scientific evidence for the UNFCCC, the IPCC, consists of about 2,000 non-salaried experts supplying scientific

evidence. It links most of the worlds best researchers on the climate and its environmental implications, but out of the 2,000 or so experts our estimate is that a maximum of 30 of them are specialised in the instruments for emissions abatement, such as emissions markets, carbon taxes or international law. The IPCC is, in essence, expert at defining the problem, but very poor at delivering solutions. Furthermore the IPCC has a salaried coordinating Secretariat of only 20 people.

Why We Need Strong Institutions

In economics and international relations theory, strong institutions are considered crucial for wealth creation and constructive cooperation.

Typical for strong institutions is that they are voluntary containment systems of options, with credible enforcement mechanisms. They establish norms around long term goals, thus making it more difficult to deviate because deviations carry an increased reputational (as well as sometimes financial) cost, also spilling over to other areas of cooperation. They thus restructure incentives to align more closely with a common good. When supported by professional organisations they also amass a body of knowledge and expertise that supports the goals of the institutions themselves.

The global climate issue is a particularly difficult case in international agreements and institutions because it is an extreme case of a global "prisoner's dilemma". Every nation benefits from the reduction of emissions, but every nation would equally benefit if

the reductions were mainly or wholly done by another nation. In the absence of an agreement, no nation reducing emissions can be sure that this reduction is not countervailed by increasing emissions elsewhere. This makes the need for a credible and lasting agreement even more important.

A New Institutional Framework

This book therefore explores a new institutional framework, tailored to the problem it is supposed to solve, consisting of four institutions:

- **The Major Emitters Forum (MEF)** that simplifies the negotiation process and acts as the governing core of the new institutions. The MEF is to agree on a core principle for sharing emissions reductions between nations.
- **The World Climate Organisation (WCO)** that monitors emission reductions, manages the linking of cap and trade markets and creates a link to nations outside the agreement through an exchange rate mechanism.
- **The Green Fund** that funds adaptation and mitigation projects with financial contribution requirements calculated on the basis of capabilities and historical emissions.
- **The General Agreement on Carbon Tariffs (GACT)** that formulates last-resort trade sanctions against free-riders in line with WTO rules.

Reshaping the Mode of Negotiation: Major Emitters Forum

To replace the present stalemate within the UNFCCC, a Major Emitters Forum could be created by the twelve nations plus the EU that together emit three-quarters of all greenhouse gases. This mode of "minilateralism" leading to multilateralism is in fact quite common within the UN system, where for example the Security Council has been delegated the responsibility to decide on imposing legally binding resolutions on matters related to international peace and security. On some sensitive issues, such as Iran's nuclear program, the most concerned nations create even smaller break-out groups to deal with the issue more effectively and making sure that the most important actors are on board.

In the climate negotiations, the more restricted MEF group would:

- Reduce complexity with fewer participants.
- Limit the room for spoilers that play an important role not because of their major stakes, but because their ability and inclination to obstruct negotiations by using them for propaganda purposes and other objectives than climate issues.
- Increase the reputational cost of deviating because these states have been selected to deliver the common good, and because each state would have to stand up for their actions without being able to hide behind others.
- Increase reciprocity, both because this body will meet more often and with more direct contact, and because

> the thirteen members are the world's leading economic powers that rely on each other in a host of other economic groups. This latter point is reinforced by issue linkages, whereby agreement on other vital matters is linked to the climate change agreement.

The most important aspect of bringing the major emitters together is that they are the ones responsible and the ones needing to take action. An agreement between these 13 major emitters would be almost as important as a global agreement. The MEF agreement can later be agreed upon within the broader group of the UNFCCC. Should the UNFCCC not be able to agree on the MEF agreement, it would still be a major step towards a credible solution to global warming.

The MEF's governance would reflect the members' respective economic weight and their emissions reduction responsibility. We therefore do not advocate UN style vetoes or one-nation-one-vote, but rather the quota system giving each member a weighted vote as practiced within the IMF. MEF quotas could be based on a mix of GDP (economic importance), population (claim to the world climate space) and emission reduction commitments in relation to 2010 and business as usual scenarios (responsibility for the problem).

The MEF's two most important tasks are the creation of a core agreement on the sharing of emission reductions and the foundation of permanent international climate institutions. The MEF will decide on funding for these institutions and also be the ultimate authority to initiate sanction procedures against free-riders.

Rational Principles for the Core Agreement

It is the MEF that will decide on a burden sharing agreement between the members specifying who should reduce emissions and by how much (just as it is for the wider UNFCCC group today). If some nations fail to adhere to the agreement, the core agreement would still remain the norm governing how non-compliers can link emissions markets to the MEF core, including countries outside the MEF group.

The principle behind the core agreement is that there is a definite limit to the amount of greenhouse gases the atmosphere can absorb if the increase in the global mean temperature is to be limited to two degree Celsius above pre-industrial levels. Within this limit all human beings have an equal upper-limit right to emit greenhouse gases.

The most rational model to distribute the burden of reducing emissions over time, after examining different alternatives, is found to be a bottom-up version of a national budget approach. Each nation is given an "emissions budget" from 2010 to 2050, based on population. The use of this budget can be modified with use of borrowing and banking provisions, within certain limits to avoid countries going "carbon bankrupt" by using up all their emissions early on. The long-term goal is to convergence emissions per capita to a sustainable level (1.4 tonnes per annum) but the burden sharing model of this book would give the developed nations extra allowances early on to soften the very sharp reduction path required and in return give developing nations extra allowances later on to postpone their emission reductions. Gradu-

ally all countries reach a convergence path towards the sustainable levels of emissions.

The Favoured Instrument: Cap and Trade Markets

Greenhouse gas emissions are a typical externality; the emitters impose an external cost on the rest of the world. The best way to modify behaviour for the benefit of all is for states to make the emitters pay for the damage (the polluter pays principle) and thus internalise the externality. The two ways of doing this are either by imposing a tax that will make it unprofitable to increase emissions above a certain limit, or by establishing that limit first, setting a cap on emissions and making businesses bid for and trade emission rights under this cap.

The latter method is called cap and trade and is the one preferred in this book. Given strong vested interests there is a great risk that starting with the tax, the rate will be set too low or too many exemptions will be allowed, and the limit consequently be overshot. Markets are also easier to harmonise and link globally than taxes. Finally taxes as such remain unpopular in several of the nations with the highest emissions. Cap and trade meanwhile will allocate emissions where they are most valuable (command the highest price) and can also allocate emissions over time. Having said this, a combination can be used where a majority of emissions are covered by cap and trade and taxes are used in special cases.

A Mechanism for Linking Emission Trading Systems

When organising an international effort there is a definite gain in linking different cap and trade schemes together. This way economic efficiency is increased as the market is broadened and emission reductions can be allocated in the most rational way. Such linking could, according to estimates by the US Congressional Budget Office and the OECD, save up to two-thirds of the cost of emission abatement. A turnover tax could also be added to this trade that could finance the World Climate Organisation and the Green Fund.

Linking, even within a burden sharing agreement in place, comes with challenges:

- Some emission markets might use price floors and ceilings, enforced by a strategic reserve pool of emission allowances, to keep the price of emissions within a price collar. If these price collars differ between systems, linking can impose the highest floor and the lowest ceiling on all markets. If the emission allowance reserve pool is unlimited, there is a risk that the cap might in fact be fully removed.
- The entire system will be affected by the swapping of emission rights for emission reductions outside the system (so-called offsets) such as the Clean Development Mechanism (CDM) in the Kyoto Protocol. The problem with offsets is to assess additionality, i.e. whether the reductions would have been undertaken

> anyway and are not countervailed by emission increases elsewhere. To bring offsets into the system they have to be discounted according to their actual levels of additionality.

Another obstacle in linking emissions markets is how to treat ETSs outside the core agreement. Any outside market not part of the burden sharing agreement would have an incentive to plug in with as generous a cap as possible. The more generous the domestic cap, the cheaper the emission allowances in the local market. If units are traded one-for-one, an outside country would have an incentive to be very generous with the cap in order to export allowances and receive a substantial net transfer of resources from ambitious countries with low caps.

Incentives for countries outside of the agreement should definitely go the other way, i.e. in favour of ambitious caps when linking to the MEF core agreement.

This book proposes a solution by setting up an exchange rate system for emission allowances within the global emission trading system. In its simplest form the exchange rate is based on the carbon budget a country would have under the MEF core agreement and divides the outside country's actual cap by this amount. This ratio would be the exchange rate, and would make the value of the total allowance pool constant. This would neutralise the gains from plugging in to the system with a high cap. In effect, countries who overuse the atmosphere would see their emission allowances devalued. To further add an incentives for lowering the cap a progressive tax could be imposed on top of the exchange rate.

This exchange rate idea is central to this institutional system

because it will open up the agreement to any nation wishing to cap, but not ready for the burden sharing agreed upon by the MEF.

However, an exchange rate does reduce efficiency. Our proposed exchange rate will, on a microeconomic level, distort the price signal and thus the efficient allocation of emission reductions. It is a compromise between national macro incentives to reduce the cap and the micro efficiency of allocation.

The Creation of New Organisations

To support the MEF agreement and the linked emission markets we propose a set of permanent institutions. These are necessary in order to:

- Manage and maintain the system
- Enable world leaders, politicians and diplomats to concentrate on rules of governance and to delegate discretionary decisions and detailed solutions to experts
- Form a pool of expertise and practical experience that can inform decisions on the design of instruments to reduce emissions, similar to the pool of expertise that the Bretton Woods institutions have created in international finance and economics.

These organisations and their roles are as follows.

The World Climate Organisation: Responsible for Verifying the Caps and Linking Emissions Markets

This organisation will regulate the main instrument of emissions abatement—the cap and trade markets.

The World Climate Organisation, with a strong secretariat and sufficient expertise on economic mechanisms for carbon abatement, would be responsible for all areas of housekeeping of the international emissions markets. It would:

- Manage the linking between emission markets within the MEF agreement and the (exchange rate adjusted) links to outside markets.
- Oversee sectoral coverage of emissions markets to make sure they are comparable.
- Oversee banking and borrowing of the national carbon budget space for each MEF-member (to avoid them going carbon bankrupt)
- Regulate price floors and ceilings on different markets so that they are harmonised throughout the system.
- Monitor and regulate which offsets are allowed and how they are discounted.
- Monitor actual emissions and keep track of the performance of the trading system and how it relates to the two degree target.
- Administer and collect possible turnover taxes on trading within the agreement or (progressive) taxes on the trading between nations inside and outside the agreement.

- Serve as a forum for dispute settlement and operate a non-compliance mechanism, including investigating price collusion, cartels etc. However, the ultimate non-compliance mechanism is the GACT detailed below.

The Green Fund: Compensation for Historical Emissions

The one institution that was decided upon at Copenhagen, albeit very loosely defined, was the Green Fund. This fund, jointly proposed by Mexico and Norway, will collect financial resources from rich countries and distribute them according to needs to developing countries to enable mitigation and adaptation efforts.
The rationale for a Green Fund is three-fold:

- A compensation for historical emissions, mainly by developed nations, affecting the climate today and in the future.
- A compensation for the adaptation that many nations are forced to make due to the changing climate, with desertification, increased floods, irregular weather patterns etc.
- An incentive for developing nations to start mitigation and sign on to a global agreement.

In its disbursements the Green Fund will have to make a trade off between equity and efficiency. Some nations may have a moral case for larger disbursements (low historical emission, low development levels) but others may have more potential projects

that can yield more results. The payments of the Green Fund must therefore, as all subsidies, be carefully monitored and assessed.

The most efficient instrument for developing nations to reduce emissions is not aid, but, just as for developed nations, to put a price on carbon. However, through a Green Fund, technology and project finance will be available at lower cost. Support for mitigation would be most efficient in nations committed to a cap.

To mirror responsibility for historical emissions, the share of funding for the Green Fund would be based on historical emissions and build on the concept of Greenhouse Development Rights, assigning responsibility for funding to all persons beyond a certain basic income level.

If the Green Fund could secure a steady flow of resources instead of being dependent on discretionary capital injections by donors, a lot would be achieved. Such financing could for example be generated through a turnover tax on emission permits or the trading of these. The EU could for example not distribute emission rights to industry for free and instead auction them and donate part of the revenues to the Green Fund.

The General Agreement on Carbon Tariffs: a WTO Compatible Sanction Mechanism

A fatal deficiency in the present climate agreement format is that there is no credible mechanism to sanction non-compliance. Even though Canada is about to overshoot its Kyoto commitment with more than 30 percent, it does not risk being sanctioned. This, in part, is a result of the fact that any binding non-compliance mech-

anism needs to be amended to the Kyoto Protocol, which means that it will not be applicable on any state that does not sign the amendment. In practice this means that states themselves can decide whether or not to be subject to sanctions.

Theoretical and empirical literature on institutions show that it is very hard to maintain institutions without a non-compliance mechanism in place. Within the tighter MEF group, the compliance will be customary based, and rest on factors such as reputational losses or a tit-for-tat within issue linkage. It will also be treaty based as the proposal of this book gives the World Climate Organisation the possibility to impose sanctions on member states, including reduction of the number of future allowances, and increased contributions to the Green Fund. But against repeat offenders and outsiders that decide to free-ride the agreement, some sort of last-resort sanction is necessary.

The simple rationale for linking this last-resort sanction to trade is that most, if not all, nations are dependent on international trade. A trade-related sanction would thus put countries in the position of having to find a balance between free-riding on emissions or getting the full gains from trade. Most countries would have much more to lose from trade sanctions than they can gain on lax environmental policies.

Any trade sanctions mechanism must be very clearly defined to avoid slipping into protectionism and it is necessary for the GACT to be fully compatible with the rules of the World Trade Organisation (WTO).

The MEF governing board will take the ultimate decision on imposing trade sanctions by allowing taxes on the carbon content of imports from the country in question; a border carbon adjust-

ment (BCA). The WTO offers two possible ways of imposing the sanction.

One is to equate the BCA to a Border Tax Adjustment (BTA). A BTA is regularly imposed within the WTO, notably the VAT of the importing country is added to the product. The problem is that a BTA should be an indirect tax, such as VAT, on the product, not an direct tax, such as income tax, on the production.

The more promising possibility is Article XX of the WTO which makes exception for measures necessary to protect human, animal or plant life or health, and for the conservation of exhaustible natural resources. Air pollution has already been invoked under this article and the climate could be considered an exhaustible natural resource.

For a trade sanction to be imposed it is not sufficient to argue that the free riding nation has not signed up to the specific MEF agreement. The MEF nations must prove that the free riding country has no comparable domestic policies for emissions control in place and that this is leading to comparative disadvantages for the countries who have signed on to the MEF principles.

In conclusion solving the problem of climate change requires new strong institutions.

Part one

Chapter 1

Bretton Woods 1944

On July 1, 1944, towards the end of World War II leaders of the Allied countries, together with some of the leading economists of the time, met in Bretton Woods, New Hampshire, to deal with a task second only to the war itself; the creation of a new framework for international monetary and economic cooperation. The *Bretton Woods Agreement* has been modified many times since. The core mechanism, fixed but adjustable exchange rates between major currencies, for example, has been abandoned.

What has remained is the institutions that were drafted at Bretton Woods; the International Monetary Fund (IMF), the International Bank of Reconstruction and Development (World Bank) and, a few years later, the International Trade Organization (later followed by GATT and eventually the World Trade Organization, WTO).

Whatever our views on the policies pursued by the Bretton Woods institutions, they turned out to be both remarkably resilient and efficient[1], because the rules were clear, the organisations themselves were well funded and information monitoring and sharing was efficiently handled by a centralised source. The

1. Dominguez 1992

Bretton Woods institutions were able to deal with international economic problems involving extremely large financial transactions and decisions with broad international economic and social consequences. They became a global centre of expertise on international financial and economic matters.

2^1

Chapter 2

Copenhagen 2009

On December 18, 2009, world leaders met in Copenhagen, towards the end of the global financial crisis. This time their task was to solve a very different common challenge, climate change.

Hopes were high for the UNFCCC Conference of the Parties in Copenhagen (COP-15); hence many believed it was a big failure that world leaders did not reach an agreement with binding targets and a clear objective on how to reduce global emissions.

Nonetheless, the accord is at least an agreement, with some progress worth mentioning; the parties agreed on a target for global warming (2°C) they agreed to submit their national mitigation targets or actions for 2020 to the UNFCCC developed countries committed $30 billion of new and additional resources for the period of 2010-2012, and, on paper at least, another $100 billion a year by 2020 to address the mitigation and adaptation needs of developing states. A significant portion of such funding should flow from the proposed Copenhagen Green Climate Fund. Finally, an assessment of the implementation of the accord shall be done in 2015.

The Copenhagen Accord is widely seen as weak accord and even though state leaders and bureaucrats have since tried to find

a positive spin on the outcome, it is clear that there is an imminent danger of never being able to break the impasse.

A great deal has been said about why there was no real agreement in Copenhagen. Major parties turned the aftermath into a blame game, mirroring the lack of trust that has characterised the negotiations.

One explanation was simply **the substantive differences between parties and lack of political ambitions.** It is a fact that none of the major emitters were able to present ambitious enough targets or in any way alter their positions. The constant demand for someone else to take responsibility and a larger share of the emission cuts became the most common tactic. Without political ambition, courage and willingness to compromise on matters of substance, an efficient agreement could not be reached.

But the other explanation is that **the existing institutions did not help state leaders to find it to be in their interest to cooperate.**

Ever since its first meeting, the COPs have been characterised by slow progress, by major rifts between parties and negotiating blocs, and by the inability to mend these rifts. This was evident during the two weeks of negotiations in Copenhagen. It seemed impossible for the 194 parties to agree. Long statements by state representatives, lengthy discussions on procedural matters and a not-so-veiled desire by certain states to obstruct the negotiations did not help to move the process forward. An inordinate amount of time was spent on the subject of whether the old Kyoto Protocol should be formally maintained or a new agreement signed - with little discussion as to the content of the agreements.

When agreements were eventually discussed, there was little

substance produced on the actual implementation. Apart from the relative progress on deforestation and the Green Fund, concrete problem solving was absent both in the final accord and, to a large extent, in the negotiations themselves. An agreement on outside Monitoring and Verification where effectively blocked by China and there were no decisions taken on collaborative use of market mechanisms. It is unclear what will happen to parts of the Kyoto Protocol as its first commitment period expires, notably the mechanisms of emissions offset trading, the CDM and JI.

The problems were further emphasised during the UNFCCC follow up meeting, held in Bonn in mid April 2010. Much time was spent dwelling on the number of meetings leading up to COP-16, none of the parties indicated any movement on emission targets, and after the meeting, the UNFCCC head Yvo de Boer concluded that the chances of reaching a full agreement in Cancun were slim. However, he and other leaders expressed hope that the discussions on financial support and green technology would bear fruit during 2010[1].

Why did Bretton Woods work, despite all its flaws, and Copenhagen fail, despite all the idealism and hope that preceded the summit?

A possibility that will be explored in this book is that even if world leaders do have the ambition and will to cooperate, the present institutions, both the negotiation framework and the organisations underpinning it, are insufficient and not tailored to the needs of resolving an issue on the economic and political scale of climate change.

1. BBC news: Slim prospects for climate deal this year. http://news.bbc.co.uk/2/hi/science/nature/8614180.stm

3.1

Chapter 3

The Use of Institutions in International Cooperation

This chapter will provide a brief overview of the literature on why environmental negotiations in general, and climate change negotiations in particular, are difficult. States' behaviour needs to be constrained and incentives aligned. Therefore there is a need for functional and effective international institutions in order to deal with the issue of climate change.

In this chapter will also follow an overview of some of the literature on institutions, mainly stemming from International Relations and Economics. This will form a framework to evaluate the current international institutions dealing with climate change, which will lead us to make a proposal on a reformed institutional framework in the following chapters.

The Special Case of Environmental Negotiations

Reaching agreement on such a complex issue as global warming is always going to be difficult. But there are reasons why climate change negotiations are more complex and difficult than most other intergovernmental negotiations.

The climate is often referred to as a global common. A tonne of emitted carbon dioxide does the same damage to the climate no matter whether it happens in Dortmund or Beijing. This also means that a tonne of carbon dioxide not emitted in one country has a positive effect on every country. Hence, since reducing emissions are associated with costs, states try to avoid taking responsibility, and hope that others take action instead. In addition, one state living up to its commitments can never be sure that other states will live up to theirs, meaning that the win would be shared, but the costs would not.

The climate, or the atmosphere, might also be referred to as a common pool resource, since there is a limit to how much emission humans can handle the consequences of. This generates a situation where the »right« to emit becomes an issue of relative advantage and thereby creates rivalry. The situation is what Garrett Hardin referred to as the Tragedy of the Commons in his landmark article from 1968.

The impact of climate change differs between countries, which makes the negotiations even more difficult. The most vulnerable countries can be the least responsible, and in some cases vice versa. This creates different incentives for states to act—a state with low costs and high vulnerability will be more prone to act

than a state with high costs and low vulnerability. Still, it might be that the states least prone to act are the ones most important to get on board in order to reach an effective agreement.[1]

A lot of what has been mentioned so far is true for the majority of environmental negotiations, though more obvious in the case of climate change. However, one thing that distinguishes climate change from most other environmental negotiations is that the human intervention is a result from activity within most economic sectors.

One other variable making the climate change negotiations unique is the significant difficulties in foreseeing the exact costs and consequences of climate change, the environmental as well as the socioeconomic.

The global climate is thus an extreme global case of the classical game theory conundrum the »prisoner's dilemma«[2]. Every nation benefits from the reduction of emissions, but every nation would equally benefit if the reductions were mainly or wholly done by another nation. Absent an agreement, backed by credible institutions, no nation reducing emissions can be sure this reduction is not counterveiled by increasing emissions elsewhere.

The incentives to defect, the perceived advantage of leaving the responsibility to other parties, and the uncertainties of the impacts of climate change, make the negotiations difficult. These are the variables that will be brought into every negotiation on

1. See Sprinz and Vaahtoranta (1994) and Rowland (1995)
2. The familiar prisoner's dilemma consists of a game where two prisoners are jointly responsible for a crime, but separated from each other in prison. The prisoners are then given the same offer: If one prisoner testifies, and the other remains silent, the testifying prisoner will go free and the silent prisoner receives ten years prison. If both prisoners remain silent, they will both receive six months prison. If they both tell on each other they will both receive five years prison. Because of the lack of trust and information, neither prisoner is likely to remain silent out fear that the other prisoner will testify.

climate change, regardless of the number of parties or the format of the negotiation.

In addition to this, issues such as fairness and justice are brought into the negotiations when parties have different capabilities and historical responsibility, which is inevitable unless the group consists of extremely similar parties.

Bearing this in mind, it seems obvious that trust needs to be built and incentives to comply need to increase. By building institutions that facilitate negotiations and reduce the incentives to defect, trust will be built. At least mistrust will be overcome.

The Utility of Institutions

Within economics, institutions are believed to create stability and predictability, and be crucial in creating effective markets. The rules and norms of an institution constrain actors and restructure incentives.[3] When dealing with common pool resources, Elinor Ostrom has shown that individuals tend to see to the common good once an open institution or organisation is established. By functioning in interaction with others, and by having to justify their actions in public, actors redefine their interest to take the common good into consideration to a greater degree. This is not necessarily done for altruistic reasons, instead actors redefine their interest based on rationalistic assumptions.[4]

Along the same lines, the institutional theories in International Relations argue that institutions have a constraining effect on state behaviour and facilitate cooperation among states.[5]

3. North (1998)
4. Ostrom (1990)
5. see e.g. Keohane (1984) and Keohane and Nye (1987)

In this book, the utilities of institutions are seen to be of particular importance during two phases when dealing with climate change—reaching an agreement and implementing (or enforcing) it. This study adopts the view that for an institution to be relevant in addressing a common challenge, it has to have agreement reaching capacity, secure sufficient participation, and ensure the treaty's actual implementation and compliance.[6]

Institutions for Reaching Agreement

The rules and norms of an institution affect state behaviour in different ways. The rules sets the form in which an agreement is to be reached, norms are something states avoid breaching.

Within institutions, norms that affect state behaviour emerge. They emerge from states' expectations on behaviour (i.e. comply and cooperate), but also from expectations on what the institution is to achieve. If the aims of an institution coincide with a public interest, the institution is understood to bear a responsibility for a public good and states are more likely to cooperate, or at least less prone to defect.[7]

The hesitance towards defecting could in large be explained by the awareness of reciprocity and concern for the reputational effect of a decision. Reciprocity emerges during formalised and repeated interaction between states.[8] If states would meet in one negotiation only, the risk of non-cooperation and defection would be bigger than if they are to meet again. Repeated interaction means that states have to take into consideration the risk that their counterpart retaliates in a future interaction.[9]

6. Keohane and Raustiala (2010)
7. Abbot and Snidal (1998) p. 23
8. Keohane (1986) p. 4, 20-25
9. Keohane (1985) p. 232

Being the country that breaks the norm will have a negative impact on its reputation. By the presumption of »once a cheater, always a cheater«, their behaviour will shape future treatment by other members of the institution. Hence, countries avoid being seen as the spoiler in a negotiation or being a non-complier.[10]

The reciprocity and reputational effects further constrain states' behaviour when combined with so-called issue linkage. This means defecting in a climate negotiation will not only have implication for the next climate negotiation, but if states find it important enough, it will also affect their relations on other matters.[11]

The rules of an institution influence the process of reaching agreements for obvious reasons. The rules of decision-making are of course one example of formal rules that affect the possibilities of reaching an agreement. An example of such a rule is whether decisions are adoped by consensus, by qualified majority or by simple majority.

A consensus-based approach tends to have positive effects on the states' problem-solving ambitions. These are however largely outweighed by the risk of states accepting the »least ambitious programme«—the quality of the agreement becomes a result of the parties' lowest common denominator.[12]

Using a majority-based approach increases the chances of reaching an agreement, but is likely to have a negative impact on the number of signatories to an agreement and thereby its effectiveness.

10. Keohane (1984) p. 94, 104
11. Keohane and Nye (1987) p. 734-737
12. Susskind (1994)

Institutions for Implementing the Agreement

Once an agreement on rules, commitments, sanctions and more is reached, an effective institution needs to ensure the implementation of the agreement and that states comply with its rules.

In order to reach full implementation, a few things need to be taken into consideration when creating the organisation.

Boundaries

Firstly, the institution needs to have clear boundaries, or areas of responsibility.[13] In the case of climate change, the areas of responsibility would be the reduction of greenhouse gases, the monitoring, reporting, verification of these reductions, financial support for mitigation and adaption in developing countries and administering a mechanism for linking carbon markets. The rules set up within these areas of responsibility should be clear but flexible. It is important for members to be able to modify set rules, should conditions change or new scientific evidence emerge.

One example of the use of flexible rules is the Montreal Protocol on the Ozone layer, where industrialised countries agreed to take on commitments in an early phase. But the protocol also included clear texts on developing states undertaking commitments once new scientific evidence had been presented. A few years after the protocol was first signed the developing countries committed to reductions and the emissions of ozone depleting gases were diminished.

13. Ostrom (1990) p.91

Critical Mass of Participants

It is vital that the participants of the institutions are the relevant ones. An institution not involving the major parties will simply not be relevant. A disarmament treaty not involving the nuclear states will not be of much use, neither would a climate treaty including only 25 percent of global emissions. By including the relevant parties, the chances of so-called bandwagoning, where a critical mass is created because of the actions by certain relevant states, increase.[14]

Compliance

However, full implementation demands not only the correct setup of membership, it also demands that the state parties actually comply to the agreed rules, something explained well by Douglass North:

> *»How effectively agreements are enforced is the single most important determinant of economic performance. The ability to enforce agreements across time and space is the central underpinning of efficient markets. On the surface such enforcement would appear to be an easy requirement to fulfil. All one needs is an effective, impartial system of laws and courts for the enforcement of formal rules, for the correct societal sanctions to enforce norms of behaviour, and for strong normative personal standards of honesty and integrity to undergrid self-imposed standards of behaviour.«* [15]

14. Barrett (2003) p. 260 ff
15. North (1998)

But as is known, enforcing agreements is not as easy as it first seems, not even within domestic institutions. Enforcement within international institutions is even more difficult, for several reasons. The most obvious is the absence of an enforcing authority in intergovernmental relations.

Therefore, state interests are harder to constrain, and compliance is more difficult to achieve when states find it to be in their interest not to comply. Even within homogeneous groups such as the EMU, evidence shows that states do not always comply with rules set.

State compliance comes as result from rules and norms influencing state behaviour. Scott Barrett makes a difference between treaty based or customary based compliance.[16]

Treaty based compliance is regulated by a so-called non-compliance mechanism that is embedded in the treaty. The problem with the non-compliance mechanism is that it needs to be enforced. This is, as we will see, not the case in the Kyoto Protocol, where the non-compliance mechanism is not being enforced.[17] (see page 34–35)

In order for a non-compliance mechanism to be enforced the punishments need to be credible. This creates a sense of predictability of other states behaviour (compliance), and hence increases states willingness to comply. The most extreme punishment is to expel a state from the cooperation. This has in some cases proven to make institutions more effective, but mainly as deterrence.[18] Although the threat of expelling members may serve as an incentive to stay in the cooperation, a situation where a large number

16. Barrett (2003) p. 274
17. Barrett (2003) p. 290, p. 386
18. Koremos, Lipson, Snidal (2001) p. 790

of members are expelled would decrease the effectiveness of the institution, and such measure should be used with caution.

