The United Nations Framework Convention on Climate Change – an Unprecedented Multilevel Regulatory Challenge

*Michael Bothe**

As the regulatory regime established in 1992 by the UNFCCC develops, it triggers a certain fascination among international lawyers, environmental lawyers in particular, but also for economists. This fascination is reflected in an abundant and often puzzling debate. An (over?)ambitious, novel and highly complex system is evolving, albeit one with an uncertain future. It is the purpose of this paper, by way of analytical stocktaking, to highlight a few key issues of this regime as they present themselves now after the Johannesburg conference (WSSD). On this basis, some conclusions may be attempted concerning the current situation of international environmental policy and law.[1]

I. The Problem to Be Solved and the History of the Regime

The starting point and *raison d'être* of the international climate change regime is a natural phenomenon, namely the greenhouse effect. So-called greenhouse gases in the earth's atmosphere account for the effect that the heat originating from the sun is retained in the earth's atmosphere. It is an effect to which life on earth owes its existence. The regulatory problem addressed by the climate change regime is due to the forecast that a further accumulation of greenhouse gases in the atmosphere will enhance the greenhouse effect in a way which is prejudicial. Business as usual forecasts predict a rise in the average global temperature of two degrees by 2025 and four degrees by 2100. This, it is predicted, would cause a major upheaval in the bio-systems of the earth.

While the greenhouse gas effect as such is an uncontroversial fact of nature, the scope of overall global warming remains uncertain, the distribution of this effect over the earth is still more so, and still more so are the consequences of that effect. The melting of the polar icecaps and the ensuing rise in the sea level are only the most commonly cited effects of climate change. Disastrous metereological events are another perspective. When the first warnings from the scientific community were uttered in the 1970's, the scope of the problem was very controversial. Since

* Professor of Public Law and Director of the Center for Environmental Law, Johann Wolfgang Goethe University, Frankfurt/Main.

[1] This article presents some of the results of the research network "Enforcing Environmental Policy (EEP)" financed by the European Commission, for more information see the project website <www.eepnetwork.net>.

then, a tremendous amount of research has been done, providing a clearer picture, but uncertainties remain.

The political reaction to scientific warnings started in the 1980's. In 1985, the United Nations Environment Programme (UNEP) and the World Meteorological Organisation (WMO) organised a common conference in Villach. In 1988, the Toronto Conference on the Changing Atmosphere was organised by the Canadian Government. In that year, UNEP and WMO created the Intergovernmental Panel on Climate Change (IPCC) as a scientific yet official body. The General Assembly of the United Nations addressed the question in Resolutions 43/53, 44/207 and 45/212, the latter Resolution establishing an Intergovernmental Negotiating Committee (INC). In 1990, IPCC rendered its first assessment report. As a result of the efforts of the Negotiating Committee, the United Nations Framework Convention on Climate Change (UNFCCC) could be opened for signature at the Rio Conference in 1992.[2] The UNFCCC is able to accommodate conflicting interests in a specific way. It is a compromise solution in many respects.

The first aspect of this compromise is the time element: The convention adopts a stepwise approach.[3] It is a framework convention, which contains only general commitments, thus leaving obligations which really hurt to a later phase. As to the specific problem to be solved, the convention adopted what can be called the double track approach: Mitigation through stabilisation of emissions on the one hand (primary goal)[4] and adaptation to the change, on the other (secondary goal).[5] The means to achieve these ends are left rather imprecise. The essential compromise between developed and developing countries lies in a system of differentiated obligations of developed countries on the one hand, and developing countries on the other, a "North first" approach. On the level of principles, this is formulated in the principle of common but differentiated responsibilities.[6] The most important practical difference between developing and developed countries relates to their stabilisation duties. Also for developed countries, these stabilisation duties are rather soft, but for the developing countries, they are still softer. In this respect, the convention really adopts a wait-and-see-approach. What is important is the provision for review the adequacy of the commitments.[7]

It is probably this soft approach which accounts for the smooth ratification process which followed. Within less than two years after the adoption of its text, the

---

[2] ILM 13 (1992), 851. For an overview see David J.-E. Grimeaud, An Overview of the Policy and Legal Aspects of the International Climate Change Regime, Environmental Liability 2001, 39 et seq., 95 et seq.

[3] Ulrich Beyerlin, Umweltvölkerrecht, 2000, 40 et seq.

[4] Article 4 (2) (a) UNFCCC.

[5] Article 4 (4) UNFCCC. See Roda Verheyen, Adaptation to the Impacts of Anthropogenic Climate Change – The International Legal Framework, RECIEL 11 (2002), 129 et seq.

[6] Article 3 (1) UNFCCC. See Bettina Kellersmann, Die gemeinsame, aber differenzierte Verantwortlichkeit von Industriestaaten und Entwicklungsländern für den Schutz der globalen Umwelt, 2000, in particular pp. 135 et seq.

[7] Article 4 (2) (d) UNFCCC.

