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Special Feature on the Kyoto Protocol

The Road to and from the Kyoto Protocol: The Perspectives of Germany and Japan

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This paper aims to present, from the perspectives of Germany and Japan, some of the major issues facing the international community in reaching agreement on the Kyoto Protocol and its implementation. It also provides the background leading up to the creation of the Intergovernmental Panel on Climate Change (IPCC), the Berlin Mandate, and the Kyoto Protocol. Although the protocol was finally signed by all participating countries (except a few) after long, protracted negotiations, the Berlin Mandate, the legally-binding minimum targets set forth for reduction of greenhouse gas (GHG) emissions by 2008 to 2012, and the priorities given to domestic solutions over external measures provided some countries, notably the United States, an excuse for rejecting the protocol. During the subsequent international negotiations Germany took a lead in pushing the hard-line European Union position, while Japan tried to mediate between the European Union and the soft-line United States position to bring the two sides closer together in an attempt to bring the United States back into the protocol, get it ratified by as many signatory countries as possible, and put into effect as soon as possible. The paper concludes that while the protocol's fate appears to have ended up in the hands of Russia, the greatest hurdle for GHG emissions reduction lies ultimately in the extent to which the governments of developed countries and European economies in transition can convince their citizens, corporations, and other entities to meet those targets within the prescribed time limit.

Keywords: Scientific inquiry, Compulsory quantitative targets, Market-based options, Civil society, Environmentally sustainable lifestyle.

1. Introduction[1]

As a result of intensive consultations among the European Union (EU), Japan, and the Russian Federation, Russia's president, Vladimir Putin, has finally given his approval to send the Kyoto Protocol to the Russian parliament for ratification, which is essential for the protocol's entry into force. It is now expected that President Putin will give his formal signature to the protocol when it is returned to him from the parliament. Several assumptions have been advanced as to why Putin has taken so long to give his approval. First and foremost, Russia's "hot air" gift has dropped in value now that the United States is not expected to ratify the Kyoto Protocol and, as a result, will not participate in international emissions trading. This will bring the carbon trading prices down significantly. Second, Russia is turning the protocol into a bilateral and multilateral bargaining chip to maximize its political and

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1. Any errors or omissions in this article are the joint responsibility of the two authors, as it was jointly written, drawing on Heike Schröder's doctoral dissertation entitled "Climate Change Policy in Japan: From Dusk To Dawn," submitted to the Free University of Berlin in May 2003.

economic interests in the short term. In fact, Russian authorities are reported to have admitted the Russian decision to ratify the Protocol partly as a political response to the EU's final agreement to Russia's application for membership in the World Trade Organization. Third, the Kyoto Protocol is feared to be a barrier to Russia's anticipated economic recovery after a long period of economic decline throughout the 1990s. Finally, the fact that with the sharp and continued rise of crude oil and natural gas prices in recent months in the global market, the annual average growth of Russia's gross domestic product (GDP) in the first half of this decade is now expected to continue to stay above 7 percent may have turned Russia around in favour of ratifying the protocol. Russia may also have recognized an adverse impact of his uncertain attitude toward the protocol on its international relations vis-à-vis both developed and developing countries.

While it is doubtful that the United States under the Bush administration will ratify the Kyoto Protocol, despite an ongoing dialogue among the European Union, Japan, and the United States, a change in the US administration, if it should happen after the presidential election in November 2004, may radically change its policy toward the protocol, now that Russia's expected ratification will certainly bring it into force in early 2005. While EU countries and Japan have been at the forefront in the quest for the protocol's early ratification and implementation, there are differences in their policy thrusts, approaches to energy policies, and in particular the greenhouse gas (GHG) emission reductions between the two. This reflects differences in the domestic configuration of vested interest groups as well as those in the public attitudes toward GHG emissions reduction.

The objective of this paper is fourfold. First, it aims to provide a better understanding of the scientific and political background of the Kyoto Protocol. Second, it attempts to analyze the process of the Kyoto Protocol negotiations, particularly the roles of Japan and the European Union in forging a consensus on the protocol by the international community in 1997. Third, it presents the protocol's institutional architecture. Finally, it assesses recent developments in Japan and the European Union, particularly in Germany, in their respective attempts and policies to reach their Kyoto targets. In so doing, German and Japanese perspectives are presented in order to find both common ground and differences in GHG emission reduction policies and approaches in the European Union/Germany and Japan, including in the governmental, non-governmental, and private sectors.

2. Climate change: Science and politics

While the history of impacts from climate variations on humankind is long, the history of influence from humankind on the global climate is rather short. The revolutionary developments in agriculture between 1650 and 1900 caused the erosion of most of Europe's old-growth forests for agricultural, pasture and urban land reclamation purposes, leading to increases in atmospheric carbon dioxide (CO_2) concentrations. A more plentiful food supply induced population growth, resulting again in growing levels of atmospheric CO_2. Also, from the late eighteenth century onward, the Industrial Revolution led to further increases in CO_2 levels from the burning of fossil fuels. Today, in addition to the already high

emission levels in industrialized countries, economic growth in developing countries is expected to further increase global CO_2 emission levels during the twenty-first century.[2]

While natural climate variability has usually prevailed at a rate that maintained natural adaptation by plants and animals to these changes, such gradual development may not be guaranteed in the future. Global average temperatures are rising and weather patterns are changing faster than at any time before in the last 10,000 years. This trend, it is believed, will accelerate in the future if not reversed in time.[3] This is due to the "*enhanced* greenhouse effect" stemming from an increase in the concentration of GHGs in the atmosphere. CO_2 concentrations have increased by 30 percent, from around 285 parts per million (ppm) in the mid-nineteenth century to around 365 ppm today; methane levels in the atmosphere, although much lower by comparison, have more than doubled from around 800 parts per billion (ppb) to around 1,720 ppb in the same time period.

Rising global mean temperatures are one manifestation of this enhanced greenhouse effect. Others include changes in precipitation patterns, melting glaciers, rising sea levels, extreme weather occurrences, and even local cooling. Despite year-by-year variations and error margins, there is an unmistakable trend toward higher average temperatures. Although regional impacts of climate change are expected to vary, it is predicted that they will be the gravest in developing countries and coastal areas.

The term *greenhouse gas* was coined in 1827, when French mathematician Jean Baptiste Fourier introduced the analogy of a greenhouse to illustrate how the atmosphere traps heat and thus warms the earth's surface. Meteorological research broadened significantly from the 1950s onward. Wide-scale investment was launched, above all by the US government and US-based industry, into meteorological research, not primarily to enhance understanding of climate change but to foster technological development of jet aviation, computer science, and nuclear weaponry. This led to the establishment of a formidable research infrastructure that produced data in the following decades that came to strongly suggest substantial alterations in present and future trends of the earth's climate.

