The emerging climate change regime: The UNFCCC, the Kyoto Protocol forever, Kyoto modified … or yet something else?

Final Report of a Study
Prepared for Environmental Studies Group
Economic and Social Research Institute, Cabinet Office
Government of Japan

Christian Egenhofer & Noriko Fujiwara
Centre for European Policy Studies (CEPS)
Brussels

International Forum for Environmental Issues, Tokyo
27 February - 1 March 2003
The emerging climate change regime:
The UNFCCC, the Kyoto Protocol forever, Kyoto modified …
or yet something else?

Content

1. INTRODUCTION ............................................................................................................................... 4

2. THE REGIONALISATION OF THE INTERNATIONAL CLIMATE REGIME? ..................... 7

3. THE EUROPEAN UNION ................................................................................................................. 9

3.1. INTRODUCTION .......................................................................................................................... 9
3.2. A SHORT HISTORY OF EU CLIMATE POLICY SINCE THE KYOTO PROTOCOL ..................... 9
3.3. EU ENLARGEMENT .................................................................................................................... 11
3.4. THE EUROPEAN ECONOMIC AREA (EEA) AND SWITZERLAND .......................................... 12
3.5. THE EU POLICY PACKAGE BASED ON THE EUROPEAN CLIMATE CHANGE PROGRAMME AND THE CREATION OF "EUROPEAN CLIMATE CHANGE AREA" (ECCA) ............................................... 14

4. THE EU-RUSSIA INTERFACE: ENLARGING THE "EUROPEAN CLIMATE CHANGE AREA" TO EURASIA? .................................................................................................................................................. 18

4.1. THE RELEVANCE OF A "EURASIAN CLIMATE CHANGE AREA" ............................................... 18
4.2. CLIMATE CHANGE IS A SUB-SET OF THE BROADER EU-RUSSIAN RELATIONS ....................... 18
4.3. RUSSIAN CLIMATE CHANGE AND ENERGY POLICY .............................................................. 19

5. THE ASIAN DIMENSION: CAN JAPAN & ASIA GAIN FROM A "SUB-GLOBAL" ARRANGEMENT? .................................................................................................................................................. 24

5.1. JAPAN .............................................................................................................................................. 24
5.2. PROSPECTS FOR REGIONAL CO-OPERATION IN NORTHEAST ASIA ................................. 27
5.3. A POSSIBLE FRAMEWORK FOR REGIONAL CO-OPERATION IN NORTHEAST ASIA? .......... 28

6. HOW DEVELOPING COUNTRIES CAN FIT INTO SUB-GLOBAL ARRANGEMENTS? .... 30

6.1. INTRODUCTION .......................................................................................................................... 30
6.2. THE IMPLICATIONS OF THE KYOTO PROTOCOL AND MARRAKECH ACCORDS FOR DEVELOPING COUNTRIES ......................................................................................................................... 31
6.3. DEVELOPING COUNTRIES’ RELUCTANCE IN EARLY PARTICIPATION .................................. 35
6.4. OPTIONS FOR DIFFERENTIATION OF COMMITMENTS ............................................................ 36
6.4.1. 'Kyoto-plus' ............................................................................................................................. 37
6.4.2. EQUAL PER CAPITA EMISSION ENTITLEMENTS ..................................................................... 38
6.4.3. PER CAPITA INCOME ................................................................................................................ 41
6.4.4. GHG/carbon intensity indicator .............................................................................................. 41
6.4.5. Sustainable Development-based approach ............................................................................. 43
6.4.6. Historical responsibility ............................................................................................................. 44
6.4.7. Multi-stage or grouping approaches ...................................................................................... 46
6.4.8. Multi-sector approaches .......................................................................................................... 47
6.4.9. Economic incentives ................................................................................................................. 49
6.5. EXPERIENCES OF DEVELOPING COUNTRIES .......................................................................... 51
6.6. CONCLUSION ............................................................................................................................... 52

7. THE US, NAFTA AND THE AMERICAS: OPPORTUNITY OR THREAT FOR GLOBAL CLIMATE CHANGE POLICY? ................................. 54
7.1. NORTH AMERICA AND THE KYOTO PROTOCOL ......................................................... 54
7.2. CLIMATE POLITICS IN THE US ............................................................................. 54
7.3. CANADA ................................................................................................................ 59
7.4. THE IMPACT OF NAFTA ..................................................................................... 60
7.5. CONCLUSIONS: LOOKING AHEAD IN NORTH AMERICA .................................. 61
     The US interface with Kyoto-land ........................................................................... 62
     The potential impact of a "sub-global" North American arrangement .................... 63

8. CONCLUSIONS .......................................................................................................... 65
8.1. EVIDENCE FOR "SUB-GLOBAL ARRANGEMENTS" AND THEIR IMPLICATIONS FOR THE GLOBAL CLIMATE REGIME ................................................................. 66
8.2. WHICH POLICIES CREATE INCENTIVES TO MOVE TO INTERNATIONALLY CO-ORDINATED CLIMATE POLICIES? ........................................................................ 71
8.3. EVIDENCE FOR BOTTOM-UP APPROACHES ...................................................... 75

REFERENCES
1. Introduction

For a time, it appeared that the 1997 Kyoto Protocol had been the decisive step in the formation of an international agreement on climate change. The successful agreement of Marrakech in November 2001 at the 7th Conference of the Parties (CoP7) has translated the political agreement struck in Bonn into legal text. It settled remaining controversial issues, such as compliance, the rules of the flexible mechanism and the use of sinks to meet the targets, and so made the Kyoto Protocol ratifiable.

To enter into force, the Kyoto Protocol must be ratified by at least 55 countries, including countries representing at least 55% of 1990 greenhouse gas emissions in industrialised countries. The first condition has already been met, but the second one has been made far more difficult due to the withdrawal of the United States, which alone accounted for 36.1% of 1990 industrialised country emissions. The ratification by the 15 EU member states and that of the Central and Eastern European states – all of which are expected to ratify – will account for only for 24.2% of 1990 emissions. Following the ratification by Japan (representing 8.5% of 1990 industrialised country emissions) in June 2002, it is Russia, with 17.4% of the relevant emissions, that holds the de facto casting vote on whether the Protocol will ever come into force.

Should the Kyoto Protocol not enter into force, there is still possibility that the Kyoto Protocol commitments will - partially or fully - be implemented unilaterally. The EU has declared to do so. Other parties might follow. But even if the Kyoto Protocol does enter into force, the international climate regime is likely to be disconnected, characterised by the co-existence of different approaches rather than a co-ordinated global effort to tackle climate change. The original UNFCCC always foresaw action according to “common but differentiated responsibilities”, but the Kyoto Protocol assumed at least that the industrialised countries would share roughly comparable goals, including a legally binding target with developing countries following suit in due course. The US withdrawal from the entire Kyoto process means that the climate change landscape is further disintegrated into different groupings. They include industrialised countries that have ratified the Protocol ("Kyoto-land"), the US, Australia that have not and developing countries, which again consist of various sub-groups. With US disengagement, the prospects for developing countries accepting legally binding targets within the near future has become more remote than ever, if one uses the recent CoP8 at Delhi as a pointer (cf. PEW Center 2002a).

The difficult state of play should not come as a surprise, however. International environmental agreements can - in the absence of a fully-functioning international governance structure - only be achieved on a voluntary basis. Because climate change protection is a global public good - no country can be prevented from enjoying climate protection irrespective of participation - such agreements provide very high incentives to free-ride (cf. Bac 1996, Carraro and Siniscalco 1998). The exception are those cases where the stakes for countries are small or if no other option exist, i.e. in the case of certainty on the outcome if no policy measures are undertaken (cf. Kolstad and Toman 2001). Neither case applies. Hence, climate change faces as other international environmental agreements the challenges related to the need for global participation, the long-term nature, strong policy interactions and free-riding (cf Carraro and Galeotti 2003). If anything, climate change is even more complex given its high degree of uncertainty, and the lack of technological solutions.\(^1\)

\(^1\) Climate change policy is characterised by uncertainty about the causes effects of damages in general, their geographical distribution and their timeline (cf. Watson 2001). For example, Hansen (2001), one of the early advocates of the dangers of climate change has recently claimed that methane rather than CO\(_2\) is the
Recent economic literature on international climate change agreements has concentrated on incentives for participating countries to sign for such agreements. This can be either done by sticks (i.e. disincentives for non-participation) such as trade sanctions (cf. Chen 1997, Brewer 2003c) or carrots (i.e. incentives) such as different target allocation mechanism (for a full discussion, see chapter 6), transfers, emissions trading to lessen the costs for emissions reductions, issue linkage and better access to research and technological development (cf. Carraro and Galeotti 2003).

There is evidence that a series of "regional deals" is more likely to achieve a stable and profitable international agreement in the medium term than attempting a global agreement from the outset. (For an overview and conclusions see Carraro and Galeotti 2003). And indeed, there is evidence for this in progressive climate change negotiations on the UNFCCC, the Kyoto Protocol and finally the Bonn/Marrakech Accords. While legally speaking, the framework is the (global) UN system, in reality it is the delicate balance between regional interests that have dictated the discussions. This is even more so after the defection of the US. In fact the negotiations since the Kyoto Protocol have been characterised by regional struggles between the EU, the US, Japan, Russia and other so-called Umbrellas countries (cf. Den Elzen and de Moor 2001; Egenhofer and Cornelis 2001; Grubb and Yamin 2001; Ott 2001). This does not only raise the question on the appropriate framework for climate negotiations (cf. Victor 2001; Bodansky 2002a) but also whether our analytical frameworks still provide guidance as to the real questions and possible solutions. This seems to be confirmed by an overview on the conditions for effectiveness of international agreements. There is evidence to suggest that most agreements had modest, or even ineffectual beginnings and often had to rely on capacity building in the first stages and ultimately depended on entrepreneurial politicians, a number of key actors (Miles et al 2001). Does the fixation on the UN system still reflect the reality or have we de facto moved to a system of where groupings of key countries, form an informal "directorate" including the EU, US, Japan, Russia plus key developing countries such as China, India, Brazil, OPEC and others? Possibly, an approach based on a "directorate" or "like-minded countries" may be more effective as for example Bodansky (2002a) claims. The literature has shown that reducing the numbers of actors to a few increases the likelihood of an agreement significantly.

The objective of the study

The objective of this study is first to test the thesis - by analysing emerging empirical evidence - that a series of regional agreements is more likely to achieve a stable and profitable international agreement in the medium term than attempting a global agreement from the outset (Carraro and Galeotti 2003). Then we will ask how these agreements could be achieved. The approach we take is to identify the potentially “winning policies” (i.e. policies and their institutional underpinning) that could lead to informal regional deals or as we call them "sub-global arrangements". We have chosen the term to distinguish between the legal term regional agreement. Strictly speaking there is neither evidence nor legal room for regional agreements, at least inside "Kyoto-land".

main cause of climate change. O'Neill and Oppenheimer (2002) present evidence that delays in achieving GHG reductions might lead to irreversible effects, e.g. a delay of reductions until 2020 might foreclose the options to stabilise concentrations at 450ppm.

2 This is especially true for the energy sector, the sector with the biggest potential impact on GHG emissions. Within this collaboration projects, IIASA has shown that in a perspective until 2050, broadly two different sustainable energy scenarios might emerge: renewables/hydrogen/fuel cell or a clean coal and carbon sequestration scenario (cf. Schrattenholzer et al 2002). Thus, one the key factors leading to a successful completion of the Montreal Protocol to combat ozone depletion, the available ready technology is not given in climate change.
However, informally within the Kyoto Protocol there have always been groupings of countries and regions, EU, Umbrella countries, EITs, Central and Eastern Europe, OPEC etc. It appears from recent CoPs that within smaller settings, e.g. at a "sub-global" setting such as EU-Russia, EU-Russia-Japan or even Japan/China/other Asia an equilibrium is easier to find. After all what matters for the EU and Japan is that the US is part of the regime to reduce potentially negative effects on competitiveness. Similarly, for Japan it matters far more that China is part of a regime than Brazil.

Our starting point is the analysis of Carraro/Galeotti (2003) who identified the following five policy strategies as crucial for achieving a global agreement.

(1) Policies to reduce uncertainty regarding costs and benefits including damages caused by the absence of climate policies.
(2) Redistribute benefits of climate policies (through negotiations or transfers)
(3) Policies to address free-riders (e.g. equity assisted by transfers and issue linkage)
(4) Allow for regional and cost-effective domestic measures
(5) Policies to support the development of climate-friendly technologies

We will test the policy recommendations against existing evidence from climate politics and ask whether these strategies could lead to sub-global arrangements, which as we argue increasingly start shaping the international regime. It is clear that such an area cannot be developed purely bottom-up but needs to be "tuned" in with existing global governance forces, including the Kyoto Protocol should it enter into force but especially "WTO" and "business conduct" (i.e. trade and investment by international business). That is why we incorporate into the analysis international trade and business issues. Hence, the CEPS studies will add in a second step the traditional layer of analysis, concentrating on intergovernmental bargaining and cost and benefits of international agreements two new sets of issues: trade policy and ‘bottom-up’ pressures exerted through internationally operating corporations3.

The study is structured in the following way.

After a short review of the state of the international regime formation in chapter 2, chapter 3 will review EU and European developments. This chapter will on the one hand examine the conditions and "winning policies" that have made a climate deal stick in the EU and Europe, in fact leading to a "European climate change area". In chapter 4, we will examine the potential for expanding the "European climate change area" into a "Eurasian climate change area" including in addition to Europe Russia and other parts of the former Soviet Union. In chapter 5 the study will analyse the potential of linking Japan and other Asian economies to the "Eurasian climate change area". Chapter 6 moves on to developing countries by reviewing potential approaches to incorporate developing counties into a global regime. Particular emphasis will be placed on attempts by developing countries to link any kind of international agreement to sustainable development, including inter alia an emphasis on poverty reduction. Finally, chapter 7 analyses the current US situation and assesses in the light of empirical evidence the future of US climate change policy and the interaction with other emerging climate change policies world-wide. The concluding chapter 8 presents the main conclusions and sketches further research steps.

---

3 See the complementary CEPS studies within these projects by Brewer (2003b; c).
2. The regionalisation of the international climate regime?

The ultimate objective of the UN Framework Convention on Climate Change (UNFCCC), which was ratified by more than 170 parties and entered into force in 1994 is to stabilise greenhouse gas (GHG) concentrations in the atmosphere ‘at a level that would prevent dangerous anthropogenic interference with the climate system’. With the aim of returning individually or jointly to their 1990 levels by the year 2000 GHGs emissions all the parties committed themselves to adopting national policies and measures on the mitigation of climate change by limiting their emissions and protecting and enhancing its sinks and reservoirs. The UNFCCC however amounted to not much more than a process to work towards the stated objective.

It was the Kyoto Protocol that made a step towards international regime formation. The Kyoto Protocol attempts in a comprehensive way to address the problem of climate change by including six gases and “carbon sinks” such as forests and farm land, which are capable of absorbing GHG. To smooth out the economic cycles, it has introduced the possibility for countries to average their reductions over a period of five years. Central were common but differentiated targets, which over time would gradually be extended to all countries. Starting with industrialised countries, historically responsible for the majority of emissions and therefore concentrations, in a following commitment period developing countries would enter the regime under terms still to be discussed. Detailed implementation issues and the progressive development of the regime were delegated to annual Conferences of the Parties (CoPs).

The text of the Kyoto Protocol was adopted in December 1997, yet the Protocol has not been ratified by sufficient numbers of parties to enter into force. Russia holds the casting vote. After the US has withdrawn from the Kyoto Protocol, followed by Australia, there are doubts about the future of an integrated international climate change regime. The US announced a comprehensive alternative but has failed to date to so although there are increasingly signs that in the US a domestic but internationally-oriented climate policy is emerging (see the analysis, see chapter 7 on the US).

It is the Marrakech Accords that have created the current international climate change regime. Following the US withdrawal, the remaining industrialised countries from "Kyoto-land" embarked on the interpretation of the Kyoto Protocol into a legal text leading to the Bonn Agreement (CoP6bis) and the Marrakech Accords (CoP7), agreed in 2001. However, the current interpretation of the Kyoto Protocol is a departure from the original agreement in Kyoto (CoP3) in 1997. The important differences between the two versions are the US withdrawal, which has fundamentally altered the relationship between demand and supply of emissions rights (see Buchner et al 2002 for an overview and analysis). The broader interpretation of sinks (Vrolijk 2002; Den Elzen and de Moor 2002; Babiker et al 2002) has further reduced the environmental effectiveness although to a lesser extent. Another important change was the increasingly explicit regionalisation of the negotiations (cf Bodansky 2002a; Legge and Egenhofer 2002a; Egenhofer et al 2002). This has most visibly resulted in EU high level bilateral diplomacy targeting at Russia, Japan and Canada in the aftermath of the US withdrawal. The new interpretation from the Bonn and Marrakech deals is a product of compromise between the EU and the rump the Umbrella Group including Russia and Japan. In June 2001 a month prior to CoP6bis the EU member states made a collective political commitment to implement the Kyoto Protocol, unilaterally if necessary, despite the US decision. Following the US withdrawal the EU has led the negotiations, inducing indecisive Parties to ratify the Kyoto Protocol on the one hand, and allowing non-participants including the US, for possible returns to the Kyoto Protocol in the future on the other. Consequently the EU has been under constant pressures from other countries
to yield concessions, which were closer to the previous demands that the US put forward in The Hague (CoP6) in 2000 and before. For instance, in Marrakech Japan and Russia sought to weaken the compliance regime and the eligibility criteria for the use of the Kyoto Protocol mechanisms with special reference to sinks (Vrolijk 2002).

The Kyoto Protocol has been criticised on mainly two grounds. The first was related to the targets, which were said to be arbitrary and not sufficient to avoid global warming and did not include the developing countries. This criticism is partly right, overlooks however the short-term targets agreed in Kyoto merely reflect a first step towards bigger reductions. The second criticism was related to the architecture, which was said to be too complex for the limited institutional capacity within the UN system. There were doubts on whether the US system could cope with complex issues such as compliance or the international emissions trading regime (cf.; Victor 2001; Bodansky 2002a) or developing countries’ capacity (cf. Cooper 2001; see also chapter 7 on developing countries) despite the fact the reporting system can be claimed to be more advanced than the Montreal Protocol which aims at prevention of ozone depletion (Wolfrum 1999 in Hanschel 2000: 13).

The real shortcoming of the existing climate regime after the withdrawal of the US is the environmental effectiveness. Not only has the overall level of GHG "regulation" been further reduced to about 40% of industrialised countries' 1990 GHG emissions (if Russia is excluded), also the future outlook for including the developing countries has been negatively affected. The following chapters therefore will concentrate on the prospects of incorporating Russia, developing countries and the US into an international climate agreement. It will also examine the potential of "sub-global" arrangements.
3. The European Union

This chapter examines why within the EU equilibrium could be found and whether the EU experience could hold any lessons for other countries or regions. The analysis will focus on incentives, instruments and institutional arrangements. The chapter will then explore how the EU approach affects its neighbouring countries including the so-called EEA countries and Switzerland and the prospective new member states, which will join the EU from now to the start of the first commitment period (2008-2012).

3.1. Introduction

The EU is obliged under the Kyoto Protocol to reduce greenhouse gases (GHGs) emissions by 8% below 1990 levels by 2008-2012. In 2001, the EU has achieved approximately a 4% reduction to 1990 level, i.e. 50% of the total target. Blok et al (2001) conclude that the current decrease of GHGs emissions by 4% will not continue, and on the contrary reductions will be outweighed by future increases, possibly from transport and services. It is estimated that by 2012 emissions will have increased by 1% relative to the base year of 1990. Therefore the EU needs to reduce GHGs emissions by 9% in order to meet the Kyoto Protocol targets (European Commission 2001d: 12).

3.2. A short history of EU climate policy since the Kyoto Protocol

A major pillar of the EU climate change policy was to break down the overall Kyoto target into differentiated targets for each member states ranging from -21% for Denmark and Germany to +27 for Portugal. This reflected the different levels of economic development including the historical responsibilities for existing GHG concentrations and as well as different marginal costs of GHG abatement in the member states, meaning different potentials for abatement measures. Theoretically the burden-sharing agreement should have lead to converging marginal abatements costs, which would mean a fair sharing of the burden within the EU. The reality, if judged on the basis of economic modelling however was different. The burden-sharing agreement in effect lead to differentiated marginal abatement costs of up to a factor of 10 (Capros et al 2000). The lowest marginal abatements costs were shown for Germany (13,5 Euro) while the highest for The Netherlands (150,70 Euro). In effect, the burden-sharing agreement led to a very unfair

---

4 There is no systematic analysis the creation of the burden-sharing agreement given that it was the result of a secret negotiation between the EU member states within the Council of Ministers. There is however some indication of how the agreement was achieved based on anecdotal evidence and derived from the general functioning of the EU Council of Ministers (cf. Peterson and Bomberg 1999; Dinan 1999). The reason for the high marginal abatement costs of the Netherlands and the Nordic countries of Denmark and Finland can be explained by the fact that these countries in general favour a high level of environmental protection and that green policies are popular. The Dutch target may also be a result of the fact that the Netherlands held the rotating EU presidency at the time of the deal, which in many cases comes at a cost to clinch a deal. Sweden and Germany on the other hand come out relatively well, however for different reasons. Germany, which took a -21% target - partly as result of the collapse of Eastern German industry - had a strong negotiation position given the high target and the size of the country, which actually makes it responsible for more than half of the total EU target in absolute terms. Sweden has de facto reversed its policy of closing down nuclear reactor, which at the time was official policy and helped Sweden to bring down its target. More generally, however, the targets were hardly negotiated on the basis of analysis than on the basis of horse trading. It appeared that only a couple of the Environment Ministers, who have been responsible for the burden-sharing agreement had in fact consulted with "their" economics ministers. Until the collapse of the COP 6 negotiations in The Hague, EU climate policy unlike in the US or Canada was an almost exclusive domain of environment ministers. (Egenhofer & Cornelis 2001).
distribution of the burdens, opposite to the initial intention. There were attempts to reopen the burden-sharing agreement but it was seen as opening Pandora's box.

Table 1.1: Marginal abatement costs and market price with and without emissions trading within the EU

<table>
<thead>
<tr>
<th>Kyoto target</th>
<th>Marginal costs of domestic action</th>
<th>Trading scenario</th>
<th>Market price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EUR 1999 / tCO2</td>
<td></td>
<td>EUR 1999 / tCO2</td>
</tr>
<tr>
<td>Austria</td>
<td>-13</td>
<td>28.4</td>
<td>32.3</td>
</tr>
<tr>
<td>Belgium</td>
<td>-7.5</td>
<td>89.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Denmark</td>
<td>-21</td>
<td>47.9</td>
<td>32.6</td>
</tr>
<tr>
<td>Finland</td>
<td>0</td>
<td>63.5</td>
<td>17.7</td>
</tr>
<tr>
<td>France</td>
<td>0</td>
<td>20.6</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>-21</td>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td>25</td>
<td>39.0</td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>13</td>
<td>53.5</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>-6.5</td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>-6</td>
<td>150.7</td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td>27</td>
<td>41.1</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>15</td>
<td>27.7</td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>4</td>
<td>39.7</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-12.5</td>
<td>31.9</td>
<td></td>
</tr>
</tbody>
</table>


The EU burden-sharing agreement, dubbed the "EU bubble" became part of the Kyoto Protocol architecture under Art. 4 of the Protocol, which allows parties to fulfil their obligations jointly, when they notify the terms of the joint commitment when ratifying. A side effect of the "EU bubble" was that the burden-sharing agreement became intractably linked to ratification of the Kyoto Protocol. Opening the burden-sharing agreement would have jeopardised ratification of the Kyoto Protocol and vice versa. To open up the burden-sharing agreement and thereby jeopardise ratification would have been politically very difficult for a number of reasons. First, concerns about climate change rank high on the scale of the European population (cf. Brewer 2003a). Second, several EU governments have committed themselves to climate change policy and to "green" policies in general. Thirdly, this "green" attitude of Europeans has been reflected in a number of EU governments with green parties or at least with green support. Finally, the European Union’s self-declared policy has been to assume a leadership role in the international climate change debate.

Given that the European Union is the dominant (economic) power in Europe, the EU has shown gravity forces towards other European countries. This does not only include the new EU member states, mainly from Central and Eastern Europe ("accession countries") but also those countries, economically close integrated into for example the EU’s internal market for goods and services such as the so-called European Economic Area (EEA) countries and Switzerland.
3.3. EU enlargement

The European Union is bound to take in 10 new member states from Central and Eastern Europe in the course of 2004, followed by Bulgaria and Romania somewhat later.\(^5\) With short, the EU will also start negotiations with Turkey.

Within the accession preparations, climate change has been an area with little emphasis. This can be attributed to a number of reasons. One might be the relative novelty of both EU climate policies compared to other areas of environmental policies and of economic instruments such as Joint Implementation in place of the traditional command and control approach (Armenteros and Michaelowa 2002: 12; Hager 2002). One other reason might be the relative lack of importance of climate change if compared to the central issues such as financial transfers or free movement. Irrespective of this, since the mid-1990s the enlargement countries became fully dependent on the EU’s position in formulating their approach to global environmental regimes, most importantly to the climate change regime (Jehlicka 2002; Hager 2002). One of the accession criteria is to implement all EU legislation, or "acquis communautaire", which means the entire EU body of law including primary and secondary legislation, case law and international agreements such as the Kyoto Protocol. Thus, in legal terms the Kyoto Protocol did not cause fundamental problems. New member states have to ratify the Kyoto Protocol and implement its obligations. Thus, Turkey which has not yet even ratified the UNFCCC will have to do so and take up commitments under the Kyoto Protocol.\(^6\) Main problems relate to institutional and financial challenges to the candidate countries concerning shortcomings of capacity to establish and maintain a national registry (OECD 2001; Pretel 2001: 8). This is of particular importance since new member states will have to implement in full the new emissions trading directive in the shape that it will finally been agreed upon. Although not bound by the EU burden sharing agreement of June 1998, accession countries will take part in the EU emissions trading framework, which is expected to start in 2005.

For non-EU member states at the start of the EU emissions trading scheme it will be possible to link the EU scheme with those of other Parties to the Kyoto Protocol, by entering into agreements and mutually recognising each other’s allowances (European Commission 2001c: 3). However, such a linkage will be only possible on a condition that allowances of other schemes meet more or less EU requirements regarding compliance, monitoring and national registry provisions. Thus, there is strong pressure for convergence between different emissions trading schemes of European countries, whether member of the EU or not.

The most critical issue is the emission surpluses for CEEs, whose size however remains unclear. Estimates range from around 50MtC to 315MtC (or 364MtCO2).\(^7\) And it is not impossible that...
CEECs alone could satisfy the EU demand for emission allowances on the basis for current emissions trajectories, which is estimated to be 336MtCO$_2$eq (European Commission 2001a). However it is unclear how these surplus emissions might actually enter in the "old" EU-15 linked together in the EU bubble.