Another possibility of sanction is to link failure to comply to trade restrictions, and thereby excluding members from privileges associated with the institution. It could be useful to focus on internal enforcement, meaning that members themselves are responsible for imposing the sanctions[19]. The mere existence of a credible non-compliance mechanism does have a deterring effect, and this might be the most effective function of the treaty based non-compliance mechanism.[20]

A majority of the environmental agreements lack a non-compliance mechanism, and thus rests upon the custom based compliance. It is however difficult to evaluate whether these agreements have made states do something they would not otherwise do.

Agreement Supported by a Permanent and Independent Organisation

The effects of norms increase with the independence of the institution. There is a larger likelihood that norms and rules that stand closer to the public interest, rather than to certain states' interest, emerge within an independent institution, which therefore increases the cost of defecting.[21] Proposals from an independent institution with relevant expertise will also be more likely to be considered as impartial by member states.[22]

19. Barett (2003) p. 274, Ostrom (1990) p 90 ff
20. Barrett (2003) p. 290
21. Abbot and Snidal (1998) p. 13–19
22. Abbot and Snidal (1998) p. 17, 19

To achieve a role of independent pool of expertise the institution would need to be supported by a permanent centralised organisation, staffed with sufficient resources, that can cultivate the spirit and norms of the agreement.

A centralised organisation would have the advantage of being able to help parties interpret other parties' behaviour and thereby promote cooperation and trust, because states receive confirmation of other states' compliance and that the common good will be safeguarded.

In addition, an independent organisation reduces transaction costs by replacing a large number of bilateral—or multilateral—negotiations[23]. Instead of having member states negotiating on technicalities, states provide the centralised institution with a mandate for impartial experts to interpret. Thus delegating decisions from diplomats to experts on technical implementation, as opposed to decisions on principle, will both reduce transaction costs and ease the path to practical solutions closer to the common good.

The informational capacities of international organisations to expose state behaviour can influence the activities of even the most powerful states by increasing transparency, so that behaviour has a direct influence on reputation, both in relation to other states and to domestic opinion.

A permanent independent organisation may also have certain leverage over current members when enforcement problems occur, and thereby being able to influence states to change their behaviour. One prime example is the World Bank, who has the ability to withhold resources if members do not abide to the rules that states have previously accepted.

23. Koremos, Lipson, Snidal (2001) p. 790

Despite the advantages of centralised organisations, one has to bear in mind the difficulties in setting up such an institution. Every decision leading up to the establishment of the organisation will be preceded by negotiation among states, where states will weigh their interest in having an effective institution against their fear of losing part of their control and sovereignty. It is a dilemma that only states can decide whether to lessen states' influence.

The Goal: Restructuring Incentives

The principal task of an international treaty is to restructure incentives and in that way change state behaviour.[24] A treaty should, in its optimal form, create a situation where no state can benefit from withdrawing from the treaty, and no party can benefit from failing to comply with the treaty.

By restructuring incentives so that states find apparent advantages in being a member of the institution, the institution is given a clear leverage on potential member states. The example of the EU enlargement has shown that states are willing to change their behaviour when there are clear advantages to becoming a member of an institution. Another example is the China accession to the WTO, which meant that the Chinese government agreed to several reforms of its economy and agreed to abide to the WTO rules, in order to be able to take advantage of the many benefits that come with a membership in the trade organisation.

The major challenge is of course to create an institution to which states find obvious advantages in joining.

We believe that a new institutional framework needs an

24. Barrett 2003

enforceable non-compliance mechanism, but do also recognise the necessity of independent institutions, which aid compliance and implementation. This framework will be outlined in the following chapters.

4

Chapter 4

Today's Institutions: The UNFCC and the IPCC

The current framework for climate change consists mainly of two institutions, the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC).

The scientific body IPCC was established in 1988 by the UN and has played a vital part in providing the scientific knowledge needed for the issue of climate change to emerge on decision makers' agenda.

Partly as a result of the IPCC findings, the UNFCCC was established as the framework for climate change negotiations by the Rio summit in 1992. The supreme body of the UNFCCC is the Conference of the Parties (COP), which meets annually to review the Convention's progress. The Copenhagen summit in December 2009 was the fifteenth Conference of the Parities (COP-15).

Both institutions are characterised by a decentralised,

consensus-based approach, with a very small central secretariat. In the following they will both be presented and then their performance evaluated.

IPCC

The scientific body IPCC plays a vital role in framing the negotiations. The IPCC has a scientific advisory role, primarily highlighted by their assessment reports.

The IPCC was founded in 1988 by UN organs WMO (World Meteorological Organization) and UNEP (United Nations Environment Programme). The purpose of the body is to assess the scientific, technical and socioeconomic information relevant for the understanding of the risk of human-induced climate change. It does not carry out new research nor does it monitor climate-related data. It bases its assessment mainly on published and peer reviewed scientific technical literature.[1]

The IPCC is funded through UN organs UNEP, WMO and member contributions. The IPCC trust fund has an annual budget of approximately $5,2 million.[2] The IPCC secretariat consist of twelve staff with the responsibility to:

- Organise sessions of the Panel and the Bureau
- Propose the annual budget and manage the IPCC trust fund.
- Oversee and co-ordinate IPCC public information and outreach activites

1. IPPC (2010a) Organization http://www.ipcc.ch/organization/organization.htm
2. IPCC (2008) IPPC Programme and budget http://www.ipcc.ch/meetings/session29/doc3.pdf

- Monitor progress of IPCC activities and ensures co-ordinaton among IPCC working groups.[3]

The IPCC's main publication is its assessment reports. As of yet, the IPCC has published four assessment reports, the last being published in 2007. The fourth report involved more than 450 lead authors and 800 co-authors. More than 2500 experts reviewed the draft documents. What is noticeable is that out of more than 1200 authors, an overwhelming majority are distinguished climate and environmental scientists.

According to our estimations (based on IPCC directories), very few, less than 30, are economists, political scientists or historians. This is the case despite the fact that the IPCC mission is to assess the scientific, technical and socioeconomic information deemed relevant for the understanding of the risk of human-induced climate change. The IPCC is, so to speak, focused mainly on defining the problem rather than the solutions.

The IPCC is widely regarded as a trustworthy scientific institution that provides world leaders with the scientific evidence needed to make policy decisions on climate change. But as much as there is the need for a pool of expertise on the science of climate change, there is the need for a pool of expertise on the economics of climate change. During the Copenhagen summit, there was an obvious lack of independent suggestions for economically viable solutions.

The IPCC needs an economic counterpart that can provide policy makers with concrete proposals and is able to implement decisions by governments.

3. IPCC (2010b) Secretariat http://www.ipcc.ch/organization/organization_secretariat.htm#1

UNFCCC

In order to facilitate solutions, the UN member states established the UN Framework Convention on Climate Change in 1992. The Convention's entry into force in 1994 established the UNFCCC as the foundation of global negotiations on climate change.

Founding principles

The primary objective of the non-binding framework convention is to stabilise the concentration of greenhouse gases in the atmosphere at a:

> »*Level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.*«[4]

In the convention the principle of common but differentiated responsibility, one of the foundations of climate negotiations, is stated - the states' commitments are subject to the »*common but differentiated responsibilities and their specific and regional development priorities, objectives and circumstances*«.[5] The principle remains one of the cornerstones of the climate negotiations, and how to interpret the principle remains one of its burning issues.

4. UNFCCC (1992) United Nations Framework Convention on Climate Change Article 2 http://unfccc.int/resource/docs/convkp/conveng.pdf
5. UNFCCC (1992) United Nations Framework Convention on Climate Change Preamble http://unfccc.int/resource/docs/convkp/conveng.pdf

Governing Principles

The supreme body of the UNFCCC is the Conference of the Parties (COP), where all 194 parties to the convention meet on an annual basis to review the convention's progress. In December 2009 the parties met in Copenhagen for their 15th meeting, COP-15. Decisions by the UNFCCC are taken by consensus.

Secretariat

The UNFCCC is served by a secretariat, whose main functions include[6]:

- Making practical arrangements for the Convention and Protocol bodies
- Monitoring implementation of parties' commitments under the Convention, through analysis and review of the information and data provided by parties
- Assisting parties in implementing their commitments,
- Supporting the negotiations, including through the provision of substantive analysis
- Maintaining registries for the issuance of emission credits and assigned Kyoto Protocol emission allowances that can be traded under the emissions trading scheme
- Providing support to the compliance regime of the Kyoto Protocol
- Coordinating with the secretariats of other relevant international bodies such as IPCC, the World Bank, and Global Environment Facility.

6. UNFCCC (2010a) The Secretariat, staff vision http://unfccc.int/secretariat/items/1629.php

In order to carry out its assigned tasks, the secretariat has been assigned an annual budget of around $27 million and a staff that in January 2010 consisted of approximately 385 international civil servants.[7] Rather limited resources to perform the massive list of tasks assigned to the secretariat.

The number of staff should be contrasted with the number of staff in the Bretton Woods institutions; the WTO has a secretariat consisting of 629 staff, the IMF 2,400 and the World Bank has a staff of approximately 10,000 people.[8]

The UNFCCC budget consists of contributions from member states, based on the UN scale of assessment and the executive secretary is appointed by the UN Secretary-General.

Agreement-Reaching Capacity of the UNFCCC

The Convention stipulates that the COP should reach decisions on their rules of procedure through consensus. Since the parties have yet to agree on the rules of voting, the Conference of the Parties reaches decisions through consensus on matters such as a new protocols or substantial agreements on emission reductions. To exemplify, the Copenhagen Accord is not a decision taken by the Conference of Parties and has no legal status within the UNFCCC since all parties could not agree on adopting the Accord. It is merely an accord agreed upon by several states, and in its decision the COP only took note of the Copenhagen Accord.

The consensus seeking approach in theory means that every

7. UNFCCC (2010b) http://unfccc.int/secretariat/history_of_the_secretariat/items/1218.php
8. WTO (2010), World Bank (2010), IMF (2010)

single state can block the entire agreement. In practice, it takes a certain size and importance to do this. In practice the possibility to block agreements mainly lies within groups, such as the G77 or EU, or with major states such as the US or China.

The formation of negotiating blocs is a way of managing the large multilateral negotiations. These blocs become the major players in the negotiations and their constellation and dynamics have great impact on the atmosphere of the negotiations, as was shown in Copenhagen.

In Copenhagen it became obvious that the states' interests were not constrained in a sufficient way. This has been equally true for the developing (G77 and China) and developed countries (the EU and United States), which is shown below.

The fear of a consensus-based approach leading to a »least ambitious programme« (where the agreement becomes a result of a desire to reach any agreement rather than a substantive agreement) became, to a large extent, reality in Copenhagen.[9]

The G77 Heterogeneity

One of the striking features of COP-15 was the complex presence of the G77 and China. The tension between the G77 and developed countries has been a reality within UN negotiations for a long time, and became obvious for a broader public at the Copenhagen summit.

The G77 was established at the UNCTAD (United Nations Conference on Trade And Development) in 1964, by 77 of the poorest countries in the world. Since then the G77 has grown to include 130 members and has become a negotiation-machinery

9. Susskind (1994), Underdahl (2002)

with a united position on development, trade and climate issues in UN-negotiations.

Still, it is a loosely constituted group and many G77 members are also members of other groups, such as Least Developed Countries (LDC), Alliance of Small Island States (AOSIS), Bolivarian Alliance for the Peoples of Our America (ALBA), and the Organization of Petroleum Exporting Countries (OPEC).

Despite its heterogeneity, the group maintains its unity on several issues. On development this might seem reasonable, even though there are several differences between members regarding the need for development aid.

When it comes to climate change and emission reductions, it is however hard to see how the world's largest emitter, China, and oil-producing Venezuela and Libya would share interests with soon-to-be-gone Maldives and Seychelles in a negotiation on emission targets. Still the Sudanese G77 chair was supposed to represent them all during the negotiations in Copenhagen. It would not be a wild guess to assume that certain countries had more influence than others when the G77 position was formed and that smaller states became marginalised.

The reasons why stronger developing states use the G77 are clear. The major powers, in particular China, try to avoid the reputational costs of not taking full responsibility for their actions by hiding behind the argument that a proposed deal is not being good enough for the poorest countries.

Nor is it hard to find the reason why smaller states benefit from being part of the G77 negotiating machinery. Every year, dozens of development resolutions are negotiated in different UN committees and the General Assembly. Many of the smaller members of

the G77 have no possibility to be represented in every negotiation and have to rely on others to represent them.

For obvious reasons, small states do not object to being represented by a superpower such as China or a skilled diplomatic core such as the Egyptian when for example negotiating the transfer of development aid from north to south.

Bearing their limited negotiating capacity in mind, the smaller states have no other truly feasible option but to rely on the G77. The smallest and most vulnerable states could not match the negotiating capacity off the EU or US, with whom they would most likely have opposing views. Therefore, they remain dependent on the G77. Their dependence might also be a result of the need for the support of the G77 on other issues.

Since the G77 constitutes a majority of the UN members in terms of numbers, the group consequently strives for as many decisions as possible to be taken in the UN General Assembly or other forums where all UN-members are present.

The EU and the US

Although it is easy to portray a few of the G77 countries as spoilers, one has to bear in mind the lack of concrete commitments from most of the industrialised countries. The industrialised countries are responsible for the current situation, by standing for the lion's share of historical and current greenhouse gas emissions. The major industrialised emitters have so far not lived up to their responsibility.

Among the major powers, the European Union was the one with the most ambitious targets coming to Copenhagen. However, the EU, or its member states, did not find a way of convincing other

major emitters to take on similar commitments. Even though the EU took some part in the process leading up to the Copenhagen Accord, the Union was largely sidelined in the major decisions and did not manage to have any significant leverage on the final agreement between the United States, China, Brazil, South Africa and India.

The US continued to oppose binding commitments. Even though the Obama administration seemed to have a more open attitude compared to his predecessor, no state or institution was able to influence the US into a more ambitious agreement.

To a large extent, the institutional framework seemed to have little positive impact on the outcome of the negotiation between the US and China. The institution could not provide a monitoring mechanism that the parties could agree on, and it did not exert enough pressure to make them redefine their interest.

To sum up, the COP managed to constrain neither the spoilers from G77 nor the major emitters who refused to move their positions.

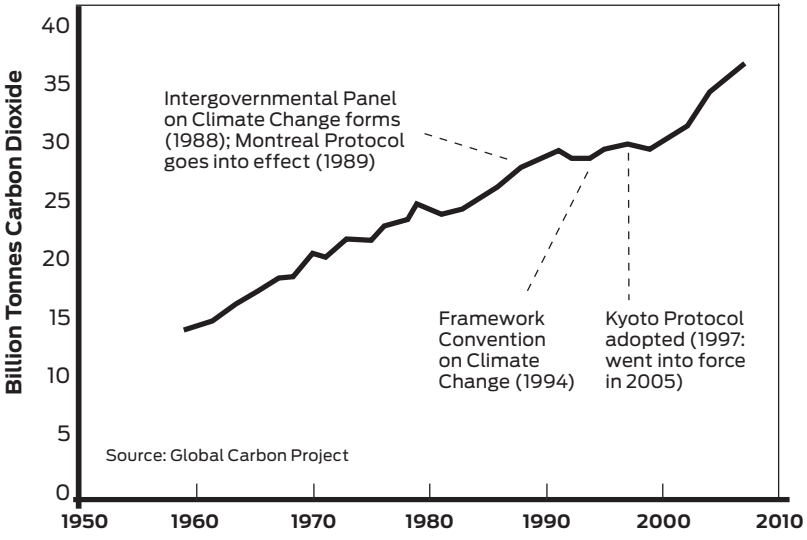
Effectiveness of the UNFCCC

In order for a treaty to be implemented and effective, the participation has to be relevant. The UNFCCC has succeeded in reaching almost full participation. But the non-binding convention does not do much to help reducing global emissions. The parties to the UNFCCC agreed on the Kyoto Protocol in 1997, which is not nearly as successful as the convention in having participation by the relevant parties. Nor has it been effective in reducing emissions (see figure 1).

The Kyoto Protocol does not include the world's second largest emitter, the US, and does not demand any emission reductions from the largest and fifth largest emitters, China and India. These three countries alone are responsible for more than 40 percent of global emissions.

Not even among the parties who have ratified the protocol has it been entirely successful. The most frequently used example is Canada. In 2006, Canada's emissions exceeded the country's commitment from Kyoto by almost 30 percent, and the government proclaimed that they would abandon their legal commitments. Despite this obvious breach of the protocol, Canada runs

Figure 1. Global Carbon Dioxide Emissions, All Sources, 1959–2007



little risk of being sanctioned, simply because the country has declared that they refuse to be sanctioned.

Canada's behaviour is possible because the UNFCCC is a non-binding convention and lacks articles on compliance and enforcement. Enforcement mechanisms for agreements have to be agreed among parties and be a separate part of every new agreement.

The enforcement mechanism of the Kyoto Protocol was agreed during the COP-7, in Marrakesh 2001. The decision stipulates that a party not fulfilling their commitments during the first control period (2008–2012), would have to make up for their lack of reductions during the next control period. The remaining reductions are transferred to the next period, with an addition of 30 percent. This would mean a country exceeding their emission target by 1000 tonnes, would have to reduce their emission by 1 300 tonnes, in addition to their new emission target, during the second period. The party can also be suspended from trading with emission rights.

The Compliance Protocol is overviewed by the Compliance Committee, which in turn is divided into one Enforcement Committee and one Facilitating Committee, where the former is to decide on whether parties have complied or not.

However, the Kyoto Protocol does not give the UNFCCC the power of enforcing these sanctions and the violator (in this example Canada) does not stand any clear risk of being sanctioned.

Another weakness of the Kyoto Protocol compliance mechanism is that procedures and mechanisms entailing binding consequences for non-compliance must be approved by an amendment of the protocol, to be decided by a three-quarter majority. The

protocol also states that compliance amendments would only be binding on parties that ratified the amendment, provided that at least three-quarters of the parties to Kyoto also ratified the amendment.[10]

Hence, parties to the protocol can themselves decide whether the enforcement mechanism should include them or not.

Need for Reform

20 years has soon passed since the establishment of the UNFCCC. Although the Climate Convention has contributed to raising the issue of global warming and to putting it on the global leaders' agenda, it has not contributed sufficiently to the stabilisation of greenhouse gas emissions. The Conference of the Parties has met 15 times and there is still no clear sign of an adequate global agreement.

The Kyoto Protocol has neither a sufficient number of participants, nor has it been implemented effectively. The Copenhagen Accord has larger participation, but the implementation remains unsure.

It is obvious that the institutional framework needs an overhaul. By using evidence from social science, empirical evidence and our own experiences, we will present below a comprehensive proposal for a reformed institutional framework.

The reformed institutions must achieve a change of play by including:

10. UNFCCC http://unfccc.int/kyoto_protocol/compliance/items/2875.php, Barrett (2003) p. 383-386

- Ways to facilitate an agreement involving the relevant actors, by restructuring incentives so that it becomes state interest to cooperate.
- Concrete measures to help states implement the aims of the agreement, and commitments following the agreement. Permanent institutions functioning as a centres of expertise will help doing this.
- Credible non-compliance mechanisms deterring states from not fulfilling commitments and thereby creating a sense of predictability and trust between states.
- Ways to restructure incentives so that states benefit from taking active part in the institution rather than standing on the outside.

5

Chapter 5

A New Institutional Framework

It is clear from the failure of the present institutional setting that there is the need for a »Bretton Woods for the climate«, a founding conference setting up a new family of institutions securing (a) an efficient negotiation process and (b) strong institutions to administer and support global economic mechanisms for implementing and complying with the agreement and creating strong incentives (negative and positive) for outsiders to join.

The institutional reform proposal of this study revolves around a new negotiating forum; the Major Emitters Forum (MEF). The aim of this new institution is to facilitate the process of reaching an agreement on emission targets, but equally important to serve as a governing board for three subordinated institutions (who themselves would each have their own executive boards).

These three executive institutions are (i) a World Climate Organisation; responsible for managing a global emission trading system (ETS) consisting of linked domestic and regional ETSs, (ii) a Green Fund; responsible for collecting and distributing finan-

cial support for mitigation and adaption in developing countries, and (iii) a General Agreement on Carbon Tariffs; responsible for administrating rules for climate-related trade barriers as part of the non-compliance mechanism as well as being a way of pushing outsiders to plug into the new system.

Table 1. A new institutional framework

Major Emitters Forum (MEF)		
World Climate Organisation (WCO)	Green Fund (GF)	General Agreement on Carbon Tariffs (GACT)

Major Emitters Forum

By bringing together 13 of the major emitters who together are responsible for more than 75 percent of global greenhouse gas emissions (2005) in a formalised institution, the Major Emitters Forum, the likelihood of reaching an agreement on emission reductions would increase.

The already existing Major Economies Forum, set up by the United States, could evolve into the Major Emitters Forum (the change of name to the Major Emitters Forum would emphasise its task of reducing global emissions of greenhouse gases).

One of the major advantages of using the Major Economies Forum as a basis is that the institution already has a minor infrastructure and institutional memory, and consists of the major emitters. This would minimise the costs for start up. Since the tasks of the institution would be more or less the same, but with a sharper focus on achieving a deal rather than facilitate the UN process, the

Table 2. Major Emitters Forum: Emissions, GDP, Population

Country	Percent of global greenhouse gas emissions (2005) Source: WRI	Percent of cumulative CO2 emissions 1850-2006 Source: WRI	Percent of global GDP (2008) Source: World Bank	Percent of global population (2006) Source: WRI
China	19.13	8.62	7.10	20.19
USA	18.33	29.00	23.40	4.59
EU	13.35	26.57	30.20	7.58
Russia	5.15	8.09	2.60	2.22
India	4.94	2.38	2.00	16.94
Japan	3.59	3.87	8.10	1.98
Brazil	2.68	0.82	2.60	0.50
Canada	1.96	2.18	2.30	0.75
Mexico	1.70	1.02	1.80	1.60
Indonesia	1.54	0.57	0.80	0.73
South Korea	1.50	0.86	1.50	0.32
Australia	1.48	1.11	1.70	2.89
South Africa	1.12	1.11	0.40	3.41
Total	**76.47**	**86.20**	**84.20**	**63.70**

In the Major Economies Forum, also the UK, France, Italy and Germany are represented. But since the EU has a common policy on climate change, and every MEF member have a share of the votes, it would be highly unfair to also give four EU-members a share of the votes.

raison d'être of the former Major Economies Forum would cease.

The institution should have clear objectives. The first and foremost objective of the MEF would be to reach an agreement on how to share the emission reductions necessary in order to reach the goal of restricting the rise of the global temperature to 2°C above pre industrial levels.

These are the states responsible for the majority of the historic, current and future emissions. They are the ones that need to agree on reducing emissions and solve the burning issue of who, when, how and how much.

Apart from agreeing on principles for burden sharing between them, the MEF-members should also agree to establish a new institutional setup potent enough to lead the world away from fossil fuels; a Bretton Woods for the Climate consisting of a World Climate Organisation, a Green Fund and a General Agreement on Carbon Tariffs.

Agreement on Emission Targets and the Institutional Setup

As we have seen there is a need to reduce the number of negotiating parties and focus on the major emitters, to increase the chances of reaching an agreement.

When minimising the number of participants, *the reputational costs rise*. In a smaller forum with a clear objective, the pressure to live up to one's responsibility of delivering public goods would increase further, which would have a positive impact on states' motivation to cooperate.[1] In addition, these states have been selected to deal with the issue because they are the ones responsible for the current situation and the ones that have the power to deal with it. With strength comes, in most modern societies, a sense of responsibility.

The pressure on all participating states to reach an agreement would mount, and the costs of being the, perhaps only, nation to

1. Abbot och Snidal (1998) p. 23f

deviate would increase. Hence, the reputational effect will have a greater impact as a constraining factor in states' calculations. In a smaller setting, major states cannot hide behind smaller states or a perceived will of the majority. It will also become more obvious to parties and public which actors that do not deliver the common good. When actors have to stand up for their actions, they become more likely to redefine their interests in line with the common good.[2]

During the COP negotiations, too much time has been spent dwelling on procedural matters. This would most likely be reduced in a smaller setting. The discussions would be more focused on substance and hence be more targeted and more efficient. From the G77 group would come the nations, such as China and India, central to emission reductions, with no possibility of delegating responsibility to the group.

The smaller setting will be able to negotiate without the spoilers who are becoming major players because of their ability and inclination to obstruct, rather than because of their major stakes in the negotiation or their relative power. Some of the more obvious spoilers from Copenhagen—such as Sudan or Venezuela—would not be part of the MEF negotiations. The possible spoilers within MEF, no matter who they might be, would have to stand up for their actions for a start, not being able to hide behind others.

It has been argued that reducing the number of parties may have a negative impact on the gains of the cooperation, although it has a positive effect on the likelihood and robustness of the coop-

2. Ostrom (1990)

eration.[3] But since these 13 parties together contribute with more than three quarters of the global greenhouse gas emissions, an agreement between them would be almost as valuable as an agreement between all UNFCCC parties in terms of absolute reductions.

In addition, should the MEF agree on binding targets, it would be extremely hard for other UNFCCC parties to reject such a proposal or not commit to targets in parity to what has been agreed among the major emitters. In the end we could then see real action and some sort of global agreement with binding emission targets for all relevant parties currently within the UN framework. Should the COP also agree on the institutional setup, the UN in a way similar to the current Bretton Woods institutions would sanction this new »Bretton Woods for the Climate«.

The actual Bretton Woods institutions, the IMF, the World Bank and what is today the WTO, were initially founded by a smaller group of nations on a mandate by the League of Nations, the predecessor to the UN. This is today mostly forgotten and these institutions are perceived as having independent status as international bodies.

Should the MEF fail to implement its agreement at the COP, the agreement would still probably be enough to reduce the danger of climate change significantly and avoid the worst consequences from it. Furthermore, the MEF agreement would most likely kick-start a process and function as a bandwagon for a majority of remaining states. Once the MEF-members start implementing its agreement, most countries would eventually participate.[4] This

3. Oye (1985) p. 21
4. For further reading of Bandwagoning, see Barett (2003) p. 326f

exemplifies the need to choose relevant members for the institution; choosing the ones able to act as bandwagons.

This said, the MEF is not a way of undermining the UN, it is a way of reaching an agreement faster on the most important issue of our time. It is a way of making the major emitters live up to their responsibility.

Undermining Multilateralism?

For some, this seems like an undemocratic way of dealing with an issue and a way of undermining the UN and multilateralism.

The UN General Assembly is invaluable in being a global forum where every state has one vote, where every state has the chance of making its voice heard and where Israel and Iran sit almost next to each other for countless meetings day in, day out. It is a forum for dialogue that promotes trust. However, the UN General Assembly does not pass binding agreements. The General Assembly cannot decide on imposing sanctions or approving military actions. This task has been delegated to the UN Security Council. This happened for a reason. Effective decision-making demands a certain degree of efficiency, which unfortunately is lacking in the General Assembly and which has likewise proven to be lacking in the UNFCCC.

Even within the Security Council, it is common that a smaller group of powerful and relevant parties gets together to agree on an agreement and then present it to the larger group.

Since the five permanent members all have the right to block a decision by using their veto, it is more important to have an agreement between the permanent five than to make sure that all of the ten non-permanent members are on board. Therefore, it is

common that the five permanent meet, more or less informally, to reach an agreement regarding the more controversial issues, such as Iran's nuclear programme. The agreement between the permanent members is then presented to the other members, who in most cases accept the agreement with only minor changes.

Miles Kahler has shown that »minilateral« decision-making and negotiating that occurrs within the multilateral framework was valuable in negotiations such as the UN Convention on the Law of the Sea, GATT and in the creation of the Montreal Protocol.[5]

In Copenhagen, the final accord was negotiated not among 194 parties, but among only a few. In this case the small group consisted of the so-called BASIC (Brasil, South Africa, India and China) countries and the US. When Obama notified the EU leaders of the agreement reached between the US and BASIC, the EU in reality had no choice but to accept the facts—if the EU wanted an agreement involving the major emitters, this was the text to agree upon. The alternative seemed to be nothing—another reason why a smaller group seems to be more effective.

Negotiations in smaller groups will always occur and are necessary when reaching agreements. Since they do occur, there is a value added in formalising, or institutionalising, the negotiations in smaller groups.

Some might point out that the major emitters do meet in different forums already today, such as in the Major Economies Forum, G20, and G8, and that this did not lead to a positive outcome in Copenhagen. From this one should not draw the conclusion that the smaller settings do not work. In fact the

5. Kahler (1992) p. 706

Copenhagen Accord in many ways resembles what had previously been agreed among the major emitters in these forums. COP-15 was not able to push key players any further than they previously had been willing to go, i.e. their positions already declared at the G8/MEF summit in L´Aquila in the summer of 2009.

There should be no illusions. Just because the number of negotiating parties is reduced, the major emitters will not instantly become more willing to reduce their emissions. The logic of the prisoner's dilemma and the tragedy of the commons will still constitute a large part of the negotiations. The US will still be eager to see China making commitments that China itself believes are unjust, and South Africa will still claim that the EU is not doing enough, given their historical responsibility and financial strength, etc. But the chances of an agreement will increase.

MEF Institutional Structure and Responsibilities

As stated above, the Major Emitters Forum would consist of twelve states and the European Union.