From 1970 onward, international meetings were held to build up evidence that human-induced emissions had already begun to affect the climate. In 1979, scientists appealed to policy makers to consider precautionary action concerning possible anthropogenic interference with the global climate. This new political dimension was further expanded at a conference in 1985, when scientists declared that, as a result of the increasing concentrations of GHGs in the atmosphere, a rise in global mean temperatures "greater than any in man's history" could occur in the first half of the twenty-first century. They recommended that "scientists and policymakers should begin active collaboration to explore the effectiveness of alternative policies and adjustments" (Skodvin 2000).

In addition to these developments of scientific evidence, growing environmental momentum in the 1980s in many industrial countries had spurred political action on the climate change issue. This

2. For example, China and India, which have been growing at 6 to 8 percent annually in real terms of GDP and increasing their CO_2 emissions by 3 to 4 percent annually during the last decade or so, are expected to become the second and third worst emitters in the world, only superseded by the United States.

3. Scientific uncertainty, however, still prevails: The greatest difficulty in fully understanding weather and climate systems is that the numerous variables, including temperature, precipitation, wind, humidity, cloudiness, sea-surface temperatures, and their interdependencies, are not yet sufficiently deciphered.

momentum was enhanced by a growing public awareness and presence of environmental movements in these countries, as well as the successful outcome of the ozone negotiations that culminated in the adoption of the Montreal Protocol in 1987. Based on these premises, scientists and policy makers at a conference held in Toronto in 1988 jointly set a reduction target of 20 percent of 1988 levels by 2005, with the eventual aim of reaching a 50 percent cut. This so-called Toronto Target is a landmark in terms of saliency because it was the first—and to date—the last time that policy makers agreed to a far-reaching policy proposal on climate change at an international conference.[4]

These developments finally led to the establishment of an intergovernmental body—the Intergovernmental Panel on Climate Change (IPCC)—to translate the status of the science into political prerogative. The IPCC has become the most significant, and highly accepted, science body to facilitate interaction between the science and policy communities. It incorporates not only scientists but also government officials and representatives from intergovernmental organizations (IGOs), non-governmental organizations (NGOs), and business representatives in its activities. This science body has been an integral part of the global dialogue on climate change and was a precondition for initiating the Kyoto Protocol negotiation process.

The IPCC was set up in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) with the objective of assessing "the scientific, technical and socio-economic information relevant for the understanding of the risk of human-induced climate change" in a "policy relevant," rather than a "policy prescriptive" manner.[5] Moreover, the IPCC does not have a mandate to carry out its own research. Rather, it assesses peer-reviewed and published scientific and technical literature to produce policy-relevant, state-of-the-art scientific reports. The main bodies of the organization are the three Working Groups (WGs), the three Working Group Plenaries, and the IPCC Plenary.

The three Working Groups established under the IPCC are charged with fulfilling the following objectives: Working Group I (WG I) assesses the scientific aspects of the climate system and climate change; Working Group II (WG II) addresses the vulnerability to climate change of socioeconomic and natural systems, negative and positive consequences from climate change, and options for adapting to it; and Working Group III (WG III) assesses options for limiting and reducing GHG emissions.[6] Up to this point, the process can be regarded as almost entirely non-political.

The results of the Working Groups are debated in their respective Working Group Plenaries. Lead authors, government experts, and environmental and industry NGOs take part in the debate, in order to acquire political acceptance of the knowledge put forth by the scientists. The line-by-line, oftentimes word-by-word, negotiation of the Summary for Policymakers (SPM) exposes each document to influence on non-scientific grounds. Substantive changes to the text cannot be made, however, without consent from the lead authors, as they can veto changes they regard to be unsubstantiated. Thus, the only

4. It has to be noted that the participating government representatives came from only 48 countries that were already convinced of the necessity for policy action on an international level.

5. See the IPCC's homepage at http://www.ipcc.ch/about/about.htm.

6. Note that the organization of the Working Groups has changed several times. For a detailed account of the history of the IPCC, see Agrawala, S. 1997. Explaining the evolution of the IPCC structure and process. ENRP discussion paper E-97-05. Kennedy School of Government, Harvard University, August.

means of influencing the results is through utilizing the rules of procedure as a tool for delaying the process. Unlike the IPCC's voluminous assessment reports (some 750 to 900 pages per Working Group), the short SPMs (some 10 to 20 pages) are widely circulated and reported on by the media.

An important function of the Working Group Plenaries is that they offer a forum for an interactive dialogue between scientists, policy makers and, to some extent, civil society on the appropriate interpretation of the scientific findings and their potential policy implications. Policy makers may thus seek clarification where necessary, exchange opinions with the science community concerning potential policy implications, or discuss which future tasks the IPCC should focus on. It is important to recognize that conclusions are, by their nature, always subject to interpretation from specific interest and value perspectives.

The IPCC Panel is the main decision-making body of the IPCC and includes government representatives and experts from IGOs and NGOs. It meets in plenary sessions about once a year, and discusses and approves the IPCC's publications, including its assessment reports. The panel also decides on the mandates and work plans of the WGs and its task forces, the structure and outline of its reports, the IPCC principles and procedures, and its budget.

As climate change is a highly sensitive issue touching upon vital national and economic interests, the risk of creating serious political conflicts within and across countries in attempting to solve the problem is high. A further impediment is the fact that climate change policy generates short- to medium-term costs, though with effective long-term benefits, is hard to sell politically if governments remain in power for merely short- to medium-term periods, as is usually true for democracies. It is, therefore, extremely beneficial to have in place a broad, objective, and transparent intergovernmental process for synthesizing peer-reviewed scientific literature into authoritative state-of-the-art reports. The IPCC's assessment reports and their SMPs (published every five to six years) play a significant role in assessing the climate change issue from its various angles.

In its *First Assessment Report*, published in 1990, the IPCC's WG I asserted that the earth's atmospheric concentrations of GHGs were increasing and that this trend was largely due to human activities.[7] While recognizing that the outcome of this would be a continuing increase in global mean temperatures, the full impacts from climate change were still uncertain. Nonetheless, scientists agreed that the climate was warming faster than at any time in the last 10,000 years. If the trend continued, average temperatures were projected to rise by an estimated 2 to 5 degrees Celsius (°C) by 2100. This would be accompanied by an average sea-level rise of 30 to 100 centimeters (cm) by 2100, putting the livelihoods of low-lying coastal areas and islands into jeopardy. These findings led to recommendations in the *First Assessment Report* that an international climate change agreement should be negotiated. The report convinced many governments of the scientific grounds for a policy response. It constituted the scientific background for the adoption of a UN General Assembly resolution in late 1990 that led to the establishment of the Intergovernmental Negotiating Committee (INC) in 1991, which was charged with negotiating the Framework Convention on Climate Change.

7. For reasons of brevity only, we shall merely summarize the impacts of the conclusions from the IPCC's WG I reports dealing with climate change science and will omit those of WGs II and III.