Most likely the emission surpluses would enter the old EU-15 via IET under the Kyoto Protocol. New member states are free as any other party to buy and sell under the rules of the Kyoto Protocol. Under such a scenario Central and Eastern European countries would compete with the countries of the former Soviet Union as sellers on the international market. This scenario does however not take into consideration that Central and Eastern European countries may not be entirely free to sell wherever they wish. The EU is currently examining whether to set rules for its member states to sell first within the EU before selling outside. Such a decision may in fact be likely and is covered by one of the EU guiding principles of "Community solidarity" laid out among other in Art. 10 of the EC Treaty (cf. Pelkmans 2001). Theoretically, reserve emission allowances could indirectly also enter in the EU through the EU emissions trading regime. However, that would cover not all CO2 but only the specific sectors and secondly, there would be very narrow limits. The proposed directive has a clause to avoid over-allocation, meaning that an industry should not get more allowances than needed.

3.4. The European Economic Area (EEA) and Switzerland

The European Economic Area (EEA) allows for the full (and legally binding) integration of countries into the EU internal market without being member. This approach has been applied to Iceland, Liechtenstein, and Norway, the so-called EEA countries (cf. Emerson et al 2002) and in bilateral treaty in a similar way to Switzerland. This means that to a large degree the EEA countries have the same obligations to implement EU legislation relating to the economic sphere in a wide sense as the EU member states. Amongst the extended legislation environmental regulation accounts for 43 EU directives which are also adopted by the EEA. Legally speaking the EEA counties are free to decide on signature and ratification of international agreements such as the Kyoto Protocol, they are nevertheless directly affected by EU policies through the EEA agreement. Since environmental policy generally has a strong bearing on the EU internal market, EEA countries have to follow EU environmental and climate policies.

For Norway, which is the only significant EEA country in terms of size of the economy and emissions (0.3% of global GHG emissions) the strategy has been to watch closely what the EU does for two reasons. First, for legal reasons, i.e. compliance with EEA agreement and second that the possible total available amount of emission allowances in EITs for sale and/or transfer for the first commitment period could be up to about 800MtCO$_2$ on annual basis. Under the estimate CEECs will have emission allowances for transfers up to 364MtCO$_2$ annually with Poland alone being able to transfer emission allowances as much as 120MtCO$_2$ (Pretel 2001:14; see also Michaelowa and Betz 2000: 16; Armenteros and Michaelowa 2002: 9).

8 Manne and Richels (2001) predict that in 2010 GDP losses to Eastern Europe and the FSU (EEFSU) will be minimised when the sale of emission surpluses is limited to somewhere between 120 and 160MtC, at best 140MtC in terms of percentage GDP losses (10, 16). Blanchard et al. (2002a) argue that the EEE and Former Soviet Union (FSU) benefits will be highest when only 10% of emission surpluses is traded (16). For market power see also Eyckmans et al. (2001: 18-19). Their market power depends on the degree of banking to be allowed (Blanchard et al. 2002a: 16; Den Elzen and de Moor 2002: 114-116). It is noted that in Blanchard et al. (2002a) the EEE refers to Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia.

9 To date Liechtenstein and Switzerland have not ratified the Kyoto Protocol.
for reasons of competitiveness of domestic industry. Norway is the biggest producer and exporter of hydrocarbons in Europe bringing its share of coverage by the EU emissions trading directive to almost about 60% of emissions by the sector to exposed international trade while corresponding figures for other Nordic countries range from under 10% to 20% (ECON 2002:3). As a result Norway has been considering to introduce a domestic emissions trading regime and the use of the Kyoto Protocol mechanisms (Hasselknippe and Hoibye 2001; ECON 2002:4). With the de facto decision in the EU to implement an EU-wide emissions trading scheme it becomes increasingly likely that Norway will join the EU scheme rather than develop its own scheme, which would most likely be dominated by the larger EU scheme with more liquidity and depth. Already as a result the Norwegian government has asked the EU to consider amendments to the Directive such as a wider coverage of sectors and gases, inclusion of credits generated by the project-based Kyoto Protocol mechanisms before 2008 (to be discussed shortly), inclusion of projects under 20MW, and sellers’ liability to accommodate specific Norwegian concerns (Buen 2002).

In conclusion, the EU has shown gravity forces towards Norway and the EEA in general. This should have been expected given the close economic and legal integration of Norway with the EU. However, one of the features of international negotiations was that Norway was part of the Umbrella Group rather than of the wider EU. This situation has reversed almost completely with the implementation stage of climate policy. The Norwegian strategy has to take account of legal (i.e. EEA agreement) and economic (i.e. competitiveness of export-oriented industry) constraints associated with the close integration with the EU. While it can make sense to implement a domestic emissions trading regime in the absence of an EU scheme, the situation changes with the shape (rules and timetable) of the EU scheme becoming clear. With a lot of Norwegian business operating globally or at least EU-wide, copying with two different schemes has unnecessary high transaction costs (see also Brewer 2003b). The most important Norwegian businesses will in any case have to deal with the EU scheme. For while, NHO the main business association was thinking about linking to the EU scheme. For while, NHO the main business association was thinking about linking to the EU scheme. However it became clear linking leads to convergence of schemes, especially as related to environmental credibility (Haites and Mullins 2001; Egenhofer and Legge 2002b). Again, convergence would most likely be driven by the bigger, more influential scheme not only in political terms but also in terms of market efficiency (i.e. liquidity and depth). This however clearly is the EU scheme.

For details about the Norwegian climate policy see Andresen et al. (2002). The parliament of Norway approved the government’s proposal for a domestic GHG emissions trading scheme in June 2002. It will be set in place in 2005. Banking will be allowed on a year-by-year basis in the period 2005-2007. The proposed Norwegian scheme will cover GHG emissions from industrial processes (mainly in smelting, cement and petrochemical industries), gas firing and spill oil use, burning of coal, and use of coal in cement production. The emissions from these sources represented about 27% of Norway’s GHG emissions in 1999 (Buen 2002) and are to be capped at 80% of 1990 levels. If introduced, the scheme would cover about 30% of total emissions in 2005-2007 (Government of Norway 2002: 8). By 2008 the scheme will be expanded to the sectors that are currently subject to a CO2 tax. The cap of the scheme will be decided by Norway’s commitment to the Kyoto Protocol.

Unlike the proposed EU scheme, the Norwegian scheme will allow companies to make use of credits generated by international projects like the Clean Development Mechanism (CDM). It is estimated that the gap between Norway’s Kyoto Protocol target and GHG emissions in 2010 in a business-as-usual scenario will be about 9MtCO2e per year (Pointcarbon 29 July 2002). As domestic measures will reduce by only 6MtCO2e (Pointcarbon 29 July 2002), it would still require the industry to buy allowances or credits through the Kyoto mechanisms at least equivalent to 3MtCO2e or at least 1MtCO2e per year in the period 2005-2007 (Buen 2002; Pointcarbon 2002). This would amount to $5 million at most if the credits were purchased through the project-based Kyoto Protocol mechanisms (Buen 2002).
3.5. The EU policy package based on the European Climate Change Programme and the creation of "European Climate Change Area" (ECCA)

A specific feature of EU climate change policy is its decentralised character, meaning that measures are implemented both at the EU and national level. This is partly because climate change policy, like most other policies of the EU, is a shared responsibility between the EU and its member states. Both the EU and its 15 members are parties to the Kyoto Protocol. As a result, the EU target will be achieved by a complex mixture of domestic and EU policies, without two third of the target to be achieved by EU measures (European Commission 2001d: 12). Generally speaking those policies affecting the internal market, i.e. the free movement of goods, services, persons and capital are formulated at EU level, while those policy areas with little or no effect on competition within the EU are left to member states.

The proper EU policy has been based on the EU's so-called European Climate Change Programme (ECCP), which was established in 2000 to identify cost-effective ways to meet the Kyoto Protocol commitments (European Commission 2001c). The ECCP consisted of several multi-stakeholder working groups (i.e. EU institutions, member states, business & industry, environmental NGOs, which were supported by economic modelling and academic work. It focussed on the whole economy including energy, transport, industry, research, agriculture and the issue of emissions trading.

Its finding were published in June 2001, identifying some 40 measures using selection criteria such as cost efficiency, emission reduction potential, time-frame and political acceptability. The programme identified cost-effective measures costing less than 20€/tCO$_2$eq, totalling 664-765MtCO$_2$eq. In estimates by the European Environment Agency (EEA) the emission reductions necessary to reach the EC's target under the Kyoto Protocol amount to 336MtCO$_2$eq (European Commission 2001a). The technical potential of the cost-effective options identified by the ECCP is twice as much as the required emission reductions (European Commission 2001a). Provided that the cost-effective policies are fully prioritised, the overall compliance costs of the Kyoto Protocol are estimated to range between 0.06% of GDP by 2010 and up to 0.3% (European Commission 2001b: 3). The compliance costs could even be lower than the ones indicated in various assessments. The reasons include the wider interpretation of sink activities, the withdrawal of quantitative provisions on "supplementarity", and the use of the Kyoto Protocol mechanisms.

The corner stone of the EU policy is however the proposed EU directive to establish GHG emissions trading scheme across the European Economic Area, covering about 4,000-5,000 installations from electricity and heat generation, cement production, and pulp and paper production. This would amount to 46% of total EU CO$_2$ emissions in 2010. The scheme is supposed to cut the EU’s compliance cost by €1.3bn a year (European Commission 2001c). The scheme has been adopted in principle in December 2002. While some of the design options may still change, it has been designed to remain compatible with the Kyoto Protocol framework and to allow linking to other schemes. Precondition is that third country schemes have similar requirements than the one of the EU (Egenhofer and Legge 2002b). Thus, the EU scheme in principle is designed to become the "default" emissions trading scheme, if there is no international agreement.

As a result, throughout the formulation of EU climate policy, EU business and industry haven by and large been supportive of EU climate change policy and ratifying and implementing the Kyoto Protocol. This did not change as the US rejected the Kyoto Protocol (cf. Boyd 2002; Egenhofer &
Legge 2002b). While at this stage it is difficult to draw conclusions on reasons for the stance of EU industry, some indications can be given. Regarding the short-term implementation of the Kyoto Protocol targets, climate change policy is popular with the electorate and with environment ministers, of which many are green in the EU. Some major European companies such as BP and Shell have come out in public in favour of climate policy, therefore making it impossible for industry as such to come out as against climate policy. The ECCP helped the discussions by involving the different stakeholders but also by its focus on cost-effectiveness and the models showing that the overall costs of compliance with the Kyoto Protocol are limited. Even US non-participation does not affect the EU industry in other than the energy-intensive sector. Because of the expected oil price rise due to a lack of climate policies, exports in non-energy intensive sectors fall in the US by more. The EU comes out as a net gainer, because of growth in non-energy intensive products (Convery 2001).

Specific within the EU context was that the two countries carrying the biggest share in absolute terms in the overall reduction target, namely Germany and the UK were on track and as the models showed could reach their targets with relatively small costs. For the longer term European business and industry might feel that the EU economy is better positioned to deal with climate change policy. First, Europe will have easy access to the most important bridging fuel, natural gas. Europe will benefit from readily available gas proven reserves in its proximity allowing Europe and CIS to double its gas consumption until 2020. For example, estimates of IEA and BP demonstrate that the total strategic gas supply to Europe for the next 50 years will be in the order of magnitude of 90 Tcm while the corresponding figure for the US is 7 Tcm. The relative weight of gas in the energy balance between the US and the EU can be illustrated in the power sector. While in the US coal-fired power plants still amount to more than 50% of total electricity generation and is expected to remain so, the corresponding figure for Europe is 23% and falling. Second, there is major potential for improving energy efficiency in the new EU member states of Central and Eastern Europe on a cost-effective basis as the review on excess emission rights in CEECs in the previous section has shown.

Nevertheless, implementation of climate policy has not been totally uncontroversial. While there was relatively limited controversy on the targets, there was on instruments. While especially energy-intensive industries such as chemicals, cement and steel were advocating negotiated environmental agreements for industry (e.g. Egenhofer 2003, ten Brink 2003), the European model of voluntary agreements, the EU decided to implement a cap-and-trade emissions trading system. But again, industry was split on this issue with BP and Shell and others in favour of emissions trading, there was no common front by industry being able to undermine the trading scheme. It was especially German industry that did not want to be part of the emissions trading scheme to be able to benefit in full and solely from the anticipated low carbon price in Germany resulting from the collapse of East German industry. German industry proposed to create a "pool" within Germany, which had it been accepted would have led to a different (i.e. lower) carbon price in Germany than in the rest of the EU. Such a move would not have been compatible with EU internal market and competition law (cf. Legge 2001).

In conclusion, at this stage the reason why EU climate change policy has been relatively smooth compared with other countries such as Canada, US or Japan can possibly be attributed to a number of reasons.

The first was the relative low costs attributed with achieving the Kyoto Protocol targets. Once the targets (burden sharing) were settled, the political debate on whether to implement climate policies has been shifted to which instruments to use. The relative low costs in Europe can be attributed partly to the collapse of East German industry in the wake of unification and the switch to gas as a result of electricity and gas market liberalisation.
Facilitated by relatively low costs, the EU applied a consensus-oriented decision-making model based on multi-stakeholder processes and the cost-effectiveness imperative. Judged with hindsight, it was crucial to discuss modelling results and to agree to base decisions on the outcome of the modelling. This avoided a US-style PR battle on costs of compliance with the Kyoto Protocol. The ECCP was not unique in that it had an important predecessor, the so-called Auto-oil programme, also a European Commission-sponsored multi-stakeholder (EU institutions, car and oil industry, research centres, regulatory specialists) approach to identify on the basis of a cost-benefit analysis car emission standards (Pelkmans and Labory 1998).

Those countries with tougher targets (e.g. Netherlands, Finland) have started to invest in buying credits from abroad. It is striking that one of the features of such initiatives is to maintain environmental integrity, i.e. use credits from real reductions as opposed to "credit of any kind". This might be partly a reflection of concerns of market efficiency (e.g. Egenhofer and Legge 2002b) and partly a result of public concern about real reductions (e.g. in the Netherlands).

Whether this relative calm will continue in the future commitment periods remains to be seen. The two long-term trends, switch to gas and availability of domestic (i.e. CEEC) reserve emission allowances will continue to exist, however their relative impact will depend on the nature of new targets and the nature of climate policy within the US.

With regard to the Carraro/Galeotti policy recommendations, there is the evidence for Europe to support the viewpoint that reducing uncertainty is a key factor. The availability of "agreed" cost estimates and their distribution played an important role in achieving a consensus on climate policy. Two caveats need to be made however. Due to specific circumstances expected costs to comply with the Kyoto commitments have been relatively low with around between 20-30 Euro per tonne of CO$_2$. Second, economic modelling in the EU was easier since EU climate change policy is based on domestic measures primarily (of course facilitated by relatively low costs) and therefore the assumptions are clear and possibly even controllable.

Private sector initiatives, the most notably by BP and Shell have been crucial to have a counterweight to blocking forces. Their proactive stances prevented the whole industry from building a common and united front against climate change policies. It also shows that early moving by BP and Shell has been rewarded with the EU emissions trading scheme being fully compatible, if not modelled on the two companies' approach. The EU proved a reservoir of different approaches including voluntary agreements, cap-and-trade schemes, hybrid trading schemes, mixing cap-and-trade with baseline-and-credits schemes or regulatory and tax policies. Thus, there was a rich experience within a portfolio of instruments applied by member states (cf. Egenhofer 2003).

Emissions trading was a key factor to gain the support of industry or at least major parts thereof. The perspective of further cost reductions and getting allowances for free (through grandfathering) most likely has played a key role of industry support by and large. However, we have also learned that possible net buyer industries in a country or region can develop powerful opposition to opening an emissions trading regime to other higher-cost countries. This was the case for Germany, where considerable parts of industry wanted to keep the benefits of potentially low-cost carbon prices within Germany via the "pool", rather being subjected to higher carbon price in the EU internal market. Our conclusion is that "voluntary" linking of emissions trading schemes will not work automatically. Net buyers have every interest to oppose linking up with high cost countries or regions. This would for example be the case if Norway, Canada or Japan

---

12 The most advanced scheme is the Dutch ERUPT and CERUP projects, whereby the Dutch government buys credits, achieved on an environmentally-sound basis to make up for expected shortcomings in 2008-12. In Germany, a similar approach is being discussed, although with private money. Many EU member states are currently thinking about such schemes involving to a different degree public and private money.
wanted to link to the EU emissions trading scheme. Net seller industries have opposite interests but have at least in Germany appeared to get less attention for their arguments.

With a view of the wider Europe, as was of course expected, the EU as dominant economic actor has shown gravity forces towards the other European countries. All other European countries are to various degrees integrated with the EU either politically such as the European Economic Area countries, Switzerland or the new member states or if not economically. Thus, it appears to be sufficient to entice the dominant economic power to climate change policy to have other countries following suit. This has been confirmed in a recent survey (Miles et al: 2001) on the conditions for effectiveness of international agreements. Power was considered essential to achieve an international agreement.
4. The EU-Russia interface: Enlarging the "European Climate Change Area" to Eurasia?

This section explores the possibilities of Russia joining the "European Climate Change Area" to enlarge the "sub-global arrangement" on the Eurasian continent. As in the previous sections, the analysis will focus on incentives, instruments and institutional settings.

4.1. The relevance of a "Eurasian Climate Change Area"

The creation of a "Eurasian Climate Change Area" would have a number of implications. Most obvious is the likely short-term benefit of Russia ratifying the Kyoto Protocol and therefore bringing it into force. A "Eurasian Climate Change Area" would however have the automatic effect of comprising of about 50 Parties to the UNFCCC including a total of 33 Annex I Parties. Once Russia as the dominant power of the former Soviet Union makes a climate change deal, one could expect other former Soviet republics to follow, notably Ukraine and Kazakhstan.

4.2. Climate change is a sub-set of the broader EU-Russian relations

EU-Russia climate change co-operation has to be seen in the context of a deepening relationship between the European Union and Russia. This relationship is based on the mutual acknowledgement between the EU and Russia of a ‘strategic partnership’ rather than ad hoc interests. The EU’s approach to Russia is based on the concept of economic integration, with an emphasis on civilian rather than military instruments and rationales and a reliance on contractual arrangements and institutions to achieve policy objectives (cf. Emerson et al 2002). The long-term objective is to integrate the Russian economy into a European economic space and, effectively, to integrate Russian society into European society. Energy policy, and consequently climate policy, is a priority issue related to such areas as economic integration (including energy trade) and common security aspects (including energy supply security). The EU–Russian energy dialogue is the farthest advanced initiative to realise this objective; it also holds the greatest promise for cooperation related to climate policy.

The Energy Dialogue in operation since October 2000 broadly reflects the common interest shared by Russia, as the primary supplier to the EU’s energy market, and the EU – a very large energy market in immediate proximity to Russia. Russia is the primary supplier to the EU’s energy market; oil and natural gas account for about 60% of Russia’s total exports to the EU. In 2000, EU energy imports from Russia amounted to about €20 billion, or 62 % of total Russian energy imports.

---

13 Parties to the UNFCCC include EU-15, 10 new members and the 3 EEA countries and Switzerland, 2 candidates for accession to EU (Bulgaria and Romania), 5 Balkan countries (Albania, Bosnia and Herzegovina, Croatia, Macedonia, and Yugoslavia), and 12 countries from the Former Soviet Union (Russia, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan). Annex I Parties include EU-15, 10 new members and the 3 EEA countries and Switzerland, 2 EU candidates, Switzerland, Croatia and Ukraine. Among Annex I Parties Ukraine’s emissions do not count toward the threshold. Among non-Annex I Parties Azerbaijan, Georgia, Turkmenistan, and Uzbekistan ratified the Kyoto Protocol.

14 Kazakhstan is experimenting with selling allowances to Japan and applying to move to Annex I Party even though it fails short to ratify the Protocol (see chapter 6.4.1.).

15 The term ‘strategic partnership’ was used in the strategy documents exchanged in 1999 in the framework of the Partnership and Co-operation Agreement (PCA). See Emerson (2001) for a more thorough treatment of the evolving EU–Russian strategic partnership.
exports. Russia provides 16% of EU oil and 28.4% of gas consumption. The energy sector accounts for 30% of foreign direct investments in Russia (European Commission 2001e). Both Russia and the EU desire reliability and growth of energy trade, and both also recognise the need to modernise the Russian energy sector, to enhance its technology base and improve energy efficiency, and to reduce greenhouse gas (GHG) emissions from energy production and use.

Given that the EU has chosen the Energy Dialogue as the main vehicle for EU–Russia energy cooperation, the Dialogue has now incorporated the climate change dimension. Among other it identifies the link between modernisation, investment, energy efficiency and greenhouse gas emissions. In the documents related to the Dialogue, climate change is not covered in the "pure Kyoto/Marrakech" form of unrestricted emissions trading but in a more nuanced form. There is however a concept of linking revenues from sales of GHG emission allowances to investment in energy efficiency (see below the section on the Green Investment Scheme) although, as one could expect, ‘conditionality’ is nowhere explicitly spelled out. The second progress report of the EU–Russian Energy Dialogue made specific reference to the ‘potential of the Kyoto Protocol to offer economic incentives for energy savings and improved energy efficiencies’ (Kristenko and Lamoureux 2002).

4.3. Russian climate change and energy policy

Russia will be obliged under the Kyoto Protocol to stabilise its GHG emissions at 1990 levels. Because of economic recessions following the collapse of the Soviet Union it is expected to be easy for Russia to meet the target. Russia’s CO₂ emissions were 30% below 1990 level in 2000 (Korppoo and Stern 2002a: 23, 25). As is well established Russia has surplus emission allowances which are estimated to be at between 111MtC to 374MtC in 2010 (Paltsev 2000 and Zhang 2000 in Löschel and Zhang 2002: 6)\(^\text{17}\). Although Russia favoured unrestricted emissions trading, recent modelling results suggest that unrestricted trading will be unlikely to maximise the sellers’ revenues. Den Elzen and de Moor (2002) argue that Annex 1 FSU would maximise their revenues from trading by banking 40% of their emission surpluses (115; see also Manne and Richels 2001: 7-8; Blanchard et al. 2002a: 16; Den Elzen and de Moor 2002: 114-116; Vrolijk

\(^{16}\) Oil production accounts for 34.8% of total investments in Russia (see Kreindel 2002).

\(^{17}\) The Former Soviet Union (FSU) holds 84% of total emission surpluses (Böhringer and Löschel 2001: 6n9). Löschel and Zhang (2002), based on the US DOE baseline projections for 2010, project that a size of emission surpluses to be 296MtC with sinks for the FSU (7). According to the POLES model the FSU will provide for 277MtC (Blanchard et al. 2002a: 8). The definition of the FSU may be partly responsible for a wide variance in estimated figures. It is noted that Böhringer and Löschel (2001) regard the FSU as Russia, Ukraine, Estonia and Latvia. In Löschel and Zhang (2002) the FSU refers to Russia, and Ukraine. In Blanchard et al. (2002a) the FSU refers to Russia, Ukraine, and the Baltic States. Den Elzen and de Moor (2002) more specifically identify these countries with ‘Annex 1 FSU’.

Further adding sinks surpluses about 34.5MtC, the FSU can expect 311.5MtC (Blanchard et al. 2002a: 13). Russia’s Bureau of Economic Analysis projects that during the first budget period Russia will have emission surpluses which account for 10-15% of its baseline (1990) level. This amounts to 300-400MtCO₂eq. per year (BEA 2002: 19). Pretel (2001) projects that Russia alone will have emission allowances for transfers about 304MtCO₂ (14). Moreover, Pointcarbon forecasts the Russian emission surpluses will amount up to 6,000MtCO₂e for the first commitment period, i.e. 1,200MtCO₂e per year (Berdin et al. 2002: 7). (All the units to be checked). On the other hand, Löschel and Zhang (2002) note that monopolistic pricing on the international emissions trading market influences the prices and quantities of other goods traded (26n11). For example it is possible that Russia could lose in relative terms from setting higher permit prices through its negative impact on international oil and gas prices (Löschel and Zhang 2002: 26n11).
It is still difficult to indicate the extent to which Russia could exercise its supposedly monopolistic power in international emissions trading markets, given variance in projections of the Russian emission levels (and therefore the amount of reserves of emission surpluses) and competition with other potential sellers of emission allowances and credits. Although the surpluses are not ensured to be sold, they nevertheless constitute a sizeable asset for Russia. Once this asset is established, they will not forfeit their claims so easily. Dealing with this asset is most likely to hold the key for engaging Russia.

Much of the urgency attached to climate change in the Energy Dialogue is due to EU concerns, however. It is Russia that holds a casting vote over the entry into force of the Kyoto Protocol to which the EU has firmly committed itself (see ‘Introduction’). Climate policy has not been a top priority on the Russian political agenda (Korppoo and Stern 2002b: 34). However, Russia has been attracted to the potential of the Kyoto Protocol mechanisms for facilitating foreign investments that could finance improvements in energy and resource efficiency (BEA 2002: 5). The bigger problem is for Russia to demonstrate its eligibility for emissions trading under the Kyoto Protocol in order to be a credible supplier of emission allowances (Berdin et al. 2002: 9-10; Vrolijk 2001: 6; Korppoo 2002: 9). The eligibility criteria involve fulfilment of the reporting and verification requirements under the Protocol. Russia will be unlikely to participate in emissions trading even if the country ratifies the Protocol in late 2002 or early 2003 (Ecosecurities 2002: 4). This is due to lack of funding and a stable institutional framework including a national inventory system (OECD 2001: 7, 10-11; Berdin et al. 2002: 10-11; Ecosecurities 2002: 4; Korppoo and Stern 2002b: 33-34b). Russia has a number of specific problems such as lack of critical activity data and incompatibility with IPCC sources categories in particular (OECD 2001: 7-8: Berdin et al. 2002: 10).

The Russia’s energy sector accounts for 90% of the country’s GHG emissions and 85% of CO₂ emissions (the ‘energy strategy’ in Korppoo and Stern 2002a: 25). The ‘energy strategy of the Russian Federation to the year 2020’ (the ‘energy strategy’) provides for an important link between its future decisions on short-term commitments to the Kyoto Protocol and its medium-to long-term objective of ensuring energy supply to support the transition to a market economy. The strategy emphasises the importance of energy saving and improvements in energy efficiency. The realisation of the ‘energy strategy’ would lead to a decrease in energy intensity in production and energy supply expenditures of the whole society and to a transition toward a sustainable development path. It is estimated that total primary energy production will increase by 8-23% over a 20 year period (the ‘energy strategy’ in Korppoo and Stern 2002a: 25). In 2000 Russia’s power generation relied on a mix of thermal power (66.5%), hydropower (18.8%), and nuclear power (14.7%). By 2020 nuclear power will have increased its share to 20.5-22.5% while other sources will reduce their shares: thermal (62.0-63.8%) and hydro (15.5-16.2%).