UNFCCC entered into force on 21 March 1994 after the deposit of the 15th ratification instrument.

The next phase in developing the regime is characterised by the attempt to achieve stricter stabilisation obligations. In 1995, the second IPCC-Assessment Report brought more certainty as to the man-made components of the greenhouse effect and furnished worse predictions for the business-as-usual approach. But it could not remove all uncertainties, in particular those relating to negative social and economic impact of climate change on specific areas, nor those relating to the actual cost of remedies.

The first Conference of the Parties took place in Berlin in March/April 1995. In conformity with Article 24 (d), it undertook a review of the existing obligations and held them to be inadequate. A new negotiating group was created with the mandate to elaborate an additional protocol containing concrete stabilisation obligations, the so-called Berlin Mandate. That mandate was fulfilled at the Kyoto Conference in 1997 (COP 3). The Kyoto Protocol, too, constitutes a compromise, but this time more between various groups of developed countries rather than between developing and developed countries. The developing countries defended their position as it emerged from the Rio Conference: No strict stabilisation obligations for developing countries, not even for threshold countries whose contribution to the greenhouse effect is not negligible. Only the developed countries commit themselves to quantified emission limitation or reduction (QELRC).

Kyoto was still characterised by a wait-and-see approach. The real meaning of Kyoto could only become clear when a number of relevant details were settled. As will be shown below, the regulatory approach chosen by the Kyoto Protocol, namely the establishment of a cap of the net aggregate greenhouse gas emissions of a country, in combination with various flexibilisation mechanisms relating thereto, requires additional and detailed rules on the calculation of assigned amounts, on the functioning of the flexibilisation mechanisms, on book-keeping, monitoring, verification and enforcement. Thus, there developed a widespread reluctance to ratify the Kyoto Protocol until these details became clear. COP 6 which took place at The Hague in 2000 brought a final show down on these matters. It was not possible to solve the outstanding issues during that conference.[8] COP 6 had to be adjourned and resumed in Bonn in 2001. It was at that conference where the difficulties were settled as a matter of principle while the finalisation took place at COP 7 in Marrakech in 2001 (so-called Marrakech Accords)[9]. The result is a huge volume of instruments most of which will have to be formally adopted by the first Conference of the Parties to the UNFCCC serving as a Meeting of the Parties to the Kyoto Protocol (COP/MOP).

---

[8] Michael Grubb/Farhana Yamin, Climatic Collaps at The Hague: what happened, why, and where do we go from here?, International Affairs 77 (2002), 261 et seq.; Barbara Buchner, What Really Happened in The Hague, Report on the CoP 7, Fondazione Eni Enrico Mattei (FEEM) Working Paper 38.01, 2001.

[9] Doc. FCCC/CP/2001/13/Add. 1

The Clinton administration had taken steps in the direction of a ratification of the Protocol by the United States, but was not successful against a hostile Senate. In 2000, the Bush administration announced its intention not to ratify. The other countries decided to go ahead nevertheless although the United States is by far the biggest emitter of greenhouse gases. But the U.S. decision fundamentally changed the negotiating environment.[10] The negotiations now practically took place between the rest of the industrialised countries. *Vis-à-vis* the EU which pushed for a strong Protocol, the relative bargaining power of some hesitant countries grew. The position of Russia became particularly strong as the entry into force of the Protocol now depends on the ratification by Russia. That decision is still open at the time of writing.

The Johannesburg summit of 2002 did not bring about a major political impetus towards the ratification and/or further development of the Kyoto Protocol. The formula used in relation to the Kyoto Protocol is somewhat dubious,[11] the provisions of the Plan of Implementation relate more to the UNFCCC alone then to the more specific mechanism of the Kyoto Protocol. The success of COP 8, which took place in New Delhi a few months after Johannesburg, was to avoid yet another North-South split.[12]

II. The Evolving Regime as a Multilevel Regulatory Task

The regulatory approach chosen by the UNFCCC and the Kyoto Protocol is characterised by a division of tasks between various levels. The regulation, in order to be meaningful, has to be global, as the problem is a global one.[13] All States contribute to the greenhouse effect. If only a part of them undertakes efforts to limit this effect, the others get a free ride. For the sake of limiting their reduction cost, participating states have an interest to exclude free riding. This can only be done by establishing and enforcing a regime comprising all relevant actors, hence a global regime, at least in principle.

On the other hand, the regulatory techniques adopted within this global climate change regime is characterised by the fact that it leaves much freedom to the member states as to how to fulfil their obligations. The UNFCCC adopts a loose ap-

---

[10] Barbara Buchner/Carlo Carraro/Igor Ceresimo, On the Consequences of the US Withdrawal from the Kyoto Protocol, FEEM Working Paper 102.01, 2001. On the various options existing after the U.S. withdrawal see Michael Grubb/Jean-Charles Hourcade/Sebastian Oberthür, Keeping Kyoto, Climate Strategies Report; Benito Müller/Axel Michaelowa/Christiaan Vrolijk, Rejecting Kyoto, Climate Strategies Report (undated).