Once the MEF members have agreed on the principles governing the burden sharing of emission reductions between them (part two, chapter 1) and also agreed on setting up three permanent institutions set out to implement the MEF-agreement, the MEF would function as a Governing Board to the World Climate Organisation, the Green Fund and GACT. The areas of responsibility for the MEF Governing Board would then be limited to:

- Taking the final decision on admission of members wishing to link up with the MEF-agreement.
- Updating the effort sharing principles and the global carbon budget.
- Agreeing on increasing/decreasing the total funding requirements to the Green Fund.
- If non-compliance penalties have been used and neglected repeatedly, taking the final decision to suspend a country from the MEF-agreement.
- As a last resort, deciding to refer countries not signing the MEF agreement to the GACT for sanction.

The point of bringing the major emitters together is to encourage the responsible states to take their responsibility. This will also be reflected in the MEF governing board, where votes will be distributed according to a formula taking each members share of GDP, population and emission reduction commitments per capita in relation to 2010 as well as the business as usual scenario, into account. Decisions will be taken by 4/5 majority.

The daily operations of the World Climate Organisation, the Green Fund and GACT will be run by its respective executive board.

Introduction to the World Climate Organisation, Green Fund and GACT

In the second part of this book, the tasks of the three permanent institutions the World Climate Organisation, the Green Fund and the General Agreement on Carbon Tariffs will be elaborated upon.

In order to give a sense of the setup and governance of these institutions, a brief introduction follows.

The Green Fund, the World Climate Organisation and the General Agreement on Carbon Tariffs would be open to every state (or regional organisations like the EU) signing the MEF-agreement and fulfilling the criteria regarding emission reductions and burden sharing. The MEF governing board would decide upon the admission, after recommendations from experts of the three institutions.

An executive board, consisting of the directors from the MEF members and five additional directors representing the remaining member nations, would run the daily operations of the respective institution. The main function of the executive boards would be to supervise and provide the secretariat with guidelines how to implement the MEF agreement.

These directors should represent regional groupings. Rather than using the regional groups of the UN (Western European and others, Eastern European, Africa, Asia, and Latin America), preferable groups would be: European (non-EU) and others, Sub-Saharan Africa, North America and Middle East, Asia, and Latin America. This is in order to correct the over-representation of EU-members that might occur after many of the Eastern European countries have become members of the European Union.

Each MEF member will appoint one director to the board, and the members of every regional group will elect a director, bringing the total number of directors to 18. Also in the executive board the formula for each directors share of vote should be based on GDP, population and emission reduction commitments, both in relation to 2010 and a business as usual scenario. Some sort of vote

share is necessary to allow the dominant economic powers to relinquish authority to the institution while still not giving them veto power. The IMF has worked well for 60 years under a similar governing system. The three criteria, which could be given equal weight, reflect economic importance, country size, and importantly commitment to reduce emissions. All three are central factors in the set-up. This last criteria will strike some as odd, as though the need for large reductions in itself should give a nation or grouping power. However the MEF's only purpose is to achieve the necessary reductions, it is a group of »penitent sinners«, and those with most at stake should thus be part of the decision making. In order for the emission commitment criteria to be credible, it has to come with an overview of states fulfillment of their commitments. A state should not be given votes according to previous, unfulfilled, commitments.

The directors elected by the regional groups will have the accumulated voting power of the countries that the director is representing. A decision of the executive board should need 3/4 majority.

In particular, the World Climate Organisation and the Green Fund will function as centres of expertise, and would hence need a large staff, which in extent could be shared between the two institutions. The secretariats will be funded through incomes from the emissions trading and from the contributions to the Green Fund.

World Climate Organisation

In order to manage a cost-effective global mitigation regime once the MEF burden sharing agreement is finalised, there is a need for a global cap and trade system consisting of linked national and regional emission markets. The World Climate Organisation (WCO) will manage this international cap and trade system, including an

exchange rate mechanism. Further, the WCO should overview the daily trade of allowances as well as offsets and oversee national commitments. All under the supervision of the executive board, who would also be responsible for drawing out the guidelines for the WCO and managing the day-to-day business.

The WCO will also serve as a global clearing house for monitoring, verifying and reporting greenhouse gas emissions and present convergence paths with yearly carbon budgets for nations applying to join the MEF system and exploratory reports for nations with a potential to join.

The WCO will function as a centre of expertise on emission markets and policies for emission control (for example carbon taxes). This centre of expertise will primarily be financed by the sale of a small share of the emission allowances that the WCO trade, but since it will be in close cooperation with the Green Fund secretariat, it will also benefit from the Green Fund contributions.

Within the WCO, there will also have to be a dispute settling mechanism and a non-compliance mechanism in place. This is in order to, in a credible way punish states who violate the MEF burden sharing agreement by exceeding their carbon budgets and not making up for the shortfall through trading.

The WCO would have the power to use different sanctions for states violating the agreement, including exchange rate control and withdrawal of emission allowances. Should a state repeatedly neglect penalties imposed, the state could as a last resort be suspended from the MEF-agreement. In worst-case scenario it would then also be subject to sanctions according to the GACT.

We explain our view on the World Climate Organisation and related tasks in chapter two of part two.

Green Fund

Financing of low-carbon development strategies in developing countries has been, and continues to be, one of the most important issues of the climate negotiations. The Copenhagen Accord states that »scaled up, new and additional, predictable and adequate funding shall be provided to developing countries to enable and support action on mitigation, adaptation, technology development and transfer, and capacity building«.

This raises obvious questions—where should the money come from, who will receive the money and who will distribute the money?

The MEF will be responsible for finding and agreeing on a wide variety of sources of funding for the Green Fund, including a formula for the members' contributions to, and rights to receive funds from, the Green Fund. The formula should be based on historical responsibilities, the polluter pays principle and build on the so-called Greenhouse Development Rights framework, where one moves away from a country-by-country division to instead focusing on individuals, meaning for example that wealthy people in Europe and the US help pay for mitigation in China, but also that wealthy and emission intensive Chinese contribute.

The Green Fund secretariat would then be responsible for distributing the funds according to a different formula and also be responsible for the monitoring and evaluation of funded projects, in accordance with guidelines set up by the executive board.

The secretariat would be financed by a share from the contributions to the Green Fund, according to a formula decided by the MEF.

We explain our view on the Green Fund and how it should operate in chapter three of part two.

General Agreement on Carbon Tariffs (GACT)

In order to limit potential national benefits from free riding by not signing the MEF-agreement, there needs to be a mechanism in place to push outsiders into the system. By establishing a carbon tariff weapon, compliant with the WTO legal framework, the incentives for moving emissions to the least regulated market will cease, and there will be a consumer price on the carbon content of consumption no matter where production takes place. The General Agreement on Carbon Tariffs will target states not linking up with the agreement on emission caps and who refuses to price emissions through cap and trade or in other comparable ways.

The governing board (MEF) will at a first stage decide on the establishment of the GACT, and formulate the mandate as described above. MEF governing board will, as a last resort, decide on when to refer cases of outside countries, neither signing the MEF agreement nor setting up comparable domestic emission control regimes, to GACT. A reference to GACT sanction mechanism will follow after negotiations between GACT and the outside country has led to nowhere and when all other attempts to make free riders accept the agreement have failed

We explain our view on the GACT and how it should operate in chapter four of the second part of this book.

6

Chapter 6

Summary Part 1

One explanation for why the Copenhagen summit in 2009 became yet another failure was the substantive differences between parties and the lack of political ambitions. But this is not the whole explanation. The existing institutions has not been able to facilitate cooperation between state leaders. How to create institutions that restructure the incentives and interests of states has been the focus of the first part of this book.

Environmental negotiations are more complex than most other intergovernmental negotiations. The climate is a common good and an extreme global case of the prisoner's dilemma. Mistrust and uncertainty therefore needs to be constrained in order for states to cooperate. By building institutions that facilitate the reaching of an agreement, that secure relevant participation, and ensure the treaty's actual implementation and compliance, states' interest may be changed. The current institutional framework for the climate, UNFCCC, has not been able to deliver this.

In order to find a way of reaching an agreement where relevant actors commit to sufficient actions, part 1 of this book has argued for a new institutional framework, revolving around a major emitters forum, MEF. In such a forum, the world's major emitters

would meet to reach an agreement on emission reductions sufficient to restrict the rise of the global temperature to 2°C above preindustrial levels.

By gathering 13 of the major emitters, the pressure to reach an agreement would mount and the reputational costs of deviating would increase. The participants would have to stand up for their actions in a way not needed in the UNFCCC negotiations. The most obvious advantage of reducing the number of negotiating parties would be that an effectively implemented treaty agreed by these major emitters responsible for more than 75 percent of global greenhouse emissions would make a real impact. Most likely it will also lead to a bandwagon effect, where a majority of countries would undertake similar commitments and plug in to the system.

In order for the treaty to be effectively implemented, the MEF should establish three permanent institutions, functioning as centres of expertise and being responsible for the implementation of the agreement. These permanent institutions would be the World Climate Organisation; implementing the burden sharing agreement by managing the linking of emission trading schemes and a non-compliance mechanism, the Green Fund; administrating compensation for the historical responsibility by transfer of resources and technology from the developed countries to the developing countries, and the GACT; pushing outsiders into the system.

The operations and tasks of these institutions, together with a suitable formula for burden sharing, will all be elaborated upon in part two of this book.

Part two

12

Chapter 1

The MEF Agreement on Emission Reductions

Background—Dividing up the Effort

In order for a global emission trading system to become a reality, the members of the Major Emitters Forum (and hopefully many other states) must sign a burden sharing agreement of some kind, specifying who should do what and when. Then, as will be further discussed below, the most effective way of reaching the targets is to establish national cap and trade systems and link them together into a global one. Setting up the burden sharing agreement on which further action can be built is exactly what the UNFCCC and the Kyoto Protocol aim for, but so far have fell short on achieving.

The process of agreeing on the burden sharing is complicated, as views on national circumstances and historical and future responsibilities differ. An equal per capita allocation of allowances is a reasonable starting point in view of the fact that we all share the atmosphere together, but it is also unavoidable to face the fact that national circumstances differ and an agreement will have to be responsive to this.

The Global Emission Cap

In order to keep the world from warming more than two degrees above pre-industrial levels, which is an explicit goal in the Copenhagen accord and many other national/regional/international strategies, the world must limit greenhouse gas emissions to a certain level. Hence there exists an implicit future global per capita emission ceiling that would keep the world within this limit.

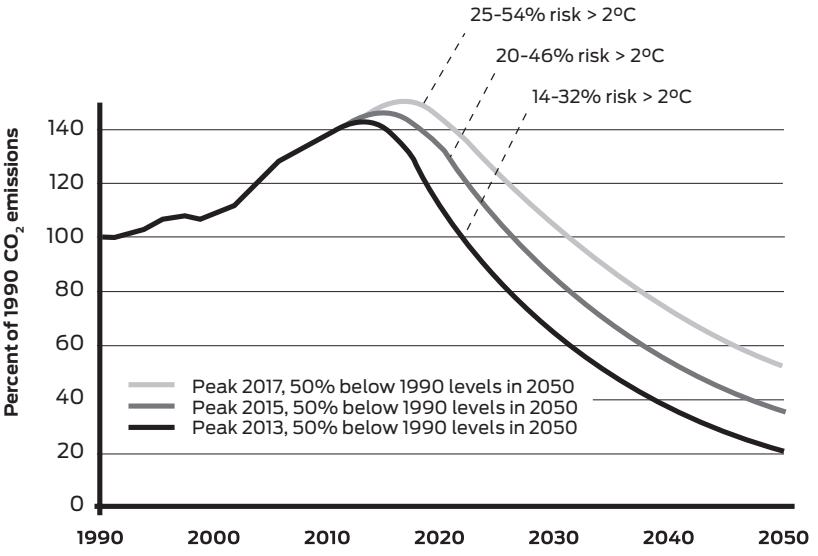
According to the IPCC, global emissions have to be reduced by between 47 and 84 percent by 2050 compared to 1990-levels in order to keep the planet from warming more than two degrees above pre-industrial levels (see table 3). We will use the middle reduction target, 65.5 percent, when doing calculations, but one should keep in mind that there is great uncertainty involved in this statistic (See figure 2).

Table 3. Emission and temperature scenario

CO2-equivalent concentration at stabilisation	Peaking year for emissions	Global average temperature increase	Change in emissions in 2050 compared to 1990	Global average sea level rise
445ppm to 490ppm	2000 to 2015	2.0°C to 2.4°C	-84% to -47%	0.4m to 1.4m

Source: IPCC (2007), p.67, »Climate Change 2007: Synthesis Report« (Modified for 1990 using Climate Analysis Indicators Tool (CAIT) Version 7.0. (Washington, DC: World Resources Institute, 2010))

Figure 2. Emission and temperature scenarios



Source: Baer et al. (2008), p.31, [Modified]

In the year 1990, global emissions were 36.7 Gigatonne (Gt) CO2-equivalents (CO2e).[1] A 65.5 percent reduction of emissions between 1990 and 2050 will thus give a total margin of 12.7Gt emissions in 2050.

According to the United Nations population division, around nine billion people will inhabit the planet in 2050.[2] When dividing the emission margin in 2050 equally between nine billion people, the result will be an annual per capita allowance of 1.4t CO2e.

1. Climate Analysis Indicators Tool (CAIT) Version 7.0. (Washington, DC: World Resources Institute, 2010).
2. World Population Prospects: The 2008 Revision Population Database

From this starting point, table 4 has been created where information on historical, present and future emission structures under a global equal per capita deal is presented for the MEF members.

As a point of reference, the current pledges under the Copenhagen Accord will lead to annual emissions of 65Gt CO2e and

Table 4. Emission profiles for MEF members

Country/ Region	CO2e emissions per capita in tonnes (2006)	Cumulative CO2e emissions per capita in tonnes (1950-2005)	Emission reductions needed per capita to reach 1.4t in 2050, in tonnes and %	Population in 2050 (million)	Cap in 2050 (Mt CO2e p.a.)	Emissions in 2006 (Mt CO2e)
Australia	19.8	533.2	-18.4 (93%)	29	41	410
USA	19.8	808.4	-18.4 (93%)	404	566	5 907
Canada	17.0	626.1	-15.6 (92%)	44	62	554
Russia	11.4	594.5	-10 (88%)	116	162	1 630
South Korea	11.3	192.0	-9.9 (88%)	44	62	546
Japan	10.1	338.8	-8.7 (86%)	102	143	1 286
EU (27)	9.0	412.6	-7.6 (84%)	494	692	4 416
South Africa	7.6	233.5	-6.2 (82%)	57	80	359
China	4.8	69.9	-3.4 (71%)	1 417	1 984	6 240
Mexico	4.3	105.3	-2.9 (67%)	129	181	452
Brazil	2.0	46.9	-0.6 (30%)	219	307	370
Indonesia	1.6	26.6	-0.2 (12%)	288	403	364
India	1.2	21.8	0.2 (-17%)	1 614	2 260	1 344

Source: Climate Analysis Indicators Tool (CAIT) Version 7.0. (Washington, DC: World Resources Institute, 2010). & World Population Prospects: The 2008 Revision Population Database

warming of over three degrees by 2050.[3] This is clearly unsatisfactory, but it is what the current framework has been capable of delivering, and why we believe there is a need for a new approach.

What the second to last column of table 5 shows is the 2050 emissions cap under an equal per capita agreement for all MEF members. Note that this does not mean that actual per capita emissions have to be exactly the same everywhere; this is a calculation of what the deal would look like given equal access to the common resource that is the atmosphere. Countries are then, if a global cap and trade system is used, free to trade their allowances as they wish.

As is evident by the OECD Environmental Outlook baseline, this equal access in 2050 will not be achieved under the business as usual scenario (table 5). Per capita emissions in OECD countries in 2050 will be almost three times the level in the rest of the world (and nowhere near 1.4t) and were this scenario to come true, the situation regarding historical emissions would be even more skewed in favor of the OECD countries.

Table 5. CO2e per capita (tonnes/person) under the OECD business as usual scenario

	2005	2030	2050
OECD	15.0	16.8	17.0
BRIC*	5.1	6.1	6.4
ROW**	5.8	5.9	6.0

*BRIC = Brazil, Russia, India and China, **ROW = Rest of the world
Source: OECD (2008), Table 7.1

3. Climate Action Tracker: Climate Analytics, ECOFYS & PIK. Available online http://www.climateactiontracker.org

In the long run, a reasonable goal is to reach an equal per capita right to the atmosphere and we argue that this should be achieved by 2050 at the latest. The closer to this basic principle an agreement gets, the more intuitive it will be and fewer (rational) sources of disagreement should open up.

One might argue that the people of some countries should have a greater right to emissions than others. For example people living in cold climates need more heating which emits more greenhouse gases. But on the other hand people living in warm countries need more cooling. People living on the countryside need more transportation, but people living in cities generally lead a more emission intensive lifestyle. This is an endless debate and if going down this road, the risk of never reaching an agreement is imminent. An equal per capita access should therefore be the joint long term target and although reaching it will require some deviations from the principle. There should at least be agreement on this direction.

There are many reasons why some countries should do more or less than others (wealth, technology, historical responsibility, growth, poverty, etc.) and the disputes about the distribution of efforts is to a large extent what is holding back an international agreement today. Furthermore, as long as there is no agreement, there will be no international price on emissions, markets will not send out the correct price signals and, as a consequence, will operate against, rather than for, emission reductions.

Pragmatism and a sense of urgency have to guide the world now. The historical and future burden sharing is best dealt with separately. It is more efficient to set up the effort-sharing principles that look to the future with respect to present social and

economic variables. Other tools should be used to compensate for historical responsibility.

That is; we now need to put a price on emissions globally in a pragmatic way. Paying for the costs of this is a different issue and one where historical responsibility and capabilities should play a more central role, we suggest primarily through the Green Fund, see chapter 3. In the following chapters we will focus on the first task, namely the burden sharing and emission reduction targets.

From 2010 to 2050—Effort Sharing Under the MEF Agreement

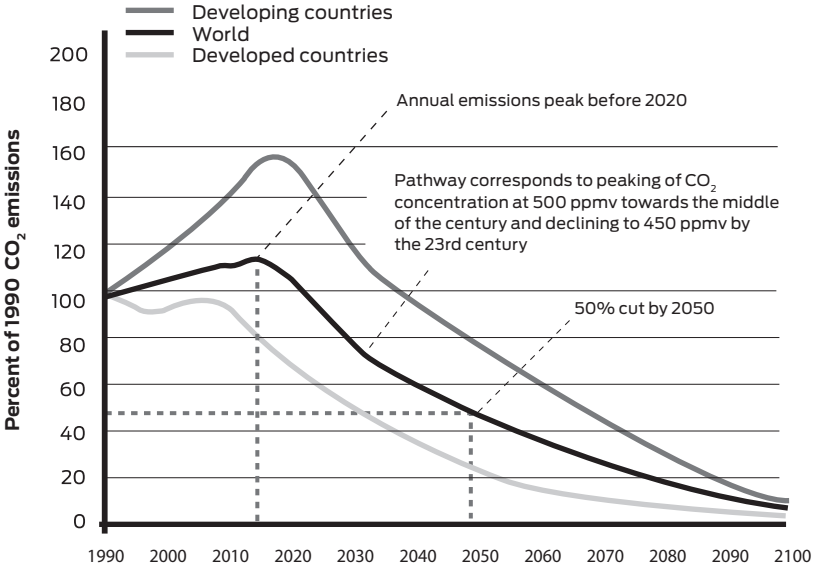
Even if the goal of equal per capita caps in 2050 is shared, the stabilisation trajectories will differ between countries. According to the IPCC[4], global emissions will have to peak at the latest in 2015, but all countries of the world cannot be expected to peak in 2015—rich countries in general will have to peak before developing ones. In order to stabilise emissions at the level calculated in this book, emissions will have to be reduced by between 25 and 40 percent by 2020 in developed countries and »deviate substantially« from the baseline for fast growing economies.[5]

One suggested pathway can be found in Figure 3 for a roughly similar, but slightly less ambitious, scenario to the one we use here and where global emissions are cut by 50 percent from their 1990 levels by 2050.

Note that in our model—a global cap and trade system—emission cuts do not necessarily have to be the same as the cap since

4. IPCC (2007b), p.67
5. IPCC (2007a), Working Group III, Box 13.7

Figure 3. Example emission pathways for developing and developed countries from 1990 to 2100



Source: The Climate Group (2008), p.18

emissions can be traded between countries. The cap thus reflects responsibilities, while the actual emission levels reflect preferences and ability to pay.

If people in one country choose to reduce emissions and sell the allowances, they do so because they prefer the income generated by the trade and should be free to do so. This is both fair and economically efficient and is not a matter of some countries buying themselves off the hook, which can sometimes be claimed regarding trading.

Trading simply creates a free and open market with an equilibrium result reflecting differences in preferences and purchasing power. We must not forget that the latter—purchasing power—is an issue of distribution of resources and not an issue of environmental management. In fact, studies have shown that using a global trading system can cut the costs of reaching global emission targets by as much as 50 percent compared to national solutions. Thereby, a significant sum of money will be saved that can be used to achieve other goals, such as fighting poverty.[6]

But it is also important to note that clearly, a high-emitting country would probably not want to choose to undertake zero abatement at home and only buy allowances from abroad. This would delay vital structural changes and dampen low-carbon innovation and investments in new clean technologies domestically.

Several principles for effort sharing under an international agreement have been proposed and debated in the past. The most widely used starting point is the principle of common but differentiated responsibilities as stated in article 3.1 of the UNFCCC and as included also in the Copenhagen Accord.

The idea of a common responsibility is straightforward as this refers to the responsibility to safeguard the global climate. How to differentiate this responsibility is more complicated though. The actual text of the article 3.1 states that:

> *»The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accord-*

6. Barker & Jenkins (2007)

> *ingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.«*[7]

Generally, the interpretation is that the »basis of equity« includes responsibilities for historical emissions and that the »respective capabilities« includes differences in wealth (GDP/Cap), technology, industrial structure, etc.

At COP-15 in Copenhagen, differences in views on the implications of the principle of common but differentiated responsibilities were at the very core of the debate. Chinese Premier Wen Jiabao stated that the principle was not to be compromised and that:

> *»It is totally unjustified to ask them [poor people] to undertake emission reduction targets beyond their due obligations and capabilities in disregard of historical responsibilities, per capita emissions and different levels of development.«*

The problem is not really the principle itself, as most if not all countries agree to the formulation of it, but rather the interpretation regarding how much to differentiate the responsibility. Key issues are; how much should the developed countries pay for mitigation in poor countries? How much should developed countries reduce their emissions, and according to which trajectory? How should technology transfer be financed and achieved? Should developing nations have binding commitments and what should these commitments look like?

7. UNFCCC article 3.1

Models for Burden Sharing

Several different approaches to pin down what exactly should be included in the common but differentiated responsibilities principles have been proposed, such as the Greenhouse Development Rights (GDR), Common but Differentiated Convergence (CDC), Contraction and Convergence (C&C), Multistage, Budget Approach (BA) and Global Triptych. See table 6 for descriptions of the different systems.

Table 6. Models for burden sharing

Approach	Description
Greenhouse Development Rights [8]	Defines a development threshold (~$20 p.p. per day, PPP) under which people are not required to share the costs of emissions control. About 70 percent of the world's population today lives under this threshold and they emit 15 percent of the global emissions. For people with obligations under the scheme, their respective capacities are defined by their income above the threshold and their responsibilities are measured by historical emissions since 1990 and exclude emissions from consumption under the threshold. Note that this approach thus uses individuals rather than nations as the starting point. The aggregated measure is a so-called »Responsibility Capacity Index« (RCI) that for any country states the share of the total global burden that it is supposed to shoulder. The result is a RCI in 2030 of, for example, 19.6 percent for EU27, 25.5 percent for USA, 15.2 percent for China and 2.3 percent for India. In terms of actual emissions, the result is a reduction of over 100 percent for many rich nations and therefore this system requires extensive trading of emission rights and/or other ways of financing emission reductions abroad.

Contraction and Convergence [9]	The first step in this model uses the best available science to define the maximum allowed size of global emissions for different scenarios. For example the total emissions budget in order to make the two degree target can be defined. This is the contraction part and specifies the ceiling of aggregate emissions for a specified year that any agreement must achieve. In the second step, a convergence year, the year in which emissions per capita should converge for all countries, is defined. The result is emissions trajectories for the world and all individual countries as they make their way towards the convergence phase.
Common but Differentiated Convergence [10]	This is a version of the Contraction and Convergence approach where industrialised economies and economies in transition (Annex I) commit to converge their emissions within a convergence period of, for example, 40 years. Individual countries within this group also converge in per capita emissions during the time period, but the period does not start for an individual country until it reaches a limit defined as a percentage of the global average, e.g. 110 percent of the global average emissions per capita. Developing countries (non-Annex I) do not have any binding commitments in this model unless they reach the emissions threshold. They can, however, take on voluntary targets and sell emission credits to the Annex I group if emissions are below this target. Taking on voluntary targets is thus a win-win option as emission credits do not have to be bought if the voluntary target is not reached. Since the global average emissions are decreasing constantly once the scheme is implemented the emissions threshold, as a percentage of the global average, also decreases. Hence, eventually all countries will participate fully and converge in terms of per capita emissions.
Multistage	In a multistage approach, there are different stages of engagement and the qualifications for each stage are defined. The stages can be defined based on per capita income, emissions, some other variable or a combination of several variables. Participating countries commit to undertake certain agreed-upon efforts once they reach a particular stage by for example reaching a certain per capita income. At the lowest stage countries might not commit to any action while countries at the highest stage commit to substantial emission reductions as well as financing of mitigation abroad. Middle stages can for example include regulatory reforms, tax schemes and some form of relative emission reductions (e.g. relative to a baseline scenario or the emissions intensity per unit GDP). Most other effort sharing models have Multistage elements in them, but rather than defining responsibility portions or something like that, the Multistage approach defines very specific triggers and actions.

Budget Approach [11]	The starting point of this approach is the maximum amount of CO2 emissions that are allowed globally from a starting year until an end year in order to meet a given target. This is the total »carbon budget", and can be, for example, the total emissions allowed from now until 2050 in order to keep the CO2 concentration below 450ppm. This budget is then divided up equally between countries on a per capita basis. Each country of the world will thus have a specific carbon budget to spend during the time period until per capita emissions converge at the end of the period. The authors of this approach suggest 2010-2050 as the period of calculation, but alternative periods can also be used. As per capita emissions in developed countries are so high today, they will exceed their emissions budget and go bankrupt long before 2050 and will therefore be forced to buy emission credits from other countries. This approach therefore demands extensive international emissions trading. A »World Climate Bank« is proposed where national »decarbonisation roadmaps« are evaluated and where emissions trading is organised.
Global Triptych [12]	This approach is sector and technology oriented when it comes to differentiating commitments and therefore has the merit of being able to take into account individual characteristics of participating countries. The European Union has used this approach under the Kyoto Protocol to separate industry under strong international competition from domestic sectors and power production, when deciding on the burden sharing of the emissions control system. Global Triptych is not limited to this division though and can also function under different setups. A bottom-up approach is used when emission allowances are calculated, as each sector will have different weights. Factors such as increased production, energy and emissions intensity and population growth can be used to distribute emissions quotas based on the structure of an economy. In the long-run, the goal is a convergence of the sectorial characteristics of each country, e.g. CO2/kWh for power production, CO2/km of transportation, etc.

8. Baer et al. (2008)
9. Global Commons Institute, see http://www.gci.org.uk/contconv/cc.html
10. Höhne et al. (2006)
11. German Advisory Council on Global Change (2009)
12. den Elzen (2002), Chapter 3.3. & Ekholm, et al. (2010) & Aldy & Stavins (2010), Chapter 7

We now continue with a discussion about the problems with some of these approaches followed by a concrete proposal for the MEF-burden sharing agreement.

What about Global Triptych?

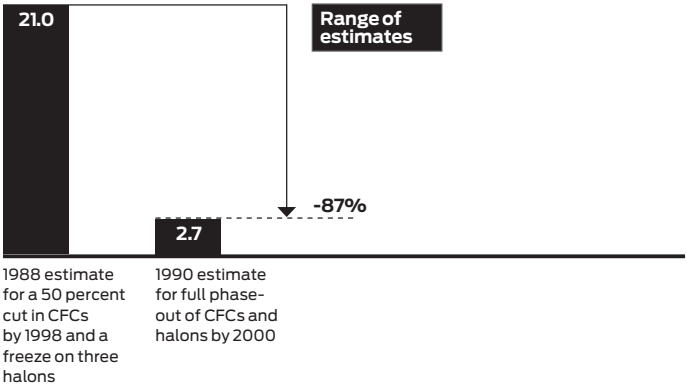
The Global Triptych approach receives a lot of attention, particularly in connection to the protection of emission-intensive production and countries harbouring many of these industries. It might appear sensible to apply a convergence strategy for individual sectors of different economies rather than for whole economies, but it is also complicated to define the methodology, and the system will be vulnerable to special interest lobbying.

When negotiating the industry-level benchmarks that will define the allocation of national emission allowances, it is likely that some industries (if not all) will succeed in making sure that their benchmarks are less ambitious than what would be possible. Since the standards to follow under the Global Triptych model will ultimately be decided through political negotiation—and not by climate science and through the marketplace—there will be immense lobbying in all participating countries to lower the demands on emission cuts in every industry. History support this suggestion as the estimated cost of pollution control tends to be greatly exaggerated before the implementation of environmental control programs (see figure 4).