The IPCC's *Second Assessment Report* (SAR) was circulated in late 1995 and published in 1996. The conclusions drawn by WG I were even more compelling than previously, stating that "the balance of evidence suggests a discernible human influence on global climate." This implied a strong endorsement of an assertive policy response and marked a turning point in the intergovernmental response to climate change. It put the debate over the validity of the science to a close. Although some science sceptics have remained vocal, the science has become officially recognized (Dupledge 2002).[8] The SAR estimated an average global temperature rise of about 1°C to 3.5°C and a sea-level rise of 5 to 15 cm until 2100. The change in the position of the United States between 1995 and 1996 may have been swayed by the outcome of the SAR (Schröder 2001). While the United States had remained opposed to a legally-binding protocol at COP 1 in 1995, it came to endorse this by COP 2 in 1996.

The *Third Assessment Report* (TAR) was published in 2001. Given the adoption of the Kyoto Protocol in 1997 and the acceptance of the reality of climate change, the political stakes were eased compared with when the SAR was being concluded. WG I asserts that there "is new and stronger evidence that most of the [global] warming observed over the last 50 years is attributable to human activities." The projections on global temperature rise of 1.4°C to 5.8°C were significantly higher than those of the SAR. This is primarily due to a decrease in sulfur dioxide emissions that have a cooling effect. Global surface temperatures have risen by 0.4°C to 0.8°C in the twenty-first century. This is slightly higher than the SAR findings and can be attributed to high average temperatures between 1995 and 2000. The sea level is now expected to rise by 9 to 88 cm in the twenty-first century, which is slightly lower than previously estimated and mainly due to improved modeling (Depledge 2002).

The intergovernmental status of the IPCC allows government officials to participate in the IPCC's main scientific decision-making proceedings, enabling them to contribute to the development of the knowledge base. This permits them to personally evaluate the reliability of the scientific information that they base their political judgement on. There is, however, a fine line between the positive aspects from broad participation on the one hand, and the risk of undermining the IPCC's credibility through politicization of the science, on the other. The scientific findings might then be put into question, weakening the IPCC's authority.[9]

Despite this balancing act, there is a high level of acceptance of the scientific knowledge base provided by the IPCC and its political neutrality among national delegates. A survey carried out by the United Nations University's Institute of Advanced Studies (UNU/IAS) at COP 3 (1997) and COP 4 (1998) finds that 80 percent of the delegates interviewed at COP 3, and 84 percent at COP 4, agreed that the IPCC provides scientifically credible information, while 3 percent at COP 3, and 2 percent at COP 4, disagreed. Moreover, 60 percent of the respondents at COP 3, and 57 percent at COP 4, agreed that the IPCC provides politically neutral information, while 18 percent at COP 3, and 10 percent at COP 4, disagreed (Barrett et al. 2001). Thus, it can be concluded that the involvement of policy makers and other relevant actors contributed to the overall positive evaluation of the IPCC's work.

8. See also Brack and Grubb (1996).

9. This weakness has been exploited many times in the IPCC's history, most prominently by large oil-producing countries such as Saudi Arabia and Kuwait. Their argument would be that "these scientific findings may well be true, but they have not come about in the correct manner. We can therefore not be certain that they are true, and they should therefore be deleted." See Skodvin (2000).

The extensive participatory process forms the basis of the IPCC's scientifically authoritative and officially accepted position on climate change. Without this strong linkage to science, the policy response to climate change might have been much weaker. Thus, although scientific consensus alone cannot bring about political consensus, it does form a prerequisite for the development of a policy response.

3. The road to and from Kyoto

From around 1990 onward, there has been a broad scientific consensus that global average temperatures were increasing significantly. Although a UN-sponsored multilateral process to find solutions was launched at the time, it was not until 1997 that concrete and binding reduction targets were agreed on. With the Kyoto Protocol not yet in effect, however, there is still no de facto legally-binding international treaty to regulate GHG emissions. It can only be concluded that the political process has been a difficult and protracted one that was strongly influenced by domestic interests. This chapter sheds light on the different stages of this process and the political stalemates and breakthroughs that have taken their turns.

The United Nations Framework Convention on Climate Change (UNFCCC) was completed after 16 months of negotiations and adopted in May 1992 in New York. It was opened for signature a month later at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. Twelve years after its adoption, 188 states plus the European Community have ratified and acceded to or approved the treaty,[10] amounting to almost universal membership.

The UNFCCC sets a long-term objective, which is to stabilize GHG concentrations in the atmosphere at a level that would maintain the natural balance of the earth's climate system. It is bound neither to timeframes nor to binding targets, reflecting the political limitations surrounding the climate change issue at the time. While the European countries and the Association of Small Island States (AOSIS) in the Pacific were pushing for CO_2 reduction targets and had submitted various proposals for this purpose, the oil-producing countries (OPEC) and fossil fuel-intensive economies such as the United States were resolutely against any binding commitments.[11] Japan was generally supportive of setting reduction targets, albeit only if the United States participated in such a scheme (Kameyama 2003).

What was eventually agreed on was that the Parties should review the adequacy of commitments under the UNFCCC and subsequent protocols at regular intervals. Once the existing commitments are not found to be adequate to achieving the convention's long-term objective, the Parties are to negotiate further protocols or other legal instruments. Thus, a process was established to bring the international community together at regular intervals to reassess what strategies and measures are required to attain the convention's objective.

After entry into force of the UNFCCC in March 1994, COP 1 (in Berlin, 1995) concluded that the commitments of the convention were not adequate. In adopting the Berlin Mandate, the Parties launched a process toward strengthening the commitments of Annex I parties beyond the year 2000 by adopting a

10. For the status of ratification of the UNFCCC as of May 24, 2004, see http://unfccc.int/resource/conv/ratlist.pdf.
11. For a detailed account of the negotiations of the UNFCCC, see Bodansky (1993).

protocol or another legal instrument.[12] The Berlin Mandate established the foundation for the negotiating process leading up to the Kyoto Protocol. It explicitly ruled out any new commitments for Parties not included in Annex I of the UNFCCC in the next round. This was a compromise struck by developed countries to bring developing countries into the negotiating process under the UNFCCC, in spite of emerging rapid increases of CO_2 emissions by many fast-growing developing countries of Asia and Latin America (Hirono 2004).

The Ad-hoc Group on the Berlin Mandate (AGBM) that COP 1 had established thus embarked on negotiating further commitments. By COP 2 (in Geneva, 1995), a breakthrough was achieved in that the United States gave its support to establishing "legally-binding" emission reduction targets. During the months prior to COP 3 (in December 1997 in Kyoto, Japan), however, it seemed unclear whether the Parties would be able to agree on reduction targets given their vastly conflicting interests.

The European Union proposed that all Annex I parties should commit themselves to a flat reduction target of 15 percent from 1990 levels by 2010. Under the internal EU distribution scheme, Germany was prepared to take on a reduction target of 25 percent, while Portugal would be allowed to increase its emissions by 40 percent. The European Union negotiated for strong policies and measures (PAMs) to achieve most of the reductions domestically, rather than permitting unrestricted use of market mechanisms.