[11] Para. 30 of the Plan of Implementation: "States that have ratified the Kyoto Protocol [not the Conference!] strongly urge States that have not already done so to ratify the Kyoto Protocol in a timely manner."

[12] Hermann E. Ott, Global Climate, Yearbook of International Enviromental Law 13 (2002), forthcoming.

[13] Roda Verheyen, Der Beitrag des Völkerrechts zum Klimaschutz – Globale Aufgabe, globale Antworten?, in: Hans-Joachim Koch/Johannes Casper (ed.), Klimaschutz im Recht, 1997, 29 et seq.

proach to regulation, prescribing only very vague and general goals. But also the Kyoto Protocol, by fixing QELRCs in the form of aggregate amounts of emissions, uses a regulatory technique which leaves the measures to be taken in relation to the various sources of emissions to be chosen by the member states.[14] There is a tremendous array of possibilities.[15] The measures are different for different greenhouse gases. In relation to CO_2, the most important greenhouse gas, the basic means of stabilisation is to reduce the combustion of fossil fuels, which, however, can be achieved in many different ways. Thus, the regulatory solution of the problem posed by the greenhouse effect rests on the combined effect of the determination of general standards at the global level and the regional, state or local action on specific emission sources. The question, thus, is not only what to do, but also who does what. Actions taken at the various levels of government have to be viewed together.

In this multilevel set-up, Europe constitutes an intermediate level. On the one hand, it implements the global regime, but it has a decentralised regime of its own which in many respects is comparable to the global one.[16]

The paper tries to present this multilevel regulatory picture of the regime in six aspects:

- interests at stake;
- policy – mechanisms and instruments;
- implementation;
- control;
- principles;
- perspectives.

III. The Interests at Stake

The interests which have determined the negotiations are well known. There are, first, the environmental interests pursued by the regime, i.e. the interest to limit the man-made increase of the greenhouse effect and to avoid its ensuing negative consequences. By whom and how strongly were those interests represented? Much of the pressure to take into account those environmental interests came from civil society. UNCED 1992 was the first big international conference which opened itself systematically to the input of organisations of civil society. As to governments, "green power" was stronger in Europe than elsewhere in the world. Thus, one can acknowledge green preferences of European politicians, expressed by the European Economic Community (as it then was) and its member states. Other developed countries (the United States, Japan, Canada, Australia and New Zealand) took a

[14] Michael Grubb, The Kyoto Protocol: A Guide Assessment, 1999.

[15] See various contributions in Koch/Casper, *supra* note 13.

[16] On EC policy approaches, see Kerstin Dittmann, Die Strategie der Europäischen Gemeinschaft, in: Koch/Casper, *supra* note 13, 63 et seq.

different view. They preferred to leave the solution of the problem to market forces. A strong emphasis on environmental interests was put forward by those states which are most probably affected by a sea-level rise, the so-called Alliance of Small Island States (AOSIS). The obvious environmental interests of these developing states limited the unity of the G-77 and China Group which otherwise is an important fact in international negotiations.

There were countervailing economic interests: The cost of investment needed in order to cope with the greenhouse effect, which means high costs threatening certain industries, in particular old, low efficiency industries in the industrialised countries. It appears that this cost has been of particular concern for the United States. The industrial development interests of developing countries, however, pointed into a similar direction. The fear of the developing countries was that these costs might force them to renounce to, or at least restrict, industrialisation, a fear which has characterised the stance of developing countries towards environmental policy from the early 70's.[17] The economic interests of fossil fuel producers (OPEC), at least as they currently perceive them, are also adverse to any attempt to limit fuel consumption through climate protection measures.

Combined with the countervailing economic interests, there is also a countervailing social interest: the interest in maintaining a lifestyle based on high-energy consumption. Finally, there is a countervailing political interest, often formulated as a sovereignty interest. It is the perceived threat to state freedom of action which might result from the climate change regime. In this perspective, this more general sovereignty aspect joins unilateralist tendencies in United States' foreign policy.

The UNFCCC and the Kyoto Protocol manages to accommodate these interests in a very peculiar way. Economic theory (game theory) and the "realistic" theory of international relations share scepticism as to the possibility to achieve international cooperation. The climate change regime is a good case in point. Negotiators who wanted to promote the system had to be very imaginative to design incentives to make states join.

