Kyoto and the Ethics of Flexibility

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Introduction

In his controversial book on the ethics of globalization, *One World*, Peter Singer is very critical about the Kyoto Protocol. The Kyoto targets for the reduction of greenhouse gas emissions 'were arrived at through negotiations with government leaders, and they were not based on any general principles of fairness, nor much else that can be defended on any terms other than the need to get agreement' (Singer, 2004: 22).

Singer's criticism appears to be twofold. On the one hand he condemns Kyoto as the outcome of a bargain between sovereign states. In an era of globalization the absolute idea of state sovereignty that has prevailed in Europe since the Treaty of Westphalia in 1648 needs to be abandoned and replaced by 'a sense that we really are one community' (ibid., 7). On the other hand Singer criticizes Kyoto because there simply 'is no *ethical* basis for the present distribution of the atmosphere's capacity to absorb greenhouse gases without drastic climate change' (ibid., 49).

I'm convinced that Singer is wrong on both counts. In the first place, he inaccurately rebukes Kyoto as the result of a deal among heads of state only. The following quote suggests something different: 'The Kyoto Summit became one of the most extraordinary and remarkable events in international environmental diplomacy, bringing together more than 2,200 delegates from 158 Parties to the Convention and six observer states, nearly 4,000 observers from NGOs and international organisations and more than 3,700 media representatives' (Oberthür & Ott, 1999: 77). These authors call the Kyoto Protocol 'one of the most ambitious treaties ever adopted' (ibid., 95). They point to the public pressure that was the result of the interplay between media and environmental NGOs. Thanks to this 'symbiosis' between journalists and environmental NGOs the negotiators lived under the impression that the whole world was looking over their shoulders.

In the second place, Singer's verdict that there is no ethical basis at all for the targets of the Kyoto Protocol is itself without a factual basis. In their contribution to the Third Assessment Report of the IPCC (on mitigation), Tariq Banuri and John Weyant (2001: 91) mention some elements of the equity agenda that have been incorporated into the emerging global climate policy regime:

- Initial mitigation efforts have been concentrated in the industrialized countries, the so-called Annex I countries, i.e. the members of the Organization for Economic Cooperation and Development (OECD) as well as twelve 'countries with economies in transition' (in Central and Eastern Europe and the former Soviet Union).
- Currently, the developing countries – the non-Annex I countries - are exempt from specific mitigation obligations.
- There are agreements to provide financial resources to non-Annex I countries to cover the full cost of preliminary climate obligations (e.g., monitoring, reporting, and planning), and the incremental cost of voluntary mitigation actions.
- There are agreements and some programs to provide technical assistance and training to identify potential win–win opportunities.

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- Various voluntary mechanisms are being designed to induce early mitigation action in non-Annex I countries, most notably including the Clean Development Mechanism (CDM) of the Kyoto Protocol.

I'm positive that there is a strong connection between Singer's misjudgement both with respect to the political genesis and the ethical merits of the Kyoto Protocol: because he is blind to the influence of non-state actors and of world opinion on the negotiating process, Singer is not able to perceive and appreciate the ethical concerns and considerations that actually played a role in this process.

In this contribution, I will first give a brief sketch of the role of non-state actors in the Kyoto process, and place the emergence of these actors on the international stage within the context of recent but persistent worldwide shifts in governance. These shifts have caused a significant increase in public and private players and multiplied the levels of decision-making, and have confronted policy-makers with problems of communication and cooperation (section 1). After that, I will go into questions of equity and justice, because they represent an important key to successful collaboration. The future of the climate regime depends to a large degree on the willingness of the biggest and most advanced countries to make quantitative commitments, and this willingness will be greater if the agreements and arrangements are widely accepted as equitable and fair. I will first elaborate on some of the most important ethical dimensions of the Kyoto process (section 2). Next, I will demonstrate the great diversity of ethical concerns and considerations through a discussion of one of the most important Kyoto issues: the distribution of mitigation burdens and benefits (section 3). It will become clear that concepts of equity and fairness are seriously challenged and contested, and that their potential to facilitate communication and cooperation is severely limited. Finally, to address the problems of consensus building and conflict solving under conditions of heterogeneity and plurality in a different, more promising, fashion, I will explore the notion of 'boundary work' that was initially introduced and developed within the context of Science and Technology Studies (STS) to understand the processes of communication and coordination across the fences that separate communities and social worlds. I will focus on the so-called 'flexibility mechanisms' and on the Clean Development Mechanism in particular to demonstrate the importance and significance of this notion for integrative and collaborative problem solving in climate change policy (section 4).

1. Globalization and Governance

In this section I will address Singer's criticism of the Kyoto Protocol as being the outcome of a bargain between sovereign states only. In an era of globalization, Singer insists, we should abandon the idea of sovereign states that have come to be part of the background of diplomacy, public policy, and even of ethics. Because national sovereignty has no intrinsic moral weight we should go beyond the existing state boundaries, 'developing the ethical foundations of the coming era of a single world community' (Singer, 2004: 198).
In my opinion Singer is wrong in two respects. His *normative* call to develop an ethics without borders – a 'one-world-ethics' – seems to be utterly mistaken. I fully agree with Michael Walzer that 'the dream of a single agent – (…) the global state – is a delusion' (Walzer, 2000: 10), and that we should favor a kind of 'global pluralism' instead, with many agents, and many arenas of activity and decision. This is in line with ethicist Onora O'Neill's rejection of Singer's 'abstract cosmopolitanism' and her plea to include non-state actors such as Non-Governmental Organizations (NGOs) and Trans-National Corporations (TNCs) in securing global justice (O'Neill, 2004).

But, more important for the argument put forward in this contribution, Singer's *empirical* claim that Kyoto was the result of a deal between state actors only is also evidently incorrect. From the start, Non-Governmental Organizations (NGOs) had a significant influence on climate negotiations. According to Sebastian Oberthür and Hermann Ott (1999: 272), the impact of NGOs on the Kyoto Protocol represents a major advance towards an emerging 'global civil society'. NGO activities include setting the agenda, monitoring government actions, and providing information, technical or scientific advice, and policy recommendations. Some NGOs have been invited to become members of national delegations. For example, members from the London-based Foundation for International Environmental Law and Development (FIELD) participated in the Kyoto process as members of the delegation of the Association of Small Island States (AOSIS).

Bas Arts (1998) distinguishes three important strategies that NGOs apply to influence the process of decision making and the outcome of negotiations: lobby, advocacy, and protest. *Lobby* refers to informal contacts between NGOs and policy makers behind the scenes, whereas *advocacy* refers to formally accepted and visible promotion activities of NGOs in political arenas. In both cases NGOs exercise influence by transmitting information, knowledge, views, text proposals, expressions of sympathy or warnings. *Protest*, finally, refers to attempts of NGOs outside or at the margin of political arenas to influence policy makers indirectly, e.g. by protest marches, sit-ins, consumer actions, or disturbance of meetings (see also: Arts, 2001).