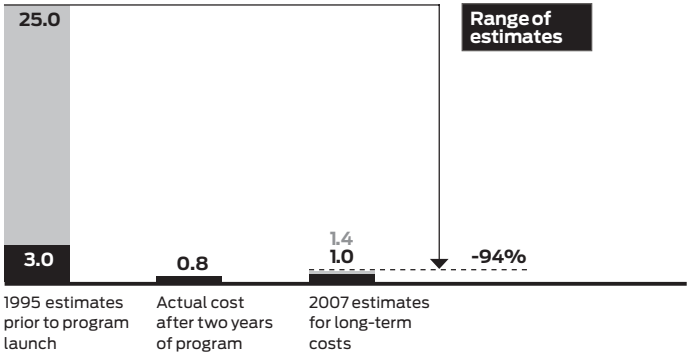
Taking internationally competing manufacturing industries as an example, the agreement would probably end up allowing every participating country in the system a higher than optimal amount of emission allowances for emitters in this industry. This would

Figure 4, Predicted and actual costs for complying with selected environmental legislation

Montreal Protocol (ozone depletion)
Estimates of total costs of implementation for the United States, $ billion



US SO2 cap-and-trade program Estimates of implementation costs, $ billion per year



Source: The Climate Group (2008), p.30

be the case because national industry associations would lobby for protection from the high costs of reducing emissions and their vulnerability to international competition.

This would mean that; firstly, the polluter pays principle might be violated as prices do not respond as much as they should if too many allowances are distributed across the whole trading system. Secondly, as the goal must be to auction allowances, countries with high shares of emission-intensive industry would receive extra income from auctioning a relatively high amount of allowances, thus there will be an incentive to support emission intensive industry in order to get more investments, more allowances and more income. This might then end up subsidising the problem needed to be solved, which is obviously not good.

In theory, it is perhaps possible that policymakers will not bend for industry pressure, but sadly this is not to be expected as environmental policy around the world is full of exemptions and rebates. For the 375 recorded environmental taxes in the OECD there are today more than 1,150 exemptions[13] — often a result of special interest lobbying rather than well thought through policy design.

If all participating countries of a global climate change agreement instead jointly agree on a simple principle for emission allowance allocation, emissions from all sources will be treated and priced in the same way. All emitters will face the same price for emissions and relative competitiveness is not affected. From a consumer's point of view, the full environmental cost of all products are included in the price and firms producing emission intensive products will not be in a different position than if countries with a lot of such companies would be given extra allowances.

13. OECD (2008), p. 457

Countries with a lot of emission intensive production would have to import more allowances under a per capita based allocation than under Global Triptych, but as long as all companies meet the same price of allowances in the marketplace, the price of their goods will increase and offset some of the worsened terms of trade. It is likely that the total market for emission intensive products will lose out relative to other products as the relative prices change, but this is the very point and something all countries will simply have to face up to.

Even if the countries within our proposed global cap and trade system agree on this, countries outside of the agreement will gain competitiveness if they choose not to regulate their industries in an equivalent manner. This is a serious problem and a key reason why the negotiations are not moving forward more rapidly today.

One way to solve this is to build in to the system a trade mechanism that makes sure embedded emissions in imported goods are treated in the same way as goods produced within the emissions control system. A mechanism of this kind also generates incentives for outsiders to plug in to the system, which of course is welcome. On the other hand such a system must be constructed so as to avoid being an excuse for protectionism. We will turn to this issue in detail in chapter 4.

Lastly, it is possible and likely that governments in any case want to support particular industries and jobs for one reason or another. In this case, however, it is better to do it in some other way than through pollution subsidising. In order to create the correct market signals, emissions should be controlled based on their damage and any form of support can then be provided ex post, by for example offering tax rebates on labour input and

financing this with income from auctioning of emission allowances. Another option could be to use auctioning of allowances to different degrees for different industries in order to protect vulnerable ones from excessive costs; this is already a design feature of the European Union emissions trading system. However this option has in itself serious drawbacks and it is difficult to argue why the worst polluters should be given free allowances for any longer than perhaps during a short transition period.

What about Greenhouse Development Rights (GDRs)?

The allure of the Greenhouse Development Rights framework is the concept of capacities, or the »right to develop«. The basic idea is that there should be a defined development threshold ($7,500 GDP/Cap) under which a country must not be required to share the costs of shifting to a low-emissions global economy.

If the Greenhouse Development Rights method is used to allocate emission allowances under a global cap and trade system, the result would be extremely hard to sell politically in high emission countries like the US and Western Europe since they would already be out of allowances by around 2025, even with rapid domestic abatement.[14] This because most of the future growth of emissions will take place in countries with low historical emissions and a relatively large number of people below the development threshold. Consequently they would have a low responsibility to mitigate under the system and a lot of the required mitigation would have to be transferred to the caps of developed countries.

14. See Baer et al. (2008), figure 9 and 10

The Greenhous Development Rights approach seems fair and logical, but development threshold (measured in money) is what drives the result. Therefore this method is more suitable for differentiating responsibilities to finance mitigation and adaptation efforts through some kind of "Green Fund" mechanism, and less suitable to use when allocating emissions allowances in a global cap and trade system. For the latter, it is better to use emission budgets as the foundation and avoid mixing up different issues.

It is important to separate emissions control and development aid, which are two different problems where different strategies are optimal. In order to control emissions generated today and in the future, a price on pollution globally needs to be set, and all major economies of the world have to take part in an agreement to make this happen. There are a lot of arguments in favour of helping people escape poverty, and for showing global solidarity in this endeavor, but it is not at all clear that subsidising greenhouse gas emissions by not pricing them is the best way to fight poverty. In fact, it might very well turn out to be a »shot in the foot« to focus on history and GDP instead of present emissions, as the effect might be an absence of (or artificially low) prices on emissions which would encourage carbon intensive lock-in in developing countries.[15]

As for the political difficulties; most OECD countries would, in the Greenhouse Development Rights framework, run out of allowances around 2025. They would then have to buy massive amounts of offsets, which involves high transaction costs, much bureaucracy and, as yet, no good method of quality control. Alternatively,

15. For a discussion about the costs of carbon lock-in see International Energy Association (2009), p.194, »Energy Sector Lock-in«. For a more lengthy discussion see Unruh G.C., Carrillo-Hermosilla J. (2006)

the developing world could be flooded with emission allowances that they would then sell back to the OECD. A situation like this, where policymakers agree to receive zero emission allowances domestically and then buy up the total domestic need plus an extra premium from foreign countries (of which not just a few are non-democratic states), might in some respects be called fair—but also totally unrealistic to hope for.

An Adjusted Budget Approach

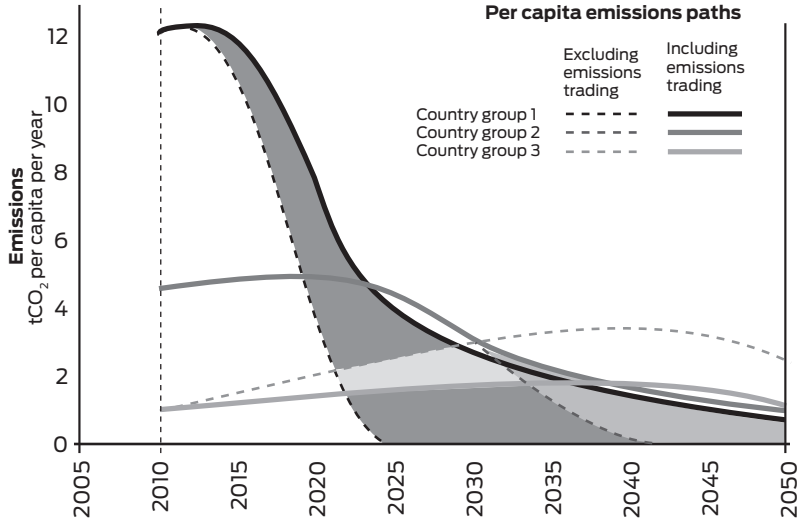
Our proposed deal builds on the Budget Approach and the idea of a global carbon budget that we define as the total amount of emissions allowed in order to meet the two degree target.

For the stabilisation scenario used in this book (65.5 percent reduced emissions between 1990 and 2050), the cumulative allowed emissions between 2010 and 2050 is roughly 1,014 Gt CO2e, this is thus the total carbon budget. If this budget would be divided up equally on a per capita basis, there would be around 3.1t CO2e available each year for each person on the planet between 2010 and 2050. The convergence cap we aim for in 2050 is 1.4t CO2e/cap after the calculations above.[16]

A strict carbon budget approach, like the one used by the German Advisory Council on Global Change (2009), where each person on the planet gets an equal share of the atmosphere from 2010 to 2050, would generate a space for each country equal to the share multiplied by the population.

16. Meinshausen et al. (2009). Modified for 2010-2050 using data from Climate Analysis Indicators Tool (CAIT) Version 7.0. (Washington, DC: World Resources Institute, 2010). Population data for per capita calculations from United Nations World Population Prospects: The 2008 Revision Population Database. Average world population (8.1bn) between 2010 and 2050 was used when calculating the average per capita space.

Figure 5. Example scenario for the budget approach



Source: German Advisory Council on Global Change (2009), p.5

Figure 5 shows a hypothetical scenario under this approach where a country with OECD-levels of emissions today (the top line) runs out of domestic allowances in 2025, but can compensate this shortfall by buying up allowances from other countries. For a low-emission country that does not need the full budget, this principle would result in an over-allocation that can be sold to other countries, the lower line in figure 5.

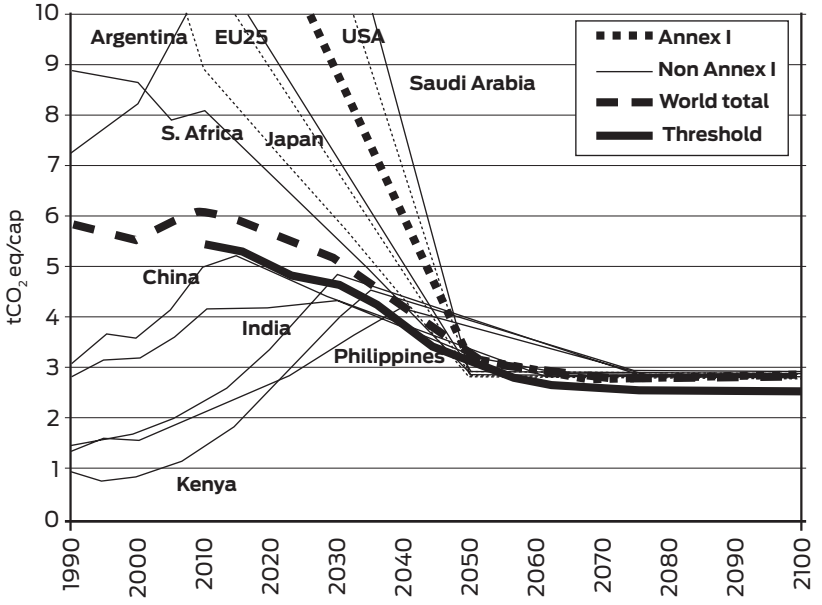
The strict version of the budget approach is a top-down allocation method where people and countries are given allowances based on a principle of equal per capita right to the atmosphere

and where bottom-up adjustments based on actual emissions are not made. This is too a simple model. People without need for their full budget not only do not have to contribute to reducing emissions (like in the Greenhouse Development Rights system), but are also over-compensated in terms of emission allowances. On the other end of the scale there is no space to adapt the system slightly for countries that start off from a high level or for fast growing economies. This illustrates that the strict version of the Budget Approach lacks bottom-up elements.

One way to introduce bottom-up elements in to the Budget Approach model is to borrow ideas from the Common but Differentiated Convergence (CDC) model. In the CDC model of burden sharing, countries agree to converge at, for example, 2050 and low-emitters can increase emissions along a business as usual trajectory while high-emitters reduce their emissions rapidly until all converge and then further reduce emissions together. See figure 6 for an example.

We will now propose a way to bring in bottom-up aspects in to the budget approach model to create a global cap system with goals from 2010 to 2050. Each country that takes part in the new agreement (all MEF members and others that plug in) will have a long-term (2010-2050) carbon budget equal to 3,1t multiplied by the expected population over the period (to be adjusted as population variables change). In the short term, four year trading periods are designed during and between which countries are allowed to borrow up to a specified maximum share of their total budget. For example, a country could be allowed to use 20 percent of the total budget in the first period, 18 percent in the second, 15 percent in the third, 13 percent in the fourth, etc. The reason to

Figure 6. Example scenario for the CDC-model



Source: Höhne, et. al. (2006), p.186

specify an upper limit is to make sure countries do not use up their full budget and go carbon bankrupt early on, which could then threaten the agreement.

A country that does not have a use for its full carbon budget in a trading period (i.e. a country with per capita emissions below 3.1t) is allocated their business as usual emission space and will thus not have to pay for emission reductions. The 3.1t per capita will thereby be the development threshold rather than a monetary one like in the Greenhouse Development Rights system. On top of

that, funds for adaptation and extra mitigation efforts in developing countries (in order to facilitate deviations from the baseline emissions) will be available through a Green Fund (chapter 3).

The unused allowances in low-emission countries will be allocated as extra budget space for countries in need of emissions and based on a formula including growth of the business as usual emissions[17], income, emissions in 1990 and emissions at the start of each trading period. A simple allocation equation could look like this;

$$\varepsilon = \alpha * \Delta BAU - \beta * income + \gamma * emissions1990 + \delta * emissions$$

Where the weights $(\alpha, \beta, \gamma \,\&\, \delta)$ can be shifted over time for reasons of fairness and to make sure countries are pushed to reduce emissions. In the early years of the agreement, relatively high weights would have to be placed on present emissions as high-emitting countries will have problems reducing emissions fast enough. It is important though that the weights are not shifted constantly to accommodate short term needs but are consistent with a path of convergence and while allowing some breathing space, also push for very ambitious mitigation in high emission countries.

These weights should then gradually be shifted so as to make growth in business as usual emissions and income more impor-

17. There is a theoretical risk that countries try to increase their business as usual emissions in order to get more extra allowances. This is probably not very likely as there are many offsetting negative effects, but in any case the business as usual variable can be designed to take in to account the change in some efficiency variables like emissions per dollar generated in the economy, energy efficiency (can be sectorial), etc. By designing the system like this, countries would be awarded for rapidly upgrading their technology, increasing environmental efficiency, etc. while at the same time taking the growth of their economy in to consideration.

tant. In practice this means that the developed world would get extra allowances at the start of the agreement (although, again, far from enough to eliminate the need for very strong reductions) and the extra allowances would then gradually shift towards countries like China, which would be given more extra allowances as the weights on business as usual growth and income increase. The weights on emissions in 1990 and present emissions can be shifted to give the US extra allowances in the beginning, making it more likely that they will sign the agreement, but then gradually shift over to 1990 emissions in order to avoid penalising countries that undertook strong mitigation efforts between 1990 and 2010.

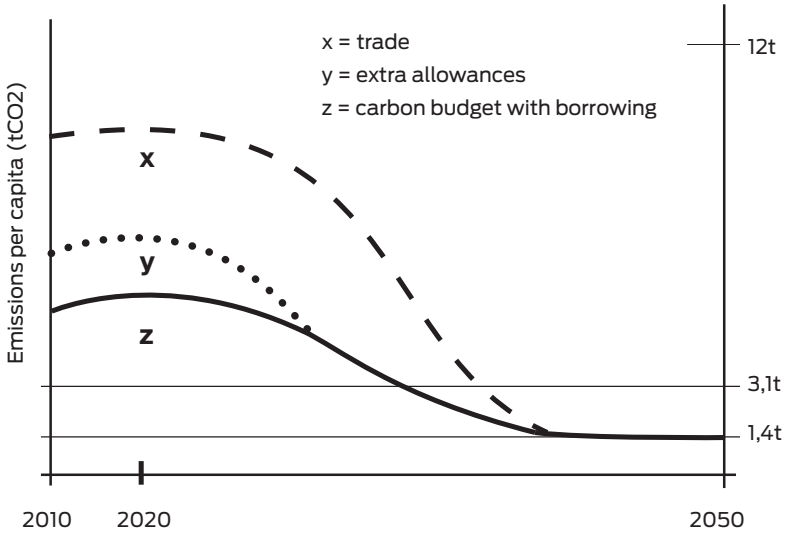
One way to provide non-discretionary funding for the Green Fund, to use for mitigation and adaptation projects in developing countries, is for receivers of allowances above their national carbon budgets to be charged a flat fee for these extra allowances.

Figure 7 illustrates the allowance allocation principles and figure 8 and 9 shows the emissions profiles for a figurative high-emissions country and a low-emissions country.

The carbon budget for each country of the world can easily be calculated and does not require that the country has signed the MEF agreement. In other words, even countries outside the agreement have an assumed carbon budget, against which actual emissions can be compared and, if the full space is not used, the excess can be allocated to other countries as extras.

Since trading is allowed for all countries that choose to plug in to the framework, there is an economic no-regret option to join for countries with low levels of emissions as they will get full allocation and also be able to trade allowances on the international carbon market.

Figure 7. Carbon budget allocation, extra allowances and trading can be used to adjust emissions



A country will exhaust its full budget by emitting 3.1t/cap from 2010 to 2050. By borrowing Z emissions from the future, the country can redistribute its cap trajectory according to the solid line. The extra allowance allocation distributes Y emissions to this country and by buying X allowances from other parties (including offsets) the country can further adjust its actual emission levels and end up along the dashed trajectory.

Figure 8. Emissions 2010-2050 for figurative high-emissions country

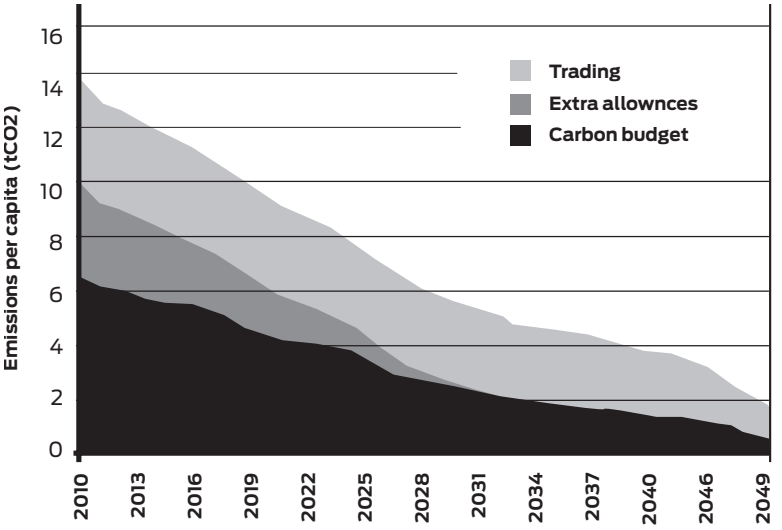


Table 7.

Period	1	2	3	4	5	6	7	8	9	10	
Percentage use of total carbon budget	20	18	15	13	9	8	6	5	4	2	= 100

Figure 9. Emissions 2010-2050 for figurative low-emissions country

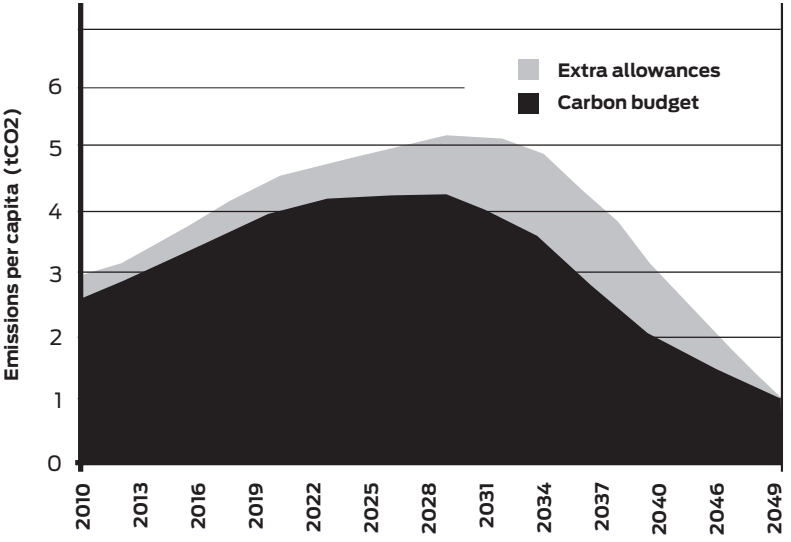


Table 8.

Period	1	2	3	4	5	6	7	8	9	10	
Percentage use of total carbon budget	9	10.5	12	13,5	14	13	11	8	5	4	= 100

It may, however, be difficult to set up large scale cap and trade markets in countries that are in the very early stages of industrialisation, but the burden sharing approach suggested here does not require that the same sectors trade in each and every country. A country like India, for example, might set up a cap and trade system for particular industries, like energy production and large emitters in parts of the manufacturing industry. These sectors would then be trading, whereas for the rest of the economy, other tools can be used to motivate low-emissions development. As long as a country on the whole follows the burden sharing agreement, using a multitude of tools to do so is acceptable. As an economy develops, more and more sectors can be added to the trading system. In fact, many large emitters in developing countries would probably prefer to trade as they will be able to undertake cheap abatement and sell the allowances abroad at a profit.

In this sense, an adjusted budget approach will create incentives that push all countries to reduce emissions below their business as usual levels. The trading sectors of any country will do their best to reduce emissions and sell allowances, while the non-trading sectors will do their best to reduce emissions to avoid taxes (in high-emission countries) and to reap the benefits of support programs (in developing countries).

If a country with very low levels of emissions in the early periods increase their emissions in later periods so much that it needs some of its unused carbon budget that was released early on, this would then have to be compensated for, by for example, using the pool of unused allowances in these later periods.

What about Historical Emissions?

The adjusted budget approach divides future emission allowances in a pragmatic way, but one might reasonably argue that poor countries should have additional (above budget) rights to future emissions since in general their historical emissions are low and since their capabilities (financial and technical) to reduce emissions are also low.

This book uses 2010 as the starting year for the agreement and the carbon budget calculations. When discussing responsibilities, however, it is common to use 1990 as the baseline year since this was the year when the IPCC released its first assessment report and alerted the world to the problems of global warming by evaluating the complete body of scientific evidence.

With respect to historic responsibilities, 1990 might therefore be seen as a fairer baseline year with which to calculate the different country-level carbon budgets. The problem with doing this, however, is that the US, Germany and Russia would already be carbon bankrupt. Japan would nearly be broke and several other developed nations would have a very small space to operate in.

In practice this would mean that all or nearly all of the emissions between 2010 and 2050 in the developed world would have to be bought from developing countries, something that seems—similar to the Greenhouse Development Rights discussion above—highly unlikely to be agreed upon.

Besides the political difficulties of using 1990 as the baseline year for allocating emission allowances, it will be more effective and logical to handle future emissions with one approach and past emissions (i.e. who should pay) with another approach—a compensation scheme.

Table 9. Years until carbon bankruptcy for selected nations from 2010 using 1990 as baseline

Country	Years until carbon bankruptcy
Germany	-1
USA	-9
China	26
Japan	2
Russia	0
India	103
EU	4

Source: German Advisory Council on Global Change (2009), Table 5.3-1 [modified]

If a compensation scheme does not require the compensated nations to undertake any sort of commitment to an emissions cap, it will indirectly subsidise greenhouse gas emissions in these nations. Besides distorting the market forces and risking carbon lock-in in developing countries, this would also be an indirect and sub-optimal way to compensate. There is unarguably an historical debt to be paid. However, the compensation agreement should not be mixed up with the need to include environmental costs in the market price of goods and services, no matter where the products were produced or consumed.

In the design proposed above, the model will in itself, by including all parties to the agreement in a common cap system, generate large financial transfers from developed to developing countries through the trading mechanism.

An advanced general equilibrium model (the EPPA model) of

the world economy, developed at MIT, has been used to simulate the effects of different global agreements. In a simulation on a scenario with 70 percent emission reductions from 2000 levels by 2050 in developed countries and 30 percent in developing countries, and with dynamic mitigation potential taken in to account, substantial financial transfers are predicted from developed to developing countries.

In 2020 the total carbon trading induced transfer from Annex I countries is estimated to be $14 billion per annum and by 2050 nearly $670 billion. As a reference, the current world total Official Development Assistance (ODA) is around $80 billion per annum.[18] These are early estimates of the costs and one should bear in mind that predictions of future costs of mitigation are very uncertain and may very well turn out to be exaggerated as new technology is developed. Both developed and developing countries will obviously win if costs turn out to be lower than predicted.

Reduction of long-term emissions in developing countries is in any case going to require large-scale investments and mitigation efforts that will bring about costs. A substantial share of these costs should be paid for by developed countries as (at least partial) repayment for historical emissions.

In order to facilitate this compensation system, our proposed framework incorporates a version of the Green Fund already proposed in the Copenhagen Accord. Countries will contribute to this fund based on their historical emissions and present capacities and the money will be used to fund emission reduction and adaptation projects as well as technology transfer and development efforts. Chapter 3 develops the design of the Green Fund.

18. Aldy & Stavins (2010), Table 24.4 & p. 776

2^2

Chapter 2

Reducing Emissions

Once the MEF agreement is in place, it needs to get implemented. This will demand concrete and determined policies for emission reductions and that states comply with the rules of the agreement. In this chapter we will discuss how to put a price on emissions and how to link emission markets to facilitate a joint approach, including the introduction of an exchange rate mechanism. In the chapter's final part, the basic structure of the World Climate Organisation, the institution that will handle the day-to-day operations of the global emissions market, including a credible non-compliance mechanism, will be presented.

Pricing emissions—the Core of a Global Solution

Once the burden sharing agreement is in place, the next step for participating countries is to implement policies that are ambitious enough to ensure that the goals are met. In this chapter we examine the most common policies used to reduce emissions and how these policies can be used for collaborative, firm and cost-effective action in our Bretton Woods for the Climate framework.

It should be obvious to everybody that a concerted approach is required, where all big emitters are involved and where a full toolbox of methods are used; business involvement, civil society activism, subsidies, technological cooperation, low-carbon innovation, and most importantly—putting a price on emissions. It is the latter that truly has the potential to both induce behaviour changes and mobilise the power of the global economy. There are two principal ways of putting a price on emissions; taxes, and cap and trade.

Taxes or Cap and Trade?

The problem of mismanaged common-pool resources—like our mismanaged climate—has been recognised for a long time. This can generally be described as a problem created by externalities.

An externality is a by-product of the activity of one or several agents, that affects other agents not involved in the activity itself. One example of a positive externality is education, where an individual's increased knowledge positively affects not only the individual himself, but also society at large. A negative externality is for example pollution in the form of a spillover from industrial production—the pollution affects the environment negatively, but the costs are not paid solely by the firm, but shared by all living in the polluted environment. In the context of climate change, emitters levy a negative externality on the whole planet.

Various solutions have been proposed to mitigate this problem and what all the solutions have in common is the ambition to internalise the externality, i.e. somehow make the people who are responsible for the externality pay for its adverse consequences. This is what the »Polluter Pays Principle« enshrines—a highly

reasonable approach simply stating that the individual(s) responsible for polluting should also take care of the consequences.[1]

Already in the early 1900s, the British economist Arthur Pigou proposed so called Pigovian Taxes as a remedy to this problem in a series of writings.[2] The idea was basically to impose a tax on the externality and equate this tax to the societal (or »full«) cost of the externality. The polluter would then take not only the private part of the total cost into account when deciding how much to pollute, but the full, or social, cost. This would then result in a lower (and socially as well as economically optimal) level of pollution. This is the basic idea behind, for example, carbon taxes.

In practice, a firm will take the Pigovian tax (for example a carbon tax) into consideration when deciding how much to produce, and produce at the level where the marginal benefit of emitting an additional tonne of carbon is equal to the tax, i.e. the marginal cost equals the marginal benefit. For an entire economy all emitters will adjust in the same way and, even if they face the same marginal cost (the tax), their marginal benefits from emitting more will differ (that is, they will differ in how much they can gain from emitting more carbon).

In equilibrium, all emitters will have equated costs and benefits and all will have reduced emissions by at least some amount per unit of production, leading to an overall reduction of carbon emissions in the jurisdiction where the tax was imposed. Theoretically, policymakers can find out what level of the tax will result in the desired reduction of emissions, and impose this tax.

It is obviously not easy to find out the exact level of this optimal

1. See for example the Rio Declaration on Environment and Development, Principle 16.
2. Pigou (1932)

tax, and to further complicate the problem, the marginal benefits of using carbon (or conversely the marginal costs of reducing carbon emissions) changes all the time, which means that the optimal tax also changes constantly.

An alternative solution, first proposed by Ronald Coase in 1960[3], involves assigning property rights—in this case emission rights—and letting the emitters themselves trade these rights (cap and trade). A benefit of this system is that policymakers now will have control over the exact amount of emission rights and can set this cap to whatever is regarded as optimal. Then emitters will trade the rights in order to minimise costs and achieve economic efficiency while keeping the aggregate emissions within the cap.