The first question in this respect is the political and/or economic attractiveness of the environmental goal. The scientific forecast, developed in particular by the Assessment Reports of the IPCC, have a different impact in different political systems. But anyway, long term perspectives have a limited impact in any political system. Short term considerations tend to prevail. That being so, giving some kind of satisfaction to the countervailing economic interests becomes crucial. This characterises the controversial negotiations conducted before, at and after Kyoto, and the compromises resulting from them. It has meant imposing less cumbersome commitments on countries evoking economic development concerns, first of all the developing countries which have no quantified reduction commitments, but also certain developed countries whose stabilisation goals are fixed at 100% or more,

[17] See Michael Bothe, Le droit de l'environnement: sa voie de développement entre écologie et économie, in: Michael Bothe/Peter H. Sand (eds.), Environmental Policy. From Regulation to Economic Instruments, Hague Academy of International Law, 2003, 37 et seq., 48 et seq.

which are, thus, allowed to increase their emissions in order not to hinder their industrial development. It has also meant designing means of implementation which are thought to be especially cost effective thereby reducing the economic burden of fulfilling the commitments.[18] This is the essential rationale of the flexible mechanisms. It is the reason why the United States insisted on the inclusion of emissions trading as one of these mechanisms as the experience in the United States showed that this was a cost efficient and therefore politically acceptable means of reducing emissions from combustion of fossil fuels.

This effort of making the Kyoto Protocol acceptable by designing cost effective measures of implementation has failed in relation to the United States. The economic analysis to which the dominant political forces of the United States adhere has it that the cost involved in honouring the Kyoto commitments are excessively high. Whether the incentives will work to convince the Russian Federation to join remains to be seen at the time of writing.

After ratification and entry into force of the Kyoto Protocol, the problem of conflicting interests will persist. This is clearly indicated by the difficult negotiations conducted in relation to the concretisation of the regulatory system. The same is true for the implementation of the Kyoto regime at the lower levels of government. For any regulatory instrument designed to achieve, for each state party and also for the EC, the goals established by the Protocol, one must take into account a variety of costs and benefits which these measures entail for various actors. Any regulatory tool is bound to have a different effect for different industries and social groups. This characterises the debate which has taken place in the EC concerning such problems as energy tax and emissions trading.[19] In particular the latter, as it is a novel regulatory instrument, involves a considerable fight about a good start-up position in this new market.

IV. Policy – the Design of Regulatory Instruments

The UNFCCC, as it has evolved, provides a huge testing ground for the legal instruments of environmental policy, at the international as well as on lower levels. It has triggered enormous creativity in the design of regulatory approaches.

A well established approach at the international level is the progressive or stepwise approach.[20] It was used by the two regimes which can be considered as precursors of the climate change regime, namely the Geneva Convention on Long-Range Transboundary Air Pollution in Europe of 1979 and the Vienna Convention on Ozone Depleting Substances of 1985. In the climate change regime, the progres-

[18] Sebastian Oberthür/Hermann E. Ott, The Kyoto Protocol – International Climate Policy for the 21st Century, 1999.

[19] Andrea Lenschow, Environmental Policy Integration: Greening Sectoral Policies in Europe, 2002.

[20] See Beyerlin, *supra* note 3.

sive development is still taking place, the Kyoto Protocol is by no means the last step.

The point of departure was the UNFCCC of 1992. It was followed by the review of the effectiveness of the obligations made by the first COP in Berlin 1995, which led to the adoption of the Protocol in 1997, providing for a first commitment period 2008-2012.[21] But the Protocol did not address all necessary questions relating to the functioning of the system. Thus, there came a clarification process which mainly took place at the COPs in The Hague/Bonn (2000/2001) and Marrakech (2001). It concerned in particular the functioning of the major regulatory devices: The calculation of net emissions by offsetting emissions by sequestration of greenhouse gases in sinks and the so called flexible mechanisms. The next step should be the entry into force of the Protocol. This is to be followed by the negotiation concerning the next commitment period.

During this evolution, the design of regulatory instruments is continuously refined. There is a general problem involved in any environmental regulation: A legal regulation can never directly address the physical problem in question, it can only influence human behaviour having an effect on some point of a chain of causation which is relevant for the physical problem. As to regulatory instruments, the law can, as a first step, formulate an environmental goal and leave it to some future step to directly address the relevant human behaviour. As already pointed out, the specific regulatory approach of the Kyoto Protocol is putting a cap on the aggregate greenhouse gas emissions of each country. This approach has several advantages and problems. As to the environmental problem at stake, it has the advantage of bearing a relatively close or direct relationship to the actual problem, i.e. atmospheric temperature. The quantity of greenhouse gases present in the atmosphere is responsible for the greenhouse effect. Thus, the relationship of the legal rule to the environmental problem is, as a matter of principle, immediate and clear. But the amounts actually fixed have not only been determined on the basis of the calculated reduction required for the stabilisation of temperature at a specific level, but also, and perhaps even more so, with the problem of cost and economic feasibility in mind, that means that the goal has been set rather low. There are few environmental regulations where it is as clear as here that the regulation is inadequate, at least for the time being. This leaves a lot to be done in future commitment periods.

The next problem of the approach chosen is that it is still indirect in the sense that it does not directly address the sources of emissions. As already pointed out, the advantage of the approach is that it leaves the member states a great freedom as to how to achieve the assigned goal. It can be done by a variety of measures which are by necessity different from country to country, due to different geographical situations. Wind energy may be an appropriate alternative energy in one place, solar energy in another. Energy consumption by heating is a problem of countries closer to the poles of the Earth, air conditioning in others. By giving space for local

[21] Article 3 (1) KP.

variations, the QELRC approach is non-intrusive and respects state sovereignty. The essential drawback of the approach is that it produces very high transaction costs in the application of the rules, a problem to which we will revert below. Nevertheless, the EU has chosen the same approach to effectuate its own burden re-allocation scheme.