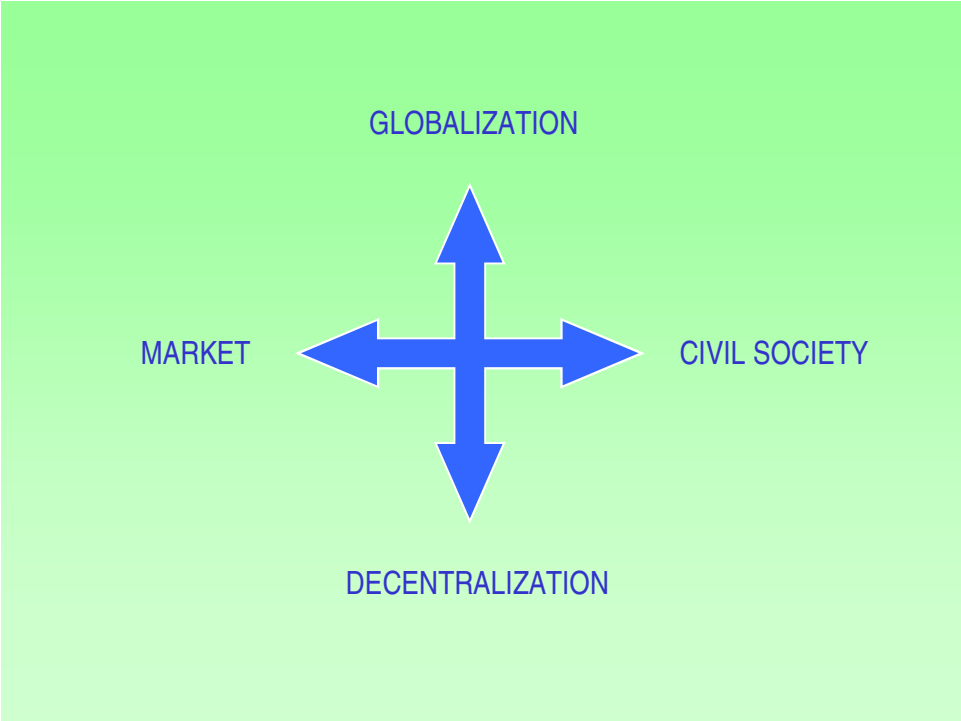
Among the hundreds of NGOs that participated in the Kyoto process two large groups can be discerned, namely environmental and business NGOs. Most environmental NGOs collaborated under the umbrella of the Climate Action Network (CAN) and its seven regional offices around the world. These NGOs promoted a strong and stringent climate treaty, with substantial greenhouse gas emission targets, especially for the rich countries, in order to combat global warming. In contrast, the majority of business NGOs tried to stop or slow down the Kyoto process, advocating a 'business-as-usual' position. These NGOs joined forces under the umbrella of the Global Climate Coalition (GCC), also called the 'Carbon Club' by its opponents. Whereas environmental NGOs aligned themselves with the Association of Small Island States (AOSIS), the Carbon Club, dominated by the coal, oil and car industry, collaborated on a regular basis with the Organization of Petroleum Exporting Countries (OPEC).

In the run-up to Kyoto, however, the business community became more and more divided. An increasing part of the industry sector went 'green' by accepting or even actively supporting a strong agreement in Kyoto, notably the 'green-energy technology' sector, the insulation industry and the insurance industry. And although the 250 environmental NGOs from 70 countries continued to coordinate their actions and activities under the CAN umbrella, and to speak with one voice in public before and at Kyoto, they too seem to have become more divided and to hold different views on various subjects. In particular, cultural differences between the New and the Old World made themselves increasingly felt. Environmental NGOs from the US and Latin America were much more positively inclined towards market-based concepts, such as emissions trading and Joint Implementation than their European partners, who rather tended to stress the advantages of regulatory systems (see Oberthür & Ott, 1999: 76).

The post-Kyoto era has witnessed a gradual shift of power both within business and environmental NGOs, opening up possibilities of cooperation and coordination among them that were unthinkable in the pre-Kyoto era. Originally environmental NGOs tried to 'curben the trends' of global warming through strengthening climate measures as much as possible, while business NGOs advocated 'business as usual' by blocking or softening these measures. 'Since 1995, this situation has (to some extent) changed. Business has become much more

pro-active on and supportive to climate measures, because they now accept climate change as a problem, and they see chances to combine emission reductions with market opportunities. Environmental organizations, on the other hand, have become more responsive to flexibility, differentiation, and market solutions, and are seeking ways to shape their role in a more market-oriented policy. This has made the cooperation between business and environmental NGOs possible' (Arts & Cozijnsen, 2003: 11).

The emergence of NGOs on the international scene is part of a much broader trend, which needs to be taken fully into account in order to be able to assess the problems and perspectives of the development and implementation of the climate regime. Due to political trends such as globalisation, individualization, deregulation and privatisation, the previous decades have shown an important shift in governance, that is, a change in the way individuals and institutions, both private and public, manage their common affairs. This shift is two-dimensional: a *horizontal* shift from the nation-state to the market and to civil society, and a v*ertical* shift from the national level to supra-national (more global) levels and to sub-national (more local) levels (Kersbergen & Waarden, 2001). The horizontal shift has led to growing interactions between state actors and civic and commercial actors, ultimately resulting in various forms of '*multi-actor governance*'. The vertical shift with the simultaneous processes of internationalisation and decentralisation produced various kinds of '*multi-level governance*'. Thus, the double shift in governance has caused a significant increase in public and private players and multiplied the levels of decision-making. More than ever before, policy-makers are confronted with problems of coordination and communication.



Shifts in Governance

The worldwide shift in governance both along horizontal and vertical axes leads to an ongoing fragmentation of responsibility and agency. Increasingly, policy-makers are dealing with a wide array of groups, which do not necessarily speak each other's language or share similar conceptions of the world. With that many voices and vocabularies and that many interests at stake, the specter of the Tower of Babel looms large. Especially in contested

matters such as scarce natural resources, multiple conflicts arise. At the same time, to deal effectively with the causes and consequences of climate change, there is an apparent need for an integrated approach and a close cooperation among the various actors involved.
An important key to successful collaboration seems to be equity and justice. The future of the climate regime depends to a large degree on the willingness of the biggest and most advanced countries to make quantitative commitments. This willingness will be greater if the agreements and arrangements are widely accepted as equitable and fair (see Toth & Mwandosya, 2001: 668). More in general, most experts and analysts agree 'that greater cooperation is likely to be forthcoming if the policy process, implementation decision, and outcomes are perceived to be fair' (Rose et al., 1998: 25). 'To be effective and to promote cooperation, agreements must be regarded as legitimate, and equity is an important element in gaining legitimacy' (Axel Michaelowa, 2000: 3). In the next two sections I will explore some of the most important concepts of equity and fairness in order to assess their potential to bridge the gap between the different countries and parties in climate policy.

2. Moral Dimensions

As a consequence of the scale of the climate problem and the intricate politics involved negotiators find themselves more and more caught up in what Oberthür and Ott (1999: 300) have called a 'complexity trap'. Especially after Kyoto, the regime has become so immensely complex that it is almost impossible for any individual to grasp. 'Only the heads of the larger delegations and some bigger NGOs have the required multiple information channels to keep track of the process. The chief US negotiator in Kyoto, Stuart Eizenstatt, called the negotiations the most complex apart from those on disarmament' (Ott, 2001: 281). However, the Kyoto process is not only of an unprecedented complexity in a technical sense but also in a moral sense. To make this moral complexity evident, I will first elaborate on some of the most important ethical dimensions of the Kyoto process, and I will next demonstrate the great diversity of ethical concerns and considerations through a discussion of one of the most important Kyoto issues: the distribution of mitigation burdens and benefits (section 3).

Anthropocentrism vs. Ecocentrism
There appears to exist a fundamental difference in the moral perception of climate change. On the one hand, in the industrialized North there is a widely held 'ecological view' of the problem. Climate change is perceived as a problem of polluting the environment, of degrading the ecosystem. As such, its essence is seen to be that of a wrongful act against 'Nature'. On the other hand, in the South the problem of climate change is framed quite different, not so much as an ecological problem but more as a human welfare problem. The harm is against humans, not against 'Nature' (cf. Müller, 2002).
From the perspective of the industrialized North the focus is on the impacts of climate change on *natural* systems. In the Third IPCC Assessment Report of 2001 it is claimed that changes in climate have already affected natural systems in many parts of the world. 'Examples of observed changes include shrinkage of glaciers, thawing of permafrost, later freezing and earlier break-up of ice on rivers and lakes, lengthening of mid- to high-latitude growing seasons, poleward and altitudinal shifts of plant and animal ranges, declines of some plant and animal populations, and earlier flowering of trees, emergence of insects, and egg-laying in birds' (IPCC, 2001: 3). Natural systems at risk include glaciers, coral reefs and atolls, mangroves, boreal and tropical forests, polar and alpine ecosystems, and prairie wetlands. Changes in climate have already begun to affect biodiversity (cf. Gitay et al., 2002). According to one recent study (Thomas et al., 2004), climate change will lead to a sharp

increase in rates of extinction. Mid-range predictions suggest that 24 per cent of species in these regions will be on their way to extinction by 2050 due to climate change (cf. Reid et al., 2004).
From the perspective of the South the focus is on the impacts of climate change on *human* systems. According to the Third IPCC Assessment Report these impacts are expected to fall disproportionately on the poor (cf. Richards, 2003). These impacts include reductions in crop yields in most tropical and sub-tropical regions with all the consequences for food security, employment, and incomes; huge displacements of people from small island states and low-lying coastal areas; exposure of millions of people to new health risks, especially from vector-borne diseases like malaria as well as water-borne diseases like cholera and dysentery. The expected distribution of economic impacts of climate change 'is such that it would increase the disparity in well-being between developed countries and developing countries, with disparity growing for higher projected temperature increases' (IPCC, 2001: 8).