The United States demanded that all Annex I parties should commit themselves to stabilizing emissions at 1990 levels by the period between 2008 and 2012, and that developing countries should participate in the commitments. The United States sought maximum flexibility in implementing the commitments, and proposed to include joint implementation and emissions trading as cost-effective means to achieving emission reductions.

Japan's position was that of a mediator, placing itself between the positions of the European Union and the United States, albeit closer to the US position. As the host of COP 3, its most important goal was to reach agreement in Kyoto. It set a maximum reduction target of 5 percent from 1990 levels by 2008 to 2012 for all Annex I countries, and proposed a detailed differentiation scheme that would take into consideration a country's per-capita emissions, gross domestic product, and population growth.

The developing countries were aligned under a coalition called the Group of 77 (G77) and China, comprising some 130 countries. The group's diversity of national circumstances and interests, however, has somewhat limited its influence on the negotiation outcomes. Not surprisingly, though, the G77 and China have remained resolute on one issue: that they should not be pulled into the commitments under the Kyoto Protocol in the first commitment period.[13]

COP 3 took place from December 1 to 11, 1997, in Kyoto, Japan. With approximately 10,000 participants, it was the largest and most significant climate change conference and the largest international conference Japan had hosted thus far. After a strand of difficult negotiations, culminating in several sleepless nights and an extension of the conference by one day, it ended successfully with the adoption of the Kyoto Protocol. The compromise deal that was struck included a total GHG emissions

12. Annex I countries are the industrialized countries and economies in transition listed in Annex I of the UNFCCC.
13. For more details, see Oberthür and Ott (1999).

reduction target of "at least 5 percent below 1990 levels in the commitment period 2008 to 2012." Annex B of the protocol listed differentiated limitation or reduction targets for each Annex I party, such as 8 percent for EU countries, 7 percent for the United States, and 6 percent for Japan and Canada, and increases of emissions for Norway, Iceland, and Australia. Furthermore, the protocol established three flexible mechanisms—joint implementation (JI), the Clean Development Mechanism (CDM), and emissions trading—and allowed parties to add certain forestation activities to their emissions reduction accounts. Moreover, the protocol included provisions for a compliance regime.[14]

These results were achieved due to negotiating flexibility on the part of Japan, the United States, and EU member states, and strong leadership and oversight by the chair of the negotiating committee, the former Argentine ambassador to China, Raul Estrada. He was instrumental in pushing through decisions on unresolved issues during the final hours of the conference, thus enabling the adoption of the Kyoto Protocol. The outcome was also influenced by high media presence and public expectations of meaningful results. By including the general public as policy constituents in the final stretch of the negotiations, the negotiators were forced to respond not only to special interests but also to the views of the general public. The details concerning the operability of the flexible mechanisms, the accounting provisions for carbon sinks, and the establishment of a compliance regime, however, remained unresolved. This "nitty-gritty" work was adjourned to future meetings.

At COP 4 (in Buenos Aires, 1998) the parties adopted the Buenos Aires Plan of Action, outlining the follow-up process in the form of a two-year action plan and establishing deadlines for finalizing the outstanding details of the Kyoto Protocol. The aim was to make it fully operational for entry into force after COP 6 in November 2000.[15] In the meantime, COP 5 (in Bonn, 1999) achieved its work plan ahead of schedule and thus concluded in an atmosphere of optimism. It adopted decisions mainly on procedural issues and preparations for decisions to be taken at COP 6. Many countries, including EU countries and Japan, announced their resolve to ratify the protocol in time for the World Summit on Sustainable Development (WSSD) in September 2002, in Johannesburg, South Africa.[16]

COP 6 (at The Hague, 2000) was meant to finalize the operational details of the Kyoto Protocol. Deadlock, however, stalled the negotiations, and the meeting was suspended (and reconvened in 2001 as COP 6, Part 2). This failure reflected lost momentum and a lack of prioritization on national and international agendas, coupled with weak leadership, as well as hardened positions and reduced willingness for compromise among the Parties. One extremely contentious issue during the final showdown was carbon sinks, especially the issue of including additional sink activities not defined in the Kyoto Protocol (but which could be added). While members of the so-called Umbrella Group—including the United States, Canada, and Japan—supported counting business-as-usual activities such as forest management in the agricultural sector as climate protection measures, this was vehemently opposed by the European Union and G77 and China. There were further contentious issues, such as sink activities under the CDM. There, too, flexibility sought by Umbrella Group members rivalled the demand for environmental integrity from the European Union and the G77 and China. But even if all the

14. For a detailed account on the Kyoto negotiations, see Schröder (2001).
15. For more details on COP 4, see Vrolijk (1999).
16. For a more detailed analysis of COP 5 from a Japanese perspective, see Kawashima (2000).

above-mentioned sticking points had been resolved, the biting issue of compensating developing countries for damage incurred by industrialized countries through climate change would have been difficult to tackle.

Conditions for agreement changed drastically in March 2001. The newly inaugurated US president, George W. Bush, unexpectedly announced the his country's retreat from the Kyoto Protocol, claiming that it was "fatally flawed" and "bad for America's economy." This produced widespread shock and anger from not only environmentalists but also governments from around the world. Japan, despite being one of America's "climate allies," was not only embarrassed but also troubled by this 180-degree turn of US climate policy. The emerging question for Japan was whether it would be appropriate to take a decision independent from the United States and help to save the Kyoto Protocol, or whether it would be better to follow its most important security and trading partner—the United States. While maintaining hope that the United States might reconsider its position, under a growing public pressure Japan eventually had to work on the United States to reconsider their position and rejoin the protocol, since it would have adverse implications on Russia's ratification if the United States did not. Japanese newspapers referred to this conflict as one between the European Union and the United States, where Japan would have to act as a mediator, or choose between the two. European newspapers, on the other hand, conveyed the issue as one between the United States and the rest of the world.

The European Union responded to this new situation, not primarily by channelling efforts to convince the United States to return to Kyoto negotiations but rather by sending a delegation to Japan, Australia, Canada, Russia, and Iran (which represented the G77 and China) to secure their support for the international accord. Japan was a major target as it was the most significant GHG emitter from among Annex I countries, after the United States and Russia, and it held a swing vote for ratification. The Kyoto Protocol became one of the most conflicting issues between the European Union and the United States.

The Japanese government and the Japanese people resolved to hold special responsibility for the implementation of the Kyoto Protocol, because it had been the host of COP 3 where the treaty was formally adopted (Simonis 2001). Both houses of the Japanese parliament unanimously adopted a resolution for Japan's prompt ratification of the protocol. This became a top priority for Japan. The European Union and Japan continued to differ on their preference for reduction strategies; the European Union maintained its position on prioritizing reductions domestically, however, while Japan preferred to rely equally on domestic measures, flexible mechanisms, and carbon sequestration.