Certain problems are pointed out concerning the gas industry's capacity to produce gas and secure markets for it. The fall in gas production and export results from the declining productivity of main gas fields in Russia and extremely high costs of commissioning new fields located in remote

---

18 Böhringer and Löschel (2001) and Löschel and Zhang (2002) do not consider the possibility of banking (25).
20 Ibid. It is understood that under the current system energy intensity is high, potential for technical energy saving is enormous, and energy prices are low.
21 Ibid.
areas without established infrastructure. However, contracted long-term gas exports to Europe will not be affected because Russia will possibly use other types of fuel, predominantly coal, at the domestic market in order to secure necessary amount of gas for exports.\textsuperscript{22} It is estimated that coal production will increase by 32-66\% (the ‘energy strategy’ in Korppoo and Stern 2002a: 25). The shift to coal for sake of gas exports will have serious consequences for CO\textsubscript{2} emissions reductions.

Alternative to an increase in coal consumption is to increase investments in energy saving which Gazprom, the main gas company estimates to be less expensive than in the development of remote fields and gas transportation to consumers. The energy strategy reports that based on data as of the year 2000 implementation of energy saving measures may decrease annual energy consumption by 360-430 M\texttext{tce} (of coal equivalent) (BEA 2002: 10). About one third of the potential savings is concentrated on fuel and energy mix. It is estimated that implementation of energy-saving measures would reduce direct annual GHG emissions by 80 MtCO\textsubscript{2}eq by the year 2005 (BEA 2002: 11). Russia recognises the need of energy saving policies and measures including strict administrative measures and structural reorganisation of economy. The government aims at fulfilling the need through improvements in pricing and taxation.\textsuperscript{23}

The Kyoto Protocol mechanisms (Joint Implementation (JI) and International Emissions Trading (IET) for Russia) could facilitate foreign investment flow that would improve Russia’s energy efficiency. In the bilateral Energy Dialogue both the EU and Russia recognise the need to modernise the Russian energy sector, to enhance its technology base and improve energy efficiency, and to reduce GHG emissions from energy production and use. ‘The potential of the Kyoto Protocol to offer economic incentives for energy savings and improved energy efficiencies is significant’\textsuperscript{24} (Kristenko and Lamoureux 2002).

Egenhofer et al. (2002) examine four instruments: i) conventional investment and trade; ii) JI; iii) IET; and iv) the Green Investment Scheme (GIS). A GIS is to earmark revenues from sales of emission allowances for projects that would yield environmental benefits that lead to further emission reductions (Tangen 2002: 1). Unlike ordinary emissions trading a GIS involves a restraint on the use of revenues not on sales of emission allowances. In comparison to unrestricted sales of emission allowances a GIS increases the legitimacy of emissions trading with Russia among potential buyers. If a GIS results in expansion of a market for Russian emission allowances, Russia could increase its revenues (Berdin et al. 2002: 8). A GIS has certain advantages over other instruments including JI and IET.\textsuperscript{25} First, unlike JI a GIS may start to operate before 2007 (Berdin et al. 2002: 10; Tangen et al. 2002: 13). Second, emission allowances can be sold on a forward basis, which is even desirable to finance early investments of a GIS. Unlike JI early reductions before 2008 can be credited and transferred to investors as a forward trade of emission allowances. However, such forward contracts for transfer of emission allowances will probably be sold at a substantial discount against a risk of default in sales due to lack of eligibility (Berdin et al. 2002: 10). An unresolved question is still how the benefits from any of these instruments will be distributed within Russia.

\textsuperscript{22} The government considers to raise internal gas prices by 2005 to 1.9 to 2.1 times higher than the level of March 2002 (\textit{Ibid.}).

\textsuperscript{23} \textit{Ibid.} Also see Korppoo and Stern (2002a: 26-27).

\textsuperscript{24} More specifically the report stresses the potential of the Kyoto Protocol mechanism for generating carbon credits which can be transferred to the investors (Kristenko and Lamoureux 2002).

\textsuperscript{25} For details see Tangen et al. (2002: 21-22).
The question is how the various interests in these four options could play out. Three levels of discussions need to be distinguished: i) intra-EU negotiations, ii) intra-Russia negotiations and then the level of the negotiations between the EU and Russia. Finally, but uncertain today is the question how the US, which is understood to propose a bilateral climate deal to Russia might influence the situation.

It is increasingly likely that the EU will set up its own internal emissions trading scheme, with strong CO₂ ‘creditor’ interests coming into the EU with the newly acceding central European states, which under some circumstances might want to keep Russian emission allowances out. It is also clear that the EU will be relatively attracted by JI and/or GIS schemes to the extent that these mechanisms will guarantee delivery of real GHG emission reductions in Russia. Even if the EU’s interest in IET, GIS or JI mechanisms with Russia will be, in some degree, constrained by its internal balance of interests (including the enlargement aspect mentioned), it is also clear that the EU retains a major strategic interest in some kind of large-scale energy investment deal with Russia on two grounds. The first is energy supply security, which has grown in importance post-11 September. The second is environmental security, especially the objective of tackling global warming, beyond the EU’s own commitments to the Kyoto Protocol targets. These two objectives together are synergetic: if Russia’s long-term energy reform strategy for the next 20 years were to succeed, this would be a huge double boost for both objectives, given that there would be a cleaner energy sector and more room for net exports of oil, gas and electricity to the EU.

These strategic interests of the EU should ultimately prove strong enough to justify major action in some cocktail of the four mechanisms listed, including GIS. The analysis of how the trade-offs between them would play out, and indeed the sum total of the actions under all of them, will also be strongly dependent on the Russian policies and investment climate conditions which will be on offer. The EU–Russia Energy Dialogue should properly embrace all these issues.

In general, EU–Russia relations seem to be getting better and better. There is evident interest at summit level at trying to push the relationship ahead in all domains – economic, political and security. There are clear political and strategic reasons why this should be so, ranging from Russia’s own ‘European choice’ through to the EU’s conception of its own interests, which include specific energy supply and environmental security points, as well as the desire for deep and stable interdependence with its major neighbour. One may anticipate that the EU will want to work towards operational mechanisms with Russia in the energy supply and climate change fields patiently, thoroughly and cautiously. This is hardly surprising because of the technical

---

26 The international competitiveness of the Russian emission allowances has been discussed in comparison with credits generated by Clean Development Mechanism (CDM) projects (Berdin et al. 2002: 8).

27 For a detailed analysis on these trade offs, see Hager (2002).
complexity of the conceivable mechanisms, combined with the need for sufficient convergence on such matters as governmental implementation and corporate governance standards.
5. The Asian dimension: Can Japan & Asia gain from a "sub-global" arrangement?

While the previous chapters have analysed the stability and profitability of an arrangement within the Eurasian continent, this chapter will explore the potential benefits of Japan and some of its Asian countries to develop "regional arrangements". The approach we take is to derive possible lessons from the European "arrangement" and ask whether they could be applied to Japan. We hope to discuss these ideas with our Japanese colleagues. This chapter therefore will not provide a comprehensive analysis. Instead it will start from a general introduction to recent Japanese developments and then will analyse the possibilities for "sub-global" arrangements. As in the previous chapters, we will concentrate on incentives, instruments and institutional arrangements and ask what the "winning policies" could be on a regional scale. The analysis will focus on Japan and then will gradually be enlarged.

5.1. Japan

Japan has increased greenhouse gas (GHG) emissions since FY\textsuperscript{28} 1990 despite more than a decade of economic difficulty. Its share of Annex I Parties' GHG emissions was 8.5% in 1990 (Government of Japan 2002: II). In FY2000 its GHG emissions rose to more than 8% above 1990 levels (Government of Japan 2002:II).\textsuperscript{29} It is projected that in 2010 Japan will have increased GHG emissions at around 7% above 1990 levels with existing mitigation measures (Government of Japan 2002: V). With its Kyoto Protocol target at a 6% cut, Japan needs to reduce GHG emissions by 13% (165MtCO\textsubscript{2}) over and above existing measures (Government of Japan 2002: V). Additional policies and measures are estimated to reduce total GHG emissions by 144MtCO\textsubscript{2} in 2010 (Government of Japan 2002: V).\textsuperscript{30}

CO\textsubscript{2} accounts for 90% of Japan’s total GHG emissions.\textsuperscript{31} This means that reduction of sources of other gases such as reduction of agricultural (CH\textsubscript{4}, N\textsubscript{2}O), cattle-farming (CH\textsubscript{4}), coal-bed or landfill (CH\textsubscript{4}) and aluminium (PFC) are very limited\textsuperscript{32} and therefore reduction of these gases is not available as a policy option. It also means that energy saving measures must play a dominant role in Japan’s climate policy.

\textsuperscript{28} The Japanese Fiscal Year runs from April to March.
\textsuperscript{29} An annual target of total reductions of emissions from the residential sector is 260MtCO\textsubscript{2} (-2%) (Government of Japan 2002: IV). An annual target of total reductions of emissions from the transport sector is 250MtCO\textsubscript{2} (+17%) (Government of Japan 2002: IV). An annual target of total reductions of emissions from the industrial sector is 462MtCO\textsubscript{2} (-7%) (Government of Japan 2002: IV).
\textsuperscript{30} Additional measures for energy savings may include energy conservation measures, [22MtCO\textsubscript{2}], ‘new’ energy measures [34MtCO\textsubscript{2}], fuel switching etc. [18MtCO\textsubscript{2}], and promotion of nuclear power. It is reported that the government plans to expand nuclear power generation by 30% by 2010, which requires build up of 9-12 new reactors in next 8 years. (http://www.foejapan.org/en/energy/brief0320.html).
\textsuperscript{31} Non-CO\textsubscript{2} gases account for about 20% of GHG emissions in the US and the EU (Yoon 2002: 38).
\textsuperscript{32} For example, much of municipal waste is incinerated in Japan due to the lack of space available in landfill (CH\textsubscript{4})(Yoon 2002: 38). Public transport is already widespread due to dense habitation. Co-generation and insulation have less impact since Japan’s climate is significantly warmer than that of Europe. Two-thirds of the land is already covered with forest and the rest is heavily inhabited, which leaves little potential for additional afforestation (Sugiyama and Yamaguchi 2002: 48). The wide coverage of forest, however, granted Japan an increase of credits from sinks in the Marrakech Accords. .
Another important factor, which shapes Japan’s climate policy is its high dependence on energy imports. 80% of its energy supply is dependent on imports. In 1999 the shares of the total primary energy supply were oil 52%, coal 19%, natural gas 13%, nuclear power 13%; hydropower less than 8% (Government of Japan 2002: I-II; Yoon 2002: 41).

The most important law in Japan’s energy policy is the ‘law concerning rational use of energy’ which dates back to 1979. It is claimed that the law has contributed to enhancing the international competitiveness of the Japanese companies and facilitating development of innovative technologies (Yoon 2002: 66). The most recent amendment to the law addresses the so-called ‘top runner approach/standards’ of energy efficiency, energy use at factories and business sites; energy efficiency standards for housing and buildings; and improvements in energy intensity. The ‘top runner approach’ can be regarded as a radical departure from Japan’s traditional approach in introducing stringent energy efficiency standards. The ‘top runner approach’ of energy efficiency is set at the highest energy efficiency standard that is achieved among products which are currently commercialised. Thus the amendment mandates that new products be more efficient than the most efficient model currently sold on the market and those who fail to achieve the target could face punitive measures including fines (Yoon 2002: 67). More specifically the approach applies in setting standards for automobiles, household electrical products and office appliances. For example new standards on passenger automobiles using gasoline would require improvements of fuel efficiency by about 23% from 15% in FY1995-2010 (Yatsu 2000).

The ‘law for promotion of measures to cope with global warming’ is central to climate policy. Under the law the government sets out an action plan with the timeframe up to 2010 which is called a ‘guideline of the measures to prevent global warming’. The guideline stipulates more than 100 domestic measures and policies to achieve the Kyoto Protocol target. With the old guideline and the Marrakech Accords, Japan’s Kyoto Protocol target, a 6% cut, could be informally broken down to sectoral targets.

---

33 The Ministry of Foreign Affairs sketches out its priorities in energy diplomacy. The list of issues includes promotion of energy saving, efficient use of energy and development, use of alternative energy, and response to environmental issues with strong emphasis on climate change (Government of Japan 2001).
34 It was most recently amended in June 1998 and came into effect in April 1999.
35 In addition to the ‘top runner standards’, more than 12,000 factories and business sites will be checked against their energy use (Yatsu 2000). Energy efficiency for heating and air conditioning of housing and other buildings are expected to be improved by about 20% and 10% respectively (Yatsu 2000).
36 The law was enacted in October 1998, came into full effect in April 1999 and revised in March 2002. The law addresses a strategy for climate change, mandatory action plan for greening operations of all the levels of the government and voluntary action plan by business enterprises etc. More specifically it stipulates the responsibilities and actions to be taken by national and local governments, industries, and citizens. Second, it requires the national government to stipulate the ‘basic policies relating to global warming’. Third, it establishes national and local ‘Information and activity centers for climate change’ in order to promote public participation and changes in life-style.
37 The overall target of a 6% cut has been broken down to a 2.5% cut through domestic policies and measures, a 2% increase for emissions of CFC alternatives (HFCs, PFCs, SF6), a 3.7% cut through net removal by sinks [revised to 3.9% in the Marrakech Accords], and a 1.8% cut through the Kyoto Protocol mechanisms [revised to 1.6% in the Marrakech Accords]. The target of a 2.5% cut through domestic policies and measures has been further divided into three categories: stabilisation (+-0%) for energy savings for CO2 emissions from energy sources, a 0.5% cut for emissions from non-energy sources (CH4, N2O), and a 2.0% cut through construction of nuclear power plants, innovative technologies, changes in social behaviour etc.
The gap between the Kyoto Protocol target and the projected emissions in 2010 is estimated to be around 1.6% above 1990 levels, which is equivalent to 19MtCO₂ per year (Daily Yomiuri, 26 August 2002). In June 2002 the Ministry of Economy, Trade and Industry (METI) agreed with Kazakhstan to purchase 0.062MtCO₂ per year through the Clean Development Mechanism (CDM) for renovating/repairing a thermal power plant. The METI reportedly plans a joint study with seven developing Asian countries (China, India, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam) (Daily Yomiuri, 26 August 2002). The METI’s arm, the New Energy and Industrial Development Organisation (NEDO), has conducted a series of feasibility studies on about 200 candidate plans in Annex I and non-Annex I Parties to search for potential Joint Implementation (JI) /CDM projects since 1997. 170 projects have been studied since 1998 yet none of the projects has been carried out (Sugiyama and Yamaguchi 2002: 51).

Up to now 30 projects were approved as feasibility study to be undertaken in Russia via NEDO (Sugiyama and Yamauchi 2002: 77-79; Korppoo and Stern 2002b: 35; Nikitina et al. 2002: 161-164). It is stressed that the location of these project sites has a broad geographical coverage all over Russia on contrary to an expected bias towards concentration on the Pacific coast. A half of them are located in the European part of Russia, a quarter in the Far East and Siberia each (Nikitina et al. 2002: 143). Over two dozens of the Japanese corporations from various sectors have been involved in F/S in Russia (Nikitina et al. 2002: 143, 150-151). They are currently waiting either for financial support from the Government of Japan beyond feasibility studies or expecting additional benefits from carrying forward the projects (Nikitina et al. 2002: 143, 147-148).

In December 1997 Japan launched the so-called Kyoto initiative which provides support for climate change programs and projects in developing countries. It addresses capacity building; provision of concessional Official Development Assistance loans; and dissemination of technology and know-how related to climate change.

Discussion on cooperation in energy projects between Russia and Japan started in the 1960s. Energy cooperation has become central to the bilateral Japan-Russia dialogue in the late 1990s. (Ivanov and Smith 1999: xiii). However, with Russia there are a number of restrictions imposed by the government of Japan for political reasons on its financial assistance. The Japan’s assistance to Russia cannot be transferred in form of ODA but through technical and humanitarian assistance. Environmental aid can be regarded as a part of technical assistance, and hence free from the restrictions imposed by the government (Nikitina et al. 2002: 153). There is a growing expectation from both Japanese and Russian companies towards the Kyoto Protocol mechanisms and a Green Investment Scheme (GIS) proposed by the government of Russia. The Kyoto Protocol mechanism and a GIS may be regarded as a technical assistance to bypass the restrictions on Japan’s ODA (Nikitina et al. 2002: 149; Müller 2001b: 5). For its relevance to climate policy a Russian GIS could enable Japan to reduce compliance costs by trading excess emission allowances (Sugiyama and Yamaguchi 2002: 51). On the other hand it is possible that mitigation costs will be simply transferred to investing firms in the form of administrative

---

38 It is projected that under the business as usual scenario domestic net emissions will exceed around 20% above the Kyoto Protocol target, which is around 250MtCO₂eq. per year (Nikitina et al. 2002: 141).
39 For Joint Implementation (JI) of Japanese corporations in Russia see Nikitina et al. (2002: 142-155) and Müller (2001b: 4-6).
40 ODA loans related to energy saving technologies, new and renewable energy sources, forest conservation and afforestation and air pollution control were given the most concessional terms: an interest rate is 0.75%, and a repayment period runs for 40 years. ¥580 billion had been committed from December 1997 to March 2001 (Government of Japan 2002: VII).
charges imposed by the government of a hosting country. A number of institutional barriers to foreign investment in Russia have been identified. They may include a lack of efficient and transparent authority, an absence of clear policies, guidelines, regulations, and a lack of clarity in division of responsibilities (Korppoo and Stern 2002b: 33-39; Nikitina et al. 2002: 146, 148, 156-160; Sugiyama and Yamaguchi 2002: 49-51; Ivanov and Oguma 2002: 46). One of the main tasks for the government of Russia would be to ensure a more favourable investment climate for foreign investors.

5.2. Prospects for regional co-operation in Northeast Asia

Northeast Asia encompasses a vast region from Eastern Russia, Mongolia, China, two Koreas, and Japan. Hereafter our discussion will focus on Russia, China, Japan and to some extent South Korea. In the context of a climate change regime, this region represents a unique mix of countries with wide disparities in specific circumstances and levels of commitments. The high degree of heterogeneity in this region compares badly with the relative homogeneity in the EU. Japan ratified the Kyoto Protocol with its name listed in Annex B. Russia is also an Annex B Party, yet has not ratified the Kyoto Protocol. South Korea, an OECD member state, and China both ratified the Kyoto Protocol as non-Annex I Parties. North Korea ratified only the UNFCCC not the Kyoto Protocol.

The Asia-Pacific Network for Global Change Research (APN) represents one of the three major research networks in the world with references to global change. It was established as an intergovernmental network for the promotion of global change research and interactions between the science community and policy makers in the region (TEMM 2001a). Climate change is central to the work of this network.

It is believed that a sub-regional co-operative framework would enhance the potential for sustainable development and create a win-win situation (Ivanov and Oguma 2001: 14). The win-win situation would be possible, taking into account the energy and carbon balance in this region. Russia’s eastern provinces account for 90% of natural gas production, 75% of crude oil, 8%- of coal and 30% of electricity generation (Ivanov and Oguma 2001: 24). The provinces have more than three fourths of the country’s hydropower resources and could export to Northeast Asia until at least 2010 (Ivanov and Smith 1999: xi). It is estimated that the forest’s capacity of absorbing carbons will amount to 359 Mt a year by 2010 (Sheingauz in Ivanov and Oguma 2001: 8). Eastern Russia including the Far Eastern region could supply oil, gas, and hydrocarbon to fast growing economies in China and advanced technologies and markets in Japan. The resource potential of Eastern Russia has been untapped due to harsh climatic conditions, lack of capital, distance from commercial and industrial centres in Western Russia and relative lack of attention by the central government. Also, vast forests in Eastern Russia could absorb carbon emissions from China, Japan, and South Korea. Hence it is crucial to involve in any discussions of a regional cooperative framework provincial authorities of Russia (Korppoo and Stern 2002b: 39; Nikitina et al. 2002: 146, 156), particularly those of Eastern Russia, given the rich resource endowments in the region. An important question arises as to whether the Russian provincial authorities should be allowed to engage in sale of excess emission allowances either being delivered through one of the Kyoto Protocol mechanisms or a GIS (Müller 2001b: 3; Yoon 2002: 189; Sheingauz in Ivanov and Oguma 2001: 9, 30).

41 The other two are IAI (the Americas), ENRICH (Europe and Africa) (TEMM 2001a). Further information about the APN is available at http://www.apn.gr.jp/
A win-win situation in the energy and carbon balance could be created by international emissions trading (IET). Kim (2001) identifies at least five possible reasons for which planning an IET in Northeast Asia may prove to be premature in the near future.

- **Lack of market experience, infrastructure and expertise.** This is because most countries in the region have developed regulatory approaches to environment and energy policies. Neither energy commodity trading nor an electricity pool exists in Northeast Asia. An energy pool needs to be developed in advance of emissions trading. Experiences from electricity trading can be applied to implementation of emissions trading in Northeast Asia (Kim 2001: 13, 21).

- **Imbalance between supply and demand in energy and GHG markets.** Combination of high demand in China and excess supply in Russia would require energy pooling. Power grid interconnection will offer the ground for a platform to support a regional emissions trading. However, insufficient market liquidity due to market concentration means that the emissions trading platform will perform poorly (Kim 2001: 21).

- **Risks associated with different fiscal and legal systems.** Due to institutional barriers there had been few commercial commitments in Northeast Asia before the opening of Russian and Chinese markets (Kim 2001: 21). Earlier this problem was addressed in a specific context of barriers to the Japanese investments in Russia.

- **Country risks and political uncertainties involved with emissions trading.** With relative instability of the region’s political landscape liability and compliance would be critical (Kim 2001: 13-14).

- **Lack of governance.** No directive or court for justice exists in order to restrict economic activities if necessary, and resolve disputes (Kim 2001: 14). Policy makers have engaged in domestic policy designs based on their own priorities toward sustainable development paths. Harmonisation of fiscal policies remains to be seen (Kim 2001: 14, 21).

The above list of concerns reflects upon the region’s characteristics: the dominant role of national governments against economic efficiency through regional economic integration. It is more likely that the region’s emissions trading markets will develop in a fragmentary and incremental fashion, and that the process will require a much longer time-frame than the development of the EU-wide scheme does.

### 5.3. A possible framework for regional co-operation in Northeast Asia?

Among Russia, Japan and China there is neither a consensus nor a sense of urgency to establish an institutional framework for multilateral regional co-operation (Akaha in Ivanov and Oguma 2001: 11). Consequently there is no sub-regional organisation or governmental framework, which is as comprehensive as the EU or the NAFTA. It is suggested that a ‘second track’ dialogue on energy and environmental issues could be useful in preparing the ground for an inter-governmental negotiations for long-term strategic issues (Ivanov and Oguma 2002: 41; Ivanov and Oguma 2001: 15, 32). This concept seems to be originated in their observation of the EU’s experience with Russia. There is a common understanding that the resource development of the European side of Russia contributed to the stabilisation of the EU-Russia relations (Fesharaki et al. 2000: 2; Yoon 2002: 189; Ivanov and Oguma 2002: 35). The Energy Charter Treaty has been also studied for its relevance to Northeast Asia (Ivanov and Oguma 2002: 38-40; Abe in Ivanov
and Oguma 2001: 10). However, given Russia’s reluctance to ratify the Charter Treaty and China’s observer status, it is not clear how another charter could bring in stability to the already vulnerable energy security in the region.
6. How developing countries can fit into sub-global arrangements?

The role of developing countries, notably their commitments will be crucial for the emerging future global climate regime. Given that developing countries remain broadly reluctant to take on targets, a number of concepts have been developed to overcome this reluctance. The following chapter will review the principle approaches and then discuss i) how some approaches fit in with the "sub-global" or "partial" agreement approach and ii) whether there is evidence for "sub-global" arrangements in the area of developing countries. Finally, the section will also try to identify whether there is potential for "sub-global" arrangements.

6.1. Introduction

Developing countries’ participation has been a contentious issue long before the Marrakech Accords, or even the Kyoto Protocol. It is alleged that the Kyoto Protocol fails short to provide for developing countries’ early participation in the mitigation regime. One of the main problems is that the Protocol’s architecture would not lead developing countries’ emissions trajectories to sustainable development paths, with a view to meeting the ultimate objective of the UNFCCC: stabilisation of GHG concentrations at a relatively low level. A number of recent proposals have been made for early participation from developing countries. However, our review of the proposals suggests that there is no magic formula for differentiation of commitments against a number of criteria such as environmental integrity, cost-effectiveness, political feasibility, and equity. In particular there is a strong divide between industrialised countries and developing countries over what constitutes equity. Lack of a single magic formula that all countries could agree upon reflects a wide variance in country-specific circumstances, and highlights the pluralistic nature of equity. This stresses the importance of a bottom-up approach, which would lead to a gradual increase of participants in the mitigation regime.

A special question arises as to the relevance of greenhouse gas (GHG) emissions trading to developing countries’ participation. While a majority of the proposed formulas include some elements of international emissions trading (IET), there are proposals based on common policies and measures (e.g. taxation, national emissions trading). A recent experiment also shows that direct financial transfer to additional countries can be more cost-effective than excess emission allowances as a partial compensation for cost uncertainty from developing countries’ participation in emissions trading (Bohm and Carlén 2000).

The review concludes that the most feasible and cost-effective option for a developing country would be a sustainable development based approach. The approaches could incorporate regional energy co-operation as one of the effective policies and measures. In some countries the proposed Green Investment Scheme (GIS) may prove to be effective in attracting foreign investments into the energy sectors for improvements in energy efficiency. The option will appeal to the widest range of developing countries regardless of their population size. It is possible that some developing countries on the sustainable development paths would start breaking their ranks within non-Annex I Parties. They could choose 1) mainly implementing domestic policies and measures, 2) joining Annex I Parties with differentiated obligations and commitments or 3) form coalitions of like-minded states on the sustainable development paths. This means that there will be a political upset in the unity of the G77/China, following the disintegration of the Umbrella Group.
6.2. The implications of the Kyoto Protocol and Marrakech Accords for developing countries

The UNFCCC recognises the principle of ‘common but differentiated responsibilities and respective capabilities’ in a burden sharing agreement with regard to GHG emission reductions (Article 3.1). The Berlin Mandate explicitly stated the need to establish GHG emissions reduction targets for Annex I Parties and affirmed the implementation of the general commitments defined by the UNFCCC for all the Parties (La Rovere et al. 2002: 158). The Kyoto Protocol confirmed that there would be no legally-binding quantified emissions reduction targets for non-Annex I Parties during the first commitment period. On the other hand it is important to stress that non-Annex I Parties are subject to general obligations under both the UNFCCC (Article 4.1, 12) and the Kyoto Protocol (Article 10). They include commitments to implement and regularly update mitigation programmes, to report their progress to the Convention, and to promote development of energy-efficient technology. The implementation of these commitments, however, would depend on the receipt of assistance from Annex II Parties (Article 4.7). Emission reductions in developing countries will require substantial resource transfers from developed countries to developing countries (Winkler et al. 2002b: 316). So far three funds have been established under the overall Kyoto Protocol framework: an Adaptation Fund which is financed from a 2% levy on transactions through the Clean Development Mechanism and operated under the Kyoto Protocol; a Special Climate Change Fund which will finance adaptation and mitigation projects; and a Least Developed Countries (LDC) Fund which will finance adaptation programmes in LDCs.