In the Kyoto Protocol, the QELRC is expressed in terms of a percentage of (in most cases) 1990 emissions. But in order to be applicable in the real world, these percentages have to be translated into actual quantities of gases, calculated as equivalents of an agreed type, as there are a number of gases which produce the greenhouse effect to a different degree. All this might seem complicated for a lawyer, but it is a solvable technical problem. The calculation allows to express a state obligation in terms of "assigned amounts" (Article 3 (1) KP).

What is not merely a technical problem is the question of sinks. The basic principle that, for the solution of the problem of undesirable warming, the net presence of greenhouse gases matters and that, therefore, sequestration can offset emissions, is plausible. But there are specific problems. Sequestration is, as a rule, not permanent, although it may take the sequestrated gases centuries to return to the atmosphere. In addition, the actual sequestration in plants cannot simply be measured, there are various and controversial methods to calculate sequestration.[22] Thus, political decisions have to be taken to make this offsetting practically possible.

As offsetting is a political decision, it entails political problems of its own, there are conflicting interests at stake. One of the basic issues is that of a cap on recognising sequestration in sinks, as exclusive reliance on sinks might put into jeopardy the very purpose of the regime which is the reduction of emissions, not simply a cap on the presence of greenhouse gases in the atmosphere. All these questions are dealt with by the documents forming part of the Marrakech Accords.[23] A cap is provided for, the actual amounts were a matter of difficult negotiations.[24]

The regulatory approach is further complicated by the introduction of flexible mechanisms. The amount assigned to a member state is not the last word. It can be changed if compensation is assured at another place. For it is the aggregate amount of greenhouse gases in the atmosphere which matters, it is, at least as a matter of principle, immaterial for the global greenhouse effect where the reduction or sequestration takes place. This offsetting serves purposes of equity and efficiency. It allows reductions and/or sequestration to be made wherever it can be done at the lowest cost. This is an advantage to which humankind cannot renounce, taking into account the considerable cost which is involved anyway.

There are four such offsetting or compensatory mechanisms in the Kyoto Protocol:[25]

– joint fulfilment of commitments, or the "bubble" (Article 4);

---

[22] Oberthür/Ott, *supra* note 18.

[23] Draft Decision recommended by CP.7 to CMP.1 on Land Use, Land Use Change and Forestry.

[24] Ian Fry, Twist and Turns in the Jungle: Exploring the Evolution of Land Use, Land Use Change and Forestry Decisions within the Kyoto Protocol, RECIEL 11 (2002), 159 et seq.

- joint implementation (Article 6);
- the clean development mechanism (Article 12);
- emissions trading (Article 16*bis*).

Article 4 allows members states to pool their assigned amounts and to redistribute their emission reduction and limitation commitments among them, provided that the sum of the assigned amounts remains the same, i.e. that a lower reduction (or even increase) of emissions is compensated by a higher reduction made by another state. This mechanism (the "bubble") is tailor-made for the EC, which is also demonstrated by the fact that the provision also anticipated the problems raised by the EU enlargement[26].

Joint implementation allows the transfer of emission reduction units resulting from specific projects from one developed country party to the other. Thus, a party can benefit from the fact that it can achieve an over-compliance, as this transfer is made in consideration of a financial compensation.

The clean development mechanism also provides for a transfer of emission reductions ("certified emission reductions"), but from a developing country (which has no QELRC of its own) to a developed country.[27]

Finally, emissions trading allows emission allowances to be traded among certain participants in an artificial market.[28]

Each of these mechanisms presents problems of its own. Both Joint Implementation and CDM require "additionality", i.e. a reduction or sequestration which goes beyond what would have happened anyway (the "baseline") which is of course difficult to determine. The most intricate problem of emissions trading is the initial allocation of allowances.

There are also common problems. The first one is that they involve relatively high transaction costs as they have to be administered, documented and especially monitored, which is a very complex task. As they involve a redistribution of burdens, they also involve specific conflicts of interests and equity concerns. Both joint implementation and the clean development mechanism allow parties to avoid emission reduction efforts "at home" by spending money, less money than would have been required for achieving the same reduction at the national level. One can view this as a desirable cost reduction device, but for others, this is objectionable. Hence the controversy about a cap on these mechanisms.[29]

Another problem is the fact, already mentioned, that the Kyoto Protocol only contains very general rules on these instruments, next to none on emissions trading.

---

[25] Michael Bothe, Tradable Emission Certificates as a Mechanism for National Compliance under the UNFCCC, in: Tao Zhenghua/Rüdiger Wolfrum (eds.), Implementing International Environmental Law in Germany and China, 2001, 121 et seq., 128 et seq.