During inter-COP negotiations, COP 6 President Jan Pronk made a concession to Japan in proposing that densely populated countries with high energy efficiency and large forest cover be allowed to claim larger credits for their forests. With around 70 percent of its land area covered by forests, Japan would be allowed to attain half of its mandated 6 percent reductions via sinks.[17]

17. See *The Japan Times*, June 13, 2001: "Bush not so dismissive of Kyoto pact: Kawaguchi," and "Pronk urges Japan to be independent of US in climate policy." This concession on carbon sinks was granted despite continuing uncertainty surrounding the issue. A report from July 2001 by Britain's Royal Society stressed again that the potential to increase carbon sinks through changes in land use is finite in size and duration. The report warned of the possibility that forests may re-emit carbon dioxide into the atmosphere after having reached their saturation points. According to the report, forests currently absorb around 40 percent of CO_2 emissions from human-induced activities. This could only be extended to up to 45 percent. For more, see Royal Society. 2001. The role of land carbon sinks in mitigating global climate change contents. Policy document 10/01, July 2001, http://www.royalsoc.ac.uk/policy/index. html.

The resumed session of COP 6 (COP 6, Part 2), held in Bonn in July 2001, concluded with the adoption of the so-called Bonn Agreement. It was a political agreement and represented a good foundation for finalizing the details at COP 7. The Bonn Conference thus succeeded in regaining valuable momentum to drive COP 7 to a fruitful closure.

While the European Union had held on strongly to its goal of maintaining environmental integrity in the Kyoto Protocol at The Hague, it was much more willing to give in after the circumstances had changed drastically since March 2001. Thus, what had changed were not so much the initial positions but the outer circumstances, and as a result, the negotiating flexibility and win-sets of the European Union. Ironically, this new momentum came to a great extent from US President Bush's withdrawal from the Kyoto process, in spite of a strong surge of civil society movements for early ratification of the Protocol by all signatory parties including Japan (Hirono 2001). The European Union showed strong leadership at COP 6, Part 2, in forging a political consensus on the outstanding details. It successfully played a mediating role, making many concessions for the sake of securing a final deal. The Umbrella Group countries, on the other hand, virtually pokered out maximum benefits in return for their promise to ratify the protocol—or at least for their *aim*, as in the case of Japan. As a result, the efforts necessary to reduce domestic emissions were reduced substantially for the first commitment period.

An agreement became possible after Japan's Environment Minister, Yoriko Kawaguchi, gave her consent to the package deal that had been forged out. Most of Japan's demands had been granted, including full demands on sinks, soft procedures on compliance, and no quantitative caps on the use of the mechanisms—the only exception being nuclear projects for JI and the CDM.[18] Thus, despite their shortcomings, the results marked an important victory—that multilateralism won over unilateralism in addressing pressing global environmental problems such as climate change.

The Kyoto Protocol was finally concluded in November 2001. The adoption of a 245-page compilation of rules and procedures, called the Marrakesh Accords, paved the way for the protocol's ratification and entry into force, concluding a protracted three-year process of negotiations of the fine print that had begun with the adoption of the Buenos Aires Plan of Action in 1998. For the Kyoto Protocol to be a solid foundation for future emission reductions it is paramount that the Annex I parties ratify the treaty as soon as possible for it to enter into force.

Prior to Russia's decision to ratify the Kyoto Protocol in October 2004 there had been a number of speculations, such as that Russia might announce its ratification of the protocol during Putin's official visit to Japan in February 2005. Another was that Russia would not ratify before the start of the first commitment period in 2008, because emission trading prices may rise sharply in Russia's favor once many Annex I parties will have failed to meet their commitments domestically and would need to resort to emissions trading with Russia. These speculations were found to be wrong. Another one, however, may have now become more probable with China's announcement in July 2004 of its completion of the necessary domestic legal and administrative measures for the CDM. Russia may have to negotiate with

18. It is said that this became possible after a phone conversation with Prime Minister Koizumi, who had just returned to Japan from the G8 Summit in Genoa.

China and other CDM target countries to not lower their emissions trading prices further, as these potential competitors would provide a huge market for industrial countries resorting to the CDM.

4. The Kyoto Protocol architecture

The Kyoto Protocol establishes that all Annex I parties are to reduce their overall greenhouse gas emissions by at least 5 percent below 1990 levels. The individual commitments of Annex I parties are listed in Annex B of the protocol and range from reductions of 8 percent for EU countries to an increase of 10 percent for Iceland.[19] The protocol adopted the concept of commitment periods to smooth out annual fluctuations in emissions arising from uncontrollable factors such as economic cycles. The first commitment period is set for 2008 to 2012, and negotiations on commitments for a second period are to start by 2005. Furthermore, each party "shall, by 2005, have made demonstrable progress in achieving its commitments under this Protocol." The wording "demonstrable progress," however, is not defined.

Annex A of the protocol lists six gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The baseline for the first three main gases is 1990, while a 1995 baseline for calculating the emissions of the other three gases is allowed.[20] The gases are taken together as a basket and compared according to their global warming potential (GWP), i.e., the radiative, or warming, impact of a molecule relative to carbon dioxide within a 100-year time horizon.

The protocol includes a non-obligatory list of policies and measures (PAMs), from which Annex I parties can choose in accordance with their national circumstances. The list suggests PAMs such as improvement of energy efficiency, protection and enhancement of sinks, promotion of sustainable forms of agriculture, and reduction of fiscal incentives and subsidies that run counter to the objective of the UNFCCC. The impetus behind the inclusion of PAMs is to protect the international competitiveness of complying countries and their industrial sectors. Certain PAMs, such as the introduction of minimum standards for energy efficiency, to traded products, or the taxation of the use of the global commons for air and sea transport, can only work effectively if implemented on a global scale.[21]

The Kyoto Protocol established three flexible mechanisms to reach emission reductions cost-effectively:

1. *Joint implementation* (JI) allows emission reductions to be undertaken where they are cheapest within the group of Annex I countries. JI thus enables emissions savings or sink enhancement arising from cross-border investments between Annex I parties, generating emission reduction units (ERUs) or removal units (RMUs) through the implementation of projects. While projects starting from 2000 that meet the necessary criteria may be listed as JI projects, ERUs will not be issued before 2008. JI projects

19. Whereas the UNFCCC set a voluntary flat target for Annex I countries of stabilizing emissions at 1990 levels by the year 2000, it also mentioned the principle of common but differentiated responsibilities. This principle is reflected in the Kyoto Protocol in that developing country parties do not have any reduction commitments. The demand for differentiation can be deduced from this principle, but determining the level of responsibility of each country by calculation is a difficult undertaking.