In advance of the negotiations in Kyoto US Senate’s non-binding resolution (see chapter 7) set out two conditions for its ratification of the forthcoming protocol: no harm to its national economy and full participation of developing countries. In doing so the Senators intended to leave possibilities for future ratification as the circumstances may change however slim the possibilities were. President Bush’s announcement of withdrawal from the Kyoto Protocol with his reference to the Kyoto Protocol as ‘fatally flawed’ was a clear departure from the Senate’s resolution. The US withdrawal caused various speculations about its impact on the making of the emerging global carbon markets. On the other hand his direct reference to the Kyoto Protocol has revived one of the most controversial issues during the negotiations in Kyoto: differentiation of commitments to emission reductions in general; and allocation of emission allowances in particular. Even within the Kyoto Protocol framework there has been hidden agenda on possibilities for non-Annex I Parties’ participation during the second and subsequent commitment periods.

This highlights inconsistencies or even incompatibilities of some essential components of the Kyoto framework. Most importantly, there is a question of compatibility between developing countries’ emissions trajectories with the UNFCCC’s ultimate objective to stabilise atmospheric concentrations of GHGs ‘at a level that would prevent dangerous anthropogenic interference with the climate system’ (Article 2). Cooper raises two questions: how can developing countries be brought into the Kyoto Protocol framework for setting national targets?; and whether can the objective of stabilising GHGs concentrations in Article 2 of the UNFCCC means that formal concentration targets have to be negotiated (Evans 2002: 4). There is no agreement on what constitutes a dangerous level on GHG concentrations (Baumert and Kete 2002: 24). Hence Victor claims that governments would not yet be able to identify the particular thresholds that would trigger climate change (2001: 18-19). Evans argues that scientific uncertainty cannot be used as an excuse for delaying commitments (2002). The longer a fixed target is delayed (‘wait and see’), the higher concentrations will climb until stabilisation at a low level, 450ppmv, or even higher at 550ppmv is no longer possible (Evans 2002: 5, 8, 18-19; see also O’Neill and Oppenheimer 2002).
priorities of the developing countries be accommodated in subsequent commitment periods? (2001: 11486) His answer is clear: they cannot be brought into the Kyoto Protocol framework without compromising its ultimate objective (Cooper 2001: 11486). Cooper attributes the failure of the Kyoto Protocol framework in involving developing countries to the base-weighted targets, which are more commonly known as ‘grandfathering’. Grandfathering will be later introduced as one of the two reasons for developing countries’ reluctance in early participation. However, we would suggest that grandfathering only reflects upon the more fundamental problem with the framework.

The most compelling reason for considering developing countries’ commitments would be projected growth of their GHG emissions. Long-term stabilisation of atmospheric GHG concentrations will require action by all countries. An incremental approach had been proposed to start with involving developing countries on the basis of voluntary commitments with relative targets or technology agreements (Baumert et al. 1999). However, gradually increasing participation beyond Annex I Parties will not leave enough time to see whether non-Annex I Parties will reverse their opposition to quantified emissions reduction targets (Evans 2002: 7). Such an incremental evolution of the mitigation regime in the form of a gradual ad hoc extension of the Annex I Parties is unlikely to bring about the level of global emission control needed to keep open the option of stabilising CO₂ concentrations at a relatively low level (Berk et al. 2001: 16-17; Evans 2002: 19). Evans (2002) insists that early participation in the mitigation regime based on quantified emissions reduction targets would benefit non-Annex I Parties. As time goes by, faster and deeper reductions will be required. Developing countries would have far lower entitlements than they would have done if they had been allocated quantified emissions reduction targets at an earlier stage (Evans 2002: 20). The sooner they join the regime, the more low-cost emission reductions will be feasible during the first commitment period (Bohm and Carlén 2000: 3). However, the longer developing countries’ commitments to quantified emissions reduction targets is delayed, the more of their excess emission allowances will be used up by developed countries, and the less surplus they will have for sales when they take on quantified emissions reduction targets (Evans 2002: 8, 20). Evans further goes on to say that equity which provides a number of the proposed options for differentiation with moral foundation should be subordinated in climate change policy to the more fundamental objective of environmental effectiveness (2002: 6). However, the principle of ‘common but differentiated responsibilities’ (Article 3.1) in the UNFCCC supports non-Annex I Parties’ claims for equity in burden-sharing while that of sustainable development (Articles 2) in the Kyoto Protocol addresses their rights to development.

To sum up, the UNFCCC’s ultimate objective does not appear to fit well into developing countries’ emissions trajectories while other associated principles in the UNFCCC and the Kyoto Protocol do. The best approach to early participation would be to provide non-Annex I Parties with an incentive to alter their emissions trajectories from the business as usual scenarios, which could also lead to further emission reductions.

The problem is aggravated by the incompatibility between time-frames for rule-making and those for implementation. There is a mismatch between a long-term policy architecture of the climate change regime and short-term emission commitments (Bodansky 2002b: 2). Countries prefer to adopt short-term commitments that are economically acceptable but without a long-term perspective for stabilising GHG concentrations (Baumert and Llosa 2002: 229; Berk et al. 2001: 16). It is pointed out that a number of options for differentiation of commitments focus on short-

---

43 For instance, see ‘common but differentiated responsibilities and respective capabilities’ (Article 3.1, UNFCCC), ‘the specific needs and special circumstances of developing country Parties’ (Article 3.2, UNFCCC), and a right to sustainable development (Article 3.4, UNFCCC).
term approaches in order to attract developing countries to a global climate change regime (Metz et al. 2002: 218). This however would undermine the environmental integrity of the Kyoto Protocol and conflict with the long-term objective of the UNFCCC. It is also suggested that the commitment periods under international law are typically much shorter than the period of time required for monitoring environmental change (Victor 2001: 9). A longer timetable would suit to settle over remaining details about operation of flexible mechanisms including CDM. On the other hand, the longer the timetable is scheduled, the shorter the time will be left between completion of the framework and the target date or period (Victor 2001: 7).

Although it may not prove to be a solution, economists have attempted to improve the mismatch between two different time frames by introducing dynamic targets which could be adjusted to changing circumstances. Dynamic targets can reduce economic uncertainty in the target-setting process and strengthen environmental integrity particularly with respect to developing countries by creating less hot air (Baumert and Kete 2002: 15). One of the main types of dynamic targets is based on the GHG/carbon intensity indicator, which will be discussed later. Intensity indicators are considered to be more appropriate than absolute emission levels for developing countries with fast growing economies (Evans 2002: 13). High uncertainties associated with rapidly changing economic assumptions make it difficult to project exact absolute emission levels (Baumert et al. 1999: 5-6). Moreover, the long-term time-frame used in analysis of global climate policy makes it essential to take into account the rate and direction of relevant (cost-reducing) technological change (Jaffe, Newell, and Stavins 1999, 2000 in Stavins 2000: 7; Buchner et al. 2002; Victor 2001: 11; on ‘global energy technology strategy’ see Lisowski 2002: 169).

Finally, there is a question of compatibility of the Kyoto Protocol mechanisms including international emissions trading (IET) with fixed targets for Annex I Parties introduced by the Kyoto Protocol. The interaction of emissions trading and new commitments would pose significant risks particularly in relation to non-Annex I Parties’ entry into IET with large emission growth targets (Baumert et al. 1999: 7, 16). The fact that the resource is limited and therefore known to be valuable will lead many countries to hold out for generous treatment in terms of lenient targets as a condition for their binding agreement. The sum of such generous treatment might undermine the purpose of the agreement (Cooper 2001: 11487-11488). There are two different concerns with impacts of new entrants into IET. One is related to environmental integrity with special reference to creation of excess emission allowances. The other concern is associated with governance, which would be relevant to common to implementation of official development aid as well.

The question of environmental integrity has been briefly mentioned in the previous section on the compatibility of two different time-frames. Some incentives designed to facilitate developing countries’ participation such as allocation of excess emission allowances are short-sighted and would conflict with the long-term objective of the UNFCCC. The original version of the Kyoto Protocol agreed in 1997 set out quantified emissions reduction targets for Annex I Parties while

44 It is possible to use relatively simple analytical models for many environmental problems with aim to comparing policy instruments where static (short-term) cost-effectiveness can be regarded as a criterion for comparison. However, the long-term nature of global climate change requires a dynamic long-term cost-effectiveness as a criterion for comparison (Stavins 2000: 7). Long-term concentration targets are unlikely to be dynamically consistent compared to short-term emission targets (Aldy et al. 2001: 29). Dynamic targets are often linked to GDP but can be based on other variable indicators such as emissions per unit of energy use and emissions per capita that have a strong influence on emission levels (Philibert and Pershing 2001 in Metz et al. 2002: 215n2; Baumert and Kete 2002: 15, 26).
exempting non-Annex I Parties from these commitments as a whole. Annex I Parties in particular the US felt their targets were extremely stringent (Cooper 2001: 11490; Victor 2001:7; Bodansky 2002: 7). It would be politically impossible for Annex I Parties to meet the Kyoto Protocol targets domestically without participating in IET (Victor 2001:7; Cooper 2001: 11490).

It is interpreted that in Kyoto the overall stringency of the collective target for Annex I Parties as well as the individual targets for each of them was presented in a package together with lenient targets which would yield excess emission allowances for EITs (Baumert et al. 1999:7). Sales from excess emission allowances could generate additional revenues for the exporting countries. Aslam (2001) also insists that excess emission allowances for EITs need to be seen as a necessary compromise and political incentive for inclusion of reluctant countries into the IET system (130, 133). However, it is widely understood that allocation of excess emission allowances without regard to any real emission reductions could undermine the environmental integrity of the Kyoto Protocol (Depledge 2002: 51). It would squeeze out bona fide efforts to achieve real emission reductions (Victor 2001: 10). While the claim that the Kyoto targets as a package deal should be acceptable in terms of environmental effectiveness can be justified, it is also reasonable to hold that such a package heavily relied on a delicate balance of interests. The balance of interests between Annex I Parties and non-Annex I Parties was lost in Marrakech. The environmental integrity of the package agreed in Kyoto was significantly undermined by the Marrakech Accords, which effectively reinterpret the Kyoto Protocol and revised the agreed targets. The targets were relaxed for some Annex I Parties mainly through provision of additional credits from sinks and acceptance of a liberal IET system without any major restrictions on transactions. Provision of additional credits is considered to be another form of side payment to keep reluctant Annex I Parties within the Kyoto Protocol framework.

Allocation of excess emission allowances to EITs, together with additional credits, have the further disadvantage of setting strong precedents of awarding relaxed and generous commitments to expand the system (Aslam 2001: 130, 133). Developing countries’ full participation in IET would generate excess emission allowances or the so-called ‘tropical hot air’ compared to ‘hot air’ in EITs (Depledge 2002: 51). The problem is that after the Marrakech Accords Annex I Parties’ targets will be unlikely to be renegotiated and therefore not available for another package deal. Generous emission growth targets for non-Annex I Parties during the same commitment period, cannot be balanced by simultaneously strengthening Annex I Parties’ targets (Baumert et al. 1999: 7).

Another concern with impacts of new entrants into IET centres on the quantity and quality of wealth transfer from developed countries and developing countries. This is not peculiar to wealth transfer associated with IET but would be relevant to official development aid as well. The volume and scale of capital flows would discourage developed countries from participating in full IET (Lisowski 2002: 165). Capital flows resulting from sales of excess emission allowances would possibly crowd out bona fide efforts to achieve real emission reductions. The flexibility introduced in the KP is likely to result in politically unacceptable large transfers among developed countries, in particularly to Russia and Ukraine (Cooper 2001: 11490). Nonetheless a number of proposed options for differentiation of commitments accommodate IET, yet the coverage of such schemes vary significantly. The volume of capital flows to developing countries will be likely to be the largest in the original version of the equal per capita emissions approach where IET will operate on a full scale from the beginning.

McKibbin and Wilcoxen (2002) for instance estimate that US firms may need to spend more money for purchasing permits (US$27 to 54 billion) from abroad than operating pollution abatement equipment (US$26 billion, 1994).
Next, there are high uncertainties about the way the capital raised through IET is going to be spent (Lisowski 2002: 165; Metz et al. 2002: 222). Cooper alarms us that some transfers would be made to governments ridden with corruption (2001: 11488, 90). Amongst other options equal per capita emissions approach may prove to be most prone to this criticism because of expected sheer volume of transactions (Lisowski 2002: 165). For a solution conditions may be attached to use of revenue from sales of permits, much of which would have to be invested in projects in low carbon development. However, such a policy might not be attractive to developing countries (McKibbin and Wilcoxen 2002: 26).

A recent experiment shows that as a partial compensation for cost uncertainty from developing countries’ participation in IET 46 direct financial transfer to additional countries can be more cost-effective than sole reliance on a transfer of excess emission allowances (Bohm and Carlén 2000). A large increase in financial and technological assistance would be expected in exchange for non-Annex I Parties’ entry into the mitigation regime (Depledge 2002: 47, 54). At least direct financial transfer would reduce the incidence of excess emission allowances. However, it would not decrease the risk of misuse or abuse of transferred capitals by recipient governments.

6.3. Developing countries’ reluctance in early participation

Developing countries are reluctant to consider early participation in the mitigation regime for two major reasons. First, their priority to climate change is relatively low. They would prefer sustainable development with a strong emphasis on poverty alleviation to environmental protection (Metz et al. 2002; Baumert and Kete 2002: 10), and adaptation to mitigation. They give more weight to funding for reduction of vulnerability to the impacts of climate change (Baumert and Kete 2002: 9) than to setting emissions reduction targets. From their perspectives oriented toward sustainable development the Kyoto Protocol framework is problematic particularly with respect to its method of allocating emission allowances based on so-called ‘grandfathering’. Grandfathering is biased toward current and historical emission levels. The Kyoto Protocol framework which is weighed on a historical base (e.g. 1990 levels) with modest differentiation, is unacceptable to developing countries which prioritise economic development (Cooper 2001: 11486; see also Müller 2001a). Grandfathering does not respond to the need to accommodate new entrants (Victor 2001: 13; Blanchard et al. 2002: 283). Moreover, it is possible to negotiate for grandfathering without any discussion of a long-term, environmentally sound, and collective target (Aslam 2002: 175). One solution for both accommodating new entrants and maintaining environmental effectiveness is to frame the issue of climate change, in particular that of an allocation scheme in a different way. For instance, the equal per capita emissions approach regards the issue of climate change as a ‘resource allocation’ problem (Metz et al. 2002: 216; Aslam 2002: 177, 182-183; Müller 2001a; Baumert and Kete 2002: 28).

Second, developing countries attribute to lack of leadership from developed countries despite of its historical responsibility (Depledge 2002: 54; Aslam 2001: 131; Baumert and Kete 2002: 6, 9-10). It would be necessary to call for deeper emission cuts from Annex I Parties in exchange for non-Annex I Parties’ entry (Depledge 2002: 47, 54). However, as earlier said, it is highly unlikely that the Kyoto Protocol targets finalised in Marrakech will be open to negotiations again. Thus it

46 There are various risks involved in developing countries’ participation in IET. For instance, developing countries’ net gains from joining an IET are not certain. Also, international demand for permits would drive up a developing country’s exchange rate and crowding out their other exports from international markets (McKibbin and Wilcoxen 2002: 26).
is understood that ‘deeper emission cuts from Annex I Parties’ refers to those who have not ratified the Kyoto Protocol, e.g. US and Australia.

Eventually acceptance of quantified emissions reduction targets by non-Annex I Parties would be linked to the re-entry of the US into the Kyoto Protocol. Notably Mexico, China and others with strong trade relations with the US would make their commitments conditional upon the US return to the Kyoto Protocol (Depledge 2002: 55). Likewise the US would consider its return when the following three issues that have reinforced US intransigence are settled: excess emission allowances; cost uncertainty; and developing countries’ participation (Lisowski 2002). Technically speaking, another package deal can be made in future negotiations involving the US on the one hand, and developing countries on the other. However, it is highly unlikely that the US would accept stringent targets that could afford to give lenient targets to developing countries.

6.4. Options for differentiation of commitments

Commitments to emissions reduction targets may take one of the two forms: quantifying emission allowances and setting emissions reduction targets; or sharing the mitigation costs. Most of the formulae proposed by negotiating countries follow the first form, possibly because emission levels are supposed to be easier to monitor than mitigation costs (Baumert and Kete 2002: 11). Nevertheless it has been alleged that the Kyoto Protocol targets expressed in terms of absolute emission levels are a political compromise with no explicit links to scientific or economic rationale. They are arbitrarily determined as a result of intergovernmental bargaining not according to an objective standard formula (Evans 2002: 7-8; Babiker and Eckaus 2000: 5; Baumert and Kete 2002: 18; Depledge 2002: 37; Aslam 2001: 130, 133; Aslam 2002: 175, 192; Torvanger and Ringius 2000: 10; Berk et al. 2001: 15-16). On the other hand it has become clear from our review that despite a number of proposals there is no magic formula for differentiation of commitments which could accommodate broad concerns with environmental integrity, cost-effectiveness, and equity. Moreover it appears to be difficult to create an allocation scheme based on a single criterion that would suit not only all developing countries (Winkler et al. 2002b) but also industrialised countries. For instance the equal per capita emissions approach does not favour South Africa. Ability to pay (capacity) e.g. per capita income would be problematic for Argentina. Commitments based on its own emission intensity would not be appropriate for Brazil (Winkler et al. 2002b). That no single criterion will be feasible reflects a wide variance in country-specific circumstances such as geography, climate, resource endowments, and economic structure. It also highlights the pluralistic nature of equity. Therefore Berk et al. suggest us not to focus on any single equity principles but to look for approaches accommodating different equity principles (2001: 18). As our review shows below, there are a number of hybrid schemes combining several principles which are complementary to each other.

The rest of this chapter will examine the main proposals for resource allocation schemes and economic incentives. First, the extension of the current Kyoto Protocol framework will be examined. Provided with its limited capacity to accommodate new entrants, alternative options for differentiation of commitments will be introduced. Among resource allocation schemes the first group of options adopts ‘per capita emissions’ in terms of an indicator and a norm. The second group is based on the principle of ability to pay. The third group asserts the principle of

---

47 The carbon prices depend upon the prevalence of excess emission allowances and the marginal cost of emission abatement (Lisowski 2002: 164). For the relevance of excess emission allowances in EITs to the Kyoto Protocol also see Babiker et al. (2002: 6-8).
historical responsibility. Finally economic incentives will be brought on board in order to highlight the relevance of principles.

6.4.1. ‘Kyoto-plus’

‘Kyoto-plus’ proposals refer to approaches, which basically maintain the existing framework of the Kyoto Protocol with slight modifications (Evans 2002: 7). The current Kyoto Protocol framework is characterised by a clear and simple division between the two categories of Parties: Annex I Parties and non-Annex I Parties. In theory the Kyoto Protocol allows for accession of individual non-Annex I Parties to Annex I status (Baumert et al. 1999: 16). At least three incentives for their accession are identified (Aslam 2001: 132): a right to participate in IET which could generate a new source of export earnings; acquisition of appropriate technology by use of the earnings; and creation of local environmental benefits through mitigation projects to advance objectives related to sustainable development. The timing of accession would be important. Accession of countries with excess emission allowances would undermine the environmental integrity of the Kyoto Protocol if these countries join during an existing commitment period (Depledge 2002: 45).

This process would suit countries which do not consider themselves to be developing countries nor are members of the G-77/China but EITs (Depledge 2002: 36, 43, 45). For instance, Kazakhstan initiated the process so that the country should be able to participate in IET. Despite strong oppositions by some countries from the G-77/China which feared the precedent to be set, the country has joined Annex I not Annex B yet (Aslam 2001: 131; 135; Depledge 2002: 43-44). In contrast Argentina sought to maintain non-Annex I status while requesting for the right to participate in all the Kyoto Protocol mechanisms (CDM, JI, IET)(Aslam 2001: 139). Motivated by the desire to become a member of the OECD (Aslam 2001: 132), Argentine proposed in 1999 to take on a voluntary commitment for the first commitment period (Depledge 2002: 48; Aslam 2001: 141). As the two countries have broken ranks, there are ongoing break-ups within the united front of G-77/China vis-à-vis Annex I Parties. However, gradual entries of non-Annex I Parties through voluntary participation would loosen the unity of the G77, which may prove politically unacceptable to the Group (Depledge 2002: 48; Aslam 2001: 141).

The examples of Kazakhstan and Argentine address a number of questions concerning the process for accession: whether an acceding country would have to take on all the responsibilities and obligations of the existing Annex I Parties; whether a more relaxed and progressive system of accepting responsibilities and obligations would be possible; and to what extent a country would forgo its ‘rights’ as a non-Annex I Party if it was to take up a commitment. (Aslam 2001: 135). As these questions remain to be answered, it is not in practice easy for individual non-Annex I Parties to join the mitigation regime through the accession process.

The above set of questions is concerned with the rationale for the division between the two categories of Parties despite wide disparities in country-specific circumstances. Victor proposes for a minimum change in the Kyoto Protocol framework with retaining the targets and trading architecture but stretching out the timetables (2001). In this proposal allocation of emission allowances will be limited to OECD member states not given to developing countries (Evans 2002: 12). However, some OECD members including Mexico and South Korea are not listed in

---

48 The country chose to set a dynamic target for itself based on emissions intensity (emissions per unit of GDP) (Depledge 2002: 57).
Annex I and therefore exempted from taking up quantified emissions reduction targets. Israel and Singapore generate high income and possibly high GHG emissions and therefore can be grouped with the two new OECD members. Central Asia of the FSU and several CEEs do not consider themselves to be developing countries but EITs. Within G-77/China there is a conflict of interests over funding between developing countries particularly vulnerable to climate change, especially Alliance of Small Island States (AOSIS) and oil exporting countries (e.g. OPEC). AOSIS and LDCs are seeking assistance to help them minimise the adverse effects of climate change (Articles 4.8 and 4.9, UNFCCC; Article 3.14, Kyoto Protocol). However, as OPEC demands assistance to compensate for the impacts of response measures, i.e. potential loss of oil revenues (Articles 4.8 and 3.14), Annex B Parties have become more cautious in implementation of their pledges on financial transfer (Barnet and Dessai 2002; Barnet 2001). Although allocation of the pledge among Annex B Parties is not clear, OPEC will be most likely to support the special climate change fund while LDCs and Small Island Developing States (SIDs) will prefer the Adaptation and LCD funds. The solution to the problem ultimately depends on G77/China, which has in effect given OPEC a tacit support (Barnet and Dessai 2002; Barnet 2001).

In response to gradual disintegration of non-Annex I Parties future negotiations for emissions reduction targets may take various forms. It will be possible that the LDCs are exempted from the first round, and rest of the G-77/China negotiate among themselves. The latter may include creation of regional bubbles eg. ASEAN (Aslam 2001: 140; Depledge 2002: 48). Some countries may choose to peg their targets to those of their main economic partners, reflecting their reliance on interdependencies. e.g. MERCOSUR, the enlarged EU (Depledge 2002: 48). Lastly, large developing countries and those countries with high income may negotiate on their own targets with the major Annex I Parties. (Depledge 2002: 48). The problem with grouping is that non-Annex I Parties which will benefit most from IET will possibly accept commitments to emissions reduction targets but those which will be required strict or real emission reductions will not be inclined to participate in IET (Jansen et al. 2001: 32). Alternatively more flexibility can be introduced in target setting. For instance, non-Annex I Parties would be allowed to choose their own historical base years (Depledge 2002: 49; Aslam 2001: 140). It would be possible to take a base period rather than a single base year e.g. Hungary uses 1985-87 as a base period (Depledge 2002: 49). Non-Annex I Parties may also select which gases are covered by their targets (Depledge 2002: 49). Moreover, developing countries’ commitments may start with introduction of ‘partial caps’ based on selected industrial sectors, which could progressively expand towards a national cap (Aslam 2001: 140).

6.4.2. Equal per capita emission entitlements

‘Per capita emissions’ can be understood both in terms of an indicator and a norm. As an indicator, ‘per capita emissions’ refers to the emissions of each individual in a particular country (Aslam 2002: 176). It enables us to evaluate disparities in emission levels across countries, to differentiate commitments to emissions reduction targets between countries, i.e. as part of burden-sharing schemes, and to signal the timing of commitments to be taken by countries, i.e. as a trigger for developing countries’ participation (Aslam 2002: 177). Moreover, ‘per capita emissions’ represents principles such as equality and need (Baumert and Kete 2002: 18; Blanchard et al. 2002b: 285; Metz et al. 2002: 216; Depledge 2002: 57; Torvanger and Ringius 2000: 2; Aslam 2002: 184-185), which makes the approach politically more acceptable to developing countries. On the contrary, per capita emissions might be less acceptable to industrialised countries.
Box 6.1

As a norm, ‘per capita emissions’ can be understood as ‘equal per capita emission entitlements’. It helps us determine how much each country should be allowed to emit (Aslam 2002: 176). The equal per capita emissions approach is a top-down method (Torvanger and Ringius 2000: 6; Aslam 195). The approach frames the issue of climate change as an equitable ‘resource-sharing’ problem (Metz et al. 2002: 216; Aslam 2002: 177, 182-183; Müller 2001a: 2; Baumert and Kete 2002: 28; Agarwal and Narain 1999 in Kasper and Kasper 2001: 14). The atmosphere is usually regarded as the global commons to which every human being is equally entitled (Berk et al. 2001: 19; Aslam 2002: 177). However, strictly speaking, it is in effect the ‘limited assimilative capacity’ of the atmosphere to absorb GHG emissions that gives the ‘scarcity’ reserve value to the atmosphere (Aslam 2002: 182-183). Accordingly, an equal entitlement means that each person has a right to emit an equal amount of GHGs (Baumert and Kete 2002: 28; Torvanger and Ringius 2000: 2; Agarwal and Narain 1999 in Kasper and Kasper: 2001: 14). Next, the scarcity value has been intrinsically recognized, quantified, and monetarily capitalized through emissions trading’ (Aslam 2002: 182-183). The value of emission allowances is created by virtue of placing binding limits on emissions according to the assimilative capacity of the atmosphere (Cooper 2001: 11487). An emission allowance is a user right not an ownership of the resource. The user right allows the atmosphere to be quantified for allocation (Aslam 2002: 182-183).