[26] Article 4 (4) KP.

[27] Hugh Wilkins, What's New in the CDM?, RECIEL 11 (2002), 144 et seq.

[28] Rüdiger Wolfrum, Völkerrechtliche Beurteilung des Handels mit Emissionsrechten, in: Hans-Werner Rengeling (ed.), Klimaschutz durch Emissionshandel, 2002, 189 et seq.

[29] See European Commission Briefing Paper, The EU's Positions for CoP 6, <http://europa.eu.wt/comm/environment/climate/eupositions.pdf>.

Thus, more detailed rules had to be elaborated. They are now part of the Marrakech Accords in the form of recommendations made by COP 7 to COP/MOP 1.

The EU bubble presents both internal and external problems. The burden sharing agreement between the member states reflects the same ideas of just re-allocation of burdens as does the distribution scheme of the Kyoto Protocol, but it makes the EU also a replica of the pros and cons of this approach.

V. Implementation

It has already been pointed out that the major problem and advantage of the aggregate QELRC as regulatory instrument is that it can be achieved through a great variety of measures used for its implementation. Any means which has an impact on a chain of causation leading to reduction of emissions which would otherwise occur, or to the sequestration of greenhouse gases, is an appropriate means to achieve the target. Reduction of CO_2 emissions can be achieved through the diminution of the combustion of fossil fuels, which in turn is to be effectuated in many different ways: energy saving through construction devices of houses, more efficient heating, more energy efficient industrial equipment, more energy efficient cars, speed limits for cars. The regulatory tools to reach this physical results vary, too: command and control strategies, economic instruments (such as subsidies, taxes and emissions trading), voluntary agreements and persuasion or public awareness.

The solution is, of course, a policy mix which needs policy coordination at various levels. These are the major challenges which the member states are facing in the implementation of the Kyoto Protocol. A special issue is control to which we will revert below.

The EC has opted for emissions trading as a major tool of implementation. The draft directive is due to be adopted during the year 2003. It thus faces at its level the same problems as the international emissions trading scheme as adopted in Marrakech, with the additional complication that the relation between EC emissions trading and the global trading system has to be regulated. Furthermore, the problem of initial allocation of emission allowances is most crucial from the political and economic point of view. Grandfathering enjoys a relatively high degree of acceptance, but it is difficult from the point of view of equity and efficiency, as it favours those enterprises which have not yet made an appropriate stabilisation effort and it poses an obstacle for new market entrants.[30] As some freedom is given to member states to determine the allocation on the national level, this creates a certain risk for a distortion of competition. Furthermore, documentation of the

[30] Jürgen Lefevere, Greenhouse Gas Emission Allowance Trading in the EU: A Background, FIELD, 2002; Peter Zapfel/Matti Vainio, Pathway to EU GHG ET, History and Misconceptions, FEEM Working Paper 85.02, 2002.

transactions, i.e. the creation of registries, including the possibility of electronic trading, is a major issue.

It is at the level of implementation that the question of the relationship between the UNFCCC regime and other regimes arise. Some of the measures taken to implement the Kyoto Protocol may be subject to a regulation in other international regimes. An important case in point is the development of sinks which may be in conflict with the Biodiversity Convention. Reforestation and afforestation may be measures which do not conform to an obligation existing under the Biodiversity Convention to maintain certain habitats in their original shape.[31] Ocean sequestration, for the time being not in the centre of the debate, probably because of the high cost involved, will also present problems concerning the preservation of the marine environment.

A related problem is synergies with other regulatory goals. A reduction of SO_2 emissions can be achieved by reducing the sulphur content of fuels, which is irrelevant for the purpose of stabilising the greenhouse effect, or by increasing the energy efficiency of fuel combustion processes, which leads both to a reduction of SO_2 and of CO_2 emissions.

Possible conflicts, however, lie in the shape of emissions trading systems, in particular in the problem of hotspots. Trading may lead to a concentration of emissions at a particular place. As far as air contaminants, such as SO_2, are concerned, this has to be avoided as such concentrations may constitute an environmental or health hazard. As far as CO_2 emissions are concerned, hotspots are irrelevant, as CO_2 does not involve such risks.

VI. Control

The issue of compliance[32] has been the major issue in the post-Kyoto negotiating process. It is also a fundamental issue in the EU climate policy. It has two levels: monitoring and enforcement.

As in many international regimes, monitoring is based on reporting by the member states. This raises the question of the content and of the reliability of reports.

The reports must contain all relevant information, i.e. all those measures taken and events which have an impact on actual emissions and which allow a judgment on whether a state has exceeded or not reached its assigned amount of emissions. This, to say the least, is a very complex and cumbersome task. Reports must provide information which facilitates an assessment over time. They must, thus, pre-

[31] Frédéric Jacquemont/Alejandro Caparrós, The Convention on Biological Diversity and the Climate Change Convention Ten Years After Rio; Towards a Synergy of the Two Regimes?, RECIEL 11 (2002), 169 et seq.