20. The reason for this provision is that emissions of hydrofluorocarbons (HFCs) have increased in many Annex I countries between 1990 and 1995 as substitutes for chlorofluorocarbons (CFCs), which are being phased out under the Montreal Protocol. It was necessary to allow a 1990 baseline for those parties (e.g., Norway) that had already started to phase out HFCs early. Furthermore, some countries have no data on emission levels of the latter three gases before 1995. Even though 1990 is a default base year, a lot of effort had already gone into establishing inventories for 1990. See also Grubb et al. (1999).

21. See also WBGU (2002).

are most likely to be carried out in countries with economies in transition (EITs) where there are still more opportunities to reduce emissions at low cost.

At Marrakesh, the COP adopted a two-track approach for JI. The track one procedure applies when the host party meets all eligibility requirements related to the Protocol's methodological and reporting obligations. It may then apply its own procedures, issue ERUs, and transfer them to the investing party. The track two procedure, on the other hand, applies when the host country does not meet all eligibility requirements. In this case, the amount of ERUs generated by a project must be verified under a procedure supervised by the ten-member supervisory committee, which is to be set up by the COP/MOP at its first meeting.[22] This allows a host party to begin implementing projects before it meets all the eligibility requirements.

2. *Emission trading.* The idea behind emissions trading is that parties can buy or sell emission rights,[23] thus making it easier for a party facing higher costs to achieve its assigned amount under the protocol. Furthermore, emissions trading provides an incentive for countries or companies that find it relatively easy to cut emissions to go further than required under the protocol. They would then profit financially by selling their surplus to countries or companies that face relatively high reduction costs.

Emissions trading may, however, create a major loophole—the so-called hot air problem. For instance, Russia's CO_2 emissions are around 30 percent below 1990 levels and the Ukraine's are even lower, due to the sharp decline of their economies since 1990. In both cases, emission levels are expected to remain significantly below 1990 levels during the 2008 to 2012 commitment period, granting them a huge reduction surplus given their obligation under the protocol to merely stabilize their emissions at 1990 levels. This "hot air" could provide for cheap supply of emission credits for industrialized countries, and in this way prevent some countries from undertaking serious domestic action.[24] While regional emissions trading schemes can start immediately, as they are independent from the Kyoto Protocol, international emissions trading will only start in 2008.

3. *The Clean Development Mechanism.* The CDM entitles industrialized countries to fund projects in developing countries and earn credits. The host country has to verify that a project meets the objective of contributing toward its sustainable development. Also, projects must lead to emissions reductions that are additional to any reductions that would have occurred in the absence of these projects (the so-called additionality clause), and resources for the CDM cannot be diverted from existing official development aid (ODA) funds.

The CDM project cycle is composed of the following six steps. (1) After a project design document has been prepared by the project participants and submitted to an operational entity,[25] it will be reviewed and, if deemed acceptable, validated (*validation*). (2) The validated project is forwarded to the CDM Executive Board for formal registration (*registration*). (3) Participants then monitor the project by preparing a monitoring report that includes an estimate of certified emission reduction units (CERs) to

22. The Conference of the Parties serving as the Meeting of the Parties.

23. The term *emissions trading* is somewhat imprecise; it is not the emissions but rather the right to emit that is traded.

24. See Grubb et al. (1999).

25. An operational entity is an independent organization formally designated by the COP or COP/MOP and accredited by the CDM Executive Board.

be generated (*monitoring*). (4) This monitoring report is then submitted to an operational entity for verification, which, following a detailed review of the project, issues a verification report (*verification*). (5) If approved, the operational entity certifies the CERs as legitimate (*certification*). (6) The operational entity issues the CERs and distributes them to project participants as requested (*issuance*).

The advantage of the CDM over JI is that crediting for CDM projects already started in 2000, while crediting for JI projects will only begin in 2008, giving the CDM an early start over JI. Also, the CDM has the potential to play an important role in the climate change regime, as it provides a framework for North-South technology transfer, enabling industrialized countries to reduce emissions cost-effectively and employing their energy-efficient technologies abroad. Critics of this scheme argue, however, that it constitutes only short-term advantages while allowing industrialized countries to continue their energy-intensive lifestyles.

Participation in the three mechanisms will, however, only be allowed if the established eligibility criteria are met. These include that a party to the Kyoto Protocol must have satisfactorily established its assigned amount and have in place its national registry. In addition to the assigned amount units (AAUs) allocated under the protocol on the basis of national targets, emission units generated by the various mechanisms and processes under the protocol are classified as three further units. They are fungible, meaning that they are equivalent and interchangeable. This allows them to be traded on a single market, resulting in more liquidity and lower transaction costs. The units are all equal to one metric tonne of carbon dioxide equivalent, calculated using global warming potentials (GWPs). The four units are as follows:

- Assigned amount units (AAUs) allocated under the Kyoto Protocol on the basis of national targets
- Certified emission reduction units (CERs) generated by CDM projects
- Emissions reduction units (ERUs) generated by JI projects
- Removal units (RMUs) generated by JI sink projects

To grant further flexibility, parties are allowed to trade between these units as long as they are in compliance with the protocol's provisions. Parties to the protocol can authorize legal entities such as companies to trade. However, the party itself remains responsible for meeting its Kyoto commitment. If a party fails to meet its eligibility requirements, its legal entities are excluded from trading under the accounts of that country.

Annual inventories will be reviewed by expert review teams (ERTs) that will be selected based on their expertise. An international accounting system and a transaction register administered by the Climate Change Secretariat will record all issuances, transfers, and acquisitions of credits, as well as the respective project types and countries involved.[26] This is an essential component of the regime, as it allows governments and civil society to keep track of how countries and companies meet their obligations (Goldberg and Silverthorne 2002).

Carbon sinks are carbon dioxide-absorbing ecosystems such as oceans, forests, and soils. The Kyoto Protocol allows for the inclusion of absorption by sinks resulting from post-1990 changes in forestry-

26. The Climate Change Secretariat was established in Bonn, Germany, to monitor the progress in the implementation of the UNFCCC.

related activities, including afforestation, reforestation, and deforestation, which were, however, not defined at the time. The protocol also omitted other sink sources such as agricultural soils. Furthermore, those Annex I parties for whom land-use change and forestry (LUCF) constituted a net source of greenhouse gas emissions in 1990 were allowed to include LUCF emissions when calculating their 1990 base-year emissions, treating them almost like an additional source (Yamin 1998).

The Bonn Agreement endorsed that countries could meet a part of their targets through the following four activities: forest management, cropland management, grazing land management, and revegetation. Each Annex I party is allocated a number of tonnes of carbon uptake that it may count towards its national target from forest management activities.[27] Each Annex I party is also required to provide information on its sinks activities and national "legislative arrangements and administrative procedures" to ensure that sink activities contribute to the conservation of biodiversity and the sustainable use of natural resources (Goldberg and Silverthorne 2002).