On the basis of equal per emission entitlements the proposal for ‘contraction and convergence’ has developed with some variants (Meyer 2000 in Lisowski 2002: 165-166; Metz et al. 2002: 216; Aslam 2002: 178-179, 189-191; Agarwal and Narain 1999 in Kasper and Kasper 2001: 14; Evans 2002:16; Baumert and Kete 2002: 19, 28; Torvanger and Ringius 2000: 2; Berk et al. 2001: 19). It aims at a convergence by a specific date of per capita emissions at an equal level under a contracting global emission profile. First, the proposed scheme establishes an allowable level of overall CO₂ atmospheric concentrations based on the IPCC scientific assessments in consistent with the ultimate objective of the UNFCCC. The CO₂ concentration target is meant to be an ultimate collective target yet can be adjusted according to updated information in the IPCC assessments. Then emission allowances are distributed equally with each country getting entitlements according to the size of a country’s population. The overall global emissions must contract to the allowable level of CO₂ concentrations gradually over time. Contraction continues towards a level where countries’ per capita emissions converge toward an equal level across countries. This approach allows most developing countries’ per capita emissions to increase while demanding a reduction of most developed countries’ per capita emissions. At the same time it expects growing emitters to take steps not to exceed their assigned amounts while requiring the largest emitters to reduce their emissions to entitled amounts.
IET would enable countries to minimise mitigation costs and keep them relatively low (Metz et al. 2002: 222). Hence inclusion of IET is essential to ensure cost-effectiveness and environmental effectiveness (Aslam 2002: 186; Baumert and Kete 2002: 22). Developing countries’ early participation, particularly those with relatively lower abatement costs could maximise these benefits from IET (Aslam 2002: 186). IET would provide developing countries with an additional incentive to participate in IET. It would generate revenues from sales of excess emission allowances for developing countries (Lisowski 2002: 165; Metz et al. 2002: 222; Evans: 2002 16). Possibly because of expected revenues from sales of excess emission allowances, many developing countries generally stand to gain more from an equal per capita emissions approach. It is likely that this approach would be able to attract the earliest possible entry of developing countries (Aslam 2002: 186).

Moreover, it is claimed that the problem of excess emission allowances will not arise (Evans 2002: 16; Lisowski 2002: 165). Even if any, excess emission allowances could be at least controlled and limited (Aslam 2002: 187). The scheme expects to engage all countries in IET after the first commitment period simultaneously (Aslam 2002: 178). Its aim at full global operation of IET from the start means that all emissions will be covered in a global framework (Evans 2002: 16; Aslam 2002: 187). Since all trading would take place under a contracting global emission profile (Evans 2002: 16), there will be no excess emission allowances. The volume of wealth transfer to developing countries participating in IET would be especially large on the basis for equal per capita emissions.\(^{49}\) Lastly even if excess emission allowances are eliminated and the amount of capital flows is scaled down, there remains a general problem of governance associated with large wealth transfer. Governance is especially a serious concern for an equal per capita emissions approach because of its rationale: each person has an equal entitlement to GHG emissions. However this approach accepts that wealth generated from IET is transferred to governments not individuals (Lisowski 2002: 165).

It is alleged that an equal per capita emissions approach is insensitive to country-specific circumstances which contribute significantly to variations in per capita emissions (Ybema et al. 2000 in Aslam 2002: 190; Aslam 2002: 189-191). These circumstances may include geographic or climatic conditions, the structure of the respective economy, and resource endowments. Benefits are likely to be skewed (Aslam 2002: 193). China, India, and sub-Saharan Africa excluding South Africa will be the major beneficiaries and the major proponents (Aslam 2002: 181. 193-194). Oil-producing countries and the more developed of developing countries (Singapore, Argentina, and South Africa) are relatively disadvantaged (Aslam 2002: 193). The main opponents will be the US and Russia who would be subject to wealth transfer from any shift to this approach (Aslam 2002: 194). Moreover, the approach will potentially create unwanted distortions, such as taxing countries with efficient economics or punishing countries with limited access to renewable resources that would tend to reduce their emission levels (Aslam 2002: 190). In the short to medium term global acceptance of this approach seems politically though it could be a guiding principle in the long term (TERI 1997 in Aslam 1997).

\(^{49}\) For instance, India could potentially increase its emissions in 2010 by 722% over the 1990 level (Gupta and Bhandari 1998 in Gupta 2002: 10). Actual emissions may not increase even three times over the same period. The scale of Indian excess emission allowances may not be politically and internationally acceptable (Gupta 2002: 10). Interestingly, with a liberal allocation scheme such as the equal per capita emissions approach, reduction of abatement costs through technical progress could lead to a decrease in revenue for countries which export emission allowances (Bertram 1996 in Gupta 2002: 10).
The reasons for its failure to account for country-specific circumstances may be associated with the top-down method and the simple allocation formula with only two variables, dates and targets. An increase of variables could increase the flexibility of the approach to accommodate disparities in country-specific circumstances (Aslam 2002: 189, 197). One solution is to introduce explicit provisions for these special circumstances, or so-called ‘allowance factors’ (Aslam 2002: 197; Ybema et al. 2000 in Aslam 2002: 190). Multi-sector convergence approach, which will be later discussed incorporates allowance factors. Another solution is to extend a transition phase or phase out requisite emission reductions (Aslam 2002: 197; Metz et al. 2002: 216). Some variants phase the participation of both developed and developing countries toward convergence. The RIVM (National Institute for Public Health and the Environment, the Netherlands) version of historical responsibility, soft-landing approach and multi-sector convergence approach all of which will be shortly introduced phase in developing countries’ participation according to emission levels. Soft-landing approach allows for ‘soft-landing’ of Annex I Parties to sustainable emissions trajectories. For developing countries an equal per capita emissions approach allows phased-graduation (Aslam 2002: 189, 192). For Annex I Parties the transition phase aims at softening impacts of convergence and allowing for adjustment in the short term (Aslam 2002: 180). Until 2012 they are supposed to fulfil the Kyoto Protocol targets. Until 2025 they will commit to targets based on their relative emission intensities. After 2025 per capita emission entitlements apply to all countries (Gupta and Bhandari 1999 in Metz et al. 2002: 216; Gupta and Bhandari 1999 in Aslam 2002: 180). This proposal opens possibilities for a two track approach: extending the Kyoto Protocol targets for Annex I Parties until after the first or second commitment periods while allocating per capita emission entitlements to developing countries.

6.4.3. Per capita income

Per capita income in this context can be understood as an indicator. However, it is also associated with a set of principles such as capability, ability to pay, and proportionality (Metz et al. 2002: 215; Torvanger and Ringius 2000: 2; Blanchard et al. 2002b: 285). It takes into account both the ability of developed countries to pay and the priority of developing countries to promote economic growth and poverty reduction (Blanchard et al. 2002b: 284). Babiker and Eckaus (2000) propose to apply the rules by which the costs of financing the UN budget are allocated. Similar rules also apply to budget allocation in World Bank and IMF. They argue that even though the levels of the individual country’s contributions vary with per capita income levels as well as size, a minimum contribution is required from every country (Babiker and Eckaus 2000: 6). The main problem of this indicator is the absence of direct links to emission levels or mitigation costs (Blanchard et al. 2002b: 284). Therefore the indicator is not sufficient to be used as a basis or differentiation of commitments to emissions reduction targets. However, it is used in various hybrid schemes such as a multi-stage approach and a soft-landing approach, which will be later discussed.

6.4.4. GHG/carbon intensity indicator

A GHG/carbon intensity indicator is related to a set of principles such as capability, proportionality (Metz et al 2002: 215-216; Blanchard et al. 2002b: 285). It can be also used as a parameter to assess progress in advancing sustainable development (Baumert et al. 1999). The link to sustainable development makes this indicator attractive to developing countries. One of the most well-known proposal based on the indicator comes from the World Resources Institute (Baumert et al. 1999; for its evaluation see Müller 2001a: 8; Metz et al. 2002: 215-216; Lisowski
Application of the indicator was initially meant to be a first step for developing countries’ participation in quantitative emissions reduction targets in the second commitment period (Metz et al. 2002: 216; Lisowski 2002: 170). It is a phased approach towards the acceptance of any developing countries’ commitments to emissions reduction targets (Aslam 2001: 137). A GHG/carbon indicator is designed only for developing countries because absolute emission levels as adopted in the Kyoto Protocol targets are not appropriate to be applied for these countries (Evans 2002: 13). This approach allows developing countries for economic growth without risks of exceeding any pre-determined cap (Aslam 2001: 137). Meanwhile the Kyoto Protocol targets stand for Annex I Parties (Baumert et al. 1999: 3). This type of a two track approach would ensure the integrity of existing targets for Annex I Parties is maintained (Baumert et al. 1999: 7).

A GHG/carbon indicator is taken as GHG/carbon emissions per unit of output.

\[
\text{GHG intensity indicator} = \frac{\text{GHG emissions}}{\text{GDP}}
\]
\[
\text{Carbon intensity} = \frac{\text{carbon emissions}}{\text{GDP}}
\]

This illustrates how well countries are decoupling economic development (GDP) and GHG emissions growth (Baumert et al. 1999: 4). GHG/carbon intensity is neither correlated with economic growth nor level of development (Baumert et al. 1999: 9, 11; also see Müller 2001a: 11n25; Lisowski 2002: 170).

As shown in our previous discussion of disparities in country-specific circumstances, there is a high variance of carbon intensity among countries with similar GDP per capita. These special circumstances may include energy efficiency of its production processes, fuel mix are particularly important (Baumert et al. 1999: 9-10). Taking into account these variances Triptych approach and multi-sector convergence approach which will be later discussed disaggregate carbon intensity indicators by sector. The sector-based intensity indicators could help forecast intensities and identify where opportunities for emission reductions exist (Baumert et al. 1999: 10, 14). For the purpose of utilising the indicator to advance sustainable development, it is more meaningful to compare a country’s performance relative to its current levels or past performance, taking into account both absolute intensity levels and changes in carbon intensity over time. The overall level of intensity is important in determining the ability of countries to change historical trends (Baumert et al. 1999: 10). Commitments based on a carbon intensity indicator would not set absolute but relative emission reductions from countries’ own levels over time (Metz et al. 2002: 215-216; Winkler et al. 2002b). This task of changing their own business-as-usual paths towards sustainable development is more politically acceptable (Winkler et al. 2002b: 314).

Under the proposal a country with a binding commitment expressed in terms of an improved carbon intensity indicator could participate in IET (Baumert et al. 1999: 8-9; Lisowski 2002: 170-171). The intensity indicator could be translated into an absolute level of emissions during the compliance period. An allowable level of GHG emissions is taken as the GHG intensity indicator multiplied by the total economic output during the period (Baumert et al. 1999: 11).

\[
\text{Allowable GHG emissions} = (\text{GDP})(\text{GHG emissions/GDP})
\]
As commitments are made in regard to improvements in carbon intensity relative to countries' own levels, there will be no problems of resource allocation (Evans 2002: 13). Since GHG intensity is not correlated with economic growth and reflects real emission reductions more accurately than absolute emission levels, incidence of excess emission allowances will be reduced (Baumert et al. 1999: 7; Lisowski 2002: 170 -171; Evans 2002: 13). In this way the proposed scheme provides a very effective safety valve against supply of excess emission allowances. This removes a major incentive for developing countries' participation by minimising the possibility of large wealth transfer (Aslam 2001: 137).

The proposed scheme was intended to be a temporal solution: until a country is prepared to make an absolute reduction (Baumert et al. 1999: 14). It is possible that with lack of commitments to absolute emissions reduction targets the scheme fails short to meet the ultimate objective of the UNFCCC.\(^{50}\)

### 6.4.5. Sustainable Development-based approach

A sustainable development based approach is a bottom-up method, taking into account country-specific circumstances such as the structure of respective economies. (Winkler et al. 2002a). It has no links to IET. The approach aims at implementing policies and measures for sustainable development and changing the reference scenarios rather than setting emission targets and promoting mitigation efforts per se (Winkler et al. 2002a: 62, 64). The process starts from identifying its own development needs, objectives and policies toward a more sustainable path of development. The next step is to set out countries' own priorities and indicate the most sustainable path of meeting those needs. The third step is to formulate policies and measures for

---

\(^{50}\) Intensity targets even when combined with multi-stage approaches which will be later discussed may not be able to keep open the option of low-level stabilisation at 450ppmv (Metz et al. 2002: 228).
sustainable development that also lead to GHG emission reductions (Winkler et al. 2002a: 65). The IPCC supports a hypothesis that GHG emissions will be reduced in shift toward more sustainable path relative to a conventional path. The earlier shift of a development path is, the greater emission reductions are. This would provide additional incentives for developing countries’ early participation in the mitigation regime (Winkler et al. 2002a). There seem to be some clear win-win opportunities such as reduction of local air pollution in a sustainable development based approach (Metz et al. 2002: 226; Winkler et al. 2002a: 82).

This approach appears to be particularly attractive to countries which will have no surplus emission allowances to sell and hence little incentives to join in IET. These are countries that have significantly industrialised (e.g. South Africa) or are endowed with particular energy resources such as large fossil fuel reserves (e.g. OPEC) (Winkler et al. 2002a: 80). Other prospective countries can be ranked by indicators such as carbon intensity and per capita income. Also those countries whose emissions are small by the international standards (e.g. some LDCs, SIDS) would prefer a sustainable development based approach (Winkler et al. 2002a: 81). However, the two largest beneficiaries of IET, China and India have followed this approach as well in order to cope with surging demands for imported energy. One of the main problems for developing countries, particularly some LDCs and SIDS, would be funding for the transition to a sustainable development trajectory (Metz et al. 2002: 226; Winkler et al. 2002a: 79-80; Baumert and Llosa 2002: 231). For a group of countries that have relatively industrialised or are endowed with non-fossil fuel energy resources, the Green Investment Scheme (GIS) proposed by the government of Russia could provide for a possible solution.

A sustainable development based approach could be a first step toward developing countries’ participation in the mitigation regime. They would be better positioned at a late stage to take up commitments to absolute emission reductions. It appears to be an incremental approach toward a long-term solution through a series of gradual steps (Winkler et al. 2002a: 82). In the short term transition strategies for sustainable development are to be taken. The approach would lead to a reduction from the business-as-usual path, however such a reduction may not contribute to stabilisation of GHG concentrations. In the medium term mitigation measures such as taxation and targets can be considered (Winkler et al. 2002a). Without binding targets this approach cannot guarantee a specific level of global GHG emissions to meet the ultimate objective of the UNFCCC (Winkler et al. 2002a: 82).

6.4.6. Historical responsibility

Historical responsibility was originally proposed by Brazil, as a criterion for a burden-sharing scheme based on each country’s relative responsibility for realised global temperature rise over time (UNFCCC 1997 in Metz et al. 2002: 215; Baumert and Kete 2002: 19; La Rovere et al. 2002: 158). The Brazilian proposal applies the scheme solely to Annex I Parties, not calling for commitments from developing countries (La Rovere et al. 2002: 159, 170). First, the scheme sets an allowable level of GHG emissions. It calls on Annex I Parties as a whole to reduce their GHG emissions 30% below 1990 levels by the year 2020. Next, it determines responsibility for individual Annex I Parties according to their relative contribution to global temperature increase and assigns related targets (La Rovere et al. 2002: 158). There are certain flexibilities with the Brazilian proposal. That the scheme allows Annex I Parties to negotiate individual targets opens possibilities for a bubble (La Rovere et al. 2002: 159). It would be compatible with the Kyoto Protocol mechanisms including IET with a view to minimising mitigation costs (La Rovere et al. 2002: 167; Baumert and Kete 2002: 22). A unique feature of IET combined with this scheme
would be the unit of emission allowances not expressed in tonnage of carbon emitted by each country but temperature change (Evans 2002: 9).

The rationale for linking cumulative GHG emissions over time to temperature change is that climate change is caused not by emissions but by the increasing concentration of GHGs in the atmosphere over time (La Rovere et al. 2002: 166). The scheme does not take into account the impacts of current emissions on future temperature rise but only the impacts of past emissions on current temperature rise (La Rovere et al. 2002: 166; Evans 2002: 9). In effect this scheme punishes countries with earlier and longer industrialisation (La Rovere et al. 159-160, 169; Evans 2002: 9). This means that the UK would bear a greater share of responsibility than the US or Japan regardless of its current share of global emissions. Despite its scientific appearance of its allocation formula, the Brazilian proposal is lack of global acceptability. Annex I Parties, particularly those with experiences of early industrialisation, felt unfairly penalised for actions in the past despite their lack of knowledge about the consequences (La Rovere et al. 2002: 160). In light of environmental effectiveness there is no fully global framework for controlling atmospheric CO$_2$ concentrations (Evans 2002: 9).

Although its allocation formula requires further corrections on the aforementioned biases, the rationale behind has been supported for its strong normative orientation. Historical responsibility is associated with a set of principles such as need, responsibility, guilt, and ‘polluter pays’ (PPP) (Baumert and Kete 2002: 18, 27; Metz et al. 2002: 215; La Rovere 2002: 159-160; Evans 2002: 9; Torvanger and Ringius 2000: 2, 9). In particular, PPP makes historical responsibility more legitimate than other allocation rules such as grandfathering and ‘victim pays’. In contrast to PPP, principles such as ‘victim pays’ or ‘willingness to pay’ assign the largest share of responsibility to the largest beneficiaries of corrective measures. The principle ignores past emissions but mainly considers expected benefits from climate stabilisation (Blanchard et al. 2002b: 285). This means that the principle does not take into account a cause of the problem but benefits from solutions to the problem. In practice developing countries will be likely to be hit hardest and therefore benefit most from climate stabilisation. They should be willing to pay the highest mitigation costs. However, these countries have limited resources for investments. Even if they will suffer the most of negative impacts, mitigation would not be on their top priority.

One of the attempts to revise the Brazilian proposal comes from RIVM (Den Elzen et al. 1999 in Metz et al. 2002: 215). First, taking into account only CO$_2$ emissions from fossil fuel sources and ignoring the relative impact of other GHGs and the various climate system feedback mechanisms on global temperature rise, the Brazilian proposal overestimates the contribution of Annex I Parties to temperature increase (Den Elzen et al. 1999 in La Rovere et al. 2002: 162; La Rovere et al 2002: 162; Evans 2002: 9). Inclusion of all sources of CO$_2$, methane and NOx in the RIVM report reduces the collective responsibility of Annex I Parties for temperature rise from 81% to 61% (La Rovere et al. 2002: 163). Second, as previously stressed, the Brazilian proposal limits the application to Annex I Parties. The revised version can be applied to all countries including developing countries (Torvanger and Ringius 2000: 9).

Further suggestions have been made from both inside and outside the RIVM.

* Allow for growth targets for any global application including developing countries (La Rovere et al. 2002: 170, 172). The RIVM version yields emission targets in terms of absolute emission levels not growth targets. Use per capita emissions rather than absolute emissions level (Metz et al. 2002: 215; Torvanger and Ringius 2000: 5).
* Use contribution to CO₂ concentrations (or radiative forcing) rather than contribution to temperature change (Torpanger and Ringius 2000: 5).

* Use contribution to cumulative GHG emissions from some given year in the past to current levels (La Rovere et al. 2002: 167, 169). Reduce the time frame. Annex I Parties suggest that 1990, the date of the IPCC’s first assessment report, could be the base year (La Rovere et al. 2002: 169, 172). Shape commitments relative to a projection derived from the business-as-usual path rather than from a base year (La Rovere et al. 2002: 170, 172).

* Use a threshold for developing countries’ participation based on income per capita (‘participation threshold’). Individual or collective (non-Annex I Parties as a whole) thresholds can be negotiated below which countries would not need to commit to emission targets (Berk and Den Elzen 2001 in La Rovere et al. 2002: 170).

The fourth point needs some explanation. It is assumed that annual GHG emissions from Annex I Parties would be required to decline. Those from non-Annex I Parties would be allowed to increase, stabilise and decline until the end of the century. Under this assumption non-Annex I Parties would have a grace period to be free from taking up commitments to emissions reduction targets until the relative responsibility of developing countries exceeds that of developed countries (a ‘cross-over’). The duration of the grace period would be negotiated (La Rovere et al. 2002: 170). At the cross-over non-Annex I Parties would be required to commit themselves to emissions reduction targets on the basis of each country’s relative contribution to cumulative GHG emissions since 1990. Linking the end of non-Annex I Parties’ grace periods to the emission reductions achieved by Annex I Parties could provide an incentive for Annex I Parties to take a lead (La Rovere et al. 2002: 172). The sooner they start implementing mitigation, the sooner non-Annex I Parties would be brought in. Alternatively, before a cross-over occurs some individual non-Annex I Parties might reach a given threshold, which would end the individual grace period (La Rovere et al. 2002: 171). Its claim to be an incentive for Annex I Parties to take a lead is hard to be substantiated. The US re-entry into the Kyoto Protocol depends on reversal of the above mentioned logic: the sooner non-Annex I Parties are brought in, the sooner they start implementing mitigation.

### 6.4.7. Multi-stage or grouping approaches

A multi-stage approach was originally developed as a global application of the Brazilian proposal along the line of the RIVM’s revised version (Berk et al. 2001: 19). The RIVM further developed the FAIR model which can be considered to be a simple version of a multi-stage approach (Den Elzen et al. 2001 in Metz et al. 2002: 217). In the FAIR model the number of parties involved and the level and type of commitments increase over time according to burden sharing rules. The model divides countries into groups with different levels of commitments or stages, and defines when their levels of commitments change as their circumstances change. This is to ensure countries with comparative circumstances have comparative commitments. They move through various levels or stages: no quantitative commitments; intensity targets; emissions stabilisation; and sharing burdens of absolute reductions. This means that different principles apply to countries with different stages: from need, then capability, and finally to responsibility (Berk et al. 2001: 19).

A soft landing approach is another grouping approach (Blanchard et al. 2002b). The proposed formula first sets a common target with a view to stabilising emissions at 10 giga tonnes of carbon by the year 2030 (Blanchard et al. 2002b: 287-288). It is assumed that Annex I Parties will...
achieve the Kyoto Protocol targets and that the targets can be reapplied with minor adjustments for the second commitment period, in this scenario 2010-2030 (Blanchard et al. 2002b: 287, 290). Next the formula identifies linear reductions of the emissions growth rates for developing countries on different time-frames, taking into account their per capita GDP, per capita CO₂ emissions, and population growth rates (Blanchard et al. 2002b: 290; Metz et al. 2002: 217). It allows for LDCs to bear a smaller burden in terms of total costs per unit of GDP (Blanchard et al. 2002b: 298). It also helps reduce inequalities across countries by moving emissions trajectories toward a convergence of per capita emissions over time (Blanchard et al. 2002b: 292, 298). Initial emissions growth rates are differentiated for regional population growth between 2000 and 2010 (Blanchard et al. 2002b: 288). It is assumed that countries in group 2 (relatively high income and emissions) will stabilise emissions by the year 2015, those in group 3 (intermediate income and emissions) by 2030, and those in group 4 (low income and emissions) by 2045 (Blanchard et al. 2002b: 289-290). This approach can be combined with IET in which the net gains are significant for some regions including US and China as a dominant buyer and a dominant seller, respectively (Blanchard et al. 2002b: 298). Unlike the original equal per emissions approach, this formula phases in developing countries’ participation according to emission levels. Gradual expansion of carbon markets under this formula reduces cost-effectiveness on the one hand, and increase the incidence of excess emission allowances on the other, compared to full operation of global carbon markets from the outset according to an equal per capita emissions approach.

6.4.8. Multi-sector approaches

The Triptych approach was originally designed as a burden-sharing scheme for a group of relatively homogeneous countries (Jansen et al. 2001: 10). It was used for the burden-sharing agreement within the EU (Phylipsen et al. 1998). The approach represents principles such as need and capability, which is reflected upon assignment of lenient targets to the cohesion countries (Torvanger and Ringius 2000: 9). The proposed formula takes into account different country-specific circumstances across the member states. Global application of this approach would require some adjustments in order to make it more flexible in accommodating for disparities in country-specific circumstances (Jansen et al. 2001: 10).

The Triptych approach is a bottom-up method (Torvanger and Ringius 2000: 6) which determines countries’ overall emissions reduction targets for the medium term by aggregating individual targets for three groups of sectors: domestic sectors; energy-intensive industries; and electricity generation sectors.

* **Domestic sectors.** Per capita emission allowances should converge to the equal level across all countries at a certain point in the future. e.g. per capita emissions for all countries at 1990 levels should converge to the equal level by 2030 (Jansen et al. 2001: 10; Torvanger and Ringius 2000: 6).

* **Internationally-oriented energy-intensive industries:** Targets are based on growth rates and carbon intensity (Metz et al. 2002: 217), e.g. All countries will reduce their specific CO₂ emissions by 1.5% per year (Evans 2002: 10).

* **Electricity generation sectors:** Power generation per capita is limited to a growth rate of 1% per year (Jansen et al. 2001: 10; Torvanger and Ringius 2000: 5). Targets are based on projections of electricity consumption, convergence in conversion efficiencies, de-
carbonisation rates for the fuel mix and a targeted increase in the share of renewables (Berk et al. 2001: 19; Metz et al. 2002: 217).

Countries would be bound only by the overall aggregate reduction targets. Excess emission growths in one sector are allowed as far as they are fully off-set by excess emission reductions for other sectors (Jansen et al. 2001: 10). This means that overshooting in one sector must be compensated by real emission reductions in other sectors. The Triptych approach can be combined with IET (Evans 2001: 10). The Commission’s Directive on an EU-wide emissions trading scheme would set a precedent for IET among relatively homogeneous countries. However, the proposed scheme does not cover domestic sectors or transportation sectors, which would limit the relevance of the proposed scheme to further elaboration on the Triptych approach.

A multi-sector convergence approach has a wider coverage, extending its application to worldwide and including more sectors and gases (Torbanger and Ringius 2000: 6; Jansen et al. 2001: 2,11). Also, this approach sets long-term targets by rolling over emissions reduction targets from one period to the subsequent one (Jansen et al. 2001: 2,11). It is a bottom up method (Torbanger and Ringius 2000: 6; Jansen et al. 2001). Global targets are set for each sector based on global trends in activity level and emission factors (Sijm et al. 2001 in Metz et al. 2002: 218). National targets are set as aggregates of sector-based targets (Sijm et al. 2001 quoted in Metz et al. 2002: 218). Like the Triptych approach a multi-sector convergence approach also allows for flexibility in allocation of costs across sectors. As far as it meets the national reduction target, a country can distribute mitigation costs across sectors (Torbanger and Ringius 2000: 6).

A multi-sector convergence approach aims at a convergence of national sector per capita emissions to global sector emission targets in some future target year (Sijm et al. 2001 in Metz et al. 2002: 218; Battjes et al. 2001 in Lisowski 2002: 165n7). That is to say, per capita emissions will ultimately converge to the equal level for all countries (Jansen et al. 2001: 5). This explains its normative orientation, particularly with regard to principles of need and capability (Jansen et al. 2001: 5; Torbanger and Ringius 2000:9). The role of IET in multi-sector convergence appears to be as essential as in simple convergence.