[32] This is analysed in more detail in the contribution by Jutta Brunnée, The Kyoto Protocol: Testing Ground for Compliance Theories?, in this issue.

sent the situation as it was, as it is and as it will be. This task is further complicated through the existence of flexible mechanisms.

It is this reporting and monitoring requirement which accounts for the high transaction cost of the regulatory approach chosen.[33] These costs provide an incentive for non-participation and non-co-operation, and thus raise the question of incentives for compliance. For developing countries, this problem is solved through financial transfers from the developed countries.[34] For the developed countries, one of the incentives is that fulfilment of these reporting duties constitute an eligibility criterion for the participation in flexible instruments.[35]

As to enforcement, a lot can be said for carrots instead of sticks. The stick provided for in the Marrakech Accord is not really big. Emission existing in excess of the assigned amounts are debited to the next commitment period. No fines or the like are provided.[36]

The problem of enforcement also arises at the lower levels, at the level of implementation in the EU and within the member states. In contradistinction to the global level, these levels of government possess formal enforcement powers. This also applies to the EC. Efficient enforcement nevertheless presents a problem, in particular for the EC. If a member state does not achieve its reduction or limitation goal under the EC burden sharing agreement, this is a formal violation of a legal obligation only when the first commitment period begins, i.e. in 2008. Then, it will be too late for an effective remedial action. Thus, enforcement mechanisms have to be designed which address the question of non-compliance at an earlier stage.

VII. Principles

Equity is a key principle of the climate change regime.[37] It determines to a large extent the political acceptability of the system. Thus, the principle is not just a theoretical question. It is of great practical relevance.

Equity is difficult to define. It cannot be denied that it is a legal principle in international law. It has been recognised as such by the International Court of Justice.[38] But it is difficult to rationalise without the assistance of judge-made law.

---

33 Philippe Sands, Reporting Requirements and International Environmental Agreements, in: Michael Bothe (ed.), Towards a Better Implementation of International Humanitarian Law, 2001, 29 et seq.; Michael Bothe, The Evaluation of Enforcement Mechanisms in International Environmental Law, in: Rüdiger Wolfrum (ed.), Enforcing Environmental Standards: Economic Mechanisms as a Viable Means, 1996, 13 et seq., 22 et seq.

34 Articles 19 and 20 KP.

35 Marrakech Accords, *supra* note 9, Decision 15/CP.7.

36 Marrakech Accords, *supra* note 9, Decision 24/CP.7, Annex: Procedures and Mechanisms Relating to Compliance under the Kyoto Protocol.

37 Erika Melkes, Sovereignty and Equity within the Framework of the Climate Regime, RECIEL 11 (2002), 115 et seq.

38 *North Sea Continental Shelf* case, ICJ Reports 1969, 46 et seq., *Fisheries* case *(Great Britain v. Iceland)*, ICJ Reports 1974, 30 et seq.

Economic theory provides us with different equity criteria, but it then leaves the decision maker with the problem of choice.

Equity is reflected in various ways in the climate change regime. Equal burden, or more precisely: formally equal burden, for all countries is considered unfair, or inequitable. But it is also inefficient from an economic point of view. Hence the differentiation of obligations which have been described.

In the relationship between developed and developing countries, equity is concretised in the principle of "common but differentiated responsibilities", which results in the "North first" approach which has been described. It is the North which has the concrete quantified reduction duties. This is a special form of intergenerational equity: The generation living in the industrialised countries of today assumes a responsibility for the emissions produced by the generations of yesterday. Let it be noted that this "North first" approach is not uncontroversial.[39]

In the relationship between developed countries, the principle of equity is reflected in the various burden allocation systems. Countries which are still relatively less developed or industrialised do not have to shoulder the same burden as the old industrialised countries of Western Europe, Japan and the USA. Although it was tried to rationalise this differentiation by some kind of factor or formula, the actual figures are rather the result of horse-trading.

Another obvious problem of the distribution of burdens is not really addressed, it is the burden of the most vulnerable states. It would be a matter of equitable allocation of burdens that the mitigation cost to be born by these countries are in one way or the other redistributed and born by the major producers of CO_2 emissions. The transfer provisions of UNFCCC provide only a minor basis for this type of redistribution.

A number of other principles enshrined in the UNFCCC are related to equity. The precautionary principle reflects intergenerational equity.[40] The polluter-pays-principle also is based on the idea of an equitable distribution of burdens between polluter and victim.

These equity considerations meet to a certain extent with considerations of efficiency. It is one of the fundamental teachings of environmental economics that formally equal distribution of abatement obligations is inefficient, due to the differentiation of abatement costs. Equity and efficiency are not foes, they are friends, but difficult ones. All turns around the appropriate differentiation criteria.

Despite all the problems which have been mentioned, UNFCCC and the Kyoto Protocol constitute a major step in the concretisation of the principle of equity in international relations.