Abatement vs. Adaptation
These differences in perception between industrialized and developing countries correlate with the two major strategies for coping with global warming. The first strategy is abatement or mitigation of climate change by reducing greenhouse gas emissions and enhancing sinks. Most industrialized countries have committed themselves to stabilising greenhouse gas emissions at 1990 levels by the year 2000 and to reducing their overall greenhouse gas emissions by at least 5% compared to 1990 by the so-called first commitment period (2008–2012). The second strategy is adjustment or adaptation to the impacts of climate change, for instance by building higher dikes or by developing drought resistant varieties of food crops. Whereas mitigation deals with the *causes* of climate change, adaptation tackles the *consequences*.
Adaptation is the most pressing issue for the developing countries because they are especially vulnerable: they have not only to bear a disproportionate share of the burden of climate change impacts but they also lack the human, financial, and natural resources as well as the institutional and technological capabilities for adaptation. This is especially unfair because these poor countries are less (causal) responsible for climate change than the rich countries. Nevertheless, global climate policy has demonstrated a strong bias towards mitigation strategies only until very recent.[2] One of the reasons for this bias, according to the Third IPCC Assessment Report, is that adaptation has been associated with an attitude of fatalism and acceptance. 'Putting too much emphasis on adaptation strategies might raise the notions that mitigation efforts have little effect, that climate change is inevitable, and/or that mitigation measures are unnecessary' (Toth & Mwandosya, 2001: 653). Following this groundbreaking IPCC report, however, three funds were established that are mainly dedicated to adaptation: the UNFCCC Special Climate Fund, the UNFCCC Least Developed Countries Fund, and the Kyoto Protocol Adaptation Fund.[3]

Intergenerational vs. Intragenerational
Climate change not only affects material and moral relations within the present generation but will also quite obviously have a powerful effect on the relations between the present

[2] In his controversial book *The Skeptical Environmentalist*, Bjørn Lomborg wants to give priority to adaptation over abatement based on considerations of cost-effectiveness. 'Economic analyses clearly show that it will be far more expensive to cut CO_2 emissions radically than to pay the costs of adaptation to the increased temperatures' (Lomborg, 2001: 318).
[3] A few Annex 1 countries (the EU and its member states, Canada, Iceland, New Zealand, Norway, and Switzerland) have earmarked 450 million Euro annually the two UNFCCC funds from 2005. The Kyoto Protocol Adaptation Fund is to be financed from a 2% levy on the proceeds of Clean Development Mechanism (CDM) projects.

generation and future generations. In other words, one will have to deal with issues of both intra- and intergenerational justice. This is acknowledged in Article 3.1 of the 1992 United Nations Framework Convention on Climate Change (UNFCCC). It 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'. Moreover, article 3.3 of the UNFCCC stipulates the right to promote sustainable development. This right also refers to future generations, as is evident from the famous definition of sustainable development in the Brundtland Report *Our Common Future* of 1987: 'sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs'.

In the climate change debate the question of future generation is mainly dealt with in terms of the so-called discount rate. This is used as an instrument that allows the comparison of economic effects occurring at different times. It plays a key role in the analysis of actions with varying time paths of costs and benefits.[4] According to the Second IPCC Assessment Report, the discount rate is specially important in climate change: 'Because of the very long times involved in climate change decisions, the choice of a discount rate powerfully affects the net present value of alternative policies, and thus the policy recommendations that emerge from climate change analysis' (Arrow et al., 1996: 129).[5]

International vs. Intranational

As Jiahua Pan has rightfully observed, existing literature on equity considerations for climate change mitigation and adaptation has almost exclusively focused on fair burden sharing *between* nations. However, disparities among regions and income groups *within* nations pose perhaps more equity concerns than those between nations. 'International arrangements for equity considerations such as technology and monetary transfers may actually exacerbate income inequality in the recipient country, as the poor may be excluded from implementation' (Pan, 2003: 7).

Inequity in the developing world, according to Pan, requires particular attention, as the income inequality gap in these nations is generally wider than that in the rich countries. He notes that the poor nations with more unequal income distribution at home are more vocal for equity demands at international negotiations. 'The nations that request for per capita allocation of emissions rights for the sake of equity are those in many cases with a record of the most unequal income distribution and a lack of social security and basic human rights' (ibid., 12). A good example is Brazil, with almost half of the national income going into the pocket of the top 10% of its population.

Special attention should also be given to impacts of climate change on gender relations. As Martha Nussbaum recently observed, in the very basic area of health and nutrition, the female-male gap is significant, and in some nations is getting worse. 'In India, for example, the sex ratio in the 1990 census was 92 women to 100 men, the lowest since the census began to be taken early in the twentieth century. The current census results are not yet final, but it seems likely that the ratio will dip to 85 to 100. (It is estimated that when equal nutrition and health care are present, women live, on average, slightly longer than men; thus one should

[4] The general formula for the present value of a future income amount *a* years in the future is:
Present Value = (Future Value) / (1 + Discount Rate)^a.

[5] The IPCC Report distinguishes two major approaches used to determine the appropriate discount rate for climate change analysis: the ethical or *prescriptive* approach and the positive or *descriptive* approach. The prescriptive approach tends to generate relatively low discount rates and can be interpreted as doing as much as is economically justified to reduce the risk of climate change. The descriptive approach tends to generate somewhat higher discount rates and can be interpreted as maximizing the economic resources available for future generations and allowing them to decide how to use the resources.

expect a sex ratio of 103 women to 100 men.) And those are government statistics. House-to-house counts in some regions by reliable NGOs have produced far more alarming figures: in a region of rural Bihar, 75 women to 100 men; in a region of Karnataka, 65 women to 100 men' (Nussbaum, 2004: 148/9).

Process vs. Product

Equity principles apply to both consequential and procedural issues (cf. Banuri *et al*., 1996). Consequential equity deals with the *outcome* of decision-making. In the context of climate change outcomes are about the distribution of costs and benefits of mitigation and adaptation efforts. The consequential decisions have implications for burden sharing among and within countries (inter- and intranational justice) and between present and future generations (inter- and intragenerational justice).

Procedural equity has to do with the *process* of decision-making. The Third IPCC Assessment Report clarifies the meaning of procedural equity with an appeal to Jürgen Habermas's notion of the 'ideal speech situation', 'a situation in which dialogue and decision making are free from inappropriate constraints such as barriers to the acquisition of knowledge or financial resources. Transfer of these concepts to climate change negotiations requires consideration of the influence of scientific information, human resources, institutional capacities, and financial assets on the bargaining, and a redistribution of these among participants to create procedural equity' (Toth & Mwandosya, 2001: 668). With respect to procedural justice, two aspects can be distinguished. The first one involves questions of participation: do people and parties that have a stake in negotiations have equal access to the process or not? The second aspect concerns questions of capacity. 'The climate negotiations are among the most complex ever attempted, and some parties have far greater capacity to participate effectively in them (…) The larger industrialized countries typically bring teams of several dozen - in some cases over a hundred - officials to a major negotiating session. Many of the poorest countries manage only to send a single representative' (Ashton & Wang, 2003: 74).[6]

3. Concepts of equity and justice

In this section, I will focus on the ethical ramifications of a key issue in the Kyoto process, the allocation of emission trading quotas – an issue that cuts through (a least some of) the moral dimensions mentioned above. In the introduction I referred to Singer's criticism of Kyoto for the total lack of an ethical basis for the present allocation of emission permits. Contra Singer, I will argue that there actually is a great variety of moral intuitions and considerations involved in the Kyoto process that are to a lesser or greater degree incorporated in agreements and practices. I will discuss four of the most important proposals for fair burden sharing. These can be situated on a scale with at one extreme proposals that are more to the advantage of the industrialized countries and on the other proposals where the balance of burdens and benefits has shifted in favour of the developing countries.