The proposed formula takes into account disparities in country-specific circumstances by introducing allowance factors (Sijm et al. 2001 in Metz et al. 2002: 218). For instance, some EITs and developing countries will be given ‘temporary’ additional emission allowances during the transition period on account of country-specific factors, which means lower burden (Torbanger and Ringius 2000: 9; Jansen et al. 2001:17). Likewise fossil-fuel exporting countries will be given ‘temporary’ additional amounts of emission allowances during the transition towards a more diversified economic base (Jansen et al. 2001: 17). However, it is another question whether or not fossil-fuel exporting countries will be willing to accept commitments to emissions reduction targets which would make them eligible to receive additional allowances as a compensation.

Moreover, developing countries will be exempted from taking on commitments to emissions reduction targets immediately (Jansen et al. 2001: 18; Torbanger and Ringius 2000: 9). Countries with low per capita emissions will be entitled to economic development without any constraints up to some determined point (‘graduation threshold’) which can be expressed in levels of per capita real emissions (Jansen et al. 2001: 5, 18). Countries with low-emissions will be also granted a pre-determined adjustment period. After the period, they will take on commitments to meet the targets when their emissions exceed the graduation threshold. The adjustment period will give another flexibility (Jansen et al. 2001: 5, 18).
6.4.9. Economic incentives

Economic incentives such as emissions trading, taxation, and their hybrid, do not address specific issues about climate change, such as environmental effectiveness in terms of meeting the ultimate objective of the UNFCCC nor equity in terms of converging per capita emissions at an equal level across countries. By equalising marginal abatement costs they expect to maximise cost-effectiveness (Babiker and Eckaus 2000: 10; Blanchard et al 2002b: 284; Torvanger and Ringius 2000: 2-3). As an instrument either emissions trading or taxation can be combined with other approaches. For instance, IET has been integrated in equal per emissions approach and intensity targets (WRI’s proposal). IET could be compatible with historical responsibility, soft-landing, the Triptych and multi-sector convergence. Policies and measures for sustainable development may include both taxation and hybrid schemes.

Taxation may represent either willingness to pay or ability to pay. In theory principle of polluter pays (PPP) and that of victim pays differ on the question as to who pays, but either party is assumed to be willing to pay. In practice ability to pay also needs to be considered. Taxation would give a clear signal to firms for estimating mitigation costs and planning long-term investments (Victor 2001: 19). Taxation is a most cost-effective instrument because only the cheapest emission reductions are undertaken (Cooper 2001: 11491; also see Victor 2001). Emitters whose reductions are expected to be more expensive will pay the tax instead of reducing emissions. This means that taxation cannot guarantee environmental effectiveness. It is possible that governments would impose GHG taxes on top of existing distortions in the tax system (Victor 2001: 19). However, Cooper (2001) argues that with carbon tax some countries could reduce other distorting taxes while others, particularly developing countries, might welcome these taxes than raising additional revenues otherwise (2001: 11491). Developing countries may be allowed more time to phase in the carbon tax. Countries in a need for generating revenues might choose to introduce it earlier than required (Cooper 2001: 11490).

All countries would agree to impose a common carbon tax. The tax would raise the price of fossil fuels in proportion (Cooper 2001: 11490). Alternatively the tax rate can be set at a percentage of GDP across countries (Torvanger and Ringius 2000: 2-3). If an international agreement were to provide for a pure emissions tax, a compensation scheme would have to be created entirely separate from the agreement (McKibbin and Wilcoxen 2002). However, it is more difficult to give tax concessions than grant excess emission allowances for instance (Lisowski 2002: 167). A proposal has been made for OECD countries to substitute the tax for removal of subsidies in developing countries as compensation (Gupta 2002: 11).

Generally harmonisation of policies and measures across countries are politically sensitive and difficult to accept to sovereign states (Baumert and Kete 2002: 14). Taxation by international agreement would be difficult even with a requirement for parliamentary ratification (Cooper 2001: 11491) In principle governments would create an international regulatory body to monitor and enforce the agreement. In practice such an institution would prove to be much more intrusive and powerful than most governments would tolerate (Victor 2001: 19). For instance, the IMF could by agreement provide reports on revenues from energy use (Cooper 2001: 11490). The new role of the IMF as a monitoring agency would appear problematic to a number of developing countries which have gone through the IMF’s Structural Adjustment programme. More specifically, it is nearly impossible to implement an international carbon tax. For instance, national counter-measures could negate the effects of the international carbon tax by reducing existing energy taxes or increasing energy subsidies (Lisowski 2002: 167).

In the hybrid scheme called ‘a safety valve’, a base level of emission permits would be auctioned or allocated by governments (Aldy et al. 2001: 25). If emissions trading drives up the price of permits up to the maximum (‘the trigger price’), governments will automatically sell additional permits at that price to prevent it from climbing further up. Sales of additional permits would ensure that the market price does not exceed the trigger price. Any additional permit allows more emissions, which would undermine the environmental integrity of the scheme (Aldy et al. 2001: 25). The quantity target expressed in total emissions will only be met if mitigation is cheaper than buying permits at the trigger price (Lisowski 2002: 168). The overall lack of environmental effectiveness can be justified given the purpose of this scheme is not to reduce emissions regardless of the abatement cost (Aldy et al. 2001: 25).

A safety valve was originally designed for a US domestic policy (Kopp et al. 1999). However, it could be implemented either individually by each country or collectively by the world (Aldy et al. 2001: 26; Hourcade and Fortin 2000). Each national government could impose its own cap-and-trade system with a safety valve and negotiate for an agreement on a common safety valve price (Jacoby and Ellerman 2002: 11). Also, a regional emissions trading agreement could incorporate a safety valve i.e. starting an agreement with a few like-minded states (Bodansky 2002b: 6). The introduction of a safety valve in one or more of the trading partners could create barriers. The lowest safety valve price among the trading partners would set the international price (‘global safety valve’). IET would take place only when the market price falls below the level of the global safety valve. (Jacoby and Ellerman 2002: 10-11). For IET an international legal authority would be created to issue additional emission permits at a certain price level (Aldy et al. 2001: 26; Bodansky 2002b: 6). Providing for an insurance against cost uncertainty, the safety-valve could be integrated with intensity targets and policies and measures for sustainable development and the Triptych approach.

McKibbin and Wilcoxen propose a modified permit scheme based on a fixed number of tradable, long-term emissions permits (‘emission endowments’) and an elastic supply of short-term permits which are valid only for a year (‘emission permits’) (McKibbin 2000; McKibbin and Wilcoxen 2002). Separating the endowment market from the permit market would ensure that emissions do not exceed a given limit over the long term (McKibbin 2000: 4). In the endowment market the supply of carbon is fixed but the price is flexible, which reflects the expected future price of emission permits. In the permit market the price is fixed but the supply of carbon is variable. Hence there is no guarantee as to how much real emissions will be done (McKibbin and Wilcoxen 2002: 18-19). At a domestic level governments would be allowed to distribute a specific number of endowments but cannot issue more endowments after the initial allocation. However, they would be allowed to sell additional permits. Since each government can supply as many permits as they wish at the fixed price and there would be no need to purchase permits from abroad, the scheme minimises transfers across countries because (McKibbin and Wilcoxen 2002: 19). The value of permits in a country would not depend on how permits are generated in other countries (McKibbin 2000: 4). The price of permits would be equal in all markets in all participating countries. This means that marginal abatement costs would be equal across countries.

Also see ‘Tax or trade’, The Economist. 14 February 2002.
in the short term. Hence there would be no gains from trade. Neither international trading nor international monitoring would be required. A full and simultaneous operation of permit schemes across countries would also solve the problems of leakage i.e. possible relocation of carbon intensive industries from developed countries to developing countries (McKibbin 2000: 5; on leakage Bohm and Carlén 2000: 2n3; Aldy et al. 2001: 23n57). The operation is decentralised. Economic efficiency reduced in segregated national markets compared to global markets. On the other hand it would be easy to add countries over time. New countries would only have to adopt permit schemes domestically and do not need to negotiate at an international level (McKibbin and Wilcoxen 2002: 19-20). The major shortcoming is the fact that in order to make the system work endowment would have to be given for a period of at least 50 years which is far reaching beyond any political life.

This hybrid scheme allows for certain flexibility in initial allocation. At a domestic level McKibbin proposes a revised form of grandfathering: as a compensation a significant portion of endowments are initially allocated to fossil fuel industries in addition (McKibbin 2000: 4; McKibbin and Wilcoxen 2002: 12, 20). At an international level it is possible that Developing countries will demand endowments based on per capita emissions levels while developing countries will demand those based on historical emissions levels (Lisowski 2002: 168). McKibbin proposes for differentiating endowment schemes, one for developed countries and another for developing countries (2000: 5). This effectively means a two track approach. For Annex B Parties the initial allocation of endowments would be based on the Kyoto Protocol targets. Developing countries would be given endowments that far exceed their current emissions (McKibbin 2000: 5). This would reduce the permit price to zero, ensuring no short-term costs to be charged for emitting carbon. The price of endowments would be positive due to an increase in the expected future price of emission permits. The proposed schemes would give developing countries a price signal for investment decisions without imposing short-term costs: the positive endowment price would encourage investments in low carbon development, and free emission permits would prevent any short-term costs for emitting carbon (McKibbin 2000: 5; Lisowski 2002: 168). The scheme could be best combined with policies and measures for sustainable development.

6.5. Experiences of developing countries

This section will briefly show that ‘contrary to popular perceptions, even without formal commitments, developing countries are already taking significant steps to reign in GHG emissions’ (Baumert et al. 1999: 1). At the Johannesburg summit in September 2002 three Caribbean Island states, St. Lucia, Grenada, and Dominica announced that they have set themselves ambitious targets for renewable energy. It was reported that St. Lucia had adopted a sustainable energy plan based on a minimum of 20% contribution from renewable energy by year 2010 and a 35% cut on its emissions from the power sector by year 2012. In doing so they aim at reducing dependence on expensive foreign energy resources and making the best use of abundant local resources. Resources released from energy import could be invested in development of renewable energy. St. Lucia’s initiative has been followed by Grenada and Dominica. The Maldives and several Pacific island states have shown their interests to join the initiatives. This rationale may also apply to majority of the LDCs. The three countries’ joint efforts have been supported by the Global Sustainable Energy Islands Initiative (GSEII), a coalition of intergovernmental organisations and NGOs.52 This initiative could be effectively linked with the

---

new EU Energy Initiative for Poverty Eradication and Sustainable Development, which is open to developing countries with an initial priority to Africa, Caribbean and Pacific (ACP) states. The example of GSEII and possibilities for its further expansion supports the earlier suggestion that sustainable development-based approaches would better suit countries with low emission levels. It is also possible that integrated approach would minimise the abatement costs, which could be the case for three neighbouring island states in the Caribbean.

6.6. Conclusion

This chapter started with an understanding that the Kyoto Protocol framework has three problems associated with compatibility: developing countries’ emissions trajectories and the ultimate objective of the UNFCCC; the ultimate objective of the UNFCCC and short-term commitments of Annex I Parties; and the Kyoto Protocol mechanisms and targets expressed in absolute emission levels. All the three compatibility problems have been also addressed by a group of climate experts from Senegal, Pakistan, and Bangladesh (Sokona et al. 2002). These problems would explain why developing countries have firmly refused to be bound by quantified emissions reduction targets. Alternatively a variant of equal per capita emissions approaches, i.e. ‘Contraction and Convergence’, appears to be the best option for large developing countries, mobilising large capital flows from Annex I Parties. To date ‘Contraction and Convergence’ has been endorsed by the governments of India and the Africa Group as official positions (GCI 1999 in Aslam 2002: 181). It is also expected to solve the compatibility problems (Sokona et al. 2002; Evans 2002). The main problem with the approach is political feasibility of large wealth transfer from Annex I Parties even with moderate differentiation and adjustments which ‘soft-landing’ approach could accommodate. More importantly an equal per capita emissions approach linked with IET is lack of incentives for a group of developing countries which will have no surplus emission allowances to sell and/or small emission allowances in initial allocation. This group may include the advanced of developing countries, oil-exporting countries, LDCs and SIDs. In this aspect a sustainable development-based approach could lead to a broader coalition of countries including those who would be marginalised under an equal per capita emissions approach. In practice the Johannesburg summit saw three Caribbean states embarking upon a joint initiative for sustainable energy use. Although its impact per se is negligible compared to global emission levels, their initiative could be replicated to other small LDCs. Incentives for cooperation are not embedded in the conceptual base of a sustainable development-based approach. However, that it is easily replicable with minor adjustments could lead to an alliance of like-minded states.

Returning to the Carraro/Galeotti recommendations, reducing uncertainty has been one of the main concerns for developing countries. Developing countries appear to prefer to have a predictable architecture with a clear time-frame which could meet the ultimate objective of the UNFCCC: stabilisation of CO\textsubscript{2} concentrations at a relatively low level. This would serve the best interests of countries that are particularly vulnerable to impacts of climate change. In this respect the Kyoto Protocol fails short. An equal per capita emissions approach, a top-down method, would score better than a sustainable development-based approach, a bottom-up method.\textsuperscript{53}

Redistribution of benefits from climate policies is another main concern for developing countries. Developing countries would prefer to have an architecture with equitable emission entitlements.

\textsuperscript{53} Here we continue to refer to ‘sustainable development-based approach’ as a specific model, which should be distinguished from the principle of sustainable development (UNFCCC Article 2). Scenarios based on sustainable development have been tested against cases of China (Chandler et al. 2002; Zhou et al. 2000), India (Chandler et al. 2002; Reddy 2002; Shukla et al. 1999), and South Africa (Winkler et al. 2002a).
This would inevitably require transfers of emission allowances through IET. IET is an essential component of an equal per capita emissions approach, not that of a sustainable-development approach.

Regarding free riding, developing countries would not enter IET without any compensation either in the form of either excess emission allowances or direct financial transfer through a separate mechanism (‘equity between Annex I Parties and non-Annex I Parties’). Otherwise they would feel discriminated against EITs, especially Russia and Ukraine (‘equity between EITs and developing countries’). An equal per capita emissions approach would inevitably require transfer of emission allowances from EITs to developing countries. A sustainable development based approach which has no direct link with IET could be combined with direct financial transfer for the purpose of capacity building in developing countries.

Cost-effective domestic measures could be highly beneficial for developing countries. A large number of developing countries are dependent on imported energy. Despite large coal production capacities, even China and India have increased oil imports (EU-India 2002: 6; Zhou in Ivanov and Oguma 2002: 24). Accordingly these energy-importing countries seek to reduce dependence on expensive energy imports through energy conservation. A sustainable development-based approach is based on a set of cost-effective policies and measures such as pricing (e.g. removal of subsidies from electricity tariffs), energy efficiency improvements, and regional cooperation (e.g. natural gas supply via pipeline). An equal per capita emissions approach is relatively silent about the question as to domestic measures. Moreover, under an equal per capita emissions approach large capital flows into large developing countries could discourage domestic measures to correct resource allocation problems, especially removal of subsidies from electricity tariffs.

One of the most urgent task is to strengthen the social, economic and technical resilience of the countries that are the poorest and most vulnerable (Sokona et al. 2002). IET could stimulate technological transfer to developing countries through a package deal on setting prices of emission allowances, i.e. development of climate-friendly technologies. For instance, developing countries could import advanced technology on favourable terms if they agree to discount prices of emission allowances on sale. Hence an equal per capita emissions approach linked with IET could help developing countries strengthen their technical base. However, this kind of package would not benefit countries without excess emission allowances to sell or only with small emission allowances in initial allocation. Sustainable development-based approaches including provision of fiscal incentives for climate-friendly technologies (e.g. subsidies to renewable energy resources, promotion of R&D), could be combined with technical assistance by Annex I Parties.

54 In India governments have used cross-subsidies mainly as a social policy instrument rather than an economic instrument. The current tariff levels of electricity do not meet even 80% of the total cost of supplies (EU India 2002: 14). State Electricity Boards (SEBs) rely on cross subsidies from industrial and commercial consumers to pay for domestic and agricultural consumers. Agricultural consumers use 30-40% of India’s power in almost free of charge (EU India 2002: 13n2; EC 2002: 9). The ‘effective subsidy’ which is taken as the difference between cost and revenue earned for agricultural and domestic consumers has been estimated to be almost 1.4% of India’s GDP according to a World Bank report (EU India 2002: 13).

55 India has implemented a significant renewable energy programme over the past two decades (Chandler et al. 2002: 25). India is now ranked at the world’s fifth after Germany, US, Denmark and Spain in wind power production (EU India 2002: 11).
7. The US, NAFTA and the Americas: Opportunity or threat for global climate change policy?

With the defection of the Kyoto process, the US has by default taken a unilateral approach and is pursuing a domestic approach, isolated from international attempts to address climate change. It is therefore important to ask how this strategy will affect moves towards "sub-global" arrangements. The US approach however cannot be purely unilateral. Obviously there are linkages to other areas of international relations. The US can not entirely neglect relations with other important countries such as Japan, Russia, China or the EU. In addition, the US is bound by other international or regional agreements with WTO and NAFTA being the most important ones or industry pressure for a stable and predictable and to some extent simple business environment (see also Brewer studies of the CEPS project). Finally, the US has signed and ratified the UNFCCC and therefore taken over a commitment to stabilisation.

This section will therefore analyse recent US policy developments both at federal and sub-federal level with a view on how they may play out in the emerging climate change regime. Particular emphasis will be laid upon the "external" pressures exerted through NAFTA, business and WTO.

7.1. North America and the Kyoto Protocol

North America is important for a number of reasons. First, North America comprising of the US, Canada and Mexico represent the general feature of a global climate change world. The three countries both economically and politically integrated through geographical proximity and economic integration (e.g. NAFTA, WTO) represent within this microcosm the three broad groupings currently predominant in the UNFCCC setting. Canada has ratified the Kyoto Protocol, the US has ratified the UNFCCC but reneged on the Kyoto Protocol while Mexico has ratified too, but as a developing country has no quantified target. Second, North America as a whole is responsible for about 40% of total 1990 Annex I GHG emissions and therefore is a key player in terms of environmental effectiveness, economic efficiency and equity. Third, with the US no longer part of the Kyoto Protocol process, there is a distinct possibility that there will be - at least over time - an alternative model to reduce greenhouse gas emissions, which ultimately might lead to a "sub-global" arrangement. This immediately raises two questions. The first is whether are there any "winning policies" to (re)-engage the US into the international climate change process. The second is how a "sub-global" arrangement could relate to the Kyoto Protocol, i.e. testing the thesis whether "sub-global" arrangements are more likely to lead to a stable global agreement.

We will concentrate our analysis on the US, not only because within North America and NAFTA it is the dominant actor but also because the US policy is still uncertain and by far the most complex. The situations in Canada and Mexico will only be analysed in as much as they matter as complement to the dominant US policy.

7.2. Climate politics in the US

In the US climate change policy has always been controversial. Ever since the Clinton administration agreed to the Protocol in December 1997, Congress had expressed its disapproval and little progress has been made for domestic implementation, let alone ratification. The US is still far away from a consensus on climate change as it exists for example in Europe or Japan, which can, at least to some extent, be related to a number of US-specific features.
The first is costs. It is striking how central the discussion on costs has been, while for example in Europe, the need to act was the main issue (i.e. the instruments discussion.) Equally striking was the wide range of variation of cost estimates ranging from GDP losses in the magnitude of 4.2% annual GDP losses to neutral effects (see Thorning 2000) for overview creating confusion and fear in the public. Certainly the current administration is basing its policy on the high estimates. The high estimates of needed expenses to reduce greenhouse gas emissions coupled with serious doubts on the impact of climate change have fuelled fears that "the effort will make the participating countries less competitive" (cf. Jacoby et al 1998). The general reluctance of the US to sign up to international agreements is well documented. Making the Congress and the public accept legally binding international agreements has always been difficult. And pushing the US towards binding commitments in absolute terms has antagonised too many interest groups and confused the public.

Possibly the most important impediment apart of sentiment is the US challenge with regard to the fossil fuel economy. Historically, energy has been relatively inexpensive than in most other developed countries. Taxes often are a fraction of what they are in other countries. The real difference is however in the power sector. Coal, which stands for about 32% of total US CO$_2$ emissions is produced in the US and over 90% is used in power generation. This has lead to a 52% share of coal in power production in 2001 (EIA 2003). With coal mining areas concentrated in only a number of states, this situation is comparable to Germany, which despite legal obligations under the EC treaties is only able to gradually reduce coal production despite a three-fold price (after transport) to world market prices. Germany however could off-set high emissions from coal through the reduction of emissions due to the collapse of east German industry after unification. The main difference between the EU and the US is however strategic. While Europe is surrounded conveniently by abundant gas reserves, the situation is different for the US. According to European Commission data, 80% of global gas reserves are located within economic transportation distance to the EU. This compares with a figure of 10% for the US. Or in absolute terms, the EU has access to strategic reserves of 90.6 Tcm while the US to less than 10%, namely 7.3 Tcm (Sveen 2001). The respective reserves would cover the Eurasian demand for 50 years. As a result, in the US coal will continue to play the decisive role in the power sector, where coal demand is expected to decrease from 52% in 2001 to 48% in 2025 (EIA 2003). The respective figures in the EU are 23% for 1999, with a possible doubling. It is not unrealistic to assume that 45% of total electricity in the EU will be produced by natural gas as soon as 2010 (European Commission 2000). In contrast natural gas in the US is expected to rise to just 27% in the power sector in 2025 (EIA 2003). As a result while in the EU and Europe in general natural gas a bridging fuel EU, this is less so an option in the US. With energy security always having been high on the US agenda and reinforced with the 11 September - see the National Energy Plan - has contributed to a reluctance to engage in climate policy, which would in effect have squeezed out coal. Two more factors, however make a difference. The first is the high level of economic growth experienced by the US with 3.2% on average over the 1990s and annual population growth of about 1.2% p.a. for the same period. Thus, energy-intensity improvements - measured

---

56 James I Connaughton, Chairman, White House Council on Environmental Quality said "The Kyoto Protocol would have cost our economy up to $ 400 billion and caused the loss of up to 4.9 million jobs, risking the welfare of the American people and American workers" (Fox News, 11 July 2002). Similar figures are used in official White House documents (cf. White House 2002)

57 For a more recent overview see, Lepetit (2002) and the 2002 Economic Report of the President to Congress (White House 2002), stating that the Kyoto protocol could cost up to 4% of GDP in the face of uncertain science (p. 247)

58 German industries’ uncompromising opposition against the proposed EU emissions trading directive was to a considerable extent fuelled by the coal industry.

59 An overview of EU growth scenarios is given in Finon and Locatelli (2002) (see also Stern 2002).
as energy use per dollar of GDP - of about 1.5% per annum could not stop the increase of total emissions. In 2000, emissions were 14% higher than in 1990 (EIA 2001) and are expected to continue to rise at the same rate (EIA 2003). The Kyoto commitment of a reduction target of 7% percent below 1990 level would have meant a 20-30% reduction of GHG emissions (Viguier 2002), which would have seen as threatening existing life styles. Against this background, it should have come as no surprise to anybody that the US pulled out of the Kyoto process.

In the follow the US promised to table an alternative approach to tackle greenhouse gas emissions. Not surprisingly in the light of the domestic US situation this did not result in a comprehensive alternative model to the Kyoto process but rather a piecemeal approach consisting of numerous initiatives including different areas such as energy policy, transport and cars, technology programmes for cleaner fuels including coal, and renewables, boosting nuclear power, carbon sequestration, tax policy, forest management. For a complete overview see Harnisch (2002). Most important for the shape of the emerging US climate policy at the federal level are the following: i) “Global climate change strategy” as national alternatives to the Kyoto protocol and “The clear skies initiative”, ii) the National Energy Plan, and iii) the Climate Action Report in the context of the UNFCCC and iv) various funding programmes.

Based on these principal initiatives the US federal policy can be described as a mixture of voluntary reporting and reduction initiatives from the public and private sector mixed of tax breaks or direct spending for new technologies such as fuel cells in automobiles and other renewables and energy efficiency measures. Yardstick against which the US administration would like to be measured are GHG intensity targets. Key element of the US proposals is a reduction target for reducing the GHG intensity of the US economy by 18% between 2002 and 2012. There might be some positive spill-over from the Clear sky initiative, which aims at a cap-and-trade system for SO2, NOx and mercury, although these effects are yet uncertain. Other elements of the plans include the improvement of the emission reductions registry, the possibility to trade emission reduction credits (on a voluntary basis), an increase of total climate spending both domestically and for developing countries, review and increased spending on climate related research focusing on technology and climate science as well as review in 2012 (Harnish 2002). The National Energy Plan focuses among other on increased supply, including new nuclear power and efficiency. Most important is perhaps the FreedomCar Initiative, aiming at the development of fuel cells.60 The final event of importance was the 2002 Climate Change Action (p.5) report by the Environmental Protection Agency (EPA) and a report by the National Academy of Sciences61, which both acknowledged that climate change is a potential that human activity is the principle culprit. The White House has also acknowledged the precautionary principle by saying in the context of the Clear skies initiative "we must address the issue of global climate change … while these uncertainties remain, we can begin now to address the human factors that contribute to climate change. Wise action now is an insurance policy against future risks". Bush also acknowledged that the US is the world's largest emitter of GHG from human activity and "we recognise the responsibility to reduce our emissions"62

60 In the 2003 State of the Union address, President Bush announced $1.2 billion in research funding to help America "lead the world in developing clean, hydrogen-powered automobiles" (ACCC News, 3.2.03)
61 The EPA 2002 Climate Action report to the UNFCCC secretariat on page 5 refers to the report by the national Academy of Sciences which notes, "Greenhouse gases are accumulating in earth's atmosphere as a result of human activities causing global mean temperature … to rise. … the changes we observed are likely due mostly to human activities. … the best scientific information indicates that if GHG concentrations continue to increase, changes are likely to occur.”.
The US plans have been criticised as very modest, when compared with historical trends and projected baselines. In fact the US will be rising in absolute terms to more than 30% above 1990 levels in 2012, far above the -7% agreed in Kyoto and -3% if adjusted by sinks (De Moor 2002 RIVM report 728001019). Or as the MIT programme points out, with the US having been projected as being responsible for 37% of total emissions in 2010, its reduction share should have been also 37% instead of the 25% claimed by the administration and confirmed by the MIT model (Reilly 2002). On the positive side has been noted that the plans provide a useful starting point that allows the private sector to get on a path towards reductions in the short-term while developing the technologies necessary to achieve significant reductions in the longer-term (cf. Faye 2002). Neither the Kyoto Protocol nor the US federal plans adequately address the issue of the long-term stabilisation objective. Whether the US plans however provide the guidance in form of a long-term predictable framework remains an open question.

Irrespective of how much weight one gives to either view, the recent initiatives have advanced the US position and allow for a clearer picture after the Clinton administration failed to implement domestic climate policies. A number of events are of particular importance.