Compliance refers to the observance of the regulations and commitments contained in an international treaty. The final decision on whether the consequences of non-compliance would be binding in not only political but also legal terms was, however, not taken even during the first session of the COP/MOP in 2004. This deferral was partly due to provisions in the Kyoto Protocol, which requires that procedures and mechanisms entailing legally-binding consequences be adopted by amendment. COP 7 created the Compliance Committee, consisting of 20 members, which is divided into two branches: facilitative and enforcing. While the facilitative branch is to promote compliance with emission targets and reporting requirements, the enforcement branch is charged with seeing to it that parties remain in compliance.

5. Recent developments in Japanese and EU/German climate policy

5.1. *Japanese and EU/German policy initiatives*

In Japan, the total volume of GHG emissions in 2002 reached 1,331 million tonnes, an increase of 2.2 percent from 2001 and an exceedance of 1990 levels by as much as 7.6 percent; this is way above Japan's reduction target of 6 percent under the Kyoto Protocol. Compared with 1990, the volume of CO_2 emissions in 2002 from industry declined by 1.7 percent (from 476 million tonnes to 468 million tonnes), while emissions from the power sector declined by 0.3 percent (from 82 million tonnes to 81.7 million tonnes). In the same period, CO^2 emissions from transportation increased by 20.4 percent (from 217 million tonnes to 261 million tonnes), while emissions from the commercial and household sectors increased by 36.7 and 28.8 percent, respectively (from 144 million tonnes to 197 million tonnes and from 129 million tonnes to 166 million tonnes, respectively). The transport, commercial, and household sectors thus need to be targeted more rigorously in the near future to reduce emissions.

The European Community and Germany are both committed to reducing their GHG emissions by 8 percent under the Kyoto Protocol. Germany agreed to a 21 percent reduction commitment under the EU

27. The figures are laid down in Annex Z of the Bonn Agreement. Appendix Z can still be renegotiated until 2006, introducing considerable uncertainty. Russia insisted that the amount of carbon uptake for forest management should be nearly doubled from 17.6 million tonnes of carbon (MtC) to 33 MtC. Russia held up the conclusion of the Marrakesh meeting until it secured its full demand of 33 MtC. See also Michaelowa (2001).

burden-sharing agreement that was adopted in the aftermath of COP 3, the second highest target after Luxembourg. Germany was historically fortunate, in that reunification in 1990 allowed the country to significantly reduce emissions through closing down many of its "dirty" industries in former East Germany—the so-called wall-fall profit. This legacy is said to have significantly contributed to the country's reduction achievement of 18.3 percent (2001) since the 1990 base year, which coincided with German reunification. After a decade of successful reductions, however, emissions have been on the rise again, mainly due to a significant increase in the transport sector of 8.7 percent (2002). This trend is also occurring at the EU level—while EU-wide emissions have increased by 2.8 percent, transport accounts for a rise in emissions of as much as 20 percent (both 2001).

Ongoing increases in Japan's GHG emissions have led the government of Japan to renew its efforts to monitor and evaluate the progress of the implementation of some 228 policy measures that were adopted in 2002. Japan's government is now in the midst of examining through its consultation mechanism, the Central Environment Council, if and what kinds of additional measures are required to accelerate the pace of all stakeholders to reduce GHG emissions. An increasing emphasis is now being placed on its energy policy measures, such as developing and utilizing alternative sources of energy, including solar, wind, and tidal wave energy, and fossil fuel energy-saving technology. There is also an increasing consensus among many stakeholders for introducing at the earliest possible time a national system for CO_2 emissions trading.

Japan's government has been streamlining financial and fiscal incentives for firms using renewable energy sources, to households installing solar energy heating equipment, and to owners of automobiles equipped with electric and fuel cell engines. It has also adopted administrative measures to encourage public transportation companies to turn off engines while waiting for green traffic lights, and government directives to all government ministries and agencies to use "green" low-polluting vehicles and not to reduce air-conditioning temperature below 24°C in the summer time. A number of initiatives have been introduced to promote higher energy-efficiency in traffic demand management, including modal shift and park-and-ride systems. In addition, the government tightened a reporting requirement on eco-efficiency measures in its building code that is applicable to all commercial and industrial construction.

Germany renewed its national climate policy program in 2002. New policy goals to mitigate climate change included doubling the share of renewable energy by 2010, an expansion of cogeneration through a system of quotas, and an increase in energy productivity. Measures to these ends include an ecological tax reform, a renewable energies law to promote renewable energy, the 100,000 roofs program to promote solar panels, and financial support for measures to enhance energy conservation in buildings.

Germany recently invited the international community and all stakeholders to participate in a conference to strengthen renewable energies both in industrialized and developing countries. The conference, Renewables 2004, held in Bonn in June 2004, addressed the question of how the proportion of renewable energies used worldwide can be substantially increased, and how their advantages and potentials can be better used. The conference concluded with a political declaration by 154 participating governments that affirms the importance of renewable energy in meeting energy needs, reducing

poverty, and protecting the world's climate. The declaration fails, however, to include binding targets, making it de facto a voluntary and non-binding text. The conference also produced an international action program containing 165 individual voluntary commitments by governments, international agencies, and private groups to promote the use of renewable energies. This action program is expected to mobilize investments worth some billion Euros.

The follow-up mechanisms for the conference are still being developed, but are likely to include an official monitoring process that reports to the United Nations Commission on Sustainable Development (UNCSD) in 2006 and 2007. In addition, a global policy clearinghouse is to be created to provide information exchange, analysis, and capacity building in both governments and NGOs. This can be regarded as a significant first step from which new partnerships and projects are likely to emerge that will enhance the efficiency and diffusion of renewable energies, and will gradually mark the end of the fossil fuel age.

In line with the Kyoto mechanisms, Japan's government initiated several measures to promote forest sinks to absorb 3.9 percent of Japan's CO_2 emissions. As it stands now, however, forest sink absorption of CO_2 emitted in 2010 is estimated to reach only about 3.1 percent, or 37.76 million tonnes. Sound forest management (including anti-disaster forest reserves), increased utilization of timber-based biomass, and expansion of community and social forestry are considered essential in this respect. As regards the use by private sector corporations of the CDM and JI, priority is being given to the early introduction of national incentives to private sector corporations to get involved and a national scheme to transfer CDM/JI emission credits from the corporations involved. Internationally, Japan's government appealed at both COP 8 (2002) and COP 9 (2003) to the international community the urgent need for early ratification of the Kyoto Protocol, intensified efforts for GHG emissions reductions, and internationally agreed rules for GHG emission data registration and reduction enforcement.

In June 2003 the European Union adopted a directive to establish the EU-wide Emissions Trading System (EU ETS). This marks a significant turning point for EU climate policy, as EU Member States had previously expressed considerable opposition to such a scheme. Domestic policies and measures were previously regarded as more aspiring, as they would represent true emissions reductions, and the failure to adopt the proposed EU-wide carbon tax had led to a search for alternative measures. The EU ETS is set to begin in 2005, and is expected to regulate around 46 percent of the EU's CO_2 emissions. There will be two phases: one from 2005 to 2007 and one from 2008 to 2012. In the first phase, CO_2 will be the only gas regulated, while in the second phase other greenhouse gases may be included in the scheme. Participating countries were required to draw up national allocation plans (NAPs) by March 2004 to match their respective allocations with the emissions from their installations. Installation operators may either invest in abatement technology or acquire EU allowances on the market to match their emissions, whichever is more cost-effective.