[6] Ashton & Wang mention another dimension: production versus consumption. The Kyoto Protocol focuses on emissions at the point of production. But in a world with a high and growing volume of international trade, some countries generate emissions to make products that are used elsewhere in the world. 'There are equity grounds for the proposition that those who receive the benefits from the emissions (or "embedded carbon") associated with the production of such goods should carry the cost. Emissions might then be assessed and penalized at the point of consumption. Otherwise a steel exporter would be carrying a carbon burden for those who use the steel' (Ashton & Wang, 2003: 69).

The 'Grandfathering Rule' and the Lockean Proviso

At Kyoto most industrialized countries have committed themselves to reducing their overall greenhouse gas emissions by at least 5% compared to 1990. This allocation is not totally morally arbitrary, as Peter Singer seems to suggest, because it follows the so-called 'grandfathering rule'. 'Grandfathering' in the context of allocating assigned amounts refers to an allocation relative to a historic emission baseline (here the year 1990). Grandfathering starts from the *status quo* and is based on some principle of priority: 'first in time, first in right' (cf. Ott & Sachs, 2002). The most pressing problem with a grandfathering distribution is that it favours the biggest polluters and puts any newcomer to the market on a disadvantage. This could be especially problematic for developing countries with currently very low but rapidly rising emissions (cf. Aslam, 2002: 176).

Proponents of the grandfathering rule generally appeal to the entitlement theory of contemporary philosopher Robert Nozick, an important representative of the so-called libertarians. According to Nozick, an allocation can be regarded as just only when the initial acquisition of the holdings and the exchange of these holdings have been conducted in a just manner, and not, for instance, by means of theft. Nozick considers the free or competitive market as the institutional structure that settles distributional issues. Assuming that economic agents are entitled to hold their initial bundle of goods, any redistribution of those goods, which comes about through voluntary exchange, will leave agents with goods that they are entitled to hold. Whether a distribution is equal or unequal is of no concern, as long as it was arrived at justly.

In dealing with the question of the original appropriation Nozick turns to the 17th century English philosopher John Locke. In his *Two Treatises of Civil Government* (1690) Locke put forward the principle that a person justly acquires land by 'mixing' his or her labour with it. However, Lock added a proviso to his account of justice in the acquisition of property. The 'Lockean proviso', as Nozick refers to it, is that acquisition is just, providing that 'enough and as good is left in common for others'. In Nozick's view, the Lockean proviso would be violated only in a catastrophic or 'desert island' situation. For example, a person should not be allowed to appropriate the only water hole in a desert and charge what he will. Apart from this kind of extreme situations, Nozick claims that the free operation of a market system will not actually come into conflict with the Lockean proviso (cf. Dawson, 2000).

Only few moral philosophers or ethicists will be prepared to follow Nozick and his disciples in climate policy in backing an allocation of emission permits that is based on the *status quo* (cf. Helm & Simonis, 2001). In *One World*, Peter Singer explicitly appeals to the Lockean proviso in rejecting the existing distribution of emission allowances. 'Once we have used up the capacity of the atmosphere to absorb our gases without harmful consequences, it becomes impossible to justify our usage of this asset by the claim that we are leaving "enough and as good" for others' (Singer, 2004: 29).

In the Second IPCC Assessment Report it is claimed that in fact no one in the literature appears to advocate strict *status quo* as an equity principle in its own right. 'It has, however, received widespread reference as a basis or starting point position from analysts taking a pragmatic or game-theoretic approach' (Banuri et al., 1996: 107). The grandfathering rule generally functions as a temporally and transitional arrangement that could be morally defended along the following lines: 'Industrialized countries do not start from scratch, but have locked themselves into a fossil-based infrastructure that cannot be dismantled in the short and medium term. This may entitle them to a "bonus" for a first mover disadvantage' (Ott & Sachs, 2002: 169). One could also point to the unfairness of changing the rules after people have made investments of effort and savings (cf. Müller, 1999).

Rawls's Difference Principle: the Greenhouse Gas Intensity Approach

The second proposal for burden sharing is derived from John Rawls's groundbreaking inquiry *A Theory of Justice*. To discover principles of justice, Rawls places individuals negotiating the rules that will regulate their social and economic life together behind a 'veil of ignorance': they are not allowed to know their positions in future society, nor their talents or tastes. Two basic principles of justice emerge from this so-called 'original position'. First, the principle of equal liberty that states that each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others. And second, the difference principle or 'maximin' principle that states that social and economic inequalities are to be arranged so that they are to the greatest benefit of the least advantaged. Rawls argues that rational individuals would agree on this principle because they do not know whether they will be among the most or the least fortunate members of future society. From behind the veil of ignorance, they will be eager to make sure that the worst position in which they might find themselves is as good as it possibly can be (cf. Dawson, 2000).

In *One World*, Singer examines the possibility of defending the 'greenhouse gas intensity approach' to climate change of the Bush administration with the help of Rawls's maximin principle. In 2002, President Bush set a national goal to reduce the greenhouse gas intensity (measured as the ratio of greenhouse gases emitted per real gross domestic product) of the US economy by 18% in 2012 (cf. Abraham, 2004). Critics of this approach have pointed out that reducing carbon *intensity* is not the same as reducing carbon *emissions*. Intensity is a relative indicator, expressed in kilograms of carbon emissions per dollar of economic output. Economic growth can outweigh intensity reductions, causing total emissions to increase. Now, as Singer indicates, Bush justified this by saying that 'economic growth is the solution, not the problem' and that 'the United States wants to foster economic growth in the developing world, including the world's poorest nations' (Singer, 2004: 38). This defence of a growth in US emissions can only pass as an application of Rawls's difference principle insofar as it can be shown that US production not only makes the world as a whole better off, but also makes the poorest nations better off than they would otherwise be. This argument is, according to Singer, flawed in two respects. First, the primary beneficiaries of US production are the residents of the US itself and certainly not the residents of the poorest countries that cannot afford to buy US manufactured products. Second, the US does not produce more efficiently, in terms of greenhouse gas intensity, than other nations.

Although Singer is undoubtedly right with respect to present US climate change policy, it can be defended on moral grounds that the green house gas intensity of various national economies should be taken into account in decision making on burden sharing. After all, 'it can be argued that an inefficient economy would have more options than an already efficient economy to reduce its emissions of carbon dioxide' (Gupta & Bhandari, 1999: 731).

Equal distribution per capita: The Contraction and Convergence Approach

The principle that is generally considered the most just and fair is the principle of equal per capita entitlements to a share of the capacity of the atmospheric sink. This egalitarian principle, which is also endorsed in Singer's *One World*, is based on the assumption that the atmosphere is a common resource and a global public good to which all are equally entitled. According to this principle, emission permits should be distributed among countries in proportion to their population size. Because this principle would lead to lower emissions allowances for industrialized countries and higher allowances for developing countries, compared to current levels, it is no wonder that it is especially popular among developing countries.

The egalitarian rule requires parties to receive equal treatment in terms of benefits and burdens. In reality, however, it is frequently the case that parties are unequal to begin with. To

address this problem the principle of equality or *parity* has to be substituted by or supplemented with the principle of *proportionality*. This principle originates in Aristotle's *Ethica Nicomachea* and holds that equal cases ought to be treated equally and unequal cases unequally. Resources should be allocated in proportion to relevant differences between parties. This principle is in fact laid down in Article 3.1 of the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that asks the Parties to act 'in accordance with their common but differentiated responsibilities and respective capabilities'.[7] The first consequence was that developed countries had to 'take the lead' in controlling greenhouse gas emissions while developing countries had to make no commitments in this respect at all, in recognition of their right to sustainable growth. This *primary* differentiation of commitments between developed and developing countries was succeeded in 1997 by a *secondary* differentiation among developed countries (cf. Blanchard et al., 2003). In the Kyoto Protocol, the developed countries differentiated their targets relative to 1990 levels, ranging from an 8% reduction to a 10% increase. Although this differentiation was mainly the result of political haggling, it still roughly reflects the parties' different economic, technological, and energy situations.