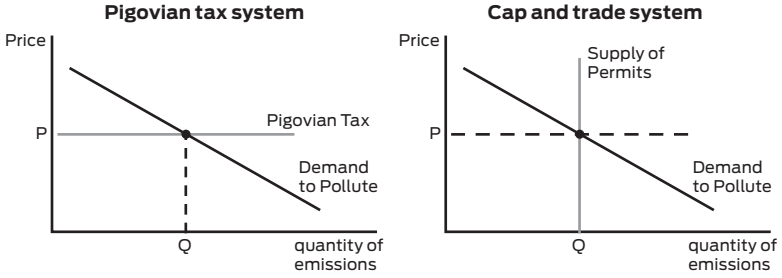
Economic efficiency is achieved when in all companies, the cost of emitting (now the equilibrium price of emission rights) is equal to the marginal benefit of emitting more. This equilibrium, as well as that of the Pigovian Taxes, satisfies the so called Equimarginal Principle, meaning that the goal for reductions of the negative externality (here carbon emissions) is achieved at the lowest possible cost to society.

Both these methods are widely used to reduce greenhouse gas emissions and other forms of pollution throughout the world, and are fundamentally the same thing; it is only a matter of from which end to approach the problem. Should the price (tax), or the quantity (amount of allowances) be set first? See figure 10 for a graphical sketch of the similarities between the two approaches.

Even though the two concepts are similar in theory, the practice is quite different and the cap and trade method is regarded by

3. Coase (1960)

Figure 10. A tax and cap system to control emissions is fundamentally the same



Under a tax regime the price (tax-level) is specified and the level of emissions (Q) is uncertain. Under a cap and trade regime the optimal social level of emissions (Q) is specified and the price is left uncertain. At the theoretically optimal level, the two approaches give the same price and quantity of emissions.

many to be the key to achieving the emission reductions needed to fight climate change.[4] A cap and trade system creates markets for emissions trading that can be linked up against each other yielding cost efficiency and positive scale and diversifying effects.[5] Furthermore a cap and trade system responds better to the business cycle as emissions respond to the economic conditions; a tax is less responsive and slower to change.

The world will use both methods when dealing with emissions and in some circumstances a tax might work better, for example it is easier to charge many small emitters for their emissions under a tax scheme than to allocate emission allowances to them all under

4. See for example: Stavins (2008), chapter 4 and USCAP (2009).
5. Scale effects give increased liquidity and generally lower marginal costs since more participants enter and thus more emitters with a lower-than-average marginal cost of reducing emissions. Diversifying effects are for example the effect of having a region with large opportunities for emission reductions through reforestation or upgrading obsolete technology, it could then be cheaper to fund these activities instead of reducing emissions directly. Today this is possible through the CDM and JI mechanisms under the Kyoto Protocol.

a cap and trade system. In a trading system, participants must be able to make rational decisions on trading allowances back and forth and the transaction cost involved is probably more efficiently dealt with by large emitters.[6]

Road traffic is often used as an example where it is easier to use taxes than to make all drivers trade emission permits. However, this is to some extent a technical issue that can be solved by, for example, demanding that the fuel providers hold emission allowances under a cap and trade system and then include this cost in the price of their products.

As already discussed, another difference between the two systems is that under a tax system the total amount of emissions is uncertain while a cap and trade system leaves the price uncertain. What is worse? It is difficult to say, and in some circumstances price volatility might be worse than emission volatility, and vice versa. In the global context, it is important to have some certainty about actual emission reductions and while an agreement on a global price (tax) of emissions is theoretically a possibility, differentiating efforts would be complex. Given that the carbon price in a tax system is set ex ante (ex post in cap and trade) the risk is that under political pressure from carbon intensive producers the necessary price level is underestimated, taxes are set too low or exemptions become too large. The public revenues from auctioning of emission rights and from a tax should for the same emissions abatement be the same, but imposing taxes is in many political systems much more controversial than establishing a market.

It is sometimes argued that a tax system is less complex and

6. Kaufmann (2009)

this might sometimes be the case if it is possible to piggyback on existing administrative systems. This argument should not be taken too far however, as a tax system also requires emissions to be measured and monitored in the same way as a cap and trade system does. Tax systems are also difficult to harmonise globally, for both political and legal reasons, and even within the EU—with an existing common cap and trade system and where 16 countries share currency—common taxes are highly controversial.

To conclude, if states can »only« agree on the desired global cap on emissions and how to distribute the rights to emit between nations, the emission allowances could then be traded and the cost of combating climate change minimised. The main global collaborative system of reducing emissions will then be organised through linked trading schemes and these can be further complemented by taxes and other emission control measures at the national level.

History of Cap and Trade Systems

Cap and trade systems have been used in different forms and sizes to tackle local environmental problems for decades. In the 1980s the US Environmental Protection Agency (EPA) designed a trading system to facilitate a 10 percent drop in the lead-content of gasoline. In an effort to equate the marginal costs of lead-replacement, refineries could trade credits between themselves where over-performing facilities earned credits that could then be traded. Similar systems, but with actual allocation and trade of allowances, were then used in the 1990s in several countries (such as the US, Singapore, New Zealand and Canada) in order to com-

ply with the Montreal Protocol designed to limit the emissions of ozone depleting gases.[7]

The largest effort so far in using cap and trade to limit environmental degradation in the US is the SO2 allowance trading program designed by the EPA to reduce SO2 emissions from electric utilities that was launched in 1995. A fine was put on every emitted tonne for which the utility did not have an allowance and the firms were free to trade allowances between themselves. By 2005 emissions had dropped by 35 percent compared to 1990-levels and the cost-savings compared to a non market-based approach have been estimated at around $1 billion annually.[8]

Existing and Planned Cap and Trade Systems

Around the world, carbon markets already trade large amounts of emissions. The economic value of these markets was $126 billion in 2009, of which the EU Emission Trading System (EU ETS) accounted for 86 percent.[9] The size of the global market is expected to grow fast as more countries adopt cap and trade regimes. Emission trading systems are being planned for and implemented in countries around the world; the US, Australia, Japan, New Zealand and others. In this chapter we go through the details of the main markets.

7. Stavins (2008)
8. Ibid.
9. Bloomberg New Energy Finance (2010)

The Kyoto Protocol

The first truly global effort to reduce emissions of greenhouse gases was the Kyoto Protocol where an emission trading system is an integrated part. Countries with binding emission reduction targets (Annex I) are allowed to trade emissions in order to reach those targets. Article 17 of the protocol states that:

> *»The Conference of the Parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading. The Parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Article 3. Any such trading shall be supplemental to domestic actions for the purpose of meeting quantified emission limitation and reduction commitments under that Article.«*

Trading is allowed to take place under the rules of the three so-called Kyoto Mechanisms. The first mechanism is the emissions trading where countries that do not use all of their »assigned amount units« (AAUs) can sell these emission units to countries short of AAUs. The second mechanism is the Clean Development Mechanism (CDM) where countries can undertake emission-reducing activities in a developing country, like investing in clean energy production, earning »certified emission reductions« (CERs) that can be used in order to meet national emission targets. The third mechanism is Joint Implementation (JI) where »emission reduction units« (ERUs) can be earned by investing in emission reductions in other developed countries (with binding targets under

Table 10. Trading under the Kyoto Protocol

Mechanism	Unit name	Type	Buyer	Seller
International Emissions Trading	Assigned Amount Units (AAU)	Allowance (i.e. a cap)	Countries with emission caps and obligations to reduce emissions (Annex I)	Countries with emission caps and obligations to reduce emissions (Annex I)
Clean Development Mechanism	Certified Emission Reductions (CER)	Project credit (i.e. production of emission reductions)	Countries with emission caps and obligations to reduce emissions (Annex I)	Countries without obligations under the Kyoto Protocol (non-Annex I)
Joint Implementation	Emission Reduction Units (ERU)	Project credit (i.e. production of emission reductions)	Countries with emission caps and obligations to reduce emissions (Annex I)	Countries with emission caps and obligations to reduce emissions (Annex I)

the Kyoto Protocol) and then used to meet national targets.[10]

Both CDM and JI credits should be additional, i.e. may not be reductions that would have had taken place even without the credit mechanism. This verification process is controversial and complicated. There is some theoretical ground to claim that this »additionality« can never be correctly verified in a country without a cap on emissions. But given that the emissions are at least to some degree additional, and that the offsets are valued with a reasonable discount for uncertainty, the trading increases economic efficiency without affecting the environmental outcome.

Under the protocol the states of the European Community were given permission to combine national emission targets into a combined target, which subsequently led to the largest international cap and trade system for greenhouse gases, the EU ETS.

10. UNFCCC website. See: http://unfccc.int/kyoto_protocol/items/2830.php

EU ETS

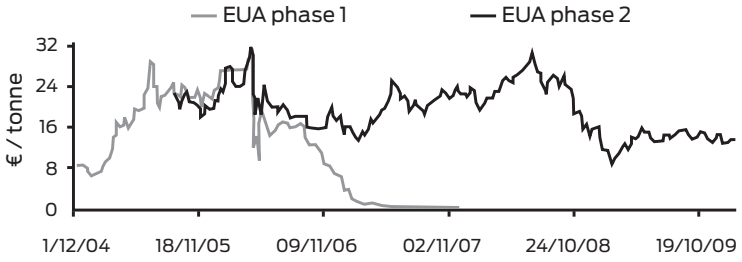
In 2005 the EU ETS was launched in order to connect member states' national targets under the Kyoto protocol and facilitate the attainment of the combined target through a cap and trade system in addition to domestic measures like carbon taxes.[11] Today the EU ETS covers 25 EU member states with binding commitments (all but Cyprus and Malta) as well as non-members Iceland, Norway and Lichtenstein who have connected their cap and trade systems to the EU's. The system covers about 50 percent of the total CO2 emissions in the EU, coming from around 11 000 installations in power generation and manufacturing. The participants are allocated a number of emission allowances each year and then the next year have to return an amount of allowances equal to their actual emissions in that year. If an installation emits more than their given allowances they will have to purchase additional allowances on the market from operators who did not use their full allowed amount.[12]

The EU ETS was implemented in different phases where the first phase (2005–2008) was a trial and error phase preparing for the first commitment period under the Kyoto Protocol (2008-2012). This phase encountered widely discussed and criticised problems which led to a collapse in the price of emission allowances.

The individual member states established their own national targets in National Allocation Plans (NAPs) which had to be accepted by the European Commission. The allowances were then given out for free, so naturally there was an incentive for emitters and countries to over-apply for allowances. This led to a situation

11. The scheme is based on directive 2003/87/EC
12. European Commission (2009) & Ellerman & Joskow (2008)

Figure 11. Prices in the EU ETS, 2004-present



Note: EUA = EU emission Allowance
Source: Point Carbon (2010)

where the supply of allowances was greater than the demand. Due to initial uncertainties of the demand and supply situation the price reached €30 in early 2006 only to plummet to nearly €0 in 2007 (figure 11).[13]

The linked CDM and JI markets can be used to reach the goals but as stated in the Kyoto Protocol this should be supplemental. The maximum percentage of offsets that emitters are allowed to use when compensating for their emissions is stated in each national allocation plan.

For the second phase (2008-2012) a number of changes were made designed to correct failures in the first phase. Data from the first phase was used to tighten up the allocation of allowances, which was reduced by 6.5 percent below the 2005 level. Fewer allowances will be given out for free in phase two, but still only around 10 percent of the total will be auctioned during the period.[14]

13. Ellerman & Joskow (2008)
14. European Commission (2009)

The third trading period (2013-2020) will see even more changes as the system is developed and tweaked to generate the proposed 20 percent EU-wide emission reductions until 2020. Emissions from aviation will be included from 2012 and from 2013 the scope of the system will broaden step-by-step in terms of both gases and emissions covered. States will at the same time be able to exclude emissions from smaller installations with low emissions. The system of national allocation plans will be replaced with a centralised system managed by the European Commission. In order to give predictability in the market, a linear reduction of the cap (1.75 percent per annum) will be used from 2013. The option of linking up cap and trade systems in third countries will also be introduced, even at the regional or state level.[15]

Free allocation will begin to be phased out during the third trading period with the goal of reaching full auctioning in 2027. The power sector will be the first to see extensive auctioning already in 2013.[16]

The US Cap and Trade Systems and Proposals

In the US, the debate over a nation-wide cap and trade system to control greenhouse gas emissions has been going on for quite some time and, while waiting for the federal government to act, several regions have proceeded independently.

- **Regional Greenhouse Gas initiative** (**RGGI**)
  The RGGI is a cooperative effort by ten US States together forming the first mandatory CO2 reduction

15. Ibid.
16. Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009

program in the country. Emissions from electric power generation (about 25 percent of the total emissions in the region) are covered and the trading started in 2009. The goal of the scheme is to lower emissions by 10 percent by 2018 compared to 2009 levels. Emission allowances are distributed at regional auctions and can be traded within or between states on the secondary market. Offset use is restricted and can today only be used to meet 3.3 percent of a participant's compliance obligation.[17]

At the first auction, held on 25 September 2008, 12.5 million tonnes of CO2 allowances were sold and the price settled at $3.07 per tonne. The price was remarkably low compared to for example the EU ETS (around $20 in the summer of 2010) and at the auction on 10 March 2010, the price had dropped even more to $2.07, while the volume of allowances increased to 40.6 million tonnes.[18] The system is under a start-up phase with a fixed cap until 2014 but from 2015 the cap is going to be lowered on a yearly basis and the price can be expected to rise.

- **Western Climate Initiative** (**WCI**)
  This regional US/Canadian program is not implemented yet but has the goal of reducing emissions of the six main greenhouse gases[19] in participating states by 15 percent below 2005 levels by 2020. In contrast to the RGGI, the WCI is a multi-sector program intended

17. RGGI Inc. (2009)
18. RGGI Website—Auction Results, http://www.rggi.org/co2-auctions/results
19. Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride

to cover 90 percent of emissions when fully implemented in 2015. Including, but not limited to, electricity, industry and transportation. The first period of the program is scheduled to start 2012, but it is yet unclear which US states and Canadian provinces that are going to participate and if the period really will start by then. Allowances will be auctioned at a minimum of 10 percent to begin with. This rate will then increase gradually. Allowances can also be banked for use in later periods where each period runs over three years.[20]

- **Congress bills**

  The Waxman-Markey bill, or American Clean Energy and Security Act, was presented by Henry A. Waxman of California and Edward J. Markey of Massachusetts and was approved by the house in June 2009. The bill, now considered to be dead, has the goal of reducing emissions by 17 percent from 2005 levels by 2020. The system would cover the main greenhouse gases and most big industries amounting to 72 percent of total US emissions in 2012, and increasing to 86 percent in 2020. Auctioning would be used as the means of allocating 15 percent of allowances and this share would then gradually increase to 70 percent in 2031. Under the provisions of the bill, the EPA would lose its authority to independently regulate greenhouse gases.[21]

  A second, also stalled, bill was introduced in the Senate in October 2009 by John Kerry of Massachusetts

20. Western Climate Initiative (2009)
21. Congressional budget office (2009a)

> and Barbara Boxer of California; the Kerry-Boxer or Clean Energy Jobs and American Power Act. The bill was very similar to the Waxman-Markey bill but had a few differences. The emission cuts by 2020 were set at 20 percent and 27 to 30 percent would be auctioned at the start, increasing to 80 percent by 2035. The EPA would not lose its regulatory power over greenhouse gases under this bill.[22]

On 12 May 2010, Joe Lieberman of Connecticut and John Kerry of Massachusetts released a new bill called the »American Power Act«. The bill (originally called the Kerry-Graham-Lieberman Climate Bill) aims to reduce emissions by 17 percent from 2005 levels by 2020 and 80 percent by 2050. From 2012, only electric utilities will participate in the trading and from 2016 manufacturing will start being phased in, agriculture is left outside of the bill and transportation will be covered by fixed-price allowances similar to a tax. States will not be allowed to operate their own cap and trade systems under this bill but will have to implement the nation-wide system. This bill also includes a »WTO-consistent« border adjustment where imported goods from countries not charging their producers for greenhouse gas emissions will be taxed at the border. A price collar will be used which means that the price of emission allowances cannot drop below $12 or rise above $25 at the start, these levels are then increased gradually and above inflation.

To conclude, there is momentum in the congress to regulate emissions and it is also one of president Barack Obama's outspoken aims. It is, however, still unclear to what extent cap and

22. Congressional budget office (2009b)

trade will be used as opposed to direct taxes, how strict the regulatory system will be and also which sectors will be covered, how and when.

The World Climate Organisation—Linking Cap and Trade Markets

> »*Apart from the palpable economic benefits that linking may entail, its importance for the evolution of the international climate regime must not be underestimated.*"
> — Schüle & Sterk (2007), p.22, for the Policy Department Economic and Scientific Policy, European Parliament

Background—Getting the Most Bang for the Buck

Establishing cap and trade markets where possible ensures, as mentioned above, that environmental goals are reached at the lowest possible cost. Once a burden sharing agreement is made and local and regional Emission Trading Systems (ETSs) have been established, linking them together is a way to achieve full cost effectiveness, to create one common price of emissions and to reap the benefits of a big and liquid market.[23]

There are at least three reasons why the specific linking design is essential: (1) linking can provide an open-ended mechanism to plug in outside nations that have not yet signed up to the core

23. The benefit of a big market is among other things lower transaction costs, greater liquidity and more capacity to absorb shocks. The OECD (OECD 2009, p. 112) writes: »As idiosyncratic shocks are shared across regions under linking, a larger market size tends to dampen the impact of such shocks, thereby lowering overall carbon price volatility and enhancing incentives for firms to make emission reduction investments."

burden sharing agreement, (2) linking to a nation outside the agreement not yet fully in line with the agreement principles will affect the distribution of public revenue and incentives, (3) linking markets together entails giving up some control, and it is not likely that policymakers will feel comfortable giving up all control over their cap and trade markets to a global market.

We will therefore now turn to the issue of how to design a linking mechanism that introduces proper economic incentives and provides political stability for all parties involved. This linking system is at the very core of the Bretton Woods for the Climate framework.

In our framework, the MEF needs to agree on the effort sharing principle explained in chapter one (part 2) to guide national ambitions, but after that the actual designs of the cap and trade markets might differ to some extent between nations and regions. Regardless of differences, however, as two ETSs link they will indirectly link to any other linked ETS. Different ETSs will influence each other's design features - either directly or indirectly via financial derivatives. It will therefore be pivotal for the participants in a global ETS to agree on some key principles, delegate some other practical issues to the management of an institution (in our proposal the World Climate Organisation) and in some areas keep the control within a national set-up. Robert Stavins (a leading scholar on the topic) has written that this kind of system could very well become the »de facto post-2012 architecture"[24] would the UNFCCC negotiations fail.[25]

24. Aldy & Stavins (2010), p. 139
25. Ibid. Chapter 4

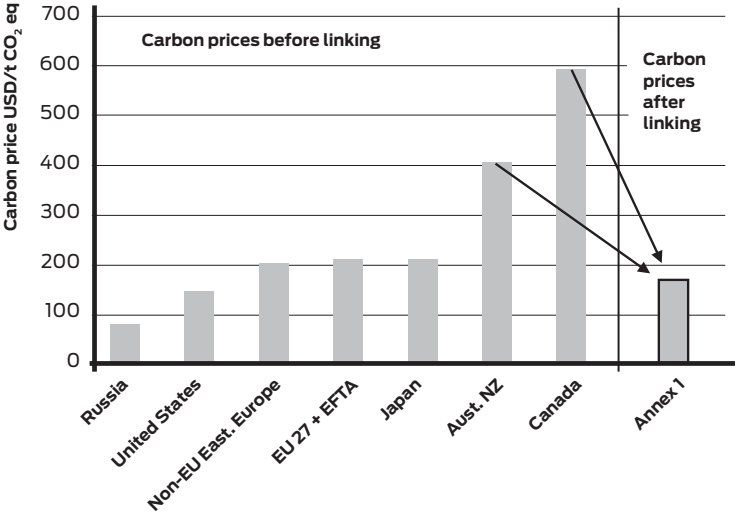
The Benefits of Linking

In practice, linking simply means that an emitter in one system, e.g. a factory in the US, can use emission allowances originating in some other system, e.g. in China, to meet national obligations. By allowing this kind of trade, buyers and sellers are connected and both will win by trading. Say for example that a company in the US values a tonne of CO2 emissions at $40 (the cost the company faces to reduce one tonne of emissions) while a holder of an emissions allowance unit in China values a tonne at only $20 (again the cost of reducing emissions by one tonne). Without trading, the emission allowance would be used in China and give a total value to the emitter of $20. Now say trading is allowed and the clearing price is $30. The US company would now buy the allowance unit from the Chinese seller for $30 and emit one tonne, which will give $40 in value back. The trade thus gives $10 in additional value to the US company and another $10 to the seller in China, who paid only $20 to eliminate the need for the allowance.

The environmental impact is constant at one tonne of CO2 emissions, but the value of the emission allowance has been increased from $20 to $40 due to a more efficient allocation—the emission took place where it yielded the highest return and emissions were reduced where it could be done so at the lowest possible cost. Trade will continue until all gains from trade have been realised and the environmental target is met at the lowest cost to society.

Figure 12 shows the price effects of linkage in a scenario where Annex I countries reduce emissions by 20 percent below 1990 levels by 2020 and by 50 percent by 2050 and using a simulation

Figure 12. Prices under a 50% cut by 2050 relative to 1990 levels in each Annex I region prior to linking and a 50% cut in Annex I as a whole after linking (2050)



in the OECD ENV-Linkages model. As is apparent, the cost of reducing emissions is lowered. In this simulation only Annex I countries are included and the cost savings are likely to be much greater once countries such as China and India are included.

The challenge facing policymakers is how to design a cap and trade system that minimises the social and economic costs, while at the same time achieving the chosen environmental target (i.e. the cap). It is important that the supply of the commodity—emission allowances—is provided by the political system with a high degree of predictability and that information about the supply is

readily available. In the initial phase of the European Union Emissions Trading System (EU ETS), neither were sufficiently clear, which led to a glut of allowances towards the end of the period. This led to the collapse of the price of emission allowances in 2006-2007, which made emissions practically free and resulted in uncertainty and inactivity on the market.[26]

Price Controls and Linking

When directly linking ETSs, design elements will inevitably interact and sometimes balance out each other or result in other unwanted consequences.

One issue with cap and trade systems is, as already discussed, that the future price level is unknown, given that it will depend on the actions and reactions of the marketplace. Policymakers controlling a domestic market (and firms trading emissions) might therefore want to introduce cost containment provisions in search for predictability (although one might argue that market actors should learn to deal with the fluctuations in this commodity price just like all other commodity prices involved in the production process).[27] For example, a price ceiling can be defined above which additional emission allowances are distributed from a reserve pool or even by issuing additional allowances in order to lower the price.

When two or more markets are linked, some degree of control is lost however. In the case above, cost containment provisions might fail because emitters in the linked market can now buy up or dump allowances on the market where the cost containment

26. Ellerman & Joskow (2008), Figure 1 & Chapter D
27. For a review of different cost containment provisions see Tatsutani & Pizer (2008)

measures are used. Conversely, if the reserve pool is large enough, or if the regulators of one market decide to issue an unlimited amount of extra allowances once the price ceiling is reached, the price ceiling will in effect be imposed on all linked markets simultaneously. Also, the environmental performance of an ETS can be compromised if links are established with other systems using a price valve. A strictly enforced price ceiling, for example, means in practice that the cap can be fully removed should prices rise far enough.

Control can also be lost over borrowing and banking provisions, which allow future emissions to be borrowed and used today in order to increase supply, or present emissions to be banked for future use in order to cut back on the supply. In a linked up system, policymakers in charge of one market cannot be sure that banked or borrowed emissions will give the intended effects, since interaction with the other markets can increase or decrease the supply of emission allowances through trading anyway. Small countries in particular will have difficulties influencing prices after links have been established with bigger ETSs.

For example, say that the Swedish government is worried that the price of emission allowances is too high and would like to increase supply in order to lower the prices. They decide to borrow 10 million tonnes of emissions from their future carbon budget and release them into the market. Since the market is linked up with other—much bigger—markets, the effect might be only marginal as the allowances can be bought up by emitters in any part of the international system.

For an individual firm, borrowing and banking is done not for concern of the market stability but as a way to optimise revenue

according to standard financial behaviour. Thus the banking and borrowing rules, especially the borrowing rules, for firms will have to differ from the rules for governments. It is more important to be careful with borrowing, to avoid building up too steep carbon debts that have to be repaid in the future. Firms might go bust and fail to repay, or national governments might be tempted to increase the carbon budget if the debt held by national firms is very high.

To some extent this also applies to governments themselves as there might be a tendency to borrow too much and therefore even governments might have to be limited in their borrowing by some rule decided by the MEF, for example by setting a maximum percentage out-take from the 2010-2050 carbon budget in each trading period, as suggested above. Banking is less dubious in this case as it is less likely to affect the overall cap in an undesired way.

Both public and corporate accounting principles also need to reflect the liabilities incurred by borrowing emissions.

Borrowing and banking provisions for firms will most likely spread through linked-up ETSs as an effect of financial innovations. Thus local and regional policymakers will lose control over the provisions. For example a firm (A) in an ETS that does not allow borrowing can sign a swap contract with a firm (B) in a system allowing borrowing. Firm A would get allowances from firm B (that borrows them in the local market) under a contract binding firm A to repay the allowances (plus some premium) in the future. Because of this reason, the rules governing this kind of price control mechanism will also demand some form of general agreement within the MEF.

Linking Offset Markets

A different type of price control mechanism is to link an ETS to a market for emission offsets. One example of such a link is the EU ETS link with the Clean Development Mechanism and Joint Implementation markets. This link is regulated by the EU linking directive which allows for about 1.4 billion tonnes of CO2 offset emissions to be traded between 2008 and 2012.[28]

Carbon offsets represent emission reductions and linking an ETS to a market for offsets implies that one decides to accept the offset units as equal to the allowance units in the ETS. Thus, an emitter can chose to buy either an emission allowance or an offset to compensate for a tonne of emissions. As an offset market opens up the possibility to make use of cheap »low hanging fruit« reductions (primarily in the developing world), linking offset markets generally lowers the price of emissions in an ETS. Examples of offsets are renewable energy projects, reforestation, reducing methane emissions from solid waste landfills and energy efficiency programs.

The CDM market, supervised by an executive board under the UNFCCC, currently has over 4,200 different projects in the pipeline and the expected amount of emission reduction units to be issued between 2006 and 2012 is almost three billion tonnes.[29]

Cost savings from accepting offset credits can be substantial. In a cost estimate for the 2009 »American Clean Energy and Security Act", the US Congressional Budget Office estimated that the provisions for domestic and international offsets would lower the cost of emission allowances by 69 percent.[30] The OECD ENV-Link-

28. Directive 2004/101/EC of the European Parliament and of the Council & EU Commission (2009)
29. See: http://cdm.unfccc.int
30. Congressional budget office (2009a), p. 16

ages model also predicts cost savings of this magnitude from offset market linking for all Annex I countries.[31]

While the economic arguments for linking up markets for emission offsets are solid, the environmental arguments are a bit less so. Firstly, there is a problem of measuring and estimating impacts, since a project might not deliver the expected amount of emission reductions. One example is offsets generated by reforestation. These projects generate emission reductions over a long period of time and it is impossible to know for sure today that the planted forest will not be cut down at some later date, dry up or that something else will happen that reduces the actual emission reductions generated by the project.

Another problem is one of incentives. Carbon credits can generate revenue streams from reducing current emissions, for example by installing a more efficient pollution control technology in a factory. To some extent there is thus an incentive created to set up activities that generate high emissions and then reduce them in order to obtain offset credits that can be sold.

All these problems are related to the biggest and most discussed problem; the one of additionality. An offset credit is really only environmentally equivalent to an emission allowance if the full reduction really takes place and if the full reduction would not had taken place anyway, regardless of the offset credits. For example, if a renewable energy project is awarded offset credits, but the project would have been undertaken even without the credits, the emission reductions are not really additional and the environmental effect can be a net increase in emissions instead of a decrease.

31. OECD (2009), Ch. 4.3.1

In general there can never be any full guarantees that emissions are not increased in another part of the economy (neutralising the effect of the offset) as long as there is no emissions cap in place. The whole problem of offsets can be summarised by the challenge of ensuring that they are »real, additional and verifiable«.[32] There are therefore some good arguments in favour of discounting offsets generated in markets without any form of cap on emissions.

Decisions on whether or not to link offset markets also have implications for deciding on linking with other ETSs. This is because direct links with offset markets can result in indirect links with other ETSs and vice versa. For example, if a country (A) does not accept offset credits but links to another ETS (B) that does, the result can be that emitters in B buy offsets for their own emissions and then sell allowances to emitters in country A. This way country A will also indirectly accept offset credits.