At the level of the EU, the same equity problems exist, as the EU has also chosen a burden sharing formula which is based on a differentiation which reflects the different levels of economic wealth among the member states.

---

[39] See Paul G. Harris, Common but Differentiated Responsibility: the Kyoto Protocol and United States Policy, New York University Environmental Law Journal 7 (1999), 27 et seq.

[40] Astrid Epiney/Martin Scheyli, Strukturprinzipien des Umweltvölkerrechts, 1998, 91.

VIII. Perspectives

The perspectives of the climate change regime are full of question marks.[41]

The first one, as already noted, relates to the immediate future. Whether the Kyoto Protocol will enter into force depends on the ratification by the Russian Federation, which at the time of writing appears uncertain. If the ratification remains an open question, the whole regime is heading for trouble, as the first commitment period is approaching, and the whole institutional set-up must be in place at that time, i.e. 2008. If Russia decides not to ratify, the regime is, certainly as a matter of law, perhaps also as a matter of political will, back to the Berlin mandate under the UNFCCC. Something new has to be invented.

But the non-ratification by Russia is not the only scenario which requires innovation in regime design. If the Kyoto Protocol enters into force, the start of negotiations for the next commitment period is due as early as 2005 (Article 4 para. 9 KP). According to the text of the Protocol as it stands, the new commitments simply take the form of an amendment to Annex B, which means that the whole regulatory approach would remain unchanged. But this is far from being realistic. If a real progress in the solution of the problem is intended, an effort must be made to bring the United States back aboard. This, however, is not possible without a serious reconsideration of the design of the Kyoto mechanism.

There are, thus, good reasons to reflect on a revised regime design, on alternative approaches to the regulatory tools currently used.

First, the QELRC approach entails high transaction costs. It is worthwhile noting that the first Protocol additional to the LRTAP Convention which contained reduction obligations concerning a specific pollutant (SO_2) started out with a similar approach,[42] but subsequently, very different regulatory instruments have been chosen. Thus, a new instrument mix for climate change might be appropriate. On the other hand, all the effort which has gone into the design of the highly complex regulatory regime implementing the aggregate QELRC approach will not be in vain, even if the Kyoto Protocol does not enter into force. These negotiations have produced mechanisms which in one way or the other will prove useful for this and other environmental regimes. There has been a collective learning process in international institutionalisation.

Economic considerations are bound to govern any future negotiations. The major basic objection of the current United States administration against the Kyoto Protocol is based on economics, at least this is what it proclaims to be. This economic criticism has to be addressed,[43] even if one sees the true reason of the Amer-

---

[41] OECD/IEA, Beyond Kyoto: Energy Dynamics and Climate Stabilisation, 2002, in particular pp. 79 et seq.

[42] See the 1985 Helsinki Protocol to the Convention, On the Reduction of Sulphur Emissions and their Transboundary Fluxes, ILM 27 (1988), 707.

[43] See Detlef van Vuuren/Michel den Elzen/Marcel Berk/Andre de Moor, An Evaluation of the Level of Ambition and of the Bush Climate Change Initiative, Climate Policy 96 (2002), 1 et seq.; Christoph Böhringer/Andrea Löschel, Climate Policy Beyond Kyoto: Quo Vadis? A Com-

ican stance in more fundamental policy considerations concerning world order. A transatlantic dialogue on the economic analysis of global warming is necessary.

One possible alternative to the Kyoto approach is a technology based one. This would mean a policy which treated growth and the fight against climate change not as conflicting, but as parallel and mutually reinforcing trends. Technological innovation is indeed required for solving the greenhouse effect problem, and it also stirs growth. The problem involved in this approach is that the increase in emissions induced by growth might outweigh the reduction of emissions obtained through technological innovation.

The current stance of the Bush administration tries to avoid this consequence by announcing a policy which links growth and the limitation of greenhouse gas emissions in a particular way. Each percentage point of growth would entail additional greenhouse gas reduction. There are two problems involved in this approach. The actual regulatory tools to achieve this goal with some degree of certainty remain to be developed. Furthermore, the question what happens to the climate in case of negative growth has to be answered. Thus, the interaction between climate change policies and growth is far from being solved and remains crucial, both as a matter of economic theory and political practice.

The second major critique voiced by the United States, in particular but not only by the current administration, is the absence of reduction and limitation obligations of major polluters from the Third World, especially India, Brazil and China. Indeed, the contribution of China and some major developing countries to the greenhouse effect is not negligible. From the point of view of efficiency and intragenerational equity, this critique is not entirely unjustified. It is of course at odds with the "North first" approach which characterises the Rio and Kyoto compromise. Reversing this compromise would only be possible if serious incentives were provided to the developing countries concerned. A dialogue concerning the economics of global warming in relation to these countries will also be necessary.

Whatever new approach is chosen, it will affect implementation requirements at the lower levels (EU, state, sub-state). The climate change regime remains a multilevel regulatory challenge.

---

putable General Equilibrium Analysis Based on Experts Judgments, EEP/FEEM Workshop Paper, 2003.