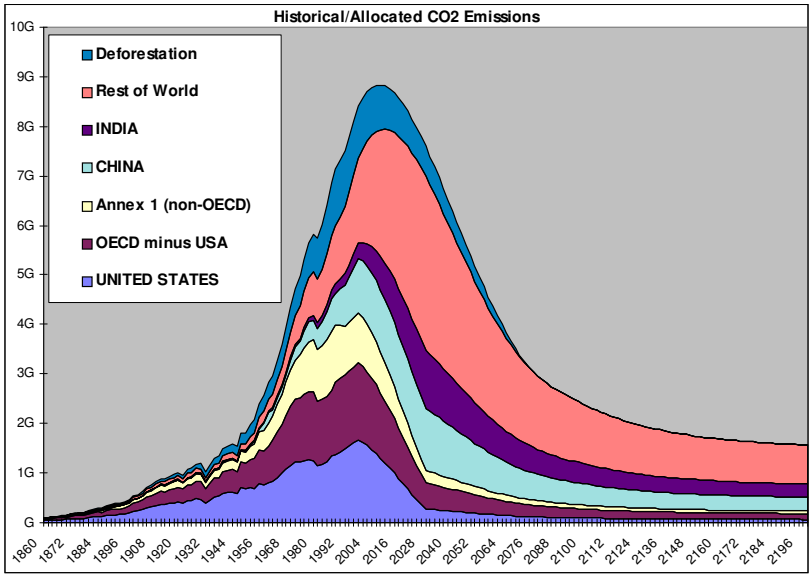
Country	Target
EU-15, Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland	-8%
US	-7%
Canada, Hungary, Japan, Poland	-6%
Croatia	-5%
New Zealand, Russian Federation, Ukraine	0
Norway	+1%
Australia	+8%
Iceland	+10%

In the future, it will be unavoidable to come to a differentiation among developing countries as well. In international negotiations, the developing countries act as one group: the 'G-77 and China'. But there are big differences among these countries, for instance between the member states of the Organization of Petroleum Exporting Countries (OPEC) and the members of the Alliance of Small Island States (AOSIS), and between the Least Developed Countries (LDC) and the so-called Big Three (China, India and Brazil).[8]

[7] It is also implicated in Article 4.2 where it is stipulated that, in taking measures on the mitigation of climate change, it is necessary to take into account the differences in the Parties' 'starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances'.

[8] Some of those countries labelled as developing countries are more affluent than their counterparts. 'For example, the GDP per capita of Singapore, South Korea and Israel is equal or higher than that of some members of the European Union, such as Greece, Spain and Portugal' (Ott & Oberthür, 1999: 28).

Now, the problem with the per capita approach in its pure form is its disregard for these differences. It cannot address variations in national circumstances that have an important bearing on emission levels or mitigation costs, such as weather conditions, the availability of renewable resources and of sinks, the ability to pay, and energy intensity and efficiency of energy use. 'A high endowment of hydro resources (e.g., in Norway and Brazil), high dependence on nuclear energy (e.g., in France), a high level of industrial efficiency (e.g., in Japan), or an exceedingly cold climate (e.g., in Iceland) can have correspondingly favourable or adverse influences on the per capita emission levels' (Aslam, 2002: 190).
If these differences are not taken into account in burden sharing decisions, countries with efficient economies or with limited access to renewable resources will be punished unjustly. According to Hermann Ott and Wolfgang Sachs, such errors can be avoided by replacing the idea of an absolute egalitarianism with the notion of 'adjusted egalitarianism'. This notion implies a certain flexibility: the egalitarian rule should be considered as a long-term guiding principle - a *Leitbild* -, and not as a rather rigid planning objective for planetary redistribution, used to prescribe the necessary outcome (Ott & Sachs, 2002: 169).
Ott and Sachs refer to the so-called 'contraction and convergence approach' as a framework that bears an egalitarian stamp and is at once flexible enough to allow the necessary adjustments to be negotiated. This approach was first introduced by the nongovernmental Global Commons Institute (GCI) in 1995. Its central idea is that all countries arrive at the acceptable level of economic development. Total emissions should *contract* over time, and per capita emissions should *converge* on a single figure. The actual convergence value, the path towards convergence, and the time when it is to be reached would all be negotiable. The proposal allows for emission trading using mechanisms of the kind permitted under the Kyoto Protocol.



The contraction and convergence approach has been consistently advocated at the sidelines of climate politics and, over the years, has received increasing support from some NGOs and governments. It was mentioned for the first time in an official agreement in 2001. In the Marrakesh Accords of that year the industrialized countries are asked to reduce emissions 'in a manner conductive to narrowing per capita differences between developed and developing country Parties' (UNFCCC, 2002).

Historical Responsibility: The Brazilian Proposal

With the 'grandfathering rule' that is most favourable to the industrialized world, we started at one extreme of proposals for fair burden sharing. With the 'historical responsibility' as equity principle we have reached the opposite extreme that is least favourable for the industrialized countries. One of the most influential proposals in which historical guilt is the key distributive code for emission reductions is the so-called 'Brazilian Proposal'.

The original Brazilian Proposal, that was first presented just prior to Kyoto, offered an approach for distributing the burden of emission reductions among (developed) Annex I Parties based on the effect of cumulative contributions to the rise in global temperature, starting as far back as 1840. According to the proposal, countries with a longer history in industrialization and hence a greater guilt for the present situation would be required to make larger reductions, while those that have industrialized relatively late would have to reduce less.

By its emphasis on historic emissions the proposal seems to downplay the significance of current emission levels. 'It is rather difficult to justify, why a country, like the United States, with a per capita emission level of 20 tons of CO_2 should get away with a reduction of 22 per cent, while the British, producing only half as much, would have to cut their emissions by a staggering 63 per cent' (Tynkkynen, 2000: 4).

Country	Reduction	Country	Reduction	Country	Reduction
United Kingdom	63.3%	Denmark	17.8%	Russia	11.5%
Luxembourg	41.7%	Austria	17.6%	Estonia	11.5%
Belgium	37.4%	Poland	16.7%	Australia	11.3%
Germany	27.4%	Canada	16.1%	Romania	11.0%
Sweden	25.0%	Iceland	16.0%	Bulgaria	10.9%
France	24.4%	New Zealand	16.0%	Finland	10.7%
USA	22.3%	Ireland	14.0%	Italy	10.5%
Hungary	20.3%	Switzerland	13.5%	Spain	10.5%
Netherlands	18.8%	Norway	12.4%	Japan	9.5%
Slovakia	18.2%	Lithuania	11.5%	Portugal	8.4%
Czech Republic	18.2%	Latvia	11.5%	Greece	7.5%

Emission reductions are as percentage of 1990 levels by 2010.

In the Second IPCC Assessment Report of 1995 three problems with historical responsibility as an equity principle are noted (Banuri et al., 1996: 109). First, present generations should not be punished for the activities of past generations that were largely unaware of the consequences of their actions and had no incentive to limit emissions. Second, it is not always clear who has benefited from historical emissions, given the continuously shifting patterns of production, trade, consumption, and migration. In some cases boundary changes could also create major difficulties for allocating past emissions to current states. Third, the inhabitants of a country and their descendants are not the only beneficiaries of economic and technological development. Positive externalities associated with development (such as

accumulated knowledge) cross state borders just as easily and frequently as negative ones (such as pollution).[9]

In response to these criticisms, advocates of historical responsibility as a fair equity criterion claim that if the present generation accepts assets from their ancestors, they should also accept the corresponding liabilities. If we dismiss historical responsibility, we should ask ourselves, what is to keep the next generation from doing so?

The Brazilian Proposal not only suggested a criterion for assigning emission ceilings to individual industrialized countries, but also included a penalty mechanism called the 'Clean Development Fund' (CDF), which was to be sustained by requiring non-complying countries to pay US$10 for every ton of carbon equivalent above the level of assigned amounts (La Rovere et al., 2002). The money was to be used for climate change mitigation and adaptation projects in (developing) non-Annex I countries. The distribution of funds was originally proposed to be proportional to the impact of the non-Annex I countries on the global-average surface temperature. The biggest developing country GHG emitters (such as Brazil itself) would thus have been entitled to the largest shares of the funding, leaving little resources for small and least developed countries.