In the case of two or more ETSs without direct links, but with common links to a market for offset credits, the prices of offsets (and thus also of allowances) will interact between the systems as more potential offset customers enter the market and increase demand. This can substantially affect the cost-saving potential of linking offset markets, as prices will increase with demand.[33]

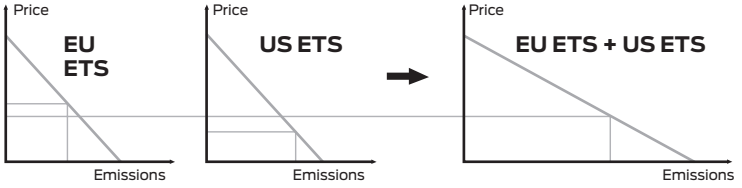
One real-world example is the New Zealand ETS that allows Assigned Amount Units (AAUs) from the Kyoto Protocol to be used for domestic emitters, while emitters in the EU ETS are not allowed to use AAUs. The reason why AAUs are not linked to the EU ETS is that Central and Eastern European economies in transi-

32. Ibid. Ch. 4.3.2. Also see: Müller (2009) & Wara & Victor (2008)
33. For a more lengthy discussion see: Jaffe & Stavins, (2007), section 7

tion were given emission allowances well above their business as usual emissions and a huge surplus of emission allowances were created in the Kyoto system. This is so-called »hot air« emission allowances that would, the argument goes, flood the EU ETS with questionable emission permits, were they to be accepted. Linking the EU ETS to the New Zealand ETS is therefore difficult as »hot air« would then be allowed to enter the EU ETS indirectly through the New Zealand system.[34]

To conclude, provisions for offset market linking is yet another design feature that to some extent needs to be addressed commonly for MEF members before establishing ETS links. Examples of such provisions could be strict rules for additionality and/or principle for discounting offsets relative to their estimated additionality.

Figure 13. Price and quantity effects of linking two emission trading systems



The figure shows prices and emissions in two ETSs before linking and the common price and total emissions after linking. The price has settled between the pre-linkage prices and the total amount of emissions is equal to the two individual caps added together.

34. Schüle & Sterk (2007), p.12 & IETA (2008)

Distributional Effects of Linking

When linking ETSs, the general economic efficiency is increased, but there will also be distributional effects that need to be taken into consideration. Figure 13 shows the theoretical effects of linking the EU ETS with a US ETS with lower allowance prices. After the linking has been done, a common price will settle somewhere between the pre-linking price of the two markets. Here the price of allowances in the EU market is lower after the linking and the price in the US market is higher.

The distributional effects of a link like in figure 13 will be:

A) EU buyers and US sellers of emission allowances will gain
B) EU sellers and US buyers of emission allowances will lose out
C) If permits are allocated by government auctioning, EU governments will lose income and the US government will gain income (partly as a result of a wealth transfer from the EU)

The effects will tend to be greater the bigger the differences prior to linking, i.e. two systems with widely differing pre-linkage prices will see more dramatic gains as well as distributional consequences after linking.

In terms of the distribution of the environmental efforts, there will be more emission abatement in the US after linking and less in the EU as a result of the pre-linking differences in abatement costs. In this scenario, US firms are reducing emissions at a lower cost than EU firms and hence will do more abatement (and export

the allowances freed up by this) after linking as it is more profitable when emission prices increase (or conversely more costly not to abate—an increased alternative cost).

There will also be effects to the terms of trade as a result of the fact that a new commodity—emission allowances—enters the international market. In this scenario, EU will worsen its terms of trade in relation to the US as it will be a net importer of emission allowances. In order to mitigate this change the EU would have to either export more goods and services other than emission allowances to the US, or reduce imports (which would hurt regional consumers and benefit producers).

Another distributional aspect of linking is if countries use different policies to distribute allowances to emitters. Say one country (A) use full auctioning and another country (B) distributes allowances for free based on past levels of emissions (so-called »grandfathering«). While this should not in theory affect how firms react in terms of their emissions (as the alternative cost of emissions will be the same), firms in country A would still have to pay out cash for their allowances which would affect their ability to undertake other investments and perhaps as a consequence affect their competitiveness.[35]

The distributional effects of linking are very similar to the distributional effects of international trade in general. Somewhat simplified, one can say that we are just adding a market to the international trade scene.

How should a policymaker react to the distributional effects of linking? If countries who are about to link up their ETSs agree and accept each other's caps and environmental policies, linking will

35. Assuming imperfect capital markets

increase the overall economic efficiency of attaining the common goal and should be embraced. Were national governments to want to address the distributional effects of linking in this case, they should do so domestically and in the same kind of way governments are already doing through economic policy.

Were, however, governments not to agree that the other countries have reasonable caps and environmental policies, i.e. not accept the implicit burden sharing, the situation would be different. Take the case above. If EU governments believe that the US government is giving unfavourable treatment to domestic emitters by imposing weak environmental regulations and too high a cap, they might not consider the distributional effects to be fair. In essence, the higher the cap, the more allowances will be sold to the country with the tighter cap, and thus the more revenues to the initial holder of the rights, normally the state.

In this case one of three things can be done:

1) Choose not to link, i.e. do not recognise the emission allowances of the other system
2) Negotiate on new principles for burden sharing and then link
3) Alter the design of the linking to take the differences into account and neutralise the part of the distributional effects considered unfair. For example by introducing an exchange rate mechanism

An Exchange Rate Mechanism to Enable Effective Linking

The biggest challenge for an international agreement to combat

climate change is agreeing on the burden sharing—who should reduce emissions, by when and how much? As argued above, a smaller group of countries organised in the MEF would have a greater probability of agreeing on principles for such burden sharing than the 194 parties of the current UNFCCC process.

As also discussed above, countries outside of the MEF have to be motivated to plug in to the framework in order to cover as much of the global emissions as possible.

One way to approach outside countries would be to demand full adherence to the MEF burden sharing agreement, but this way the situation of the current UNFCCC framework would be somewhat replicated. On the other hand; not demanding countries that want to plug in to the MEF system to also adopt the burden sharing principles would give strong incentives to set the emission cap at the highest possible level. Having the cap at the highest possible level would generate a maximum amount of emission allowances that can then be sold and generate export income.

As an example, take a small country outside of the MEF, country A. Country A is emitting 12.4 million tonnes of carbon dioxide equivalents and, under a business as usual scenario, emissions will grow by five percent each year during the coming decade. The market price of emission allowances in the, now up and running, MEF system is $30. Were country A to set up a cap and trade system and link it to the MEF system, the total value of emission allowances in country A would be its cap multiplied by $30.

Country A expects the emission allowance price in its domestic market to be lower than $30 and will thus become a seller of emission allowances. In order to maximise the total value of its export, country A will therefore set the domestic cap at the maximum level

accepted by the members of the MEF (at too high a cap linkage would be refused) and raise the cap with five percent each year. Most of each increase will be sold to the MEF system and generate national revenues. This is the so-called »free-rider effect«.[36]

The example above illustrates how, when linking takes place, but there is no burden sharing agreement, the economic incentives for countries outside of the MEF agreement will be entirely contradictory to the goal of reducing emissions. The same logic applies if countries in the MEF agreement are allowed some flexibility to deviate from the burden sharing principle. How can this problem be mitigated and countries motivated to both link up ETSs and reduce emissions?

Country A is in this case motivated to set the cap at the highest possible level, because it will export emission allowances to other ETSs.[37] Say country A has a population of two million people. The basic carbon budget of country A under our proposed MEF burden sharing principle would then be 6.2 million tonnes of emissions per year between 2010 and 2050.[38]

Were country A to cap at 6.2 million, the value of its emission allowances would be $186 million (6.2 multiplied by 30) of which some proportion would be export income from selling allowances abroad.

Since this allowance level for country A, 6.2 million tonnes per year, is in line with the burden sharing principles of the MEF agreement, emission allowances should be seen as standard and be traded one for one (1:1).

36. Edenhofer et al. (2007), p. 9
37. For a net importer of emission allowances, the economic incentives are also favourable to increasing the cap as this will reduce the price spread and have a dampening effect on the world price of emission allowances.
38. 3.1t CO2e (the average per capita level between 2010 - 2050 under the burden sharing principle explained above) multiplied by the population (tow million).

Table 11. Exchange rate effects on the value of emission allowances

Country A	Value of emission allowances (6.2 million tonnes)	Value of emission allowances (12.4 million tonnes)
Without exchange rate	$186m	$372m
With exchange rate	$186m	$186m

However, were country A to choose to cap at a higher level, an exchange rate system could be designed to fully correct incentives while keeping the option of linkage open.

Say that country A chose to cap at two times 6.2, i.e. 12.4 million tonnes. In order to keep the value of the total amount of allowances constant (valued at the world price) an exchange rate of 2:1 could be imposed. Now an emitter in a country under full compliance with the MEF burden sharing principle would have to buy two country A emission allowances in order to emit one tonne of emissions at home. This way the value of the country A allowances would be halved, since they are worth half as much for emitters under the MEF agreement, i.e. 12.4 million multiplied by $30 and divided by 2, or $186 million. From the perspective of country A, nothing is gained from increasing its cap above 6.2 million tonnes if we assume unit elasticity of demand for emissions.[39]

Now, let's relax the assumption that the emissions demand curve in country A has the unit elasticity property. Now not only the prices change when the cap is increased but the export share

39. Unit elasticity = an X percent increase in the price of emissions will lead to an X percent decrease of emissions. In this case this implies that the export share of emission allowances for country A is kept constant.

will change as well, and depending on how it changes country A might improve or worsen its terms of trade.

If the elasticity would be low between the new and old world price of emission allowances (i.e. between $15 and $30) but high between the new domestic equilibrium price and $15, the export share would increase and country A would improve its terms of trade (albeit much less than if no exchange rate existed). If, on the contrary, the elasticities where high between $15 and $30, but low below $15 the country would export a relatively small share of its cap increase and experience terms of trade losses.

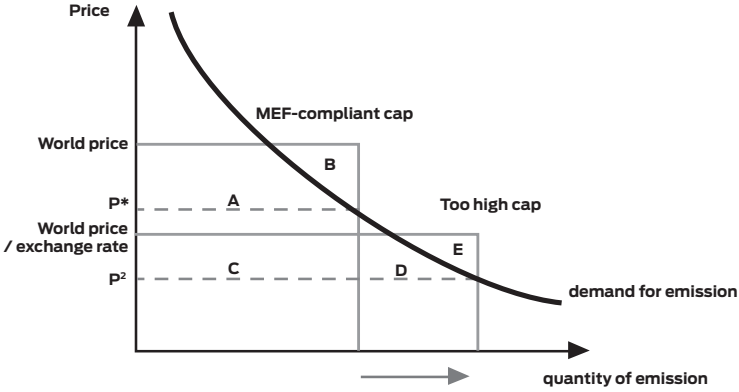
Therefore we can conclude that the exchange rate will always reduce the gains from increasing the cap, but to what extent and whether it actually makes a country worse off depend on the shape of the aggregate emissions demand curve in the country in question.

More generally, for any country deciding to increase the cap to a level above the burden sharing principle, an exchange rate mechanism has the following effects:

For a country with a domestic allowance price below the international price:

1. The total value of the emission allowances is kept constant and the terms of trade improvement is reduced or reversed.
2. The new international market price for domestic buyers will remain unchanged, while the price for sellers will be reduced.
3. The domestic equilibrium price of allowances will be reduced

Figure 14. Exchange rate effect for a country with a domestic allowance price below the international price

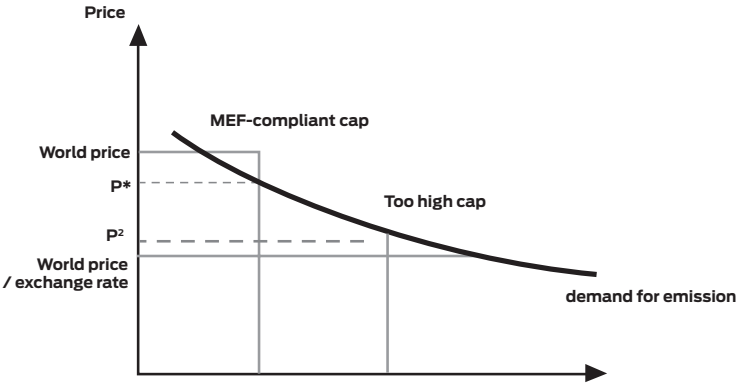


The total value of emission allowances under the MEF-compliant cap is equal to A+B+C. The total value of emission allowances after the cap has been increased is C+D+E. The exchange rate can be designed to make A+B+C equal to C+D+E and thereby keep the value of the total amount of allowances constant. P* is the autarky equilibrium price with the MEF-compliant cap, P2* is the autarky equilibrium price after the cap increase.

As long as the domestic equilibrium price is still below the price for sellers (the international price divided by the exchange rate), the new domestic price will be equal to the exchange rate adjusted world price. Domestic emissions will be increased since the equilibrium price is lower and will be done so in a way that is economically inefficient as the emitters would prefer to reduce emissions and sell the emission permits at the real world price (the price faced before the cap was increased and the exchange rate imposed).

If, after the exchange rate has been imposed, the domestic price ends up being higher than the price faced by sellers, the country

Figure 15. Exchange rate effect for a country with a domestic allowance price below the international price, but where the price is then pushed above after the cap-change



P* is the autarky equilibrium price with the MEF-compliant cap and is below the world price; hence the country is selling emissions. P2* is the domestic autarky price after the cap increase and is now above the world price faced by sellers (World price divided by the exchange rate). Since the world price faced by buyers is still the original world price (and above P2*), the country will no longer trade emissions in the world market.

will no longer be a net seller of emission allowances and will in fact not take part in trading and in practice become an isolated domestic trading system.

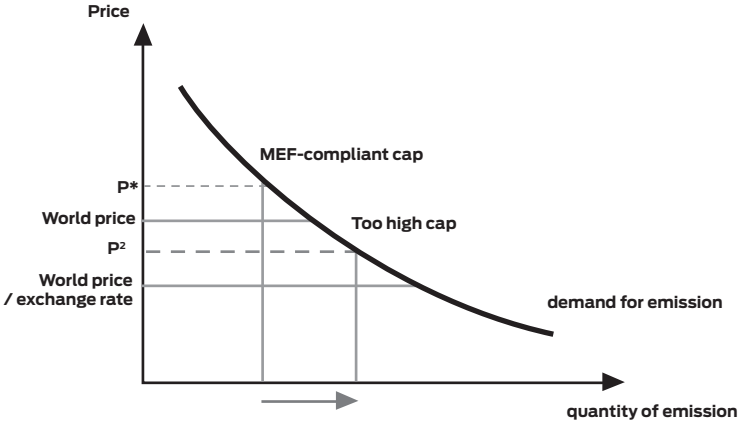
For a country with a domestic allowance price above the international allowance price:

1. If the increased supply of emission allowances would make the domestic price drop below the international price, reaping economic gains from this by becoming a seller of allowances would not be possible as the

exchange rate would press the price for sellers below the international price. An isolated domestic market would be the end result.

2. If the country remains a net buyer despite the increased supply, the exchange rate would have no effect and the country would gain from increasing the cap (at least economically).

Figure 16. Exchange rate effect on a country with a domestic allowance price above the international price



P* is the autarky equilibrium price with the MEF-compliant cap and is above the world price; hence the country is buying emissions. P2* is the autarky equilibrium price after the cap increase and is now between the buyer price (World price) and the seller price (World price divided by the exchange rate). The country will no longer buy emissions from the world market as demand is met by issuing more allowances domestically. The government will take over the import so to say and the country will gain economically. Note that emitters would now want to sell allowances to the world market, but the exchange rate does not allow this as it creates a wedge between the allowance selling and buying price.

To conclude, the exchange rate will reduce or fully remove incentives for countries with a low domestic price of emission allowances (i.e. most countries outside of the MEF agreement) to increase the cap. It will also remove the possibility for countries that are buying allowances to increase the cap in order to try to become net sellers. It will not, however, lessen the possible urge for high-cost countries to increase the cap in order to import fewer allowances. This last scenario would however not affect the integrity of the MEF agreement when linking to an outsider.

Designing the Exchange Rate

While an exchange rate would in general correct incentives it could be designed in many different ways, for example to strengthen incentives or generate a revenue stream for the Green Fund.

To do so we may impose the exchange rate as a tax wedge imposed on those who cap above the carbon budget norm. In its simplest form the tax would simply mimic the exchange rate. An emission allowance sold into the MEF area would then have to be supplemented by X additional allowances, where X is equal to the exchange rate minus one.

To follow up on our example above an allowance that is sold to the MEF area with the exchange rate 2:1 would have to be supplemented by one additional allowance. In such a system the market price for the sold allowance can be unaltered at $30 in this example, but because of the additional allowance that is required to supplement the sold one the average price will be $30 divided by two, i.e. $15.

The additional allowances could then in part or fully be scrapped to maximize abatement. If fully scrapped this is equal

to the original exchange rate scheme where a buyer in a MEF compliant country had to surrender two allowances per one tonne of emissions. But now the World Climate Organisation will hold the extra allowance and could re-sell it to raise revenue for the Green Fund and the MEF/WCO institutions, although at the expense of the abatement goals.

A second model would be to add some progressivity by adding a surcharge on the exchange rate that would itself be related to the exchange rate. The tax could for example take the form:

$$Outside\ allowances\ required = exchange\ rate\ [(tax\ * exchange\ rate) + \ MEF\ emissions]$$

which can be reformulated

$$Outside\ allowances\ required = (exchange\ rate^2 * tax) + \ (exchange\ rate * MEF\ emissions)$$

and which would mean that one tonne of emissions in the MEF region would, with a 2:1 exchange rate and a 0.1 tax rate, require;

$$(2^2 * 0.1) + \ (2 * 1) = \ 2.4$$

allowances from the outside country.

This would reduce further the incentive for the outside country with above norm emissions to trade with the MEF, but it would also create stronger incentives to lower the cap towards the MEF norm. It could also provide an additional revenue stream without compromising the abatement goals.

A last possibility would be to simply add a turnover tax on any trade going in to MEF compliant ETSs.

National Abatement Incentives and Economic Efficiency—a Trade Off

While the exchange rate mechanism (with or without a tax wedge) does solve some important incentive problems and enables flexible linking for countries outside of the MEF, it does also lower the overall economic efficiency of the linking itself and there is hence a trade-off to be made. The whole point of linking ETSs is to realise the cheapest possible emission reduction within the whole system. In equilibrium the so-called equimarginal principle will then be fulfilled and all emission reductions on the margin will have an equal cost. I.e. emitters will trade emission allowances until their cost of reducing emissions are equal.

With an exchange rate however, this principle is violated, as the value of emission allowances are distorted. In the case above, an emitter in country A would have to reduce emissions at a cost of $15 in order to make allowances available on the international market, since two tonnes have to be abated in order to sell the equivalent of one tonne from the perspective of the buyer. Two times $15 is equal to $30, which is the price it will get for two emission allowances originating in country A. Hence the equimarginal principle will be violated.

However the basic commodity in this system is a politically defined one and if the supply of this commodity is in fact being mischievously oversupplied by some governments, this should (at minimum) not be rewarded by allowing such nations to plug in to the MEF ETS and reap revenues.

There are no perfect solutions, but an exchange rate mechanism, although it cannot solve all problems, is a good way to make sure incentives on the supply side of this politically defined

commodity are corrected while still allowing for some flexibility in the design of national cap and trade systems, and thus leaving the system partly open-ended with a combined political and economic incentive to adhere to the full MEF agreement.

Furthermore, offset provisions can be used to lessen some of the lost economic efficiency and the GACT and Green Fund will complement the exchange rate system to create a consistent framework where incentives will push for reduced emissions.

Institutional Need—The World Climate Organisation

We have already discussed and proposed a concrete way to set up a global cap and trade program by negotiating a burden sharing agreement in the MEF context, create domestic and regional ETSs and then link them together. In order to efficiently manage the day-to-day operations of this global market, facilitate the plug in of non-MEF trading systems and solve problems that emerge, some sort of institution is needed. We therefore propose the founding of a World Climate Organisation (WCO), with an executive board in which not only the MEF members, but all linked up countries, are represented, according to the 13+5 formula outlined in part one of this book.

Several similar institutions have been proposed by others as a good way to facilitate emissions trading, make sure that the markets work smoothly, and practice efficient decision making over the day-to-day operations of the marketplace and its institutional framework. For example the »World Climate Bank« by the German Advisory Council on Global Change (2008), an International Clearinghouse by Edenhofer et al. (2007) and the Carbon

Market Efficiency Board in the Lieberman-Warner Climate Change Bill to the US Senate in 2007.

In the Bretton Woods for the Climate model, the MEF will agree on some basic principles regarding system design (most importantly the burden sharing), but preferably, in the name of efficiency, give some leeway to the independent WCO. In light of the discussion in this chapter, the WCO should be responsible for the following:

- Borrowing provisions for independent emitters as well as nations. Here, keeping track of the national carbon budgets and making sure countries do not use up too much of their budget in early years is important. Rules for borrowing for individual emitters can be used as a price control measure and the WCO should therefore have some power to change interest rates and the timeframe for allowed borrowing. For example, the interest rates on borrowing could be increased and the number of years from which borrowing is allowed be reduced in order to limit supply and vice versa.
- Price control measures in the form of a soft price-floor and price-ceiling. Tools to be used in this effort include a strategic reserve pool of emission permits (created by withholding a small share of allowances each trading period) that can be used if the price rises above the ceiling, and the power to remove allowances if the price falls below the floor. In general both these options should be discouraged since they reduce the efficiency of the market. But if used, they should rest

with a common, not decentralised institution to avoid clashing policies with linked markets. Tools should not include an unlimited amount of extra allowances if the price of emissions rises above the ceiling. It would be better if a ceiling was not used at all, but if this is not politically possible, a (high) ceiling can be acceptable as long as the global carbon budget is not compromised over time.

- A price control measure in the form of offset markets, including responsibility over the crediting system for offsets (possibly with a discounting principle), as well as monitoring of performance of the offset projects.
- ETS links and the exchange rate mechanism. This includes keeping records of transactions in an allowance registry (similar to the EU ETSs Community Independent Transaction Log or the International Transaction Log of the Kyoto Protocol), overseeing and adjusting exchange rates and advising the MEF on making new or removing existing linkages.
- Keeping track of the performance of the trading system and how it relates to the two degree target. The WCO should report to the MEF annually on the performance and if needed, suggest changes to the global carbon budget.
- Overseeing regional auctioning and making sure the allocation of allowances follows agreed rules. The WCO will also manage the distribution of unused allowances from countries outside the agreement and from countries inside that do not need their full budget. These

extra allowances could be sold at a fixed rate in order to raise money for the Green Fund.

- Overseeing the sectorial coverage and the covered greenhouse gases in order to make sure emission allowances are comparable system-wide.
- Acting as a center of expertise on carbon markets and other emission control policies. This includes coordinating a body of experts who can offer advice to national governments. One of the greatest tasks here would be to develop good methods for measuring, reporting and verifying emissions as well as offsets and help developing countries implement these systems when setting up their emission trading systems.
- Serving as a forum for dispute settlement and operating a non-compliance mechanism, including investigating claims of price collusion, cartel formation and other unallowed behaviour. Tools to use for enforcement include, apart from the exchange rate, control over penalties for overshooting emissions. The mechanism would in large resemble the WTO dispute settlement mechanism. One difference would be that once any MEF-signatory accuses a member of violating the treaty, the WCO executive board will be the violator's counterpart in negotiations. In this first phase of negotiations, the WCO executive board and the accused state will try to find a solution. One possible offer from the WCO in the case of overshooting emissions would be for the violator to make up for the shortfall by purchasing extra allowances from the strategic reserve pool.

In the case of a potential breach of the agreement, the executive board will appoint a panel of experts to investigate whether a state has violated the treaty. This could for example be claims that emitters in a country have exceeded their allowances without being punished by their government, or that a country is not reducing emissions enough in its non-trading sectors. The panel of experts are then to propose sanctions from a list of alternatives that could include:

- Increased contribution to the Green Fund
- Reduced number of allowances in future periods
- Exchange rate adjustments

These sanctions will each have different levels that will correspond to the amount of the violating county's total uncompensated emissions. For example, the violator could be made to raise its contribution to the Green Fund according to the expected emission reductions this would generate and/or receive a reduced level of future allowances in accordance with the violation.

A state could be punished repeatedly by the WCO. For every violation by a state, the level of sanctions will increase. However, should one state repeatedly neglect the decision by the board of experts, the panel of experts could recommend the party to be suspended from the MEF-agreement. This final decision would be taken by the Governing Board (MEF). The suspended party would then be subject to potential trade sanctions under the GACT (see chapter four part 2)

Regarding penalties for individual emitters, this is left to national governments to decide but the WCO have a responsi-

bility to set minimum levels guaranteeing that the penalty for each tonne of excess emissions is greater than the spot price of emission allowances.

To conclude this chapter, it is worth mentioning that in some ways the design and role of the WCO can be compared to the one of a modern central bank, supplying a politically defined commodity (base money / emissions) establishing norms (price stability / emission convergence levels). Today's situation is akin to each nation possessing a printing press for issuing the common currency. Edenhofer et al. (2007) writes:

> *»In the longer term, an international institution could therefore emerge to coordinate the common emissions market on the basis of certain instruments (along the lines of the US Federal Reserve Bank or the European Central Bank) and objectives (such as market stability, compliance with a politically defined emissions target, equal treatment of all participants) that have been clearly and jointly agreed from the very beginning.«*[40]

In this case the MEF would agree on the basic rules and mission of the WCO and then delegate to the WCO secretariat the tools needed to achieve the goals. The WCO secretariat will report to the WCO executive board, who in turn will be the body responsible for formulating the guidelines for the day-to-day business of the WCO.

The executive board will as previously mentioned consist of the 13 MEF members and five regional representatives. The executive

40. Edenhofer et al. (2007), p. 18.

board will need a three quarters majority in order to secure a decision.

3^2

Chapter 3

The Green Fund

Background—Financing the Low-Carbon Transition in Developing Countries

How will the developing countries manage to shoulder the costs of reducing emissions, adapt to the inevitable climate change effects that are coming and get hold of the most up-to-date clean technology available? It should come as no surprise that some of these efforts will have to be funded and assisted by richer countries who by far have most of the historical responsibility for filling the atmosphere with greenhouse gases and who also have the resources to encourage reluctant developing nations to join an agreement.

In the framework that is proposed in this book, the Green Fund is the key body responsible for administrating compensation for the historical responsibility and also the institution that today seems most likely to be implemented as the negotiations have already come a long way. We propose a Green Fund where the MEF members are the main equity holders, but where recipient countries also have influence over the decisions of the fund through the 13+5 executive board explained in part one of this book (page 49).

This model would give donors a high degree of oversight over the operations of the fund, which most probably will also be a precondition for ample contributions.

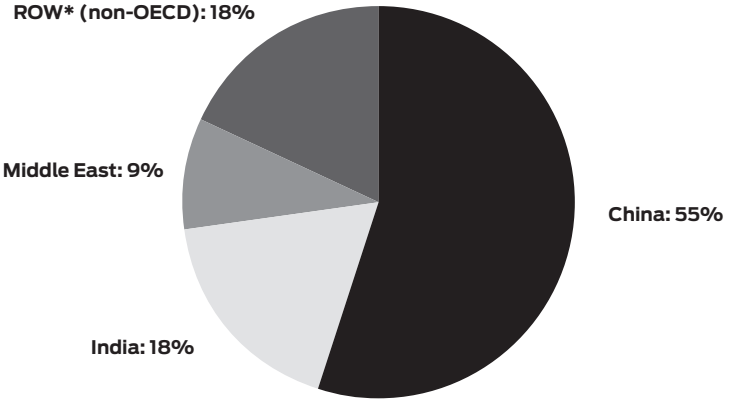
Given that many issues of climate change economics within the Bretton Woods-like structure proposed in this book is intimately related, the Green Fund could institutionally be part of the World Climate Organisation, share a common pool of expertise and partly have the same executive board.

The Greenhouse Development Rights framework is a useful tool to use when specifying funding requirements between donor countries. An additional, and stable, funding stream for the Green Fund could be established through an auction of a small share of the total allowances in each trading period under the MEF agreement and from selling the extra allowances from unused carbon budgets as explained in chapter 2. While the fund should work closely with existing institutions and initiatives, it will be important to build up a strong in-house capacity to help design, implement and evaluate projects.

As discussed in the previous chapters, the most efficient way to control emissions in developing countries is—just as for developed ones—to employ the polluter pays principle. In particular in developing countries that combine a need for new revenues and a competitive advantage in cheap labour (not cheap energy) international emissions trading might be a good idea. But only joining the international carbon market will undoubtedly not yield big enough revenue streams given the huge sums of money needed to make sure the investments generating emissions (energy, infrastructure, buildings, transportation, etc.) are made in a low-carbon fashion in developing countries.

The International Energy Agency (IEA) forecasts that $198 billion per year in additional funding is needed by 2020 in order to make the two degree target.[1] The proportion of this to be financed by the industrialised world is up for debate. Hopefully the debate does not continue for many years, since the IEA also predicts that the global cost of safeguarding the global climate increases by $500 billion for every year of delayed action and failure to make the necessary investments—inaction also has a cost.[2]

Figure 17. Projected growth in global emissions (2007–2030)



OECD: 0% (Emissions are actually predicted to drop 3 percent. Needless to say from an initially very high level)

* Rest Of the World

Source: International Energy Association (2009), Part B.

1. International Energy Association (2009), Part B.
2. Ibid.

When discussing low-carbon development it is important to remember that far from all the best ideas and initiatives are funded by, or is taking place, in the industrialised world. As an example China is already leading the world in clean energy investments with $34.6 billion, dwarfing the US in second place with $18.6 billion. The three countries with the highest growth in clean energy investments over the last five years have been Turkey (+178 percent), Brazil (+148 percent) and China (+148 percent).[3]

Thus the work of the Green Fund will perhaps not so much focus on rich countries teaching poor countries how to do things, but rather countries taking historical responsibility and working side-by-side to boost the good initiatives that are already taking place.