First, there is now a global consensus that climate change represents a significant potential threat to the world and that "the changes are mostly due to human activities". This view has been confirmed not only by the IPCC third assessment report (Watson 2001) but also by official US government sources. This move is politically significant in that it acknowledges the importance of the climate change problems, their human cause and that precaution is needed. This acknowledgement is also backed up by increased spending on climate science and other climate related research and technological development focusing for example on sequestration, advanced energy technologies but also a better understanding of science. Internationally, it focuses on joint research programmes with other industrialised countries such as Japan, Italy and in the future, the EU and capacity building in developing countries (Harnisch 2002). The commitment to the long-term objective of the UN Framework Convention for Climate Change of stabilisation of concentrations has never been contested by the US government.

Second, the gradual approach, focussed on the long-term might indeed develop over time into a credible climate change policy. The strong points are engagement of business and the emphasis of research and technological developments. The improvement of the registry and a "learning-by-doing" tradable credit scheme may indeed develop into a fully-fledged strategy. The US SO₂ cap-and-trade trading regime was developed in a similar way. For more than a decade, there were experiments with other than cap-and-trade schemes that in the end did not work. Ultimately they were replaced by a more efficient cap-and-trade regime (cf. Klaassen and Nentjes 1997; Godard 2000; Egenhofer 2003). The litmus test for the US is however the stringency of the targets. Current targets will increase rather than decrease emissions. Real reduction effects can not be expected unless they lead to a change of relative energy prices. This would however affect the US consumption model. If one takes the National Energy Plan in addition, which focuses on supply the Bush administrations’ policy becomes ambiguous at best.

It is not clear whether the current administration eyes intensity targets as a transition phase (as can be argued was the case in the run up to the sulphur cap and trade scheme) or as the ultimate objective for a global climate regime. Should the latter be the case, it is worth noting that intensity targets - which focus upon emissions per unit of GDP output - have a number of drawbacks that are worth being discussed. While the lack of guarantee of environmental effectiveness and potentially higher transaction costs (cf. Dudek and Wiener 1996; Michaelowa and Stronzik

63 See also Faye (2002).
and their extreme sensitivity to the GDP measurement are widely known, they have major, hitherto additional, less analysed equity effects. Since intensity targets depend both on current and projected future fuel mix, uniform intensity targets raise the same equity issues like absolute targets. A second aspect is that although they leave room for above average economic growth, this advantage is reversed in time economic stagnation or collapse. Intensity improvements depend on new investment, which is not undertaken in times of economic difficulty (Müller et al 2001). For example, Russian and CIS emissions have fallen because of economic contraction while energy intensity has increased since the 1990s by 1.8% p. a. (cf. European Commission 2002b).

The Federal government is not the only actor in the US. Most notably, the biggest actor have become some of the states, mainly on the east and west coast. GHG reduction targets have been adopted by eight states including New York, New Jersey and six New England states. Power sector carbon caps have been introduced in Massachusetts and New Hampshire while Oregon requires that all new plants meet a given emissions rate or buy offsets. A low GHG emission vehicle has been introduced in California where recent legislation requires the adoption of “regulation that achieve the maximum feasible reduction of greenhouse gases emissions”. New York, Maryland and Oregon offer tax incentives to switch to lower GHG emitting vehicles. Other states use negotiated agreements with companies and other sources to reduce GHGs. Many states have renewable portfolio standards or funds to support renewable energy sources. Many states have introduced "smart growth" and vehicle miles travelled reduction programmes designed to locate development more efficiently to reduce emissions. For a full overview see CCAP (2002) and (2003) and Rabe (2002).

Public authorities are not the only actors. Many businesses have been taking voluntary action including reductions, trades or agreeing with environmental NGOs on GHG reduction programmes. For example, in 2000 the US Energy Information Administration reported a total of 222 companies and other organisations reporting emission reductions of 260 million metric tons of carbon dioxide equivalent plus 9 million metric tons from carbon sequestration, representing 3.9% of total US GHG emissions (cited from Lepetit 2002). Among the most visible business initiatives has been the Chicago Carbon Exchange, a pilot carbon trading programme, the WRI/WBCSSD Greenhouse Gas Protocol, which establishes an international reporting standard and the International Emissions Trading Association (IETA), grouping businesses that engage in emissions trading. While the latter are global initiatives, they nonetheless have major US participation.

Similarly, Congress has been active. As of January 2002 there were 56 legislative proposals regarding global climate change. Most notable was that Senator Robert C Byrd, a democrat from the coal-producing state (Virginia) and a principal sponsor of the 1997 Byrd-Hagel resolution - the symbol of Senate opposition to the Kyoto Protocol - urged in May 2001 President Bush to return to the negotiation table of the Kyoto process (Harnisch 2002). Already in the new Congress, Senator Lieberman and McCain, sponsored a new bipartisan bill on reducing GHG gases to 2000 levels by 2010 (For an analysis see Pizer and Kopp 2003). A separate bill aiming

---

64 The Massachusetts programme is expected to result in a ten percent reduction while New Hampshire will stabilise in 2010 at 1990 levels (Schmidt 2002).
66 The resolution stated that the US should not sign a climate treaty if it harms the economy or if it fails to include binding developing countries commitments.
at reducing air pollution including the establishment of a nation registry for GHG and an attempt to redirect the president to lower GHG to 1990 levels by 2013 by Senator Jeffords, the outgoing independent chairman of the senate environment committee together with the minority Senate leader Tom Daschle (Sevastopulo 2003).

Also public opinion generally is positive towards climate policy. About two fifth of the US public is seriously concerned about global warming while this is matched with unconcerned fifth at the opposite end of the spectrum. Two thirds of the public even think the US should participate in the Kyoto Protocol. Also surprising is that half of the population would support government action, even if that meant higher electricity prices. In a recent survey on public opinion Brewer (2003a) concludes perhaps surprisingly that "in an international comparative perspective, the publics in the US and Europe share their concern about the problem of global warming. They agree in their support for the Kyoto Protocol”. The reason for this apparent disconnect may however lie in an apparent public/leader gap, where support for climate policy and the Kyoto Protocol is lower than in general public (Brewer 2003a).

7.3. Canada

Despite major controversy within Canada, the Canadian federal government has ratified the Kyoto Protocol, making Canada the only country in the Americas and by extension within NAFTA with a target. This is the more significant if one recognises Canada has a tough target under the Kyoto protocol. Canada committed to reducing its GHG emissions to 6% below 1990 levels, which amounts to a reduction of 240 million tonnes from the projected business-as-usual baseline in 2010 (Government of Canada 200b). Depending on the strategy choices that Canada will make and the international carbon price, official estimates form modelling acknowledged negative affects of up to -2% in the event of ratification (Government Canada 2002a). This high potential impact is mainly due to high exposure to trade. Canada's trade accounts to 37% of GDP, which is one of the highest figures in the world, with 87% of the trade going to the US (Drake 2002). Although economically difficult, the reason for Canada to ratify the Kyoto Protocol and accept the commitments was fuelled by Canada's commitment to the multi-lateral system. The Canadian government acknowledged that due to Canada's limited strength in bilateral negotiation, its interests are best preserved in a multi-lateral scheme, even if it means economic difficulties in the short-term (Drake 2002; Government of Canada 2002).

There were considerable differences within Canada. Notably Alberta, which depends to 90% of its gross revenues on hydrocarbons and where the principle Canadian reserves for oil, natural and other hydrocarbons are located feared to forego major revenues and consequently fiercely opposed to ratification. Overall a majority of provinces, however was in favour of ratification.

The Canadian strategy is based on a broad sharing of the burden including transport, housing, industry, notably the energy sector, agriculture and forestry and international emissions trading. This strategy has attempted to distribute the burden across provinces equally in as far as possible.

---

67 Based on a review by Brewer (2003a) reviewing developments at major polling institutes.

68 This compares with about 600 MtCO₂ (European Commission 1999: 3) of the EU compared with a business as usual scenario with a total population of 370 million tonne as compared to 31 million tonne of Canada.

69 Out of a total revenue of C$ 50.6 billion only C$ 5.3 billion did not originate from hydrocarbons. Hydrocarbons make up 57% of total exports. Alberta produces 55% of Canadian conventional crude oil, 80% of all natural gas, 90% of LNG, 49% of coal and 10% of bitumen and synthetic oil. See: The Alberta Economy: http://www.alberta-canada.com/economy/energy.cfm
The government estimates that the strategy, which covers about 180MT of 240 MT i.e. the required amount of emission reductions, would cost about 0.4% of economic growth of a total of 18% over the years to 2010. In terms of employment, this would take off about 60,000 jobs of a total of 1.3 million new jobs for the same period (Government of Canada 2002b). The difference to US figures of up to 4% of GDP is striking.

7.4. The impact of NAFTA

According to the Balassa stages of integration, free trade areas are a very limited means of economic integration. Their essential characteristics are similar to GATT, in fact the abolishment of tariffs and quotas for imports from area members (cf. Pelkmans 2001). A pure free trade agreement does not have a major effect on environmental matters. The North American Free Trade Area (NAFTA) however goes beyond in scope of coverage and in approximation. The negotiation of the NAFTA provoked numerous concerns about the impact of increased trade and investment on both environmental and labour market conditions in the region. To respond to environmental concerns related to the NAFTA, the three contracting parties decided to agree among other on a general side agreement, the North American Agreement on Environmental Cooperation (NAAEC). The NAAEC has two broad goals: (1) to encourage improvement of environmental conditions in North America, through cooperative initiatives, and (2) to provide a mechanism for mediating environmental disputes. The NAAEC provides an institutional structure — the Commission for Environmental Cooperation (CEC) — to implement these environmental objectives. (cf. McFadyen 1998; Hufbauer et al 2000; Krist 2002).

To date within the CEC secretariat there is no ongoing forum on climate change. Nevertheless, there is co-operation on technical elements for a generic emissions trading framework and on market-based mechanisms to promote renewables, energy efficiency and carbon sequestration (Miller 2002). Regarding emissions trading, it is still speculative as to whether NAFTA rules will impact directly on emissions trading (GCSI 2001). The issues are very much the same as in the more specific relationship between emissions trading and the WTO: treatment of tradable allowances as goods or services, issues of subsidies and trade restrictions (see also Petsonk 1999 and notably Brewer 2003b).

Cooperation is more specific in electricity, where Art. 13 of the CEC agreement mandates the CEC to examine environmental challenges and opportunities of the evolving continental electricity market and to identify ways for electricity production market integration to promote sustainable development, maximising economic and environmental benefits. This is an important area since according to the CEC, North American power demand is expected to rise in Canada by 14%, in the US by 21% and by 66% in Mexico. The respective figures for CO$_2$ are 3-15%, 14-
38\% and 29-53\% (Miller 2002). In June 2002, the CEC secretariat published a so-called Art. 13 report based on a mandate by the three heads of governments, whereby the Electricity Advisory Board "urges" to the Council consisting of the heads of the federal Environment Protection Agencies "to act immediately to define and implement complementary carbon reduction in 2002" (CEC 2002). More specific recommendations include the development of a North American GHG inventories that can support the integrity of JI and GHG emissions trading policies, the establishment of the necessary elements of an emissions trading framework and CDM type of projects to accelerate investment in Mexico. Getting around the Kyoto Protocol issues, the report recommends "considering the US contribution to CO$_2$ globally" that it "adopts an aggressive long-term program to stimulate clean and renewable electricity production". The recommendations were received positively by the Council which in its communiqué on 19 June agreed to "establish a North American Air working group" to take these issues further.

While this is still far from a common North American approach to electricity production, let alone climate change, nevertheless, the NAAEC might over time become an important layer of cooperation between the US and Canada, and thereby the US and Kyoto-land. Indeed power production and distribution has not only an environmental but also a trade dimension. With liberalisation of the power markets, power will potentially be traded freely, necessitating a minimum harmonisation of infrastructure but also of environmental legislation and potentially, emissions trading frameworks. While it is possible that there might be some legal trade related issues between NAFTA and the implementation of the Kyoto Protocol - given that NAFTA is in some areas more far-reaching than the WTO agreements - at this stage it is still largely speculative whether there will be tensions between NAFTA and the Kyoto Protocol and second, whether Canada would indeed bring those trade related issues up (Drake 2002).

7.5. Conclusions: Looking ahead in North America

Based on our analysis, we will ask in this section two questions. (1) What are the policies that might "win" North America including the US for an international agreement? (2) What are the chances that a North-American sub-global agreement might develop and how could this be linked internationally?

Taking stock of the US situation, the starting points is that the US administration has joined in the global consensus that climate change represents a significant threat to mankind and that these changes are mainly man-made. This represents a significant move from earlier positions in the Senate and the Republicans, which have continued to question whether climate change is a legitimate concern for policy in the light of uncertainty.

In the light of the US failure to propose a comprehensive alternative model to the Kyoto Protocol, the US can not ignore the dynamics the Kyoto Protocol has created. The overwhelming majority of industrialised countries including notably Canada have decided to go with the Kyoto Protocol. The international community was not ready - much to the surprise of the US - to dump the Protocol because of US resistance without being shown a better way of combating climate change. Whatever the shortcomings of the Kyoto Protocol are, to date there is no credible alternative to the "targets and timetable approach" taken by the Kyoto Protocol. The moment Russia has ratified, bringing the Protocol into force, which it has said it would and for which there are many good reasons as our analysis in chapter 4 shows, there will be little doubt that the first commitment period obligations will be implemented. And even in the unlikely event that Russia would not ratify, the EU - especially after the weakening of targets under Bonn/Marrakech (se chapter 2) accords has made a commitment to implement its obligations even unilaterally, most
likely bringing Europe as a whole along. With much political capital spent in many other countries such as Canada and Japan, it is hard to see that these countries would back track at least in principle. In case of non-entry, there would of course be some "redefinition" of targets but the general Kyoto Protocol architecture would remain intact. Non-entry into force would have however major consequences regarding further commitment periods, the role of developing countries, the environmental effectiveness and ultimately, the position of the US. The latter issues will be discussed in a section below. In conclusion, we should expect that the Kyoto-land countries would continue to work within the broad architecture of the Kyoto Protocol, i.e. common but differentiated targets, timetables and the three flexible mechanisms. One should not forget that the Berlin mandate, opening the way to "targets and timetables" and leading to the Kyoto Protocol adopted within the UNFCCC framework was a US proposal. The Clinton administration acknowledged that another voluntary approach was needed in the wake of the failure of its Climate Action Plan, which relied on voluntary actions.

The US interface with Kyoto-land

As we have shown, the causes for the US reluctance can not only be blamed on the administration or Senate. This would be a too simple answer. There are many forces at work - discussed in the previous sections - which have made a consensus on climate change impossible in the US. What will be the winning policies to make the US embark on more serious climate change policies?

Going back to the Carraro/Galeotti recommendations, it appears that the first policy recommendation, to implement policies to reduce uncertainty regarding costs and benefits including damages by absence of climate policies offers the biggest potential for the US to move closer to credible climate policies. With the administration having accepted the risks of climate change, its by and large human cause and the US responsibility, better information on costs and notably benefits, i.e. due to avoided damages from climate change are likely to increase chances for a comprehensive policy. Notably, it could lead to a further strengthening of local, state and business initiatives, if they can be linked to costs of damages. It is interesting to note that the Canadian climate strategy (Government of Canada 2002b) discusses vulnerabilities and more generally, local and regional impacts, to make the case for national climate policy. Such a discussion is largely absent in the EU, given the strong consensus within member countries.

There is also a drive to develop cost-effective regional and domestic measures. While on the one hand the administration supports technology programmes to foster new technological development and diffusion, including sequestration, there is a strong tendency to identify cost-effective measures. Cost-effective should here be seen both in the literal sense (i.e. value for money) but also indirectly, meaning politically feasibility. Opposition to climate change policies in the US is probably more than anywhere else in the world driven by fears of needing to change the lifestyle. Thus, one way out in the short-term is to use off-sets (i.e. emissions trading in the broad sense) in e.g. developing countries rather than domestic reductions strategies. The administration's increase in spending related to capacity building regarding climate change (e.g. CDM) and the reinforcement of the registry can be seen as attempt to explore and develop cheaper abatement possibilities in developing countries. At the same time, it may be an attempt to entice developing countries to buy into the US approach, which would offer potentially better chances for FDI than e.g. European policies, which concentrate more on domestic measures. Should the US approach of favouring off-sets - which is also emerging within the NAFTA framework, notably the electricity market - as against to domestic measures as preferred by the EU, Japan and Canada prevail, this would constitute a major division by Kyoto-land and the US. The bridge could however be that both the US and Kyoto-land demand "real" reductions, i.e. that off-sets need to stem from actual, measurable and permanent reductions. There is also a natural
limit to achieve targets abroad as opposed to domestically. Such a policy would reduce the pressures and opportunities for US business to develop and market new technologies. Regarding the interface of research and technological development, see the contribution by Galeotti/Carraro (2003) within this project.

Another area of attention in the US is research and development of new technologies and their diffusion. Spending in this area has been increased significantly, acknowledging that only new technologies will be able to achieve stabilisation in the long-term. While this is the area that has been singled out by the US administration, Japan, the EU and some member states such as Italy as the area for co-operation, there is little concrete today. Possibilities for example could be a joint R&D programme on energy efficiency and less carbon-intensive technologies (Lepetit 2002) or the expansion of the "Energy Star" energy efficiency labelling programme (Palmaerts 2002).

While it is uncontested that the administration's current policies will neither lead to stabilisation of GHG emissions in the US nor contribute to stabilisation worldwide, it is difficult to judge the long-term relevance of these. The administration's gradual approach based on intensity targets, voluntary approaches and pilot offset programmes could indeed lead to a greater consensus on climate change policy, which could become a starting point for credible action. On the contrary, it might be an attempt to undermine existing international climate policies in the context of the Kyoto Protocol. At the moment there is evidence for both views. In the follow, we will analyse the risks and opportunities for an international climate change regime, should the US develop a competing approach, built somehow in the context of North-America.

**The potential impact of a "sub-global" North American arrangement**

The US withdrawal from the Kyoto Protocol and the agreement's likely entry into force have de facto created a situation where the US and the rest of the world will go separate ways on climate change. Nobody can really count on the US coming back to the Kyoto process under this administration and even under a new president in two years, ratification of the Kyoto Protocol, even in its current version seems little more than a remote hypothetical possibility. The most likely working assumption is therefore that there will be pluralism regarding approaches. A competing approach might constitute a hedging strategy regarding the legal and institutional matters linked to the UNFCCC processes that have not yet proven to work. "The international community will not have to put all its eggs into a single basket" (Bodansky 2002a). This approach is widely used in the EU internal market and described as "regulatory competition".

This situation both holds risk and opportunities. Regulatory competition can be beneficial if it takes place in some sort of a common framework, thereby avoiding a race to the bottom. Such a race to the bottom cannot be ruled out altogether, especially if the US tries to impose its approach, which as we have seen will not lead to reductions. That way, the further development of the Kyoto process would be hampered, the environment would suffer and more than ten years of international negotiations would have been in vain with no credible alternative evolving. There were signs at CoP 8 in Delhi that the US attempts to undermine the international negotiations when it reversed its old position that developing countries need to accept targets to urging them not accepting targets (cf. Pew Center 2003).

The opportunities of regulatory competition stem from the assumption that the current administration's approach will develop into a credible alternative, based on credible targets. There is indeed, not only in the light of recent government and senate initiatives but also based on public opinion and the host of local, state and business initiatives reason to believe that a US consensus will emerge, at least in the medium term. In the meantime, it is important that the two
competing approaches remain compatible, to reintegrate at a later stage when the one or the other approach, or as most likely elements thereof. It is fair to say that US initiatives to date are by-and-large compatible with the Kyoto framework. In fact, the US has taken on several elements from the Kyoto Protocol, such as the development of registries and off-sets from third countries, in fact a version of the CDM. The critical factor in compatibility of the flexible mechanism is an eligibility criterion. But not every single detail of eligibility would need to be identical. Markets can take care of different rules and provide hedging instruments to deal with this. Minimum requirements are a standardised currency of exchange, harmonised enforcement mechanism including a common penalty rate and monitoring, reporting and verification rules including a standard registry (Egenhofer and Legge 2002b). Ideally as part of the enforcement there should be a common treatment of sinks, possibly based on best practice to achieve the highest possible environmental effects. For a detailed analysis on how linking of schemes might work in practice see (Haites and Mullins 2001), with a special emphasis on the US/Kyoto-land interface see Bodansky (2002b). Currently, the critical factors are the enforcement mechanisms including sinks. As Bodansky argues, a successful US policy will need to address the cost issues, which might either be done via intensity targets or more likely, as a result of the expected higher transaction costs or the complications surrounding them - as discussed above - as price ceilings, which have been prominent in the US discussion (notably Kopp et al 1999), and as a variant (McKibbin and Wilcoxen 1997) or with a view to the international discussion and the EU-US dispute in Hourcade and Fortin (2000) or Jacoby and Ellerman (2002). While such ceilings would not be compatible with the current Kyoto regime, they are only meant for the transition as a safeguard against costs. Once the two carbon prices will emerge (both in the US and Kyoto-land), costs become clear, thereby alleviating the need for price caps, or if prices were too high, leading to a strong temptation to introduce them in both regimes.

There are little problems with reporting, measuring, verification and the registry, which are governed by UNFCCC rules. In addition with WBCSD/WRI GHG Protocol, there exist a global standard for GHG measurement and reporting at industrial level. Similarly, the UNFCCC has set the currency, which is CO2e. The US adherence to the UNFCCC framework convention and the associated process suggests that the US will also adhere to UNFCCC rules. In addition the existing process on achieving an international climate regime is flexible enough to accommodate for additional approaches such a technology protocol or joint-EU-US R&D programmes.
8. Conclusions

For a time it appeared that the Kyoto Protocol had been the decisive step towards the formation of an international climate regime. It provided a comprehensive way to address the problem of climate change by including six gases and "carbon sinks" such as forests and farm land, which are capable of absorbing GHG. To smooth out the economic cycles and more generally to provide flexibility, it has introduced the possibility for countries to average their reductions over a period of five years. In addition the Kyoto Protocol has created the so-called ‘flexible mechanisms’ (emissions trading, joint implementation and clean development mechanism). Central were common but differentiated targets, which over time would gradually be extended to all countries. Starting with industrialised countries, historically responsible for the majority of emissions and therefore concentrations, in a following commitment period developing countries would enter the regime under terms still to be discussed. Detailed implementation issues and the progressive development of the regime were delegated to annual Conferences of the parties (CoPs), which over time would tidy up and further develop the regime.

This optimism has given way to confusion. Several events have contributed to this. First, the US has dropped out of the Kyoto Protocol process, followed by Australia. Second, against all odds the remaining industrialised countries including Canada - politically and economically deeply integrated with the US - have decided to go ahead with ratification of the Protocol and attempting to bring it into force. Third, Russia, the big potential looser of the US defection remains committed to the Kyoto Protocol. Fourth, developing countries which are expected to adopt binding targets over time seem to be increasingly detached from the international climate change regime. It is true that many of them have ratified and or will ratify but this is not surprising given that the Protocol provides various benefits in the form of investment, increased funding and - marginally - improved global emissions trajectory holding the promise of a better climate.

Although the original UNFCCC always foresaw action according to “common but differentiated responsibilities”, ‘the Kyoto Protocol assumed’ at least that the industrialised countries would share roughly comparable goals. With the US withdrawal from the entire Kyoto process the climate landscape has indeed become disintegrated into several groupings. The first include industrialised countries that have ratified the Protocol (“Kyoto-land”). The second includes the US (and Australia) with Russia still pending. Further groupings among developing countries emerge. Finally, with US disengagement, the prospects for developing countries accepting legally binding targets within the near future has become more remote than ever, if one uses the recent CoP8 at Delhi as a pointer.

This situation calls into questions on whether the Kyoto Protocol will continue in its current form and be extended to new commitment periods or whether there will be a new approach for an international agreement, coming out of the UNFCCC. A third possibility would be to replace a global agreement by a series of regional agreements (as the Carraro/Galeotti work suggests). Our review suggests that none of the three options are likely to materialise. Instead the new climate regime will be based on some key elements of the Kyoto Protocol architecture but with modifications in others. These key elements are the comprehensive approach including six gases and sinks, a gradual approach to a long-term problem, responsibility of industrialised countries to start with reductions first. The areas for modifications are the institutional framework (i.e. a top-down approach through the UN system or a bottom-up approach based on sub-global arrangements), the nature of targets and the exact way and the timing of developing countries' involvement. The three are intractably linked.
With the EU and the US likely to continue to be the dominant actors on the world stage, there are no signs that either bloc has radically departed from the key elements of the Kyoto Protocol architecture. Russia, the country holding the key for ratification of the Kyoto Protocol has said it would and has never challenged the basic approach. After it all it evolved potentially as the main beneficiary and therefore has every interest in a climate regime that acknowledges its past reductions. Similarly, other crucial players such as Japan and Canada, which have questioned the targets - implicitly or explicitly - have put their weight behind the Kyoto Protocol although they acknowledge that further tightening of targets will become more difficult.

8.1. Evidence for "sub-global arrangements" and their implications for the global climate regime

Although legally speaking the UN remains the institutional background, there is evidence of a "regionalisation" of climate change negotiations, i.e. a more bottom-up approach. The research could depict evidence for "regional approaches". The relative importance of attempts for regional approaches varied a lot. Clearly, in Europe the EU as a dominant actor has been instrumental in shaping a "European climate change area" including in one way or the other all European countries, excluding the former Soviet Union, except the three Baltic states. The US clearly takes a national/regional approach in opposition to the other industrialised countries, which have chosen the Kyoto Protocol framework. Whether these trends amount to a full regionalisation or indeed the establishment of "sub-global arrangements" is still difficult to judge. It is however clear that climate change is progressively entering into the mainstream of policy including foreign policy and development policy. With this trend towards integration of climate policies into mainstream economic and foreign policies, the scope for regional bottom-up approaches by settling climate change related trade-offs in a broader economic and political co-operation framework has considerably increased.