The CDF was rejected mainly because it was a punitive instrument entailing financial penalties, making it an unlikely instrument in an international treaty. In the light of this and other shortcomings, the Kyoto negotiations subsequently modified the CDF into what is now known as the Clean Development Mechanism (CDM), which earned widespread support from industrialized and developing countries alike. CDM was mainly the result of intensive bilateral discussions and negotiations between Brazil and the US on the eve of the Kyoto meeting, and was declared the 'Kyoto surprise' by observers of the process. I will go into this so-called flexible mechanism at length in the fourth section of this paper.

Although generally not very supportive of the idea of additional North-South resource transfers, the US grasped the chance that the Brazilian Proposal represented for industrialized countries interested in 'geographical flexibility' for the implementation of their commitments. Instead of a penalty for non-compliant industrialised countries, the Brazilian Proposal could also be read as a means of avoiding non-compliance and thus fulfilling the commitments under the Kyoto Proposal by investing in climate change related projects in developing countries. For this, the punitive element of the Brazilian Proposal would need to be dropped. Instead, the US idea was that industrialized countries would provide resources to acquire emission credits in advance of any compliance assessment (Oberthür & Ott, 1999: 166).

What this overview, which is far from complete, shows is that there is a wide array of equity conceptions that play a role in climate policy negotiations. Many insightful studies demonstrate that equity cannot be reduced to any single factor: 'it is rather a complex concoction of sometimes incompatible, but selectively justifiable, principles' (Aslam, 2002: 185). Odile Blanchard and her colleagues arrive at the conclusion 'that no single rule is likely to achieve broad political acceptance in the foreseeable future' (Blanchard et al., 2003: 281). Their main premise is 'that several differentiation rules must be combined to achieve climate stability as efficiently as possible' (ibid., 287). John Ashton and Xueman Wang also come to the conclusion that there is no 'single truth' about equity – no unique mathematical solution to the equity equation. They argue 'that parties are unlikely to agree on any unitary approach to equity, based on a single, objective yardstick, as a foundation for a long-term climate agreement. Any search for such an approach is bound to fail and risks diverting negotiating

[9] The IPCC report gives this example: 'the peak energy intensities achieved by countries in the process of industrialization have steadily declined over the century, as countries developing later can draw on better (and more recent) technologies developed elsewhere' (Banuri at al., 1996: 120).

capital away from more productive terrain. Rather, a fair agreement will be one that is qualitatively robust across competing equity claims' (Ashton & Wang, 2003: 62).
In the Third IPCC Assessment Report, Ferenc Toth and Mark Mwandosya note that there are different perceptions of what is equitable and fair and that these differences generate conflicting debates on how to share the burdens, even though there might be equally legitimate and justified claims. 'Therefore, it is very difficult to achieve a worldwide consensus on just one justice principle. One way of reaching an accord might be to set up a combination of the diverse equity-based distribution proposals (…) In summary, manifold equity principles and different accompanying operational rules exist; these might best be applied as a combination to respect more than just one equity position and thus enhance political feasibility (Toth & Mwandosya, 2001: 670).
Already in the Second IPCC Assessment Report, it is observed that a number of fundamentally different 'world views' are adopted towards climate change. These views not only span different ideas of equity but also differ concerning basic assumptions about the urgency of abatement action and appropriate management strategies. In order to arrive at a common climate policy, the report argues, a process of compromise between these different and sometimes conflicting world views is needed (Banuri et al., 1996: 86).
As was shown at some length in the second section (on moral dimensions), one of the most fundamental differences in the perception of climate change appears to be that between the North and the South: while the North considers the problem of climate change mainly as an ecological and environmental problem, the South defines it first and foremost as a human welfare problem; the North is more interested in mitigation of climate change, the South in adaptation to the impacts of this change, etcetera. Moreover, as became clear in this section, these different perceptions lead to the adoption of different principles of justice and of different equity proposals, from the grandfathering rule to the Brazilian Proposal.
So the problem is not that there is too little or no ethics at all involved in climate change negotiations, as Peter Singer seems to suggest. Rather, the problem seems to be that there is too much ethics involved, in the sense that there exist too many different and often divergent kinds of equity perceptions and principles of justice.
Because concepts of equity and fairness are seriously challenged and contested, their potential to facilitate communication and cooperation is severely limited. An exclusive focus on equity questions could even be counterproductive rather than constructive, and could deepen existing differences and disagreements rather than bridging them.
Whereas consensus on distributive justice in matters of climate change is highly unlikely, there is also barely room for compromise - where different deep-seated ethical convictions are at stake people find it hard to bargain and to make concessions without compromising themselves or their integrity.
So the question becomes how to handle these conflicts if the possibilities for consensus and compromise - for arguing and bargaining - are severely limited. Here the notion of *boundary work* could prove to be very helpful. This notion was introduced and developed within the context of Science and Technology Studies to understand the processes of communication and coordination across the fences that separate communities and social worlds. In the next section the importance and significance of this notion for integrative and collaborative problem solving in climate change matters will be explored at some length.

4. Towards an Ethics of Flexibility

The term 'boundary work' was launched by Thomas Gieryn (1983) in the discussion on the boundaries between science and non-science. Gieryn studied the ways scientists carve out domains of cognitive authority for their discipline. He emphasized that what counts as science and what not is a matter of negotiation: the boundaries of science are fluid rather than fixed. His focus was on processes of differentiation, demarcation and distancing science from pseudo-science, ideology, or belief.

Susan Leigh Star and James Griesemer shifted the focus from competition over cognitive claims and cultural capital to cooperation across the boundaries between communities. Their approach is complementary to Gieryn's. Together, they illuminate what separates or integrates various groups on different geographic scales and organizational levels, and what complicates or facilitates communication and cooperation between them.

On the basis of a case study of the history of the Museum of Vertebrate Zoology in California, Star and Griesemer showed how heterogeneity and cooperation can coexist in the field of science. Scientific work is heterogeneous, requiring many different actors and viewpoints, but at the same time it also requires cooperation – 'to create common understandings, to ensure reliability across domains and to gather information which retains its integrity across time, space and local contingencies' (Star & Griesemer, 1989: 387).

To explain how people in practice handle both diversity and cooperation, Star and Griesemer introduced the notion of *boundary objects*. These are objects 'which both inhabit several intersecting social worlds (…) *and* satisfy the informational requirements of each of them. Boundary objects are objects that are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds' (ibid., p. 393). One of the most important features of the boundary object is that one group does not create or set the meaning of the object for other groups nor does one group regulate access to the object by other groups. 'Boundary objects act as anchors or bridges, however temporary' (ibid., p. 414). They allow for equal coexistence of conflicting convictions without the necessity for consensus or compromise.

Repositories. These are piles of objects which are indexed in a standardized fashion like that found in a library or museum.

Ideal types. These are descriptions (such as the species-concept) which are adaptable to local sites precisely because they are fairly vague.

Coincident boundaries. These are common objects which have the same boundaries but different internal contents. Star and Griesemer use the example of the state of California as boundary object - the maps that represent it are created for different purposes but share a common set of boundaries.

Standardized forms. These are boundary objects devised as methods of common communication across dispersed work groups, for example methods of collecting, preserving, labelling and taking field notes.

Types of boundary objects (Star & Griesemer, 1989)

In their case study of the Museum of Vertebrate Zoology Star and Griesemer distinguish four types of boundary objects (see Box). From this list, which is not meant as an exhaustive list by Star and Griesemer, it is clear that boundary objects are quite divers. They not only include

objects in the strict sense but also concepts, not only products but also processes and even people. Given this interpretative flexibility, it seems that the notion of boundary object represents a boundary object itself. In the remainder of this contribution the importance and significance of this notion for integrative and collaborative problem solving in climate change policy will be explored at some length, with a focus on the so-called 'flexibility mechanisms' and on the Clean Development Mechanism in particular.