Designing a Green Fund

Several different proposals have been made over the years for funds that would collect money from rich countries with high levels of historical emissions and deploy them in mitigation, adaptation and technology transfer efforts in the developing world. Some examples[4];

- China and the G77 have suggested a fund with equal representation from developing and developed nations where 0.5–1.0 percent of GNP of the industrialised countries would be collected to fill the fund.
- Mexico has proposed a World Climate Change Fund to which all countries would contribute and where

3. PEW (2010), p. 7
4. Engelman (2009), Box 6-2

a formula for withdrawing funds would be based on current emissions, population and GDP. Mechanisms to raise money in this proposal include auctioning of emission allowances and taxes on air travel.

- Switzerland has proposed a fund financed by a global two dollar tax on carbon dioxide emissions and where countries with emissions under 1.5 ton per capita would not have to contribute.
- Norway has proposed a system where a share of the »assigned amount units« under the Kyoto protocol would be auctioned to capitalise a fund.
- There have also been proposals to link the adaptation side of the Green Fund to a climate insurance scheme, with funding for the insurance against climate change related disasters provided by major emitters.[5]

In Copenhagen the discussions took a big step forward as the signatories to the Copenhagen Accord finally agreed on setting up a fund; the so-called »Copenhagen Green Climate Fund«.[6]

The proposal on which the Copenhagen Green Fund is based was presented by Mexico in the spring of 2009.

During the negotiations in Copenhagen, Mexico together with Norway presented an updated version of the Mexican proposal, aiming to substantially increase the amount of predictable funding available for mitigation and adaptation activities in developing countries. The main elements of the Mexican-Norwegian proposal[7] —that were also reflected in a non-paper issued by

5. http://www.climate-insurance.org
6. Copenhagen Accord, Art. 8
7. Norwegian Office of the prime minister (2009)

Norway, Mexico, the UK and Australia during the Copenhagen summit[8]—are:

- The scale of the Green Fund is to start at $10 billion a year, increasing to $30–40 billion in 2020. Contributions may come from different sources such as budget funding or international and domestic auctions of allowances and should go to both mitigation and adaptation efforts.
- Budget contributions are to be made by all countries, except the least developed countries. State contributions should be based on a model where states emissions, GDP, population and carbon intensity are taken into account. Developing countries would be net beneficiaries.
- A certain proportion of the total UN-allowances for auctioning on the international level should be set aside to support the fund. Income from auctioning national cap and trade systems may also contribute to the fund.
- The fund should have a high level board under the policy guidance of, and be accountable to, the COP, with equal representation of developed and developing countries.
- To ensure rapid start-up and efficiency, Mexico and Norway propose that the administration could be entrusted with an existing international financial institution that could deliver funding in partnership with domestic and international public and private financial institutions.

8. Climate Finance: Proposals on Government. A non-paper by the Governments of the UK, Mexico, Norway and Australia. Available [2010-05-20] http://centralcontent.fco.gov.uk/central-content/campaigns/act-on-copenhagen/resources/en/pdf/climate-finance-governance

The Copenhagen Consensus

The green fund agreed on in Copenhagen is yet to be established. Its final form and exact function are still somewhat unclear, although the basics are there. After the Copenhagen summit, the UN Secretary-General Ban Ki-moon appointed a high-level advisory group on climate change financing, chaired by the Prime Minister of the UK, (by then Gordon Brown, as of now David Cameron) and the Prime Minister of Ethiopia, Meles Zenawi. The group's task is to identify new and innovative sources of climate financing to reach $100 billion per annum in 2020 with further scale-up envisioned in the future, as agreed in the Copenhagen Accord. The advisory board will present its final report prior to COP-16 in Mexico in late 2010.

One hundred billion dollars is a large sum of money, but the sums are even bigger if one considers the potential of using these funds to leverage private sector money. According to UNEP the money could, if deployed intelligently through Public Finance Mechanisms (PFMs), leverage between $300 billion and 1,500 billion in additional private sector investments as long as the project pipeline is full—i.e. as long as there is a »pull« generated by emission control policies at the ground locally.[9]

Even though the fund is not yet operational, funds have already started to flow in, and the EU, Japan and the US have committed to contributing to what is supposed to become a total of $30 billion »fast-start« funding between 2010 and 2012. These funds are suggested to be used for capacity building for integrating adaptation into development and poverty reduction strategies; capacity building in the area of mitigation, national mitigation actions,

9. UNEP (2009), p 10. See also UNEP (2008)

and emissions monitoring, reporting and verification; capacity-building and pilot projects for carbon market mechanisms; readiness and pilot projects for reducing emissions from developing country deforestation, and capacity building and pilot projects in technology cooperation.[10]

Since there is yet no one institution to take care of the deployment of funds, different suggestions have been made, ranging from using international institutions like the World Bank or the Global Environmental Facility (GEF), to setting up entirely new institutions or channeling the money through existing initiatives like bilateral development cooperation programmes.[11]

One big hurdle and topic of debate is to what extent the money should and will come with strings attached. At the time of the Copenhagen conference, US State Secretary Hillary Clinton said that recipients would have to accept some scrutiny over how the money would be spent, while China, India and other developing countries said this would violate their sovereignty. Also EU heads of states have made clear, however, that no money will flow unless there is some form of pull in recipient countries towards a low-carbon development—that is; unless »meaningful and transparent« mitigation action is taken.

In its final version, the Copenhagen Accord took note of the issue by stating that the agreement »will ensure that national sovereignty is respected« and that while some sort of measuring, reporting and verification (MRV) of mitigation action is required, this will rest on domestic systems based on internationally agreed guidelines. It remains to be seen what this will mean in practice,

10. EU Commission (2010) & EurActiv (2010)
11. For an excellent overview of different ideas and positions of COP members see Von der Goltz (2009)

but it is obvious that just sending money around the world without strong policies in place to make sure the money has high impact is of questionable value. It is likely that part of the fast-start funding will be spent on designing and implementing emission control policies that can generate a local push for emission reductions, as well as on MRV systems.[12]

Already after COP-13 in Bali, the so-called »Bali Action Plan« suggested developing countries take on Nationally Appropriate Mitigation Actions, or NAMAs, as a voluntary way to, in accordance with capabilities and national circumstances, reduce emissions compared to the business as usual scenarios. A range of actions for NAMAs have been proposed, including:

- »Sustainable development policies and measures, nation-wide or sector-wide mitigation programmes, as well as activities and projects (e.g. clean development mechanism-type activities)
- Low-carbon development plans and strategies
- National sector-based mitigation actions and standards
- Actions under para. 1 (b) (iii) (REDD-plus)9 [reducing emissions from deforestation and forest degradation, sustainable forests conservation and enhancement of forest carbon stocks]
- Technology deployment programmes;
- Relevant standards, laws, regulations and targets at a national or sectoral level
- Cap-and-trade schemes.«[13]

12. Ibid. & EurActiv (2009)
13. UNFCCC (2009), Art. 39

An explicit goal in the Bali Action Plan, and subsequently in the Copenhagen Accord, is to have some of these Nationally Appropriate Mitigation Actions (NAMAs) as well as National Adaptation Programmes of Action (NAPAs) financed by the industrialised countries; one can say that this is the essence of the Green Fund idea.

What Should the Green Fund Do?

The three obvious aims of a Green Fund are adaptation relief, support for mitigation (including technology transfer) and technical assistance. But there would indeed be little point in paying out money to countries that do not employ good strategies for how to use the funds in a way that reduces future emissions and where no system is in place to create domestic pull for low-carbon technology (e.g. taxes, subsidies or cap and trade).

Monitoring

The requirement on recipient countries to, in accordance with local capabilities, set up domestic emissions monitoring mechanisms and create annual emission inventories is reasonable in light of the need to form a foundation for action at the local level. The Green Fund should have both funding to support setting up such systems and a body of experts to advise the process.

When monitoring mechanisms and emission inventories are in place, it will be much easier to design nationally appropriate mitigation actions and update these as things progress and as developments are benchmarked against other countries. For example, recipient countries will be able to benchmark their industries and

energy production against similar sectors in other countries and, based on the findings, design effective projects and policies.

Support for Mitigation

For support to mitigation projects to be truly effective it is important that recipient countries agree on the carbon budget principle, with a medium and long term cap on emissions including serious deviations from the baseline. If not, mitigation efforts supported by the Green Fund could well be offset by an expansion of for example fossil energy consumption elsewhere in the economy.

However, implementing a domestic emission control system in perfect accordance with the MEF burden sharing principles (see chapter 2) should not be a requirement for becoming a recipient of money from the fund. For some countries it can be a first step towards the MEF system, especially for countries where local circumstances make instigating a fully fledged cap and trade system at the present time unrealistic. As long as a country with low levels of historical emission is willing to take some level of serious action and cap future emissions, the Green Fund should be open for mitigation funding. That is; the fund should pay the costs of reducing emissions from the baseline - not fund projects on top of the baseline.

Paying for Adaptation

Unlike mitigation support, the Green Fund's contributions for adaptation should not be contingent on mitigation efforts. Costs incurred by climate change in developing nations are predominantly caused by emissions in developed countries and compensation for this is in perfect order.

An interesting model proposed by the Munich Climate Insurance Initiative would require major historical emitters to pay insurance for developing nations against climate change related catastrophes, a mechanism that could become part of a Green Fund[14]. This would have the added benefit of starting to quantify costs of climate change (and related uncertainty) in insurance premium terms.

Equity, Efficiency and Technical Assistance

Ideally one would want to pay out mitigation funds in relation to a country's emission profile and spend them where emissions can be reduced the most, i.e. where the money will give most »bang for the buck«. The same applies to adaptation funds, and we will naturally want to spend the money where the vulnerability to climate change effects is greatest and thereby where the money will give the largest positive effects for the people involved.

For any distribution system there has to be some balance struck between the efficiency (greatest reduction of emissions per dollar spent or greatest adaptation effort per dollar) and equity (making sure the funds reach the countries and people with the least historical responsibility) of the deployed funding. This is especially important as many projects also have the potential to spread technology, spur additional investments and deliver economic and social returns as a by-product.

A reasonable allocation system for mitigation funds will primarily take efficiency into consideration, but also make sure that capacities to develop and implement projects are provided for those countries that lack capacity, so that all the funding does not

14. www.climate-insurance.org

end up in big recipient countries like China or India.

For funding of mitigation and adaptation projects the executive board of the Green Fund will have to develop and agree on a methodology for how Green Fund committees should evaluate and approve projects in cooperation with local stakeholders. It is crucial that the Green Fund be a multilateral mechanism with projects approved to common transparent rules, as with the World Bank and IMF support, and not be distributed as cash-in-hand or be supplemented by bilateral requirements by donors and thus become an extension of regular foreign aid.

Naturally, the Green Fund will have to be a global center of expertise on this kind of activities and work closely with current global actors in the field such as the World Bank's Climate Investments Funds and the Global Environment Facility.[15]

As the world's number one source of expertise, the Green Fund should be able to provide help and financing on climate-proofing socio-economic activities in order to minimise emissions and maximise resilience for investments in energy, infrastructure, agriculture, urban planning, etc. In this endeavor the Green Fund should coordinate closely with other providers of project funding such as the World Bank in order to avoid one international institution supporting low-carbon investments and the other(s) supporting the opposite kind of investments, as sadly is often the case today.[16]

It will also be very important to avoid creating incentives for inefficient investments by distorting prices, e.g. that fossil-intensive investments are undertaken simply in order to get a subsidy

15. See http://www.climateinvestmentfunds.org and http://www.undp.org/gef/
16. See for example Bank information center (2009)

on the investment by applying for Green Fund financing to reduce emissions from the project. This could be made by using intelligent distribution mechanisms; one such example is using Green Fund money to finance a feed-in tariff[17] in developing countries, giving producers of clean energy a premium on their production. Another example is to involve local public and private sector actors with stakes in the projects through private equity and venture capital programmes.

For adaptation funding, even more challenges will be faced, such as; how should the damages in small island states be compared to damages for African farmers and to what degree is each problem caused by global warming?

The ultimate goal of the adaptation funds must be to minimise the social costs and human suffering from the effects of climate change and therefore both sensitivity and exposure to global warming are factors that have to be taken into account. The World Bank has proposed a list of key variables to take account of[18];

1. Central government performance
2. Absorptive capacity
3. Lack of social capacity
4. Climate sensitivity
5. Climate change exposure
6. Population weight
7. Poverty weight

17. For a lengthy discussion on a global feed-in tariff system see UNDES (2009)
18. World Bank (2010), Chapter 6, p. 278

This list is useful in guiding the use of funds, but ultimately this process cannot be operationalised fully. Every project has to be evaluated independently, while at the same time making sure that funding deployment is strongly correlated with the vulnerability and exposure of countries to the effects of climate change.

Capitalising the Fund

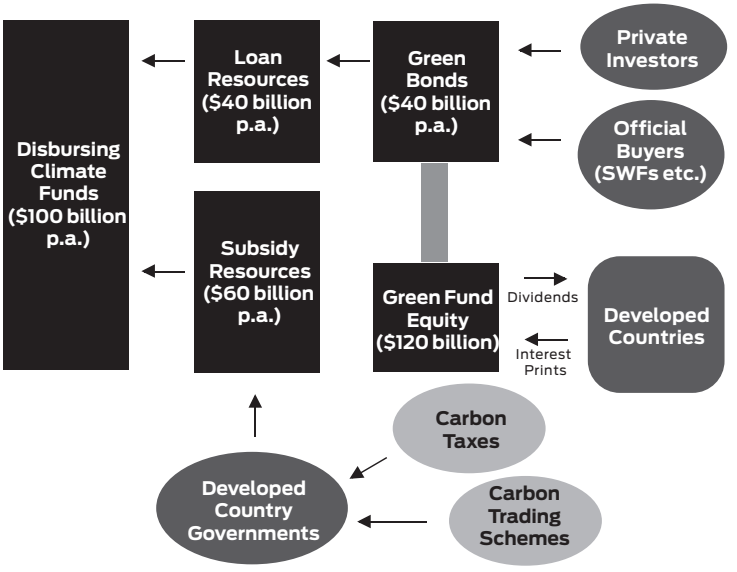
A mixture of different methods of financing the work of the Green Fund can be considered. Funding could be through one or more of the following; donations from developed countries, low-cost loans issued by the Green Fund and backed up by bonds, a global tax on maritime and air travel, auctioning of a small share of the emission allowances under a new global agreement (in our case the MEF agreement) or from crediting nationally appropriate mitigation actions with certified offsets that could be sold in the global carbon market. In the case of offsets however, the emission reductions are not additional but will only replace emissions in the funding country and would thus be a transaction involving both the WCO and the Green Fund.

A »staff position note« from the IMF[19] in March 2010 proposed an interesting design for the Green Fund. In the proposal the fund would be boosted by an initial capital injection from developed countries in a start up phase (2011-2013) with the goal of amassing around $17 billion a year and then quickly increase this to the agreed $100 billion a year by 2020.

The initial capitalisation of the fund could, according to the proposal, be raised in the form of reserve assets including the

19. Bredenkamp & Pattillo (2010)

Figure 18. The IMF staff position note's proposed Green Fund in steady state



Note: SWFs = Sovereign Wealth Funds.
Source: Bredenkamp & Pattillo (2010), "Financing the Response to Climate Change", I MF staff position note, March 25, 2010, SPN10/06

IMF currency SDRs. This capital base would then be used to issue low-cost »green bonds« [20] that would leverage liquid money from private and official investors in the global financial markets. Using SDRs in this way, rather than using the SDR-money directly, would leverage more funds and increase the operating space of the fund.

Leveraged private and official funds would then be used to issue cheap loans to developing countries to use for climate change

20. A good introduction to green bonds can be found in Reichelt (2010)

related investments. In addition to these loans the proposal also suggests a second source of money, coming from developed country subsidies paid out as grants. The share would eventually be 40 percent loans and 60 percent grants flowing out of the green fund. See figure 18 for an illustration of the fund structure.

The proposed $60 billion in public funding for the Green Fund is in line with what the EU Commission has proposed[21] in its communication on »international climate policy post-Copenhagen« a few months after the Copenhagen conference. But where will this money come from and how should the funding requirements be designed?

Concerns have already been raised from developing countries and civil society organisations that the funding for the Green Fund risks materialising in the form of rebranded Overseas Development Aid (ODA) money and in January 2010 it was revealed that the UK's pledged $2.5 billion for start-up funding came entirely from the already announced development aid budget. Similar things have been seen from several other countries in spite of the fact that the Copenhagen Accord reads »the collective commitment by developed countries is to provide new and additional resources«.[22]

In a post financial-crisis world where most public coffers in the developed world are more or less empty and politicians are stressed at home, the need for innovative ways to raise funds is pressing. As discussed above, several different methods of raising funds can be used. A workable system would be one where the MEF agree on a fixed method of allocating the funding requirements based on historic responsibility and capabilities.

21. EU Commission (2010), p. 11
22. Schalatek et al. (2010) & Copenhagen Accord, Art 8.

Some of the better options for raising funds would preferably be agreed on jointly, such as removing some of the, according to IMF estimates $750 billion[23], annual subsidies for petroleum products.

Naturally, a structural flow of funds from emission markets or a long term tax would be more secure than discretionary financing through donor conferences and pledges at climate summits like COP-15 in Copenhagen.

Probably the steadiest funding for the Green Fund would be to integrate its financing with global emissions trading. Very large sums of money will flow through the international emissions trading system established by the MEF. One way to use this market to raise funds would be for the WCO to withhold a small percentage of the allowances for participating countries and auction these. Estimates put the potential of raising money this way at $15–25 billion per year.[24]

Money can also be raised by allowing the WCO to charge a fee for allowances distributed from unused carbon budgets as discussed in chapter 1. Another related measure is to tax offsets and use the income to fill the Green Fund, this is actually already the case under the Kyoto Protocol, with a two percent tax on CDM credits and where income is used to fund adaptation projects.

Carbon markets can also be used by individual ETSs to raise public funding for the Green Fund. As an example, in the third phase of the EU ETS (starting in 2013) auctioning of emission permits will increase substantially and EU legislation states that at least 50 percent of these resources should be used for domestic and international climate change purposes. In this case it has been

23. Ibid.
24. UNFCCC (2008), Table 30

estimated that between 7 and 20 percent of these revenues would be enough to raise almost $4 billion per year. In the US the same idea has been floated, for example in the American Clean Energy and Security Act (HR 2454) where 7 percent of allowances would be used to support REDD, energy and technology efforts.[25]

Another measure that would have to be agreed upon jointly is charging international aviation and maritime transports for their emissions through either a tax or cap and trade system. The latter could yield as much as $28 billion per year.[26]

To conclude, there are many ways to raise money and to do this in accordance with the Polluter Pays Principle. As there is already an agreed amount of funding to be raised—$100 billion by 2020—and plausible methods, the main question is how to allocate the funding requirements. To some extent the funding could be related to individual transactions, emissions trading or aviation taxes, but given that the fund is also devised as compensation mechanism for historical emissions there is a need for burden sharing between nations within the system.

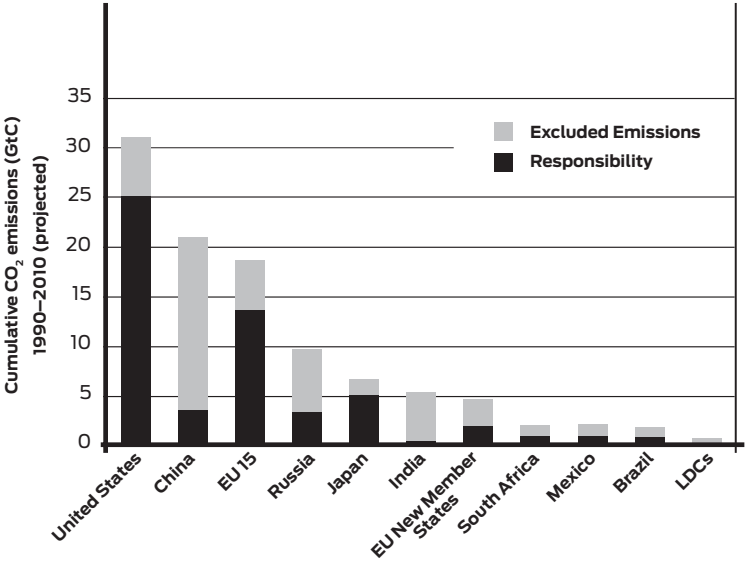
Who Should Pay?

In the original Green Fund proposal by Mexico, and as has been suggested by the European Council among others, the principles governing the fund should follow the idea of common but differentiated responsibilities and thus take into account some measure of ability to pay as well as responsibility for historical emissions.

An efficient way of establishing such a principle is to build

25. EU Commission (2009)
26. UNFCCC (2008)

Figure 19. Cumulative emissions from fossil-fuel combustion with responsibility and development threshold emissions in different colours.



Source: Baer et al. (2008), p.53

on the Greenhouse Development Rights (GDR) framework of capacities and responsibilities, developed by Baer et al. (2008). One benefit of this system is that it enables moving away from a country-by-country division in terms of the variables used and instead focus on individuals. This is good since it is reasonable that, for example, well-off people in Europe and the US help pay for mitigation in China, but also that wealthy and polluting Chinese people contribute. The GDR framework makes this possible.

The capacity variable in the GDR framework is defined by the share of people in a country living above a certain GDP/Cap threshold, $7,500 is suggested.

The responsibility variable is defined as emissions since 1990 and excluding emissions from people below the capacity threshold in order to make the comparison over time fairer. The resulting responsibility level for selected countries are displayed in figure 19.

A responsibility index can be calculated by weighting the capacity and responsibility variables like this;

$$RCI = \alpha * Capacity + \beta * Responsibility$$

Where RCI is the responsibility index and alpha and beta are the weights that can be weighted differently depending on how much one thinks capacity should matter in relation to responsibility. For a beta value of zero point eight, i.e. 80 percent weight on the responsibility variable, the responsibility profiles for the MEF members are presented in table 12.

The third column in table 12 show the annual funding requirement for each MEF member if the full $100 billion would come from subsidised public funds and the fourth column shows the requirements under the 60–40 idea from the IMF proposal. Some might react to the relatively high RCI for China, this is largely because of the rapid growth of the economy and hence of projected emissions from now until 2020, the RCI for China in 2010 is 5.3 percent, half of the 2020 value.

As evident from column two in table 11, the MEF members' contribution add up in total to around 86 percent of the total

Table 12. Responsibility index and funding requirements for MEF members

Country	RCI (%)	Responsibility (billion dollars in 2020, total $100bn)	Responsibility (billion dollars in 2020, total $60bn)
China	10.6	10,6	6,4
USA	30.7	30,7	18,4
EU	21.0	21.0	12,6
Russia	4.9	4,9	2,9
India	0.9	0,9	0,5
Japan	6.4	6,4	3,8
Brazil	1.4	1,4	0,8
Canada	2.9	2,9	1,7
Mexico	1.5	1,5	0,9
Indonesia	0.4	0,4	0,2
South Korea	2.0	2.0	1,2
Australia	1.7	1,7	1,0
South Africa	1.3	1,3	0,8
Total	**85.7**	**85,5**	**51,2**

Source: Data from GDR Calculator (http://www.gdrights.org)

funding commitment when calculating in this way. The remaining proportion is made up of a large number of almost exclusively developing countries that would be net recipients of money and for whom it would therefore be a no-regret option to join the fund. In this, as well as the original Mexican proposal, all countries contribute some money to the fund according to a universal

funding principle, but developing countries will in a way commit this money to themselves, and then also get additional money from developed countries with high RCI values. This way an incentive is also created not to increase emissions rapidly in the future as this would make your RCI grow.

4^2

Chapter 4

GACT–General Agreement on Carbon Tariffs

As shown above, the current reluctance to sign an ambitious climate agreement among the countries of the world is to some extent a free-rider problem. Not only are states worried that they have to take a disproportionate share of the reduction burden, but there is also a fear of losing emission intensive production to countries that do not sign the agreement, or to countries without obligations under the agreement. It is essentially this notion that led the US to refuse to sign the Kyoto Protocol.[1]

These are in essence two very distinct issues. While the lack of sanctions against free riders is an obvious impediment to any agreement, the issue of losing competitiveness due to stricter environmental legislation is much more contentious. A forthcoming survey of studies on this subject (often referred to as »carbon leakage«) finds little support for significant loss in competitiveness.[2] Early adoption of strict environmental rules that are later implemented internationally may on the contrary

1. Pauwelyn, (2007) p. 2
2. Johan Gars: Carbon leakage or Taking the Lead, forthcoming FORES Policy paper 2010)

give domestic industry a head-start in adaptation and technological innovation.

Nevertheless, the concern about carbon leakage might be somewhat more legitimate when based on fears of future competitiveness problems if the environmental policy compliance cost spread between countries taking no action and countries taking the lead increase substantially. Therefore, both the free-rider problem and the issue of carbon leakage have led some countries and scholars to put forward ideas of »border carbon adjustments« (BCAs). This could for example be tariffs levied on the carbon content of imported goods with the aim of removing the competitive disadvantage for industries that have to pay for their climate pollution. The basic argument in favour of such a policy is that a country should not be able to gain economically from allowing companies to pollute the global climate for free and then export their products to countries with emission control policies in place.

In the framework presented here, the purpose of the border carbon adjustment is to provide policymakers some security by getting access to this last resort policy to employ as a sanction against nations that persevere in free-riding on the global agreement. The logic of the sanction is that the access to global markets is more valuable than free-riding and that it will sooner rather than later lead the country in question to stop lagging on emissions control. It should not be seen as a permanent adjustment mechanism, opening up a new avenue for global tariff-hiking. Finally it is worth mentioning that while the focus here is on trade related sanctions, global emissions abatement would benefit strongly from an international agreement to tear down tariffs on low-carbon goods and services. Negotiations on such

»green free trade« are unfortunately stalled within the WTO today.

If border carbon adjustments are imposed against states that are not signatories to the MEF-agreement, those states are likely to accuse the MEF signatories of violating the WTO legal framework. Therefore, any border carbon adjustment would have to be WTO-compatible. In order to handle this, there is a need for an agreement embodied by an institution: the General Agreement on Carbon Tariffs (GACT).

This chapter analyses the foundations of the ideas of border carbon adjustments, how they comply with the free trade rules within the WTO and what problems might arise. The chapter ends with an analysis of what needs to be negotiated and agreed upon for an agreement on carbon tariffs to come about, and for it to be WTO compatible.

The WTO Institution and Dispute Settlement Process

As the name suggests, a GACT would have many similarities with the General Agreement on Tariffs and Trade, GATT, and its larger institutional framework; the WTO. The choice to look to the WTO stems from a core idea of this book; that a functioning global approach must build on the economic principles governing the market economy. As a matter of fact, the current problem of unsustainable levels of emissions stems from the lack of a price of emissions within precisely the sectors where market-driven global competition has shown to be the most effective tool for spreading technology and growth to new countries and people (ener-

gy, transportation, agriculture, manufacturing, etc.).[3] Only with a price on emissions in place will these sectors experience the necessary incentives for low-carbon technological development.

Compared to the World Bank and the IMF, the WTO has a smaller secretariat (though still bigger than the UNFCCC secretariat), with the sole purpose of supervising a constant negotiation process. The core body of the WTO is the General Council in which all member states are represented with one vote each, though to this date no votes have taken place. Decisions have been taken by consensus. The fact that WTO has still not reached consensus on the Doha round is sign of a shortcoming in its institutional format. The WTO dispute mechanism has however proven to efficient, due to a balance between state and expert involvement.

Disputes within the WTO are most often solved through negotiations between parties. When this is not possible, the party claiming a violation of the rules can demand that the Dispute Settlement Body (the General Council in another guise), on a case by case basis, creates a panel of experts (who are not allowed to take instructions from governments). The panel then decides, on the basis of WTO law, if the accused party has violated the GATT[4], GATS[5] or the TRIPS[6].

If the panel finds that there has been a violation it issues recommendations on how to solve the dispute, recommendations that the losing party may follow or use as a starting point for providing compensation. In many ways this system resem-

3. It is deeply ironic that some politicians and organisations currently argue that countries, in the name of the climate, should with one hand limit the global trade while with the other create nationally controlled systems for transferring green technology and know-how.
4. General Agreement on Tariffs and Trade
5. General Agreement on Trade in Services
6. Agreement on Trade Related Aspects of Intellectual Property Rights

bles how private companies solve their internal affairs with contracting parties.

The decisions of the panels can be appealed to an appellate body, a body consisting of seven permanent members chosen by the dispute settlement body (i.e. the General Council). Once the appellate body has made its decision, the dispute settlement body signs the decision.[7] The entire procedure from setting up a panel to the final signing by the dispute settlement body must never take more than 465 days[8]; a relatively fast and effective procedure.

Although it would be preferable for the GACT to be run by an executive board, as outlined in previous chapters, the dispute settlement process of negotiations, panel of experts and appellate body is something the GACT should replicate. The dispute settlement process could either function under a fourth WTO agreement, or through a separate agreement with its own secretariat using the WTO framework as a blueprint model. Since the GACT is to be compatible with WTO law it could already be fully integrated in the legal construction, following WTO precedence etc. For international negotiators and for the states involved, the WTO is a familiar legal system and much is to be won by using this notion.