North America

Regionalisation is most evident in the US, which by pulling out of the Kyoto Protocol has by default taken a regional or in our language, "sub-global" approach. Coming back to the original question on whether such "sub-global" arrangements are likely to benefit the development of a global regime, we have concluded that the current US policy can be healthy in that it offers the possibility of "system competition" or to use an EU-term "regulatory competition" (Chapter 7). In the case of the US policy and likely developments, we have identified both risks and opportunities with the opportunities more important than the risks. Regulatory competition can be beneficial if it takes place in some sort of common framework, thereby avoiding a race to the bottom. Such a race to the bottom cannot be ruled out altogether, especially if the US tries to impose its current approach, which will not lead to credible reductions. That way, the further development of the Kyoto process would be hampered, the environment would suffer and more than ten years of international negotiations would have been in vain with no credible alternative evolving. There were signs at CoP 8 in Delhi that the US attempts to undermine the international negotiations when it reversed its old position that developing countries need to accept targets to urging them not accepting targets. As we have shown, there are major forces in the US calling for more climate protection including from crucial states, public opinion, some businesses and within Congress (Chapter 7.2). Power sector deregulation within NAFTA is likely to add pressure on the government and provide business opportunities for power companies (Chapter 7.4).
The opportunities on the other hand are considerable. The opportunities of regulatory competition stem from the assumption that the current administration's approach will indeed develop into a credible alternative, based on credible targets. This belief seems justified not only in the light of recent government and senate initiatives but also based on public opinion and the host of local, state and business initiatives. There are reasons to believe that a US consensus will emerge, at least in the medium term. In the meantime, it is important that the two competing approaches - i.e. "Kyoto-land" and US - remain compatible, to reintegrate at a later stage. It is fair to say that US initiatives to date are by-and-large compatible with the Kyoto framework. In fact, the US has taken on several elements from the Kyoto Protocol, such as the development of registries and offsets from third countries, in fact a version of the CDM. The critical factors in compatibility of the flexible mechanism are eligibility criteria. But not every single detail of eligibility would need to be identical. Markets can take care of different rules and provide hedging instruments to deal with this. Minimum requirements are a standardised currency of exchange, harmonised enforcement mechanism including a common penalty rate and monitoring, reporting and verification rules including a standard registry. Ideally as part of the enforcement there should be a common treatment of sinks, possibly based on best practice to achieve the highest possible environmental effects (Chapter 7.5). Thus, to date the critical factors are the enforcement mechanisms - the US approach is voluntary - and possibly sinks.

A successful US policy will need to address the cost issues, which might either be done via intensity targets or more likely, as a result of the expected higher transaction costs or the complications surrounding them - as discussed above - as price ceilings, which have been prominent in the US discussion. While such ceilings would not be compatible with the current Kyoto regime, they could only be meant for the transition as a safeguard against excessive costs. Once the two carbon prices will emerge (both in the US and Kyoto-land), costs become clear, thereby alleviating the need for price caps, or if prices were too high, leading to a strong temptation to introduce them in both regimes. The modest environmental impact of the Kyoto Protocol after US defection and the subsequent Marrakech Accords could in fact turn out as advantage, because costs come down, therefore reducing the risks of a shock therapy.

**Europe and Russia**

There are equally strong signs of sub-global arrangement between Europe and Russia. Following the US withdrawal the EU has led the international negotiations, inducing indecisive Parties to ratify the KP on the one hand, and allowing non-participants including the US, for possible returns to the KP in the future on the other. Consequently the EU has been under constant pressures from other countries to yield concessions, which were closer to the previous demands that the US put forward in The Hague (CoP6) in 2000 and before (Chapter 2).

Looking at Europe first, the EU has shown strong gravity forces towards other European countries such as the potential new member states of Central and Eastern Europe and the so-called European Economic Area countries (e.g. Norway) but also Switzerland (Chapter 3.3 & 3.4). This should of course have been expected given the close economic and legal integration of Norway with the EU and the effects of competitiveness of the Norwegian industry vis-à-vis EU industries. Norway is the biggest producer and exporter of hydrocarbons in Europe bringing its share of coverage by the EU ET Directive to almost about 60% of emissions by the sector to exposed international trade while corresponding figures for other Nordic countries range from under 10% to 20%.

Looking further east, both the prospects are the implications of an "EU-Russia arrangement" are considerable (Chapter 4). Starting with prospects, EU-Russia climate change co-operation has to be seen in the context of a deepening relationship between the European Union and Russia. This
relationship is based on the mutual acknowledgement between the EU and Russia of a ‘strategic partnership’ rather than ad hoc interests. The EU’s approach to Russia is based on the concept of economic integration, comparable the European Economic Area approach. Energy policy, and consequently climate policy, is a priority issue, and not surprisingly most advanced in institutional terms, given energy trade and investment between the EU and Russia.

With Russia holding the key to entry into force of the Kyoto Protocol, climate change has quickly emerged as an important element of EU-Russia relations. In the documents related to the Dialogue, climate change is not covered in the "pure Kyoto/Marrakech" form of unrestricted emissions trading but in a more qualified form. The implicit concept is linking revenues from sales of GHG emission allowances to investment in energy efficiency, which can be read as an attempt to find a mutually acceptable solution to excess emission allowances in Russia.

We have examined four instruments to foster this EU-Russia partnership with special reference to climate change. They are i) conventional investment and trade; ii) JI; iii) International Emissions Trading under the Kyoto Protocol and iv) the Green Investment Scheme (GIS), sometimes referred to a Green Fund. A GIS is to earmark revenues from sales of emission allowances for projects that would yield environmental benefits that lead to further emission reductions. Unlike ordinary emissions trading a GIS involves a restraint on the use of revenues not on sales of emission allowances. In comparison to unrestricted sales of emission allowances a GIS increases the legitimacy of emissions trading with Russia among potential buyers. If a GIS results in expansion of a market for Russian emission allowances, Russia could increase their revenues. A GIS has certain advantages over other instruments including JI and IET. First, unlike JI a GIS may start to operate before 2007. Second, emission allowances can be sold on a forward basis, which is even desirable to finance early investments of a GIS. Unlike JI early reductions before 2008 can be credited and transferred to investors as a forward trade of emission allowances. However, such forward contracts for transfer of emission allowances will probably be sold at a substantial discount against a risk of default in sales due to lack of eligibility (Chapter 4).

It is still too early to judge whether such a deal will come about due to a number of trade-offs within the EU and Russia - but there are good arguments in its favour. The first is that with the de facto creation of an EU internal emissions trading scheme, there is a structure for an "EU-Russia" agreement. The EU scheme explicitly has been designed to be open to other "Kyoto-land" to allow linking. The EU scheme has been designed to become the "default" model, should international emissions trading under the Kyoto Protocol not come into operation (Chapter 3.5). From here on the picture gets more confused however. A first unresolved question is still how the benefits from any of these instruments will be distributed within Russia. Further more there are trade-offs within the EU. The old EU member states, some likely to be CO₂ debtors and pressed by domestic industry to find cheap abatement possibilities, will at first sight have interests in wanting to open up the IET market to cheaper Russian credits, although with some environmental conditionality. The new EU member states as strong CO₂ creditors may want to keep Russian surpluses out. However, the further element in this balance of interests is that the newly acceding central European states are being required to achieve high EU environmental standards, which the EU is being expected to pay for either by budget subsidies or, possibly, by a protected IET market. This means a complex internal EU set of trade-offs between the financial interests of private companies and public budgets in the rich old member states. The outcome of this future hypothetical negotiation process is at this stage quite unclear, except to say that there will be serious pressures to limit EU companies’ access to cheaper Russian emission allowances. Another element of uncertainty is US attempt to strike a bilateral deal with Russia.
It is however clear that the EU will be relatively attracted by JI and/or GIS schemes to the extent that these mechanisms will guarantee delivery of real GHG emission reductions in Russia. Even if the EU’s interest in IET, GIS or JI mechanisms with Russia will be, in some degree, constrained by its internal balance of interests (including the enlargement aspect mentioned), it is also clear that the EU retains a major strategic interest in some kind of large-scale energy investment deal with Russia on two grounds. The first is energy supply security, which has grown in importance post-11 September. The second is environmental security, especially the objective of tackling global warming, beyond the EU’s own commitments to the Kyoto Protocol. These two objectives together are synergetic: if Russia’s long-term energy reform strategy for the next 20 years were to succeed, this would be a huge double boost for both objectives, given that there would be a cleaner energy sector and more room for net exports of oil, gas and electricity to the EU. And to finish with EU–Russia relations seem to be getting better and better. There is evident interest at summit level at trying to push the relationship ahead in all domains – economic, political and security. There are clear political and strategic reasons why this should be so, ranging from Russia’s own ‘European choice’ through to the EU’s conception of its own interests, which include specific energy supply and environmental security points, as well as the desire for deep and stable interdependence with its major neighbour. One may anticipate that the EU will want to work towards operational mechanisms with Russia in the energy supply and climate change fields patiently, thoroughly and cautiously. This is hardly surprising because of the technical complexity of the conceivable mechanisms, combined with the need for sufficient convergence on such matters as governmental implementation and corporate governance standards.

The merits of such a "sub-global agreement" based on GIS for example would go far beyond entry into force of the Kyoto Protocol - as a result of inevitable Russian ratification - and a climate policy framework for the Eurasian continent responsible for about half of industrialised countries (1990) carbon emissions. The most significant asset of such as GIS arrangement would be its potential to be easily extended to other industrialised countries that have a strong prerogative towards environmental integrity such as Japan and Canada. But just as such a GIS agreement could play for the EU both regarding environmental and energy security, the same could be said for Japan and possibly other Asian countries.

Returning to the US for a moment. A potential EU-Russia with built in enlargement mechanism via GIS may prove to be attractive for the US for the same environmental and possibly even more energy security reasons. An energy security deal (more advantageous to the EU and Japan), coupled with a climate change deal (more advantageous to Russia) has by extension implications on energy security in the US. Given that the US policy - if one believes the administration's rhetoric - is driven by energy security, a broad Eurasian energy/climate deal will not leave the US unaffected.

Asia

There is little evidence for regional approaches when it comes to climate change in Asia. Even for North East Asia, comprising of Eastern Russia, Mongolia, China, two Koreas, and Japan and the area we have studied thinking about regional co-operation has just started and therefore is confined largely to concepts. The GIS concept linking Russia to the EU and other Kyoto-land countries such as Japan has been discussed above. Another concept is being developed by the Asia-Pacific Network for Global Change Research (APN), established as an intergovernmental network for the promotion of global change research and interactions between the science community and policy makers in the region with a strong focus on climate change.
The starting point is that a subregional cooperative framework would enhance the potential for sustainable development (SD) and thereby create a win-win situation, taking into account the energy and carbon balance in this region. Eastern Russia including the Far Eastern region could supply oil, gas, and hydrocarbon to fast growing economies in China and advanced technologies and markets in Japan. The resource potential of Eastern Russia has been untapped due to harsh climatic conditions, lack of capital, distance from commercial and industrial centres in the West and relative lack of attention by the central government. Also, vast forests in Eastern Russia could absorb carbon emissions from China, Japan, and South Korea. Hence it is seen crucial to involve in any discussions of a regional cooperative framework provincial authorities of Russia, particularly those of Eastern Russia, given the rich resource endowments in the region. Russia’s eastern provinces account for 90% of natural gas production, 75% of crude oil, 8% of coal and 30% of electricity generation. The provinces have more than three fourths of the country’s hydropower resources and could export to Northeast Asia until at least 2010. It is estimated that the forest’s capacity of absorbing carbons will amount to 359 Mt a year by 2010. Thus, we find similar linkages as within the EU-Russia partnership and a major theoretical potential for regional emissions trading. At the same time however the complexities and trade-offs involved appear even bigger than is the case for the EU and Russia. With governments being still the dominant factor in the economy, market-based approaches hardly prosper. But even in the event of change there are still major problems with institutional, legal and economic/market capacity (Chapter 5.2). If at all, it is more likely that the region’s emissions trading markets will develop in a fragmentary and incremental fashion, and that the process will require a much longer time-frame than for example the development of the EU-wide scheme does. Nevertheless given the considerable potential, regional approaches and the prospects for a sub-global arrangement should be further studied and tested via pilot projects.

**Developing countries**

Without being subject to legally binding targets, generally developing countries have not really begun implementing climate policies in earnest. Thus, it was not surprising to find little evidence for regional arrangements. We have therefore approached the subject theoretically (Chapter 6).

Commitments to emissions reduction targets may take one of the two forms: quantified emission allowances, based on emissions reduction targets or sharing the mitigation costs. Most of the formulae proposed by negotiating countries follow the first form, possibly because emission levels are supposed to be easier to monitor than mitigation costs. Nevertheless it has been alleged that the Kyoto targets expressed in terms of absolute emission levels are a political compromise with no explicit link to scientific or economic rationale. They are arbitrarily determined as a result of intergovernmental bargaining not according to an objective standard formula. On the other hand it appears to be difficult to create an allocation scheme based on a single criterion that would suit all developing countries. This reflects the wide variance in country-specific circumstances such as geography, climate, resource endowments, and economic structure. It also highlights the pluralistic nature of equity. One logical consequence is therefore not to focus on any single equity principle but to look for approaches accommodating different equity principles (Chapter 6).

Our analysis concludes that the most feasible and cost-effective option for a developing country would be a sustainable development based approach. The approach could incorporate regional energy cooperation as one of the effective policies and measures. In some countries the proposed Green Investment Scheme (GIS) may prove to be effective in attracting foreign investments into the energy sectors for improvements in energy efficiency. The option will appeal to the widest range of developing countries regardless of their population size. It is possible that some
developing countries on the sustainable development paths would start breaking their ranks within non-Annex I Parties. They could choose 1) mainly implementing domestic policies and measures, 2) joining Annex I Parties with differentiated obligations and commitments or 3) form coalitions of like-minded states on the sustainable development paths. This means that there will be a political upset in the unity of the G77/China, following the disintegration of the Umbrella Group (Chapter 6.4).

This outcome is a direct outcome from the fact that the Kyoto Protocol framework has three problems associated with compatibility. The first is developing countries’ emissions trajectories and the ultimate objective of the UNFCCC. Trajectories and the objective are diverging. The second is the ultimate objective of the UNFCCC and short-term commitments of Annex I Parties. Existing targets will not lead to stabilisation, possibly not even reductions. Why should then developing countries take targets? The third is the flexible mechanisms and targets expressed in absolute emission levels. Absolute targets are hard to accept for developing countries for fear of curbs on economic growth. These problems go some way explaining why developing countries have firmly refused to be bound by quantified emissions reduction targets. As a result a variant of an equal per capita emissions approach, i.e. ‘Contraction and Convergence’, has emerged as an option for large developing countries, mobilising large capital flows from Annex I Parties. To date ‘Contraction and Convergence’ has been endorsed by the governments of India and the Africa Group as official positions. The main problem with the approach is political feasibility of large wealth transfer from Annex I Parties even with moderate differentiation and adjustments which ‘soft-landing’ approach could accommodate. More importantly an equal per capita emissions approach linked with IET lacks incentives for a group of developing countries which will have no surplus emission allowances to sell and/or small emission allowances in initial allocation. This group may include the advanced of developing countries, oil-exporting countries, least developed countries (LDCs) and small island developing states (SIDs). In this aspect a sustainable development-based approach could lead to a broader coalition of countries including those who would be marginalised under an equal per capita emissions approach. In practice the Johannesburg summit saw three Caribbean states embark upon a joint initiative for sustainable energy use. Although its impact per se is negligible compared to global emission levels, their initiative could be replicated to other small LDCs. Incentives for co-operation is not embedded in the conceptual base of a sustainable development-based approach. However, that it is easily replicable with minor adjustments could lead to an alliance of like-minded states (Chapter 6.3).

8.2. Which policies create incentives to move to internationally co-ordinated climate policies?

Moving on the second question this study has attempted to answer, we have examined the evidence for "winning policies". To recall, Carraro/Galeotti have recommended a set of policies to achieve a global agreement. They include policies to reduce uncertainty regarding costs and benefits including damages caused by the absence of climate policies, redistribution of benefits from climate policies (through negotiations or transfers), approaches to address free-riders (e.g. equity assisted by transfers and issue linkage), explicitly allowing for regional and cost-effective domestic measures and finally, policies to support the development of climate-friendly technologies.

Given that there is no stable global climate change regime, evidence cannot be conclusive and only indicative.

EU and Europe
As for Europe, the evidence supports the viewpoint that reducing uncertainty is a key factor. The availability of "agreed" cost estimates and their distribution played an important role in achieving a consensus on climate policy. Two caveats need to be made however. Due to specific circumstances expected costs to comply with the Kyoto commitments have been relatively low with around between 20-30 Euro per tonne of CO\textsubscript{2}. Second economic modelling in the EU was easier since EU climate change policy is based on domestic measures primarily (of course facilitated by relatively low costs) and therefore the assumptions are clear and possibly even controllable (Chapter 3.5). Possibly, the current US approach might attempt to move also towards a situation where the parameters of climate change policy including price expectations become largely endogenous. In the past one of the arguments against the Kyoto Protocol was that it was that targets were imposed from outside, leaving the US with too little control on costs.

Private sector initiatives, the most notably by BP and Shell have been crucial to have a counterweight to blocking forces. That a number of companies have undertaken measures avoided that industry could build a common and united front against climate change policies. It also shows that early moving by BP and Shell has been rewarded with the EU ET trading scheme being fully compatible, if not modelled on the two companies' approach. The EU proved a reservoir of different approaches including voluntary agreements, cap-and-trade schemes, hybrid trading schemes, mixing cap-and-trade with baseline-and-credits schemes or regulatory and tax policies. Thus, there was a rich experience within a portfolio of instruments applied by member states.

Emissions trading was a key factor to gain the support of industry or at least major parts thereof. The perspective of further cost reductions and getting allowances for free (through grandfathering) most likely has played a key role of industry support by and large. However, we have also learned that possible net buyer industries in a country or region can develop powerful opposition to opening an emissions trading regime to other higher-cost countries. This was the case for Germany, where considerable parts of industry wanted to keep the benefits of potentially low-cost carbon prices within Germany via the "pool", rather being subjected to higher carbon price in the EU internal market. Our conclusion is that "voluntary" linking of emissions trading schemes will not work automatically. Net buyers have every interest to oppose linking up with high cost countries or regions. This would for example be the case if Norway, Canada or Japan wanted to link to the EU ET scheme. Net seller industries have opposite interests but have at last in Germany appeared to get less attention for their arguments.

With a view of the wider Europe, as was of course expected, the EU as dominant economic actor has shown gravity forces towards the other European countries. All other European countries are to various degrees integrated with the EU either politically such as the European Economic Area countries, Switzerland or the new member states or if not economically (Chapter 3.3 & 3.4). Thus, it appears to be sufficient to entice the dominant economic power to climate change policy to have other countries following suit. This has been confirmed in a recent survey on the conditions for effectiveness of international agreements. Power was considered essential to achieve an international agreement.

**Russia**

As has been known for long, the tool to entice Russia to participate in an international climate regime are transfers. This has been attempted by generous baseline setting allowing Russia potentially to sell considerable excess emissions rights, later become known as hot air. As we equally know, this approach has failed at the latest with the rejection of the Kyoto Protocol by the
US. Whether it could have ever worked is also an open question. There have always been doubts on the political feasibility of large financial transfers to a Russia, with a mixed record of governance at best. Be it as it is, our analysis strongly suggests that the "winning policy" for Russia is issue linkage (Chapter 4). There is convincing evidence that climate change including Russian ratification has by now been fully incorporated into the overall EU-Russia political agenda including energy trade, investment, deepening economic integration via *inter alia* a European economic space agreement and EU support for Russian WTO membership and security and defence co-operation. That such a broad approach does not always lead to Russia signing and ratifying an international agreement however has been learned by Russia's unwillingness to ratify the Energy Charter Treaty on investment protection and energy transit. Russia as a major source of oil and gas is wary not to lose its autonomy of these resources including transport rules. This might suggest that there would be some kind of transfer necessary to tip the balance in favour of full participation.

**United States**

The causes for the US reluctance can not only be blamed on the administration or Senate. This would be a too simple answer. There are many forces at work which have made a consensus on climate change impossible in the US. What will be the winning policies to make the US embark on more serious climate change policies?

Going back to the Carraro/Galeotti recommendations on winning policies, it appears that the first policy recommendation, to implement policies to reduce uncertainty regarding costs and benefits including damages by absence of climate policies offers the biggest potential for the US to move closer to credible climate policies. With the administration having accepted the risks of climate change, its by and large human cause and the US responsibility, better information on costs and notably benefits, i.e. due to avoided damages from climate change are likely to increase chances for a comprehensive policy. Notably, it could lead to a further strengthening of local, state and business initiatives, if they can be linked to costs of damages. It is interesting to note that the Canadian climate strategy discusses vulnerabilities and more generally, local and regional impacts, to shore up local and regional support for national climate policy.

There is also a drive to develop cost-effective regional and domestic measures (Chapter 7.5). While on the one hand the administration supports technology programmes to foster new technological development and diffusion, including sequestration, there is a strong tendency to identify cost-effective measures. Cost-effective should here be seen both in the literal sense (i.e. value for money) but also indirectly, meaning politically feasibility. Opposition to climate change policies in the US is probably more than anywhere else in the world driven by fears of needing to change the lifestyle. Thus, one way out in the short-term is to use off-sets (i.e. emissions trading in the broad sense) in e.g. developing countries rather than domestic reductions strategies. The administration's increase in spending related to capacity building regarding climate change (e.g. CDM) and the reinforcement of the registry can be seen as attempts to explore and develop cheaper abatement possibilities in developing countries. There might however be a trade-off between CDM projects and creating pressures and opportunities for US business to develop and market new technologies, an area, which has been analysed extensively by the FEEM group.

Another area of attention in the US is research and development of new technologies and their diffusion. Spending in this area has been increased significantly, acknowledging that only new technologies will be able to achieve stabilisation in the long-term. While this is the area that has
been singled out by the US administration, Japan, the EU and some member states such as Italy as the area for co-operation, there is little concrete action today.

A successful US policy will need to address the cost issues, which might either be done via intensity targets or more likely, as a result of the expected higher transaction costs or the complications surrounding them as price ceilings, which have been prominent in the US discussion. While such ceilings would not be compatible with the current Kyoto regime, they could easily be introduced in Kyoto modified. Perhaps they provide the best opportunity to engage the US (Chapter 7.5).

**Developing countries**

Reducing uncertainty has been one of the main concerns for developing countries. Developing countries appear to prefer to have a predictable architecture with a clear time-frame which could meet the ultimate objective of the UNFCCC: stabilisation of \( \text{CO}_2 \) concentrations at a relatively low level. This would serve the best interests of countries that are particularly vulnerable to impacts of climate change. In this respect the Kyoto Protocol fails short. An equal per capita emissions approach, a top-down method, would score better than a sustainable development-based approach, a bottom-up method (Chapter 6).

Redistribution of benefits of climate policies is another main concern for developing countries. Developing countries would prefer to have an architecture with equitable emission entitlements. This would inevitably require transfers of emission allowances through IET. IET is an essential component of an equal per capita emissions approach, not that of a sustainable-development approach.

Regarding free riding, developing countries would not enter IET without any compensation either in the form of either excess emission allowances or direct financial transfer through a separate mechanism (‘equity between Annex I Parties and non-Annex I Parties’). Otherwise they would feel discriminated against EITs, especially Russia and Ukraine (‘equity between EITs and developing countries’). An equal per capita emissions approach would inevitably require transfer of emission allowances from EITs to developing countries. A sustainable development based approach which has no direct link with IET could be combined with direct financial transfer for the purpose of capacity building in developing countries.

Cost-effective domestic measures could be highly beneficial for developing countries. A large number of developing countries are dependent on imported energy. Despite large coal production capacities, even China and India have increased oil imports. Accordingly these energy-importing countries seek to reduce dependence on expensive energy imports through energy conservation. A sustainable development-based approach is based on a set of cost-effective policies and measures such as pricing (e.g. removal of subsidies from electricity tariffs), energy efficiency improvements, and regional cooperation (e.g. natural gas supply via pipeline). An equal per capita emissions approach is relatively silent about the question as to domestic measures.

Moreover, under an equal per capita emissions approach large capital flows into large developing countries could discourage domestic measures to correct resource allocation problems, especially removal of subsidies from electricity tariffs.

One of the most urgent task is to strengthen the social, economic and technical resilience of the countries that are the poorest and most vulnerable. IET could stimulate technological transfer to developing countries through a package deal on setting prices of emission allowances, i.e.
development of climate-friendly technologies. For instance, developing countries could import advanced technology on favourable terms if they agree to discount prices of emission allowances on sale. Hence an equal per capita emissions approach linked with IET could help developing countries strengthen their technical base. However, this kind of package would not benefit countries without excess emission allowances to sell or with small emission allowances in initial allocation. Sustainable development-based approaches including provision of fiscal incentives for climate-friendly technologies (e.g. subsidies to renewable energy resources, promotion of R&D), could be combined with technical assistance by Annex I Parties (Chapter 6.4).

8.3. Evidence for bottom-up approaches

Coming back to the original question on whether the top-down or bottom-up approach is likely to prevail, there is evidence for both. While major parts of the top-down Kyoto Protocol framework are likely to remain, detailed implementation is increasingly moving towards a regional bottom-up approach. There are strongest signs for this on the Eurasian continent. While firmly rooted in the Kyoto Protocol framework, the EU has attempted to bilaterally negotiating with Russia (and to some extent with Japan) policies to entice participation in an international climate regime. Even if this meant radically changing the original Kyoto Protocol agreement (Chapter 2). We could even go as far and argue that should the Kyoto Protocol have a future, implementation must be done in bottom-up fashion on the basis of sub-global arrangements taking into account the relevant trade-offs in a comprehensive way, going beyond environmental security but incorporating energy security and economic integration, notably trade and investment).
References


Berk, M. et al. (2001), Keeping our options open: a strategic vision on near-term implications of long-term climate policy options: results from the COOL project. RIVM.


Chandler, W. et al. (2002), Climate change mitigation in developing countries. Pew Center on Global Climate Change. October 2002.


Depledge, J. (2002), Continuing Kyoto: extending absolute emission caps to developing countries, Baumert, K. et al. (eds.), Building on the Kyoto Protocol: options for protecting the climate, World Resources Institute.


Government of Norway (2002), The third national communication to the UNFCCC. 8 May 2002.


Japan International Cooperation Agency (2002), Committee report for the promotion of cooperation on climate change mitigation measures and implementation of CDM/JI. March 2002.


Miles et al. (2002), Unlocking effectiveness: why some international environmental regimes achieve more than others. An unpublished paper. Oslo: Fridjof Nansen Institute.


Pelkmans, J. (2001), European Integration. Pearson Education.


Pretel, J. (2001), PCF II project cycle after CoP7 and preparedness of EIT countries. Paper prepared while working as a PCFplus Fellow with the PCF Fund Management Unit at the World Bank, Washington.


Shukla, P. et al. (1999), Developing countries and global climate change: electric power options in India. Pew Center on Global Climate Change. October 1999.


Ten Brink, P et al (2003), Negotiated Agreements and Climate Change Mitigation, Carraro C and Egenhofer C (eds.), Firms, Governments and Climate Policy: Incentive-Based Policies for Long-Term Climate Change. Cheltenham: Edward Elgar


Winkler, H. et al. (2002a), Sustainable development policies and measures: starting from development to tackle climate change, Baumert, K. et al. (eds.), Building on the Kyoto Protocol: options for protecting the climate. World Resources Institute.


Woerdman, E. (2002), Implementing the Kyoto mechanisms: political barriers and path dependence. University of Groningen, the Netherlands.