International Emissions Trading (IET)

Article 17 of the Kyoto Protocol allows developed countries to participate in emissions trading of GHGs for the purposes of meeting their assigned amounts. Recognizing that countries and businesses face widely differing economic costs in trying to achieve emission reductions, IET is included in the Kyoto Protocol as a means to reduce the cost of compliance. It allows nations to fulfil part of their emissions reduction obligations by purchasing reductions from other nations. With IET, emitters have the choice of making the reductions themselves or purchasing reductions from countries or companies in a position to reduce the same quantity of emissions at lower cost.
The tradable unit is metric ton units of CO_2 emission reductions, or CO_2 equivalent emission reductions. Carbon dioxide equivalents (CO_2e) provide a universal standard of measurement against which the impacts of releasing different GHGs can be evaluated. Every GHG has a Global Warming Potential (GWP), a measurement that describes its effect on climate change relative to a similar amount of CO_2 (See table 1).
Under the IET, an industrialized country may acquire Assigned Amount Units (AAUs) from other industrialized countries that find it easier, relatively speaking, to meet their emissions targets. Similarly, Annex I Parties may also acquire Emission Reduction Units ERUs from Joint Implementation projects, and Certified Emission Reductions Units (CERs) from Clean Development Projects.

Joint Implementation. (JI)

Article 6 of the Kyoto Protocol permits Joint Implementation whereby developed countries are able to invest in projects in other developed countries to acquire credits to assist in meeting their assigned amounts. JL allows developed countries, or companies from those countries, to cooperate on projects to reduce GHG emissions in the most cost-effective way. The investor from one country would receive emissions credits equal to the amount of emissions that were reduced or avoided as a result of the project. The recipient country would receive new technology and know-how. Emission Reduction Units (ERUs) awarded for JI projects are subtracted from the host country's allowable emissions and added to the allowable emissions total of the investing country.

Clean Development Mechanism (CDM)

Article 12 of the Kyoto Protocol provides for the CDM whereby developed countries are able to invest in emissions reducing projects in developing countries to obtain credits to assist in meeting their assigned amounts. CDM projects in developing countries are intended to meet two objectives: 1) to address the sustainable needs of the host country; and 2) to generate emissions credits - Certified Emission Reductions Units (CERs) - that can be used to satisfy commitments on Annex I Parties and thus increase flexibility in where government Parties meet their reduction commitments. A share of the proceeds from the project activities is to be used to cover administrative costs, and to create an adaptation fund that will assist developing countries that are particularly vulnerable to the adverse effects from climate change to take action to adapt.

Kyoto Flexibility Mechanisms to lower economic costs of emission-reduction requirements

The flexibility mechanisms established under the Kyoto Protocol are market-based mechanisms that allow industrialized (Annex I) parties flexibility in meeting their commitments by taking action outside their own borders. The flexibility mechanisms are designed to reduce the costs of complying with the Kyoto targets and to ease the pressure to

achieve these targets by domestic climate policy measures. The three main mechanisms are Emissions Trading, Joint Implementation and the Clean Development Mechanism (see Box). These flexibility mechanisms should not only be valued for their cost-effectiveness but for more genuine ethical reasons as well. Since they function as a kind of boundary objects, they facilitate and foster cooperation between various parties, state as well as non-state (civic and commercial) parties, at various levels (local, national, regional, and global) – they are therefore also sometimes referred to as 'cooperative instruments' or as 'mechanisms of cooperative implementation'.

By enabling communication and cooperation between heterogeneous parties and countries, the flexibility mechanisms can help build and enhance the trust that is an indispensable precondition for the acceptance of and compliance to new or further commitments, especially by the developing countries. In this respect the Clean Development Mechanism (CDM) seems the most promising – it is the only mechanism under the Kyoto Protocol that involves developing (non-Annex I) countries, and can help overcome the profound differences in the moral perception and framing of global warming without recourse to consensus building or compromise bargaining.

In the previous section it was already made clear that the CDM grew out of the Brazilian Proposal. This included a penalty mechanism called the 'Clean Development Fund' (CDF), requiring non-complying countries to pay US$10 for every ton of carbon equivalent above the level of assigned amounts, money that was to be used for climate change mitigation and adaptation projects in developing countries. In Kyoto, as a result of bilateral discussions and negotiations between Brazil and the US, this fund was transformed in a mechanism with the potential to combine and reconcile a wide variety of motivations and interests.

CDM projects in developing countries should meet two objectives: they should address the sustainable development needs of developing (host) countries, and at the same time allow industrialized (investor) countries to earn emissions credits that can be used to meet their reduction commitments as cost-effectively as possible. Whereas the developing countries succeeded in creating a new source of funding for sustainable development, the US and other industrialized countries succeeded in adding 'geographical flexibility' to the Protocol.

At this moment, the CDM portfolio is growing very fast and has more than tripled in one year. If this trend continues the CDM will meet its role to bridge the gap between Annex I countries' emissions and commitments under the Kyoto Protocol. Currently, CDM project activities are concentrated in three sectors: renewable electricity generation (particularly from bagasse and biomass), reduction of methane emissions from landfills or coalmines, and decomposition of HFCs. Sink projects (afforestation and reforestation) and projects in the transport sector account for only a small proportion of the proposed CDM project activities (Ellis et al., 2004: 6).[10]

The majority of CDM investments and projects known today are planned in countries that already attract large amounts of foreign direct investment. Ten countries (India, Brazil, Indonesia, China, Korea, Vietnam, Costa Rica, Chile, Peru, Thailand) account for more than 80% of expected annual credits. Only in 9 out of 54 African countries CDM project activities are being planned or implemented (ibid., 20). Several economic models suggest that up to 75 percent of CDM investment could be concentrated in China and India, where large volumes of low-cost abatement opportunities exist (Baumert & Kete, 2000: 12).

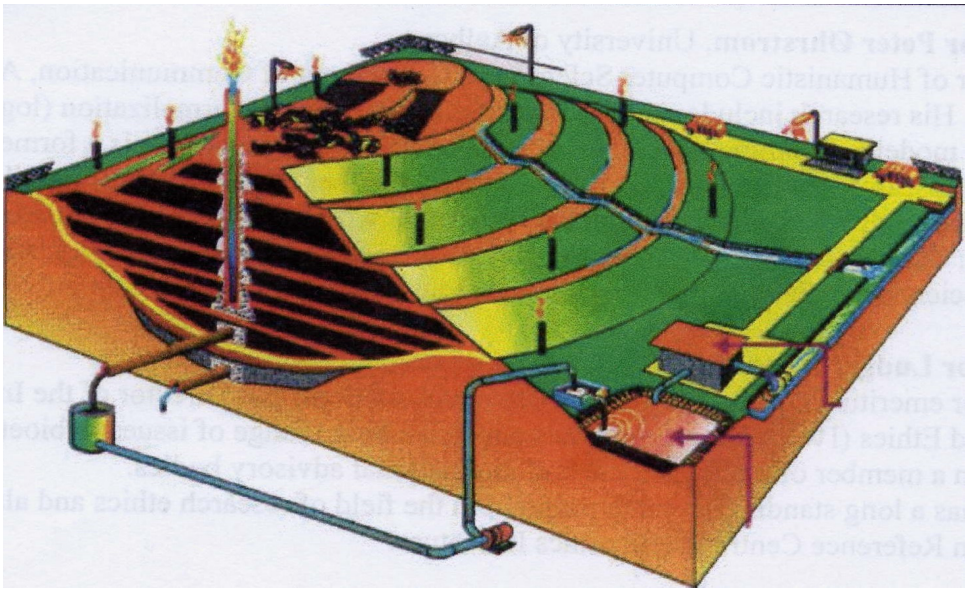
This *uneven geographic distribution* of projects represents one of the problems of CDM. Another problem is constituted by the relatively *high transaction costs* both at the national

[10] The CDM portfolio is not only growing fast but is also becoming increasingly diverse. At present, non-electricity projects account for 51% of total reductions expected by proposed CDM projects during the 2008-2012 period. While most electricity projects reduce CO_2 emissions, non-electricity projects also tackle CH_4, N_2O, HFC and PFC emissions (see Ellis & Gagnon-Lebrun, 2004).