The European Union introduced the so-called Linking Directive to facilitate the integration of the other flexibility mechanisms introduced by the Kyoto Protocol (JI, the CDM, and emissions trading) into the EU ETS. The directive renders emission credits under the protocol exchangeable for EU allowances to ensure full fungibility of credits within the EU ETS. ERUs from JI projects and CERs

from CDM projects will thus be exchangeable for EU allowances. This is expected to boost technology transfer to industrialized and developing countries and reduce compliance costs.

5.2. Civil society and NGOs

Japanese NGOs and civil society have for some time been pressing the government to install more stringent measures, such as a carbon tax and other economic instruments, as soon as possible to make the Japanese economy and lifestyle less energy-dependent, less polluting, and more environmentally sustainable. They have also been pressing the government to increase the national target for renewable energy.

In many local communities, the public and NGOs have been successful in rendering their local government decisions more supportive of environmental sustainability by introducing community ordinances conducive to keeping vehicles out of downtown areas, managing more orderly traffic control, and greening public and office buildings and residential areas, as well. In spite of claims by private sector interests that Japan has already achieved high eco-efficiency, the public and NGOs are concerned with the steadily increasing level of GHG emissions year after year. Reducing waste and re-using and recycling materials and products have now become a rallying cause among pupils and students at school and among ordinary people in many local communities. It will, however, take a long time before their lifestyles in Japan become sustainable.

In Germany, environmental awareness is highly advanced among the general public. Environmental concerns take a prominent position in the national parliament, and the Green Party is part of the current coalition government. German NGOs play an important advisory role in environmental legislation, and they are represented in the German delegation at climate conferences.

5.3. Private sector corporations

While supporting Japan's 6 percent Kyoto target, the Japanese industry group, Keidanren, which often acts as the spokesperson for private sector corporations in Japan, insists upon the following principles: First, the government must leave it to the private sector to decide how they would contribute to achieving the Kyoto target of 6 percent and it should not prescribe specific targets to each industrial/business sector. Second, while each industrial or business sector may decide on its own GHG emissions target through its own industrial association, each company should be able to decide itself how it wishes to contribute to achieving the industry-wide target, taking into account its respective GHG emissions level and available technological resources. Third, each company and each industry association should monitor the progress of their respective GHG emissions reduction programs on a voluntary basis, and the government should not get involved in such monitoring. (NGOs and civil society, however, insist on government monitoring.) Finally, a private sector corporation or industry association should not be penalized for its failure to comply with the target it set for itself, but rather be given positive incentives to try its best to achieve the target.

Keidanren has laid out its own principles and guideline for its member associations to follow, but they are non-binding. There are a variety of views among corporations on the need for their compliance with the Kyoto Protocol targets. Some business leaders are more proactive in lending their support to the

protocol's targets, while others tend to be less enthusiastic, even to the extent of taking a negative stance. In spite of such a complex situation, once Keidanren publishes, as it has already done, its own industry-by-industry sectoral targets for GHG emission reductions, its member corporations are morally, but not legally, bound by those targets. In monitoring the implementation of the industry-wide reduction targets, Keidanren simply collects data and information without verification from its member industry/business associations, but the publication of such data has tended to impose discipline on its members.

One of the most contentious questions facing the Japanese private sector in GHG emissions reduction in recent years has been the rising pressure from the public to levy a carbon tax on industry and households. Despite opposition from the private sector to a carbon tax, there seems to be a gradual rise in its acceptance by an increasing number of business leaders. In fact, some business leaders venture to say that a carbon tax will facilitate innovation of energy-efficient technology and products by triggering increased research and development investment in energy-saving technology and alternative sources of energy, thus leading to more environmentally sustainable patterns of production and consumption.

In 1996, leading German business sectors announced a voluntary commitment of reducing industrial CO_2 emissions by 20 percent by 2005. This target was already surpassed in 1999, leading industry to pledge a 28 percent reduction by 2005 and a 35 percent reduction of six GHGs by 2012. German industry was initially strongly opposed to a mandatory company-based emissions trading approach, as it would run counter to these voluntary commitments. Rather, it insisted on a global, country-based scheme that would offer greater incentives to participate. The German government, on the other hand, was predominantly supportive of such a scheme and it was backed by German environmental NGOs. It was not Germany but mainly the EU institutions and countries like Britain that had pushed for this initiative.

6. Summary and conclusion

The science of climate change is compelling, its politics frustrating, and its legal manifestations are cumbersome. Although it is scientifically proven and politically acknowledged that an increase in greenhouse gas concentration levels over the past 150 years has set off an enhanced greenhouse effect that is causing global average temperatures to rise and weather patterns to change faster than at any time within the past 10,000 years, the international legal framework to direct and monitor domestic policy outcomes has not (yet) come close to fulfilling its objective.

Although a strong scientific basis is paramount to an effective policy response to the issue at stake, it is by no means its guarantor. Negotiations at the international level are ordinarily interlinked with negotiations and bargaining processes at the domestic levels of the parties involved. Domestic policy actors representing vested national interests have exerted substantial influence on the international policy process, which explains why the science has not had a stronger influence on the negotiated outcome.

The Kyoto Protocol, adopted in 1997, despite containing legally-binding emissions reduction targets for industrialized countries, is still not in force as of October 2004 because the United States, Australia, and Russia have not yet ratified the treaty. Nonetheless, this evolving international framework may still

provide sufficient impetus for spurring effective domestic action, since it is a process, and stronger commitments appear unavoidable in the future.

Despite the fact that the entry into force of the Kyoto Protocol in the end depended on a few final countries ratifying, the greatest hurdle for GHG emissions reduction worldwide lies ultimately in the extent to which governments of developed countries and European economies in transition can convince their respective citizens, corporations, and other entities to meet the Kyoto targets within a prescribed time limit. This achievement will essentially require not only further developments of energy-saving technologies and alternative sources of energy that are free of GHG emissions, but also a dramatic change in daily lifestyles. Success will be impossible without the fullest possible cooperation of civil society. Also, because GHG emissions, CO_2 in particular, are rising rapidly in many developing countries, such as Brazil, China, India, and Mexico, the international community will eventually have to start negotiations on repealing the Berlin Mandate and revising the Kyoto Protocol to involve such countries beyond 2012. It would too risky to depend overly on the current increase of crude oil prices to provide an impetus to achieve the ultimate objective of the Kyoto Protocol—the pursuit of sustainable and equitable development consistent with the life-support system of our Blue Planet.

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