The WTO Position on Border Carbon Adjustments—Some Basics

To understand the controversies of border carbon adjustments within the WTO legal order, one must understand the basic prin-

7. There is a theoretical possibility that the DSB does not sign the appellate body's decision, this is when all members of the WTO find the decision questionable, something that does not happen since at least the winning party of the settlement usually is satisfied.
8. Formally the timetable is 285 days plus 6 months

ciples of WTO law. The first principle of the WTO is the Most Favored Nation principle (MFN).[9] Developed within the creation of the GATT, the principle supports state equality by stating that any advantage one country gives to another signatory of the agreements must be given to all signatories. In its least complicated form this means that if a country puts a tariff on imports of a particular product, say for example shoes, imports of shoes from all countries must be given the same tariff. The principle has the advantage of being clear and understandable. Combined with the WTO rule that prohibits quantitative limitations[10], the level of protectionism between countries is easily measured and thereby leveled to the lowest possible level. This does not mean that no conflicts arise following the MFN principle; one of the more famous WTO-disputes is the US-EU dispute on bananas concerning an EU breach of the MFN-principle by giving unlawful preferential treatment to some of its trade partners, the so called ACP-countries.[11]

Some exceptions from the MFN principle are allowed; firstly, free trade areas such as the EU or NAFTA are accepted as they are believed to generally be good for global free trade despite their de facto exclusionary objective. Secondly, so-called border tax adjustments (BTA) can be unilaterally levied on products from individual countries. Thirdly, there is the Article XX (a-j) of GATT which states the »General Exceptions« . We will analyse these exceptions further below.

The MFN principle is complemented by a second cornerstone principle, the so-called principle of National Treatment (NT).[12]

9. GATT art. I, GATS art. 2 and TRIPS art. 4.
10. GATT art. XI
11. African, Caribbean and Pacific states with which the EU has a preferential trade agreement.
12. GATT art. III, GATS art. 17 and TRIPS art. 3

According to this principle, a signatory state must not treat a foreign product, intellectual property or service that has entered its market differently to the way in which it treats nationally produced goods and services. This means that an exporter can be sure that once the customs duty is paid (duties which are set in accordance with the MFN principle); their products are not in any way discriminated against on the market where the product will be consumed.

With this background to the WTO framework, the question is now whether border carbon adjustments could be accepted.

BCAs as BTAs?

The Border Tax Adjustment (BTA) provision is a key exception from the above stated principles allowing countries to, within the GATT, impose:

> *»At any time on the importation of any product…a charge equivalent to an internal tax…in respect of the like domestic product or in respect of an article from which the imported product has been manufactured or produced in whole or in part.«* [13]

In other words, unilateral tariffs that do not violate the most favored nation or the national treatment principles may be allowed. An easily understood example is value-added tax (VAT). Since VAT is an indirect tax, meaning that it is believed to be carried by the consumers, the level of it does not, as such, distort the com-

13. GATT art. II.2.a

petitive environment for producers in different countries. However, since not all countries use the so called »destination principle« [14] for their VAT taxation and since countries differ in their level of taxation, countries may introduce BTAs to make sure that the same VAT is imposed on all products on the market, in order to level the playing field. To illustrate the opposite; a tax such as an income tax, which is a direct tax carried by the producers, is not eligible for tax exemption and is not an accepted BTA.

Can a carbon tax qualify as an indirect tax? The scholars are divided on the subject, arguing on the one hand that the raison d'être of a carbon tax is to raise the consumer price by pricing the carbon content of products[15], and on the other hand that the tax is de facto directly carried by the producer [16]. The problem for the proponents of allowing the BCAs to qualify as BTAs is the issue of measuring the amount of carbon that has been emitted in the production. In the existing relevant case law, only components that are physically inherent in a product, such as for example a certain chemical component in a medicine, have been accepted as BTA exceptions; in the case law BTAs based on inputs which are fully consumed in the process have not so far been accepted (e.g. coal that has been used to produce something and by being consumed has emitted carbon dioxide into the atmosphere).[17]

The uncertainty on how to interpret the current WTO law on this matter is unsatisfying. However, one important policy to keep in mind is that, irrespective of the stand scholars take on the issue of accepting inputs that are fully consumed in the production, all

14. This meaning that a government taxes the product in the country of consumption, not in the country of origin.
15. Pauwelyn, (2007)
16. Bhagwati and Mavroidis (2007)
17. Howse and Eliason (2008), Pauwelyn (2007)

scholars agree that if BCAs are ever to be accepted as BTAs, the tariff needs to be equivalent to the actual cost local emitters face per unit of emissions. This is easy in the case of a carbon tax or with auctioning of emission allowances, where the market price can easily be determined. However if other policies are used and mixed with these, it might be difficult to identify the actual price of emissions for local firms.

Assuming that the BCAs could qualify as BTAs, the question is how the new tariffs should be applied.

For a country that has signed on to the MEF agreement and respects its rules, the GACT procedure would not apply and it would in any case not be desirable to use border carbon adjustments as the country is already doing its fair share. But levying a tariff on imports from outside countries only on the basis that they have not signed a particular agreement would be a violation of WTO law. Instead, the BCA has to be applied with respect to the actual conditions for the producer whose products are being targeted by the tariff. Countries that chose not to sign the MEF agreement may for example have their own domestic emissions trading programs or domestic taxes on fossil fuels that might be as stringent or even more stringent than the policies that apply to MEF signatories.

The issue of actual emission costs and content measurement in products is the key challenge here. In this context, the GACT would have to take into consideration national emission control policies in the country of origin and whether they are to be seen as comparable to the MEF framework or not. Any carbon tariff must then be equal to the difference between the price foreign producers face for emissions and the price local producers face.

For example, say the price of emitting one tonne of carbon dioxide in the MEF-area is $30 and a country outside MEF imposes a cost of only $5 on their emitters while another country outside the MEF charges $10. Then the BCA would have to properly measure the carbon content in the imported products and adjust $25 and $20 per tonne in these two cases in order to not violate the MFN and NT principles.

BCAs and Article XX

Article XX formulates the general exceptions of the GATT and reads:

> *»Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:«*

The ten measures (a-j) are listed thereafter. The article expresses that even if something is found to be violating the rules of the GATT, including the MFN principle, it could be accepted if the action exists to fulfill certain objectives. Since we have seen that it is not entirely clear whether the BCAs can qualify as accepted BTAs, this is highly relevant.

For the question of carbon emissions, two particular measures under Article XX are potentially interesting:

> (b) Measures necessary to protect human, animal or plant life or health
> (g) Relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption

Legal scholars have found that there is an extensive problem reaching the criteria of necessity in Article XX (b), but that Article XX (g) may be more useful. The dispute settlement panel has stated that clean air is an exhaustible resource.[18] Following this, and the current debate on climate change, there should be little dispute on the fact that the atmosphere is exhaustible when it comes to its capacity to absorb greenhouse gas emissions.

Two things have to be proven in this context; 1) whether the imposed BCA relates to the conservation of the planet's atmosphere, this means that the imposing country has the burden of proof that usage of the BCA has a substantial relationship with the conservation of the atmosphere i.e. not a protectionist tool, and 2) whether the measure is made effective in conjugation with restrictions on domestic production or consumption. This last step correlates with the discussion above; to be eligible with WTO law, a system of pricing emissions must be put in place domestically before any BCAs can be accepted.

18. US-Gasoline DS2/9, May 1996

The Introductory Phrase of Article XX; the Chapeau

Even if all conditions under the specific paragraph of Article XX (g) were met, the legislation creating the BCA would also have to fulfill the introductory phrase of Article XX. I.e. the BCA must not »constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade.«

This so called »chapeau« has been used in the case law to limit the use of Article XX in relation to developing countries, especially the least developed. There is an understanding within WTO law that producers from poor countries cannot be fully excluded from international trade because of their countries' internationally undeveloped position. Furthermore, the application of the chapeau has made it clear that no unilateral measure can be imposed before the imposing country has, in good faith, tried serious across-the-board negotiations to identify a bilateral or multilateral solution.[19]

The Fundamental Legal Issues

To sum up the legal situation, the central problems to solve before the BCAs can be invoked are 1) to measure the level of carbon content in the imported product, 2) to ensure that a system for pricing the content has been put in place domestically and 3) to ensure that the foreign country's system for emissions control is absent or inadequate.

19. US-Shrimp DS58, November 1998

The Current Proposals; Europe vs. the US vs. China

An early attempt to create a system of BCAs was launched in a report on climate change by the French parliament in 2006.[20] This was later modified and made known to the world by the French Prime Minister Dominique de Villepin when he proposed taxing imports from countries that had not ratified the Kyoto Protocol.[21] In 2006, the target country behind the European idea of BCAs was the United States. In 2006 the US seemed most unwilling to take on obligations to reduce emissions and the risk of a looming competitive disadvantage became pressing for European policymakers.

When the US started drafting its own proposal[22], the motives were different and the target country another; China. The US had nothing to gain in trying to level the playing field towards EU countries or Canada, its main importers. On the contrary, in these trade relations the US faced a comparative disadvantage in leveling the price on carbon emission since its industries were less carbon efficient.[23] The discussion on BCAs in the US has therefore had a somewhat different focus than in Europe.

Criticisms of the US approach have been that US import of emission intensive goods from China is low in the sectors concerned[24] and that the risk of carbon leakage therefore cannot be

20. Report available at www.addeble-nationale.fr [2010-02-22]
21. Reuters, 'French Plan Would Tax Imports From Non-Signers of Kyoto Pact', New York Times, 14 November 2006
22. The House of Representatives Lieberman-Warner Climate security act (S. 3036), the House of Representatives American Clean Energy and Security Act of 2009 (the Waxman-Markey Bill) and the Senate Clean Energy Jobs and American Power Act (S. 1733) (the Kerry-Boxer bill)
23. Houser, et al. (2008)
24. Interesting facts are that even though the US is the biggest market of Chinese exports in general; http://www.uschina.org/statistics/tradetable.html, only 1 percent of Chinese steel is exported to the US, and the same goes for

resolved by taxing imports, and correspondingly that the leverage of carbon tariff threats on China to accept obligations under a climate agreement is small, since China has little export to lose.

The current US position seems at any rate to be that BCAs are necessary for a climate change bill to come into place and was in fact included in the Kerry-Lieberman American Power Act of 2010.[25]

How to Deal with the Issue of Measurement?

The US proposals have a sector based approach to BCAs. Specifically iron, steel, aluminum, cement, glass, and paper are named as products that should be covered. The proposals also leave open the option for the administration to include »any other manufactured product that is sold in bulk for purposes of further manufacture,« the production of which results in a significant amount of direct or indirect greenhouse gas emissions.

In most proposals the question of measuring is still unclear and a standard method has not yet been designed. American scholars analysing the development of a passable bill seem to have agreed that measurement is a daunting task that might be possible in the sectors listed above, but nearly impossible for more complicated downstream products such as consumer electronics.[26]

However, a few conclusions can be drawn; firstly, a working emissions control scheme such as the EU ETS or a carbon tax

other energy intensive sectors; the US market accounts for 3 percent of Chinese aluminum production, 2 percent of paper production, and less than 1 percent of both basic chemicals and cement. Instead most of the demand for these products comes from developing countries, China itself in particular.

25. For an in depth analysis of how tariffs made its way into the American bills, see Zhang (2009)

26. For example Houser et al. (2008), Wooders et al. (2009), OECD Round Table on Sustainable Development SG/SD/RT(2009)8 or Zhang (2009)

removes much of the problem regarding measuring since such systems require a working methodology of emissions measurement anyway. Therefore, the measurement issue will mainly be of concern regarding countries with no such system of emissions control in place.

Secondly there is a problem with defining the carbon footprint of a product from the perspective of nations rather than firms. In the case of China for example, the industries exporting carbon intensive products are the country's most carbon efficient. If the products they export were to be taxed following the average Chinese emission levels for such goods, there would be no incentive for them to reduce the emission content of their goods in order to reduce tax payments (as tax levels would stay the same).[27] Houser et al. (2008) suggest that this could be solved through a two-track system where trusted importers would be allowed to appeal for an individual carbon-intensity audit.[28] They present an example:

> *»Baosteel, the largest and most energy-efficient Chinese steel producer, could voluntarily enroll in a ›green importer‹ program with US Customs. Customs officials would conduct an initial carbon audit of Baosteel's plants (at the Chinese company's expense) and then allow Baosteel to declare the carbon content of its exports to the United States, rather than be subject to China's nationwide carbon intensity assessment. Periodic audits could be conducted to ensure accuracy in reporting as needed«*

27. Let alone the WTO legality issue see above.
28. Houser et al. (2008)

And further:

> *»Assessing emissions allowance requirements or border taxes at the firm level is a more effective use of the leverage access to US markets provide. While Chinese steel sales to the United States are insignificant in terms of China's overall economic health (discussed later), they are very important for the financial health of the exporting firm. And though Baosteel has limited ability to influence nationwide climate policy, it has unlimited ability to improve its own carbon footprint, if given the economic incentive to do so. Focusing trade measures at the firm level uses market incentives rather than economic threats and thus stands a better chance of succeeding.«*

Thirdly, if it is found to be impossible to measure the true carbon footprint of imported goods, two possible techniques remain for the country to use.[29] Either the country prescribes the tax rates for the imported product based on the domestically predominant method of production for a like product, or it uses the best available technology as the reference technology level and then uses the average embedded carbon content of a particular product produced with the best available technology when setting the BCAs. Such a policy would obviously price the carbon content of imports too low, but is also least likely to lead to disputes.

29. Zhang (2009)

The GACT

Following this brief analysis of the current WTO framework and the discussion on measurement, the GACT as outlined below should be compatible with the WTO legal framework:

1. A decision by the MEF governing board can allow countries to use BCAs on imports from outside countries. This decision should be a last resort policy and should follow consultations with GACT legal experts and previous negotiations in good faith between GACT and the outside country. The negotiations will start no earlier than 12 months from the entry into force of the MEF agreement, in order for countries to get a fair chance to plug in to the system. An outside country will be one that, 12 months from the entry into force of the MEF agreement, has neither:
    - Joined the MEF agreement, nor
    - Domestically established a comparable emissions control regime
2. BCAs will only be allowed for particular emission intensive sectors. Which sectors to include should be decided on a case-by-case basis by the GACT executive board. Sectors would probably include energy intensive industries such as iron, steel, aluminum, cement, glass and paper.
3. The country or group of countries (MEF agreement signatories) that invoke the BCAs will have the burden of proof. They must show that it is likely that the choice

of the outside country to stay outside leads to increased competitive advantage and to significant carbon leakage.

4. The invoking country will further have to prove that the level of the BCA invoked follows the Agreed System of Measurement (ASM) under GACT.
5. The ASM includes three mechanisms
   - Firstly that the outside country has a functional system of measurement that is accepted by the GACT secretariat. If such a system does not exist, the GACT should have the capacity to aid the implementation of such a system.
   - Secondly that single factories or carbon emitting facilities can join the system on an ad hoc basis by accepting the supervision of the GACT secretariat.
   - Thirdly that the ASM will accept the use of geographical general emission intensity levels; either on a national or a regional level depending on what is advantageous for, and can be sufficiently proven by, the outside country.
6. If there is no other option than to resort to a BCA, the tariff mustn't be greater than the difference in the price of emissions that domestic firms face compared to firms in the outside country.

These steps, or objectives, of the GACT should certainly, when agreed on by a majority of states, be found to be in compliance with WTO rules.

A Sanction of Last Resort

Our choice to, in this Bretton Woods framework, include the GACT mechanism as a WTO compatible and credible sanction method does not in any way imply that this measure should be used routinely or as a compensation mechanism. Quite to the contrary it should be the sanction of last resort to be initiated only if all other attempts to make free-riders accept the agreement have failed. Only then should the MEF governing board refer the case to the GACT for sanction. We hope and believe that this would have a preventative effect on countries and regions which might consider becoming international »pollution havens«.

5^2

Chapter 5

Summary Part 2

The first part of this book argued that a fresh start and approach is needed in the global climate change negotiations, and that a smaller group of the most relevant countries should take their responsibility and act. First and foremost a political agreement on the key issues would need to be signed, but as much as possible of the details and operations should then be handed over to a set of institutions. The second part of this book has discussed the specifics of the actual agreement and the mandate of these institutions.

The book has identified the issues pivotal for getting a good-enough system for global emissions control in place, these are:

- A political agreement amongst the MEF members on the principles for burden sharing, based on the notion of a global carbon budget.
- National systems of emissions control fit to keep emissions within the national carbon budgets, consisting of cap and trade markets complemented by other policies like taxes and subsidies.
- A compensation scheme that provides developing countries with the financial and technical assistance needed

to adapt to the effects of climate change and adopt low-carbon development strategies.

- Non-compliance mechanisms that change incentives for »free-riding« and provide policymakers with a sense of security going forward on emission reductions. These systems include an exchange rate mechanism for cap and trade markets, emissions allowance adjustments and, as a last resort policy, carbon tariffs.

In order for world leaders to move forward on these issues and avoid deadlock, the preceding chapters has argued that politicians need to agree on the basics but then leave as much as possible regarding the actual day-to-day operation of the agreement to experts rather than diplomats.

The burden sharing agreement will by necessity be a political one (obviously building on climate science) and for this the 13 members of the MEF must reach an agreement.

For the key emissions control policy—the cap and trade markets—this book propose a bottom-up process where national markets are formed but a central institution (the World Climate Organisation) is established to operate the market linking, homogenisation of design aspects and general oversight.

For the compensation scheme a Green Fund institution should be established where contributions are defined by an equation taking account of historical responsibility and capacity to pay. The fund should in as great extent as possible be financed by non-discretionary money in order to guarantee a steady stream of funds.

For the non-compliance system the World Climate Organisation will be the primary institution and will have some power to

impose sanctions within its mandate. As a last resort policy a new General Agreement on Carbon Tariffs can be used to tax the emissions content of imports and effectively block the option for a country to become a pollution haven by refusing to take responsibility for the world's global common goods.

The authors of this book have decided to name this whole setup a »Bretton Woods for the Climate« because of this predecessor's outstanding achievements in getting a political agreement in place to approach a common problem and then leave it up to independent institutions and world leading experts to make sure that results are delivered.

Comment from Greenhouse Development Rights author's group

First, we'd like to say that *A Bretton Woods for the Climate* is a work of admirable seriousness, and we're grateful for the invitation to comment on it. It's an excellent and thought provoking analysis of a grave and extremely difficult situation. Whereas many analysts succumb to primitive forms of »realism« that, frankly, offer little chance of avoiding catastrophe, the *Bretton Woods* authors have, in contrast, sought a proposal that, while willfully clear-eyed, also seeks to honor principles of equitable burden-sharing. This attempt to bridge the gap between realism and fairness – to a kind of »ethical realism« – is both important and rare.

Second, the institutionalist style of this analysis bears real fruit. This is not an empty framework proposal, but one that – in most cases – is elaborated into concrete institutional proposals. So, for example, proposals for »soft« compliance mechanisms – e.g. punishing free riders with reductions in future allowances – are supplemented by trade sanctions with real teeth. And rather than just suggesting such sanctions, the authors propose – with enough detail to support real evaluation – a specific approach to a trade-based sanctions regime that's designed to avoid the provocation of dangerous, protectionist, tit-for-tat.

As those who read the Green Fund proposal in *Bretton Woods* will see, its authors make explicit use of a burden-sharing approach – the »Greenhouse Development Rights« (GDRs) framework – which we have developed. We will comment on this proposal, but

we will not restrict our comments to it. We'll also note the differences between the overall stance of the *Bretton Woods* framework and GDRs, highlighting differing judgments about fairness, feasibility, and the relationship between the two. These judgments play out as substantive differences of both structure and strategy, differences we note even though, at the same time, we do not doubt that the authors ultimately seek the strongest and fairest »global deal« possible.

We focus on three key choices made in *Bretton Woods*, choices which, though each has precedents, are combined to express the authors' unique vision and contribution. The first is the proposal to shift the negotiating focus from the UNFCCC to a limited »Major Emitters Forum« (MEF). The second is the adoption of a modified "equal-per-capita" approach to emission allocation. The third is the suggestion of a means by which equitable contributions to a Green Fund (for mitigation and adaptation in developing countries) are to be specified.

The matter of the MEF is an important one. As a subset of countries, the MEF excludes more than a third of the world's population, and thus its legitimacy as a forum for devising a response to global crisis can reasonably be questioned. In particular, it is worrisome that the MEF excludes most of the »most vulnerable« countries. Certainly the authors' proposal is intended to *increase* the likelihood of reaching a sufficiently stringent precautionary target, and to protect the poorest and most vulnerable. Nevertheless, in practice, MEF-based negotiations would exclude the »moral conscience« of the climate discourse – the voices of AOSIS, the LDCs, the African nations – that have called for capping warming at 1.5°C and/or returning carbon dioxide concentrations

to 350-ppm. The consequence of this exclusion is of course uncertain, but there are nevertheless good reasons to be concerned about the ambition and legitimacy of an agreement from which most highly-affected parties are disenfranchised.

With respect to burden-sharing, *Bretton Woods* reiterates the importance of an equitable framework, and refers to the UNFCCC's underlying principles of »common but differentiated responsibilities and respective capabilities«. It reviews several burden-sharing frameworks and discusses Greenhouse Development Rights at quite some length as a possible basis for establishing national emission allocations, but ultimately settles for something rather different – a modified equal-per-capita allocation – on the grounds that the GDRs approach leads to results that would be difficult to sell in developed countries. This, we grant, is an important concern; but it's not definitive. There are at least three other comparably significant issues: political realism in poor and developing countries, fairness, and the requirements of the science.

Let's take these in turn. The emissions allocation proposed in Bretton Woods is a version of equal per-capita, one in which a global emissions budget (approximately 1,000 GtCO2 between 2010 and 2050) is divided among countries in proportion to their 2010 populations. As the authors clearly state, this allocation is based on the premise of equal access to the atmospheric commons, and in particular on the per-capita variant elaborated recently by WBGU [1], in which equal access is applied only to future

1. WGBU, 2009. Solving the climate dilemma: *The budget approach.*

emissions, with past emissions exempted from the accounting[2].

The authors clearly believe that such a formula is »fair enough« to the South, and that it might yet be generous enough to the North to be politically feasible. Yet there is reason to doubt that such a proposal will indeed be acceptable in developing countries and, in particular, to the developing-country members of the MEF (Brazil, China, India, Indonesia, Mexico, South Africa, and South Korea). After all, the emissions budget available to them would be extremely small. Keeping within it would require these countries to make extraordinarily strenuous efforts, forcing their emissions to peak before 2020 and then decline at rates over 4% per year for the ensuing three decades.

It's difficult to imagine circumstances in which such allocations would be accepted as fair. Yes, they represent (approximately) equal per-capita shares of the remaining space, but this alone does not make them just. They would only be so *only* if the developing and developed worlds had both 1) comparable levels of capacity to face the climate crisis and 2) comparable levels of responsibility for causing it. Needless to say, neither of these conditions is true. The developed world has vastly greater capacity (its per-capita PPP income is six times higher), and is responsible for the majority of emissions to date (also six times higher on a per-capita basis).

None of which is to say that this approach is inherently flawed.

2. A variation (introduced by the authors of *Bretton Woods*) would take emission allowances from low-emitting countries (with »BAU« emissions below the global annual per-capita budget) and re-allocate them to higher-emitting countries. It is, however, not entirely clear that this re-allocation is consistent with the overall carbon-budget approach adopted in the proposal. One of the defining features of a carbon-budget approach is that countries can bank allowances to future years when they are needed. Appropriating the allowances of poor counties with low emissions, on the grounds that they are »excess«, prevents these countries from banking them for use at a future time when their energy demands will have (hopefully) grown. By introducing this variation on the per-capita carbon-budget approach, the *Bretton Woods* proposal moves in the direction of Contraction and Convergence (see GCI Briefing: *Contraction and Convergence*, http://www.gci.org.uk/briefings/ICE.pdf), a well-known burden-sharing proposal characterized by a gradual transition over a specified period from grandfathered allowances to per-capita allowances.

Indeed, it could be made much fairer, and much more politically acceptable to developing countries, if the equal per-capita allocation was reckoned from an earlier date. For example, considering 1950 rather than 2010 as the initial date would, at least in part, acknowledge the greater responsibility of the developed world. Consequently, it would increase the allowances available to the MEF developing countries by more than 50%. Doing so would make the proposed allocation somewhat more compatible with equal per-capita frameworks now being promoted by various developing country analysts [3]. It would also, of course, make it less acceptable to the North – and how »fairness to the South« and »acceptability to the North« are balanced is, of course, the key judgment at stake here.

From the standpoint of the science, the proposed budget of 1,000 GtCO2 from 2010 to 2050 is a rather risky one. If the objective is to hold warming below 2°C, it presents a chance of failure that is rather high (calculated at 23–62%[4]). This is a level which – while often termed »2°C compatible« in the realist debate – would be unacceptable for most policy decisions. But, if a primary objective is to avoid presenting the developed world with the politically unpalatable prospect of imminent »carbon bankruptcy«[5], then a smaller budget is not an option. Reducing the budget by as little as 200 GtCO2 would draw the date of carbon bankruptcy into this decade.

In short, the *Bretton Woods* proposal stakes out a series of compromises, which we believe weight political acceptability in

3. See, for example, the recent work of India's Tata Institute of Social Sciences (http://www.moef.nic.in/downloads/public-information/tiss-conference-cc-2010.pdf) or the work of Pan Jiahua in China.
4. Malte, Nature, 2009. See the calculator, which is available with the supplementary online material.
5. The term is from *Bretton Woods*. See for example the chart on page 91 (first edition) and the related discussion.

the North too highly, at the expense of political acceptability in the South, fairness, and scientific necessity. We also believe, however, that it could fairly straightforwardly be adapted in a way that would make it more viable as a basis for global burden-sharing.

Similarly, we believe that the proposed Green Fund could be viable as a politically pragmatic and ethically fair mechanism. The authors put forward the Greenhouse Development Rights framework as a reasonable basis for the Fund's burden-sharing approach, and as its developers, we obviously have no disagreement. They also highlight the institutional attractiveness of generating a secure funding stream by withholding a portion of emissions allowances – sometimes referred to as the »Norwegian holdback« proposal[6]. GDRs burden-sharing and the Norwegian holdback could be straightforwardly married. The GDRs framework (and its Responsibility–Capacity Index) could serve as the basis for determining the portion of allowances withheld from any given country, rather than withholding a constant proportion from all countries. This would ensure that each country's funding contribution is proportional to its capacity and responsibility. Such a mechanism has been proposed by Norwegian Church Aid and elaborated in detail elsewhere[7]. It offers a promising approach to equitable, adequate, and reliable climate funding.

That said, questions remain. The authors suggests that there is a tradeoff between efficiency and equity (which they define as »making sure the funds reach the countries and people with the least historical responsibility«). It is important to point out,

6. See Andrew Pendleton and Simon Retallack, Fairness in Global Climate Change Finance, http://www.boell.de/ecology/ climate/climate-energy-6455.html
7. Discussion paper: An equitable financial mechanism under the UNFCCC. www.aprodev.eu/files/climate_change/UNFCCC/ aprodev_finance_proposal_submission_unfccc.pdf

however, that this tradeoff need not exist. It only arises if the Green Fund is under-funded, and thus incapable of covering all climate costs that can legitimately be considered the obligation of the international community.

The *Bretton Woods* authors could thus be more explicit with regard to which costs they envision the Green Fund covering. They imply that adaptation costs would be covered, but not whether the Fund should be committed to covering all adaptation costs, and in particular »full incremental costs«, (which may be difficult to quantify even if fully legitimate). Nor is it clear which mitigation costs are covered. Given the detail of their emission allocation proposal, we presume that they intend each country to bear the mitigation costs associated with its own emission allocation. If this is not the intended interpretation, and the authors are actually proposing that countries can use Green Fund resources to help them comply with their allocations, then this would obviously have major burden-sharing implications. It is difficult to understand these implications absent a more explicit discussion of how the Green Fund is apportioned among countries.

As suggested above, the last component of the *Bretton Woods* framework – its compliance regime based on trade sanctions – is laudable, though we leave it to others to elaborate its strengths and weaknesses. We conclude with two points and a question. First, there can be no doubt that this represents one of the most comprehensive attempts yet made to define the institutions and principles necessary to balance between »acceptably fair« and »fairly acceptable«. Second, *Bretton Woods* makes (compared, say, to Greenhouse Development Rights) a set of compromises that increase the risks and costs to the South in order to make it more

acceptable in the North. Are these compromises necessary, and would they in fact lead to a negotiations breakthrough? This is the question. Or, to put it another way – is this the fairest deal that the South can reasonable hope to get?

Sivan Kartha, Tom Athanasiou, Paul Baer,
August 20, 2010

Tables

Figures

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FORES

»Solving the problem of climate change requires new strong institutions«

On July 1, 1944, leaders of the Allied countries met in Bretton Woods, New Hampshire, to create new global institutions, the IMF and the World Bank, that would stand the test of time. 55 years later world leaders met in Copenhagen to solve the global issue of climate change. This time the meeting ended in almost total failure.

Why? This book argues that the main problem is the lack of strong institutions. Instead of trying to make 190 nations reach consensus, the 13 top emitters should create a Major Emitters Forum. A World Climate Organisation could link world emissions markets and create an exchange rate that would allow outsiders to plug in. Institutions for linking, funding and sanctioning would give climate negotiations a fresh start.

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