and the project level. Yet another problem is the problem of the so-called *'free rider' credits* – credits going to projects that would happen even without the CDM. To prevent this problem two types of additionality are required: environmental and financial additionality. Emissions reductions should be additional to any reductions that would also have occurred without the CDM project, and funding must be additional to official development assistance (Spalding-Fecher, 2002: 6).
Then there is the problem of *leakage*. This is a measurable emissions increase that is caused by the project, but is outside of a CDM project boundary or timeframe. For instance, a large energy-efficiency programme may decrease the price of electricity and increase the total demand for power. There is positive leakage (known as *spillover*) if the CDM project leads to reduced emissions elsewhere, or after the project ends. Positive leakage or spillover could happen when CDM project technology is emulated by other projects in the same country or elsewhere, through a demonstration effect (ibid., 15).
A last problem that ought to be mentioned is the problem of *low-hanging fruits*. For developed countries it is relatively easy to meet their commitments with Certified Emission Reduction Units (CERs) generated in developing countries. By the time the developing countries have to take mitigation measures themselves the more simple and cheap methods will all be used up by the developed countries.
Although CDM is not without its problems, these problems can in part be overcome by developing more sophisticated methodologies and they will certainly be outweighed by the many benefits and win-win opportunities for the diverse group of stakeholders involved: government officials, project managers, non-profit organisations, community groups, project participants, international policymakers, international financial institutions, corporations, carbon funds, emissions brokers, foundations and NGOs, local commercial banks etc. (cf. Banuri & Spanger-Siegfried, 2002; Jackson et al., 2001).
Donor countries will receive carbon credits (CERs) to meet their Kyoto Protocol commitments at the lowest possible costs. Donor countries are not the only investors. In fact, most countries will try to delegate the responsibility to meet their emission targets to the private sector. Corporations in these countries will try to acquire CERs for reasons of cost-effectiveness. But they may also view a CDM project as a means to create markets for their products, or as a way to enhance their corporate image or to gain a 'climate-neutral' status. Other investors will also benefit. Institutional investors will be able to further portfolio diversification and to promote socially responsible business. A foundation or NGO may invest in a CDM project with the motive to 'retire' CERs and put them out of commercial circulation. In this case, the investor is not interested in market potential, but is motivated by the possibility to promote the environment and sustainable development.
Under the CDM host countries are beneficiaries as well. They receive new and additional investment to foster rapid and more sustainable development, in line with their own priorities. They will also be able to profit from the transfer of low- or no-GHG emitting technologies. CDM projects can have a positive effect on the local environment, by reducing air pollution and groundwater contamination, by protecting or restoring biodiversity etc. They can also have a positive effect on the local economy and employment, on poverty alleviation and capacity building (see Rosales & Pronove, 2003)

To demonstrate the potential of the CDM as a boundary object that allows for communication and cooperation across the lines that separate stakeholders and their diverse and often divergent social worlds, I will end this paper with a representative example: the NovaGerar Landfill Gas to Energy Project. This project was the first CDM project to be registered on 18 November 2004 – the day when the crucial ratification for the entry into force of the Kyoto Protocol had arrived. Its aim is to collect landfill gas (LFG) from two sites, Marambaia and

Andrianopolis, located 10 km from the center of the city of Nova Iguaçú in the State of Rio de Janeiro, Brazil. The LFG, which consists of methane mainly, will be used for generating 12 megawatts of electricity for the grid, while excess LFG will be flared. To capture and collect LFG landfill cells will be coated with an impermeable high-density polyethylene membrane. Leachate and surface run-off will be channelled and dealt with in a wastewater treatment plant. At each landfill site a modular electricity generation plant will be established, together with a generator compound (see DNV, 2003; EcoSecurities, 2004; Jong et al., 2004).



Landfill gas collection system

A broad variety of stakeholders will benefit from this LFG-to-energy project. The investor – the Netherlands – will be able to meet part of its Kyoto commitments in a cost-effective way. The combusting and flaring of LFG are expected to reduce emissions of 14 million tonnes of CO_{2e} over the next 21 years.[11] The Netherlands Government authorized the International Bank for Reconstruction and Development, the Trustee of the World Bank Netherlands Clean Development Facility, to purchase the certified emissions reduction units (CERs) on its behalf.

At least three corporations will profit from this project: EcoSecurities, a multinational environmental finance company, specialising in GHG mitigation, its joint venture partner S.A. Paulista, a Brazilian engineering and waste management company, and EnerG, a British specialist landfill gas-to-energy company that will provide technical advise.

The project will of course be advantageous to the host country as well. It is expected to conform to the Brazilian Government's expectations with respect to the CDM and sustainable development objectives.

Brazil has over 6,000 landfills, the vast majority of which are not controlled in any way. 75% of general waste generated in Brazil is simply thrown into garbage dumps that are totally uncontrolled and have no landfill gas (LFG) collection or drainage. The remaining 25% is disposed of at "controlled" landfills that cannot be called sanitary landfills.

The CDM project could help to change this situation. The proposed landfill gas collection system and electricity generation technology represent leading edge technology for landfill

[11] In addition, the generation and supply of electricity to the regional grid will lead to emission reductions attributable to the displacement of a certain amount of fossil fuels, but these will not be claimed by NovaGerar.

management. The project has potential as a clean technology demonstration project, encouraging less dependency on grid-supplied electricity and better management of landfills throughout Brazil, which could be replicated across the region. Moreover, it could attract additional foreign investment into the country, with a positive effect on the country's balance of payment, contributing towards a decrease in fuel imports.
For the local community the main social and environmental impacts of this project will be positive. Contaminated leachate and surface run-off from landfills and the uncontrolled release of landfill gas can affect the health of the local environment and the local population. By managing the Marambaia and Adrianopolis landfill sites properly the environmental health risks and the potential for explosions are greatly reduced. The project will have a small, but positive impact on employment in the local area as a number of staff will need to be recruited to operate and manage the landfill gas sites. Finally, as a condition of the licence to manage both landfill sites, NovaGerar will donate 10% of the electricity generated on-site to the local municipal authority of Nova Iguaçú, where the project is located, to provide lighting for local schools, hospitals and other public buildings.

Conclusion

As a result of the worldwide shifts in governance along horizontal and vertical axes, the total amount of public and private players in climate negotiations increased quite dramatically, together with the levels of decision-making. These developments have confronted politicians and policy-makers with severe problems of communication and cooperation. On the other hand, there is an obvious need for an integrated approach and a close cooperation among the various actors to deal successfully with the causes and consequences of climate change.
An important key to cope with this problem is justice. The willingness to make new commitments will increase if agreements are perceived as equitable and fair. At the same time, due to the proliferation of stakeholders with their different social worlds, consensus on one principle or set of principles of distributive justice in climate negotiations is very unlikely. Instead, we should abandon such a unitary approach to justice and look for a pragmatic mix of equity claims to satisfy the needs and requirements of the different parties and countries involved.
But we should not stop at such a pragmatic mix of rules and principles and broaden our moral horizon to encompass other forms and fashions to facilitate and foster communication and cooperation. I this paper, I focused on the flexibility mechanisms and on the Clean Development Mechanism in particular to explore their potential for integrative and collaborative problem solving in climate negotiations and policy. By enabling interaction and coordination between heterogeneous parties and countries, these mechanisms can help build and develop the trust that is vital to the acceptance of and compliance to new or further commitments. In this respect the Clean Development Mechanism, the only Kyoto mechanism that involves developing countries, appeared to be the most promising to help overcome the profound differences in the moral perception and framing of global warming, especially between the North and the South, that form the most persistent barrier to global cooperation. Because of this communicative potential the flexibility mechanisms deserve more attention from politicians and policy-makers as well as from environmentalists and ethicists. To realise and amplify this potential, they should make serious efforts to deal with the problems of uneven geographic distribution and the high transaction costs of CDM projects and promote the development of better methodologies to cope with the problems of the free rider credits and of leakage. Together with a sound pragmatic combination of equity claims, such an effort will be the best guarantee for a successful continuation of the Kyoto process